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**Faculty of Economics**

**Economia e Management dei Mercati Internazionali e delle Nuove  
Tecnologie (CLEMIT-SL)**

**Academic Year 2007-2008**

**MICROFINANCE: PEER SELECTION  
WITH IMPERFECT INFORMATION**

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## **Acknowledgement**

I am grateful to my supervisor Professor Francesco Passarelli and to Professor Carlo Secchi, for their constructive comments, corrections and optimism.

I warmly thank my parents, Myriam and Delfino, for their understanding and encouragement during these years of studying. They let me follow my aspirations and wishes giving me a loving support.

Special thanks are due to my family, especially to my cousins, who were always here to listen to me and my complaints.

During this work, I have collaborated with many friends that I want to thank you for their help, their advice, and their warm feelings.

I am deeply grateful to my Indian and international colleagues at Ujjivan, who allow me to share one of the most important experiences in my life.

My loving thanks go to Alessandro for his sustain, his useful help, and, especially, for always believing in me.



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## **Abstract**

*Microfinance fills the gap between supply and demand for credit access by poor people. Microfinance institutions frequently operate in an environment with no possibility of collateral and imperfect information about borrowers' riskiness. We explore peer review effect in group lending when borrowers have limited information about partners. We build on Ghatak (2000), who explicitly studies group lending under perfect information finding conditions for homogeneous group formation. We assume that people receive a noisy signal about the type of partners (risky or safe), and we show that, if the signal is sufficiently informative, separating equilibrium occurs. Nevertheless, due to imperfect information the distinction between risky and safe borrowers is less clear. As a consequence, with respect to Ghatak's case, the lender should provide a contract with a lower interest rate and a higher joint liability component to keep safe borrowers in the market.*

*We also give a survey of microfinance in practice. Around the world there are a few differences about international experiences. In developing countries, where the main demand comes from people living in rural area, microfinance can exploit two important tools: group lending and joint liability. On the contrary, in developed economies, as in Europe, poverty is concentrated in urban societies; consequently, institutions usually prefer to offer individual contracts. In our paper, we apply group lending to the latter contest.*





## 1 Introduction

*"To argue that banking cannot be done with the poor because they do not have collateral, is the same as arguing that men cannot fly because they do not have wings"*

*Muhammad Yunus, during the World Food Day, 1986*

Microfinance is a powerful and innovative tool to fight against poverty and it is considered one of the most promising theories in economic development. Microfinance procures credit access and financial services to poor people, giving more than 130 million people the possibility of receiving a loan.

Experts calculate that the potential of microfinance is enormous, however the challenges are huge. The World Bank estimates that 3 billion people live on less than US\$ 2 per day (2006). They need the opportunity to overcome their condition and to develop their skills. Nevertheless, they cannot have any access to the credit market, since they are not able to offer any collateral; poor people are *unbankable*, but, at the same time, they are that part of the population who mostly need to receive credit.

Microfinance was born as a reaction to this situation. Nowadays, there are many examples all over the world of micro lending programs. There are a wide range of microfinance institutions: some of them focus on poverty alleviation of the poorest between poor, other organizations serve poor or disadvantaged people to sustain their consumption necessities or to stimulate job creation. Both types of institutions are present in developing countries and developed countries, offering different financial services, but always with the same mission (and ambition): promoting the development of an area and offering borrowers the chance of escaping from their condition of poverty.

Considering the underinvestment problem in credit markets highlighted by Stiglitz and Weiss (1981), the past literature on microfinance demonstrates how this tool can overcome asymmetric information between lenders and borrowers which represents the main cause of adverse selection in the credit market. If financial institutions are imperfectly informed about their customers, who are not able to afford collateral, they cannot discriminate against borrowers with a high level of risk. This situation leads traditional lenders to propose a contract with an elevated interest rate to all their customers. In this way, safe borrowers, discouraged by a too-high interest rate, are driven out of the credit market. As a consequence, poor people, but with safe and profitable projects, do not have any chance of borrowing.

To solve this problem, microcredit and microfinance programs employ the innovative tool of group lending, which is based on social collateral. People in a group guarantee for their partners; co-signing a microcredit loan they accept the payment of an additional sum, the joint liability component, in case of their partner's default. This instrument permits the lender to propose a lower interest rate allowing people with relatively safe projects to come back into the credit market.

The most powerful features in microcredit are the benefits of *peer selection* in group formation. A great part of the literature focuses its attention on this issue. Nevertheless, many authors consider an environment with perfect information within customers. On the other hand, if we desire to apply group lending to the richest areas of the world we know that the high mobility of people reduces the possibility of a strong network formation. In few worlds, in urban societies, social bonds become weak and people have no chance of acquiring perfect information about potential partners. For this reason, in the present dissertation, we allow imperfect information within people.

We build our model on Ghatak's (2000) who, considering perfect information within customers, shows that the lender is able to provide loans to poor people through group lending. The author shows that people, required to form groups, select partners of the same level of risk, ending up in homogenous groups and creating a separating equilibrium. The lender does not know the type of borrowers that, each time, require a loan; nevertheless, it can provide a pooling contract to all the customers, knowing that people of the same type match together. The contract proposed is a typical microcredit contract; it is composed of an individual component (the interest rate) and a joint liability component.

Recognizing the great characteristics of group lending in Ghatak, we try to understand if this model can be successfully applied and, in particular, in areas with imperfect information about potential partners. A small part of the literature introduces imperfect information in peer selection. Nevertheless, authors like Laffont (2003) and Armendariz de Aghion and Gollier (2000), do not explore the possibility of people selecting their partners conscientiously. They simply assume that imperfect information leads to a random matching.

We create a model where people are not forced to create groups randomly, but, even if they have to face imperfect information, they can select their partners on the basis of their preferences creating a new separating equilibrium. In our model, people can observe a signal of potential partners which is particularly informative about the level of risk of their project. The probability that this signal reveals the right type of borrower is proportional to the knowledge that people have about other people. This mechanism permits the lender to exploit the degree of joint liability to screen borrowers with dissimilar level of risk, even if customers do not perfectly know each other.

Our work does not concern the impact of microfinance in society. There are many macroeconomic reports that highlight this issue. In the present

paper, we would like to focus on a microeconomic level and investigate the agents' behaviour.

This dissertation wants to demonstrate the possibility of successful group lending programs even in developed areas. In our analysis of microfinance supply around the world, we highlight that many projects in developed countries do not focus on group lending, since they believe there is no chance of creating strong networks, with solid relationships, if borrowers live in an individualistic society.

On the other hand, in our description of microfinance demand, we find that in Europe, as in many developed areas, microcredit programs can be helpful to give credit access to poor and disadvantaged people. For example, the number of immigrants is growing in many areas, producing new forms of poverty and the necessity of integration. Research finds that in many countries there are large communities of people from the same geographical region, who probably have the same cultural experiences and the same values. It is easy to suppose that, within these communities, even if there is imperfect information about other people, bonds are sufficiently strong, and people have a great knowledge of one another. These elements allow a correct peer selection and successful peer monitoring, two elements that represent the basic tools in group lending projects.

In addition to this example, we can apply group lending in other situations. Microcredit programs can be useful in increasing the level of consumption and in reducing the poverty of people who face a particular and transitory situation. Microcredit can stimulate new businesses or develop an old one. Newspapers report that in Europe there are many industrial districts and networks which are in a critical situation. Unemployment is growing and new kinds of poverty are emerging. Financial institutions can provide microcredit contracts to stimulate a new beginning. People living in urban - but relatively small - societies can

exploit the benefits of group lending, co-signing a loan and sustaining themselves in repaying it.

However, there are huge obstacles that are a result of a strict and inappropriate legal environment where microfinance institutions are growing, especially in developed countries. In Europe, there is no special regional legislation in place to regulate this type of lending. Even if we take into account international accords, this issue is not considered and policy-makers at the global level find national governments responsible for the creation of a detailed and *ad hoc* legislation.

The dramatic success of microfinance institutions which has received a lot of attention among policymakers should stress the importance of developing this sector with specific legislation, of not missing any occasions to help poor people and of sustaining economic development.

My interest in microfinance began at university while I was studying group lending theories to overcome the lack of collateral that poor people are not able to offer traditional lenders.

However, the most important experience was the opportunity of coming into contact with the reality of a microfinance society during my internship in India, last summer. In India, I met many poor people living in terrible conditions, but always maintaining their dignity and their pride, never asking for anything and always sharing with me their experiences. As I was working for a microfinance organisation, I had the opportunity to observe the business developments and the job creation of several small businesses. I perceived the happiness of the customers and, most of all, their continuous hope for the future. My dissertation is dedicated to them.

The remainder of the present work is organised as follows: Section 2 outlines the past literature of microfinance. Firstly, we highlight the definition of microfinance and microcredit in different areas; secondly, we present the main basic theories, which stress the importance and the effectiveness of microloans; thirdly, we investigate the related literature,

focusing on group formation and imperfect information models. Section 3 discusses the model we created, examining the main features and comparing it with Ghatak's work. For each proposition, we provide an analytical proof and we highlight the detailed intuition. As well as this, Section 4 examines the demand of microfinance in the world, considering the situation in developing countries and in European countries. We describe the same elements to discover the different characteristics of microfinance in the two regions, and to make simple possible comparisons. Section 5 describes the supply of microfinance in the two areas of interest, highlighting the structure of microfinance institutions, their products, and their mission. In addition, we analyse the critical aspects that these institutions face with present regional and international legislation (Basel II). At the end, Section 6 offers concluding remarks about our analysis, the main limits of the research and possible suggestions for the future.

## **2 Literature**

The present review is organised as follows. Firstly, we report the definition of microfinance and microcredit, highlighting the difficulty in finding an all encompassing definition.

In the second section, we describe the general literature which is the theoretical basis of microfinance, explaining the main problems that financial institutions should face in lending to poor people and how microfinance can overcome these issues.

Later, we introduce the overinvestment problem that may emerge in an asymmetric environment, this theory is opposed to the underinvestment situation we find in the main part of the literature; nevertheless, we are interested in reporting both views.

In the fourth section, presenting both theoretical and empirical studies on the issue, we describe the literature about group formation. There is a great debate about the composition of groups in peer selection. Some authors show a separating equilibrium where groups are homogeneous; on the other hand, others demonstrate the presence of a pooling equilibrium where groups are heterogeneous.

In the end, we show the recent literature that introduces the imperfect information among partners in peer selection. This is an important section, since it considers the same hypothesis we discuss in our model. This section should be seen as a bridge between the past literature and the model we present in our paper.

## 2.1 Definition of Microcredit and Microfinance

*"Along with the 3 other pillars of development: democracy, education and infrastructures, microfinance is increasingly considered a key instrument in implementing effective and sustainable strategies in the fight against poverty"*  
*Jacques Attali, President of PlaNet Finance<sup>1</sup>*

It is difficult to find a unique definition for microcredit, Planet Finance<sup>2</sup> in its web site highlights that this tool is geared towards poor people who are excluded from the financial sector, particularly to the micro entrepreneurs with no access to the financial services of commercial banks and traditional institutions. Moreover, Jacque Attali, President of PlaNet Finance, says that microfinance can be a tool or a "key instrument" to fight against poverty. This means it should be perceived at the same level as democracy, education and infrastructure. Democracy allows everybody to participate in the political scenario, education for all permits every child to increase their skills and knowledge, infrastructure allows movement of people, capital and goods, microfinance allows poor people to participate in the credit market and receive loans.

The Microcredit Summit, in February 1997, adopted the following definition of microcredit:

"Microcredit (mI-[\*]Kro'kre-dit); *noun*; programmes extend small loans to very poor people for self-employment projects that generate income, allowing them to care for themselves and their families."<sup>3</sup>

In addition, experts stress that the definition differs from country to country and they point out the following criteria:

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<sup>1</sup> Source: PlaNet Finance web site

<sup>2</sup> PlaNet Finance is a non Governmental Organization which operates all over the world, and which aims to alleviate poverty through the development of micro financial services.

<sup>3</sup> The definition is available at the web site of Microcredit Summit Campaign



### 1) *Size of loan*

The size of loan is important in defining if a loan is embedded in the microloan category, only small or very small loans are microcredit, nevertheless the tininess of the loan is relative to the country where the client lives;

### 2) *Target users*

The target user is essential in the definition of microloans: microfinance is a special tool studied for micro entrepreneurs and low-income households;

### 3) *Terms of use and conditions*

Terms and conditions for microcredit loans should be flexible and easy to understand even for illiterate people. Moreover, they should be compatible with the local conditions of communities;

### 4) *Utilisation of funds*

Microcredit can have different purposes, such as income generation, and enterprise development, but also common uses such as health and education. At the beginning, microfinance was only an instrument to help *unbankable* people to expand self-sustained businesses or create others. Later, poor people started asking for loans to increase their level of consumption (*consumption smoothing*). These credits are not investments; they concern scholarship fees, payment to repay house-building, daily needs such as food or water. In particular, these programs are aimed at women, helping them to increase their power in the family and their importance in society.

Moreover, the Grameen Bank gives its own definition of microcredit: a sustainable instrument which can be implemented on the global scale to “respond to the urgent needs of those living on less than \$1 a day: the World’s poorest” (Grameen Bank web site). Its projects consist of making

small loans, usually less than \$200, to poor women, and of focusing on the poorest between poor.

In addition to the present definition, we would like to emphasise that the term microfinance differs from microcredit. Microcredit only refers to the provision of credit services to low-income clients, and it is usually in the form of small loans for the purpose of microenterprise and income-generating activities (Sandra Nowland-Foreman, 2001); microfinance can be defined as the provision of a wide range of financial services (for example savings, money transfer and micro insurance) which enhance the probability of loan repayment and cover the demand of additional services.

The aim of microcredit and microfinance is to improve the conditions of poor people, let them transform their *vicious cycle of poverty* to a *virtuous cycle*: credit becomes investment, investment generates earnings, earnings are employed to produce profits. In general, we can say that microfinance tries to create the right incentives to overcome poverty conditions.

Since there is a substantial heterogeneity of experiences, in Europe, supporters clarified a definition of microfinance. For example, the European Commission explains in its declaration of 2007<sup>4</sup> that microcredit is defined by five fundamental elements:

- 1) *Target* – Usually microcredit targets are micro-entrepreneurs, self-employed people, socially excluded individuals lacking access to traditional sources of capital;
- 2) *Objective* – The object can be the creation or the expansion of income-generating and job-creating activities. Most of the time, the

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<sup>4</sup> Commission of the European Communities, Brussels, 13.11.2007, COM(2007) 708 final, "Communication From the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions

principal need of these businesses is the financing of the starting capital or the working capital;

- 3) *Size* – Microcredit provides small or very small amounts. Typically, in Europe this amount does not exceed EUR 25,000. The European Commission calculates that the average micro-loan provided by microfinance institutions (MFIs) in Europe is approximately EUR 7,700<sup>5</sup>;
- 4) *Interaction* – Microcredit needs a great labour-intensive delivery system for making loans, which should involve a significant knowledge of borrower's skills and abilities. Moreover, the institution should develop a close relationship with customers during the start-up phase and correct monitoring in loan repayment offering general business support.

## **2.2 Exclusion from the Credit Market**

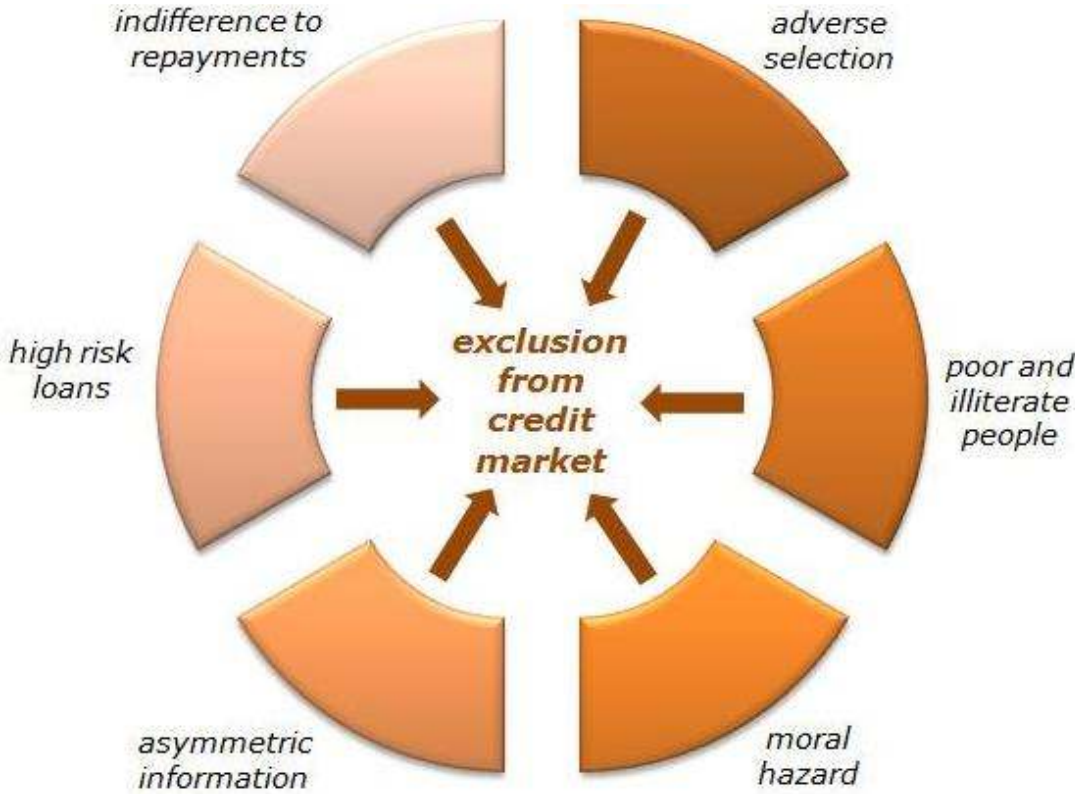
There are many elements that reduce the possibility for poor people to receive loans. In the present section we present the main issues that cause the exclusion of the poor from the credit market, and we describe the key theories explaining how microfinance overcomes these critical points. In Figure 1 we illustrate the most important elements that we are going to describe:

*Asymmetric Information and Adverse selection* – Stiglitz and Weiss, in 1981, demonstrate that banks are not perfectly informed about the riskiness of borrowers' projects; this problem of asymmetric information makes it impossible to discriminate against risky borrowers. The two

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<sup>5</sup> This amount varies according to the target population and the GDP per inhabitant. According to Overview of the Micro-credit Sector in Europe (EMN, 2004- 2005), the average micro-loan in the EU-15 is € 10 240, while in new Member States (EU-12) it is € 3800.

authors study the Akerloff<sup>6</sup>'s lemon's problem: the bank cannot discriminate between risky and safe borrowers, and it can offer only a contract with a high interest rate to both risky and safe borrowers, as a consequence, it operates a credit rationing. In this way, the lender charges less risky customers, who often fail, and more safe clients: there is a cross-subsidization from safe to risky borrowers (Ahlin, 2007) and safe clients, discouraged by high interest rate, are driven out of the credit market.



**Figure 1 - Elements causing the exclusion of poor people from the credit market**

Ghatak (1999), Van Tassel (1999), Armendariz de Aghion and Gollier (2000) analyse how microfinance can mitigate asymmetric information overcoming the adverse selection problem. They highlight that

<sup>6</sup> Akerlof, George A., (1970) "The market of Lemons: Qualitative Uncertainty and the Market Mechanism"

microfinance brings back safe borrowers in the market, through joint liability: lenders ask borrowers to form groups and to co-sign a loan; as a consequence, all the customers in a group are responsible for the loan repayments. The assumption is that groups are formed voluntarily and customers know exactly their partners in the group; a careful *peer selection* is allowed and it is employed as social collateral (Fedele, 2006). It is well-known that in traditional contracts there is only one individual component: the interest rate. On the contrary, in microfinance contracts there are two different elements: an individual component and a joint liability component. Both these two elements repay the loan: the individual component is the interest rate that each borrower has to pay in addition to the repayment of the borrowed amount, the joint liability component is a new element that borrowers have to pay for each partner in their group who is not able to repay the loan. The presence of this new component (the joint liability component) allows the interest rate to decrease and, as a consequence, safe borrowers come back in the credit market. In this way, the lender can operate successfully in a poor environment where asymmetric information is present, not requiring any additional collateral. It is worth saying that in this way a new niche of the credit market can be explored and exploited.

*Moral Hazard* - Moreover, Stiglitz (1990), Varian (1990), Banerjee, Besley and Guinnane (1994), Armendariz de Aghion (1999) and Wydick (2001) discover that, during the loan repayment, *peer monitoring* can provide a solution to moral hazard. People sign together a contract; consequently they are all responsible for loan repayments. If a borrower does not repay, her partners pay a joint liability component which represents a cost for them. So, customers are willing to strictly monitor the activities of their counterparts and they try to sustain their business,

too. In particular, members in a group control the effort of their partners in business creation, and in managing loan profits.

*Indifference to repayment* – Dynamic incentives have been studied by Besley and Coate (1995) and, by Hulme and Mosley (1996) who focus their attention on “progressive lending”. Firstly, authors notice that, in microfinance, there is a continuous relationship between lender and borrowers which increases the value of the interaction. In this way the lender, without additional costs, can acquire information about customers. A second point is that, in some experiences such as the Grameen Bank, MFIs start lending just small amounts and, subsequently, they increase the capital lent in the case of successful and correct repayments. In this way, they allow a stream of increasingly larger loans.

Morduch in “The Microfinance Promise” (1999) draws a synthetic but complete scenario of microfinance which shows the mechanisms employed, exploring the past literature and the empirical experience of three MFIs: Grameen Bank in Bangladesh, BancoSol in Bolivia and Rakyat Indonesia. In particular, exploring the main microfinance instruments, he notices that the effects of dynamic incentives diminish when there is competition between institutions and these elements are less effective in areas with high mobility, such as in urban societies. The reason is that, if there is a great competition between MFIs, people have more possibilities to borrow money from an institution and, before, repaying it, they ask a new amount from another bank; the same situation appears if borrowers live in an urban society where it is easy to change domicile.

Moreover, Morduch (1999) points out that, in order to overcome the problem of indifference to repayments, MFIs adopt a regular repayment schedule. Most of the time, the repayment starts just after the disbursement of the loan (usually the next week); in this way, poor people, that are not used to managing money and loans are obliged to a

correct and regular repayment. This instrument may help poor borrowers learn how to administrate the profit of their business and to understand additional emerging problems such as the need of a micro insurance or a marketing support. Rutherford (2005) stresses that, thanks to the frequent interaction between bank and borrowers, a regular cash flow can be assured even before the end of the repayment.

Moreover, Armendariz de Aghion and Morduch (2000) analyse three emerging economies: Russia, Eastern Europe and China and they find that in these environments there are three elements that can promote high repayment rates: direct monitoring, regular repayment schedules, and the use of non-refinancing threats.

In the end, we would like to stress that Morduch (1999) points out that the presence of tools that increment loan repayment are possible and more effective only if they come with extra loans, as for example seasonal agricultural loans. The reason is that these loans are in addition to another income resource in the household. If the customer has to repay regularly and safely it is easy if there are more incomes.

*High Risk and Small Loans* – A traditional lender perceives micro loans as costly and risky, because of the tiny size of the loan and the lack of collateral of poor people. Sometimes, in addition to the group collateral allowed by group lending, microcredit programs usually ask for additional collateral substitutions (Morduch, 1999): lenders may require borrowers to pay an additional sum, which may be considered as a sort of saving. For example Grameen Bank creates an “emergency fund” which provides services such as health insurance. This additional sum represents a sort of guarantee of group’s solidarity and it is used by the bank in case of unlucky situations, as for example, if a customer cannot pay back one of the scheduled repayments of the original loan. Collateral substitution can

be considered as a forced accumulation that will be given back to the client at the end of the loan repayment (being customer's money).

Moreover, we highlight that providing credit to poor people is expensive, especially for the size of transactions involved: poor people require small amounts; nevertheless, the lender has to face high fixed costs. As a consequence traditional lending institutions do not tend to provide financial services to them. In addition to this, microfinance is a labour intensive business. Savita Shankar (2007) analyses transaction costs considering the Indian environment and studying the case of three established institutions which use the group-lending model. She finds that transaction costs include the costs for identifying and screening the client, for processing the loan application, for completing the documentation, for disbursing the loan, for collecting repayments and for following up on non payment. The fact that micro loans are particularly small implies that the transaction costs tend to be higher on a percentage basis, compared to other types of credit: the nature of transaction costs is never proportional to the credit amount.

On the other hand, some authors, such as Ghatak and Guinnane (1999) say that, when borrowers' projects are simple and similar, "lending to groups as opposed to individuals is a way to reduce transaction costs". Nevertheless, more research should be done on this issue.

*Poor and Illiterate People* – Both illiterate people and skilled people have a credit necessity; most of the time the former need a loan to create a business activity to overcome their poverty condition. Microcredit is not enough, poor and illiterate people need more. MFIs, in order to achieve successful programs, provide additional services which are called "microfinance". Microfinance is a larger concept: it is a wide range of financial services that an institution can offer beyond credit, such as for instance marketing services, training, insurance programs, saving advice,



legal support, health education and more. Microcredit and microfinance create a sort of “two-tiered approach” (McKernan, 2002): additional microfinance services are complementary instruments that enhance and enrich microcredit projects. The scope of these additional tools is to procure several enhanced skills; moreover, this scheme can become a proper poverty reduction package.

### **2.3 Underinvestment or Overinvestment?**

Stiglitz and Weiss (1981) underline a problem of underinvestment in the credit market in case of asymmetric information between lender and borrowers. Due to adverse selection, good projects are driven out of the market, since the cost of borrowing capital becomes too high. The underinvestment problem is considered by other authors, such as Jaffe and Russell (1976). They all conclude that asymmetric information leads to credit rationing.

In 1987, De Meza and Webb created a competitive model, examining the effect of asymmetric information on the financial structure of firms and on aggregate investment. They show a contrasting result: lenders, ignoring the level of risk of the projects, invest more than the socially efficient. They say that “asymmetric information causes good projects to draw in bad” (p.281) and it leads to too much investment. In this situation risky borrowers are able to receive loans even if they projects are unproductive. This situation is possible since safe people cross subsidy risky borrowers with their productive projects.

Ghatak (2000), in his paper, presents the underinvestment and overinvestment problem, he finds that microcredit is able to overcome both difficult situations thanks to group lending (For more information about this issue, see Section 3.2 *Individual Lending*).

## **2.4 Group Formation**

Group formation is one of the main discussions in microfinance literature. Yunus in "Grameen Bank As I See It" (1994) says that "usually it takes quite a bit of time for the members to identify each other and consult each other before announcing they wish to form a group"; Yunus's words highlight the difficulties in choosing partners to co-sign a microfinance contract. This behaviour is particularly important since it influences the probability of each borrower to pay the joint liability component.

There are two opposite theories concerning *peer selection* in microfinance, which lead to two different equilibriums. People, who are asked to form a group, should choose their partners on the basis of their knowledge about the counterpart's characteristics and the probability that potential partners will succeed.

A first theory considers that borrowers prefer to form homogeneous groups, choosing partners of the same type – safe people with safe ones, and risky people with risky ones –, which leads to a separating equilibrium (Stiglitz, 1990; Armendariz de Aghion, 1999; Ghatak and Guinnane, 1999; Ghatak 1999, 2000; Van Tassel, 1999, Ahlin, 2007).

On the contrary, a second theory shows that borrowers prefer, or are forced, or do not mind forming heterogeneous groups, this situation leads to a pooling equilibrium where safe and risky people match together (Kugler and Oppes, 2005; Prescott and Townsend, 2002; Wydick, 2001).

### **2.4.1 Separating Equilibrium**

Some authors consider homogeneity in group formation the best solution in microfinance, since this phenomenon is a direct consequence of the selection of partners who have the same level of risk. As a consequence, a separating equilibrium appears when borrowers of the same level of risk match together. Stiglitz (1990) highlights that,

borrowers in a group try to persuade their partners to not invest in projects riskier than their own. This willing leads to a sort of well-balanced equilibrium, where borrowers have all the same probability of failing, and, moreover, the same probability of paying the joint liability component in case of the partner's default.

Devereux and Fisher, 1993 highlight that a great advantage of homogeneous groups is the easy peer monitoring of borrowers having the same job or involved in the same business. If members in a group know exactly the work area of the others, they are more likely to understand the positive or negative trends and, in the case of unexpected problems, they have the right expertise to give advice and help their colleagues.

A similar situation is present in Armendariz de Aghion (1999); the author maintains that borrowers try to anti-diversify their groups in order to minimize the expected costs, preferring partners with the same level of risk. The possible heterogeneity within groups is only caused by the absence of people of the same level of risk.

Moreover, Ghatak and Guinnane (1999), Ghatak (1999, 2000) stress the importance of homogeneous matching between agents with the same level of risk: Ghatak (1999) calls it "positive *assortative* matching". Since safe borrowers value safe partners more than risky counterparts do, they strongly prefer to allow the formation of a separating equilibrium. Moreover, Ghatak (2000) explicitly demonstrates that, in group formation, a transfer from risky borrowers to safe borrowers cannot be possible. He finds that safe people require risky partners a very high transfer; at this condition risky borrowers do not find it convenient to ask safe people to form a group together.

Assuming that microfinance contracts have two elements (interest rate and joint liability component), Ghatak (2000) shows that safe borrowers prefer a higher degree of joint liability component and a lower interest rate; on the contrary, risky borrowers wish for a higher interest rate and a

lower joint liability component. The author studies, firstly, the case of a lender that proposes two contracts (one which fits with safe customers' preferences and the other one which fits with risky customers' preferences); secondly he presents the case where a lender proposes a unique contract. The results are the same: homogeneity intra group is always present and in both situations the group lending ensures better repayment than the individual contract. Ghatak (2000) understands that the assumptions of his model simplify too much the real world. Nevertheless, in a previous paper (1999) he remarks that his results are still valid allowing for an arbitrary group size and a general distribution of borrower types (a continuum of borrower levels of risk).

Moreover, Gangopadhyay, Ghatak and Lensink (2005) examine the consequences of introducing in Ghatak (2000) a constraint which requires that the amount of joint liability cannot exceed the amount of individual liability, they find that, even with this restriction joint liability allows a Pareto improvement.

Van Tassel (1999) develops a model with one-period game which analyses the optimal contract under asymmetric information in the credit market. His results about group formation are similar to Ghatak (1999), even if Van Tassel allows variable loan sizes. In particular, the author shows that these results are possible only allowing for endogenous and voluntary group formation.

On the other hand, authors who sustain heterogeneity in group formation accuse Ghatak et alia, maintaining that their results are due only to the assumption of uncorrelated projects. Nevertheless, around the world, we find great evidence of this assumption and, most MFIs try to avoid correlated projects in their programs, for example, asking people to form group with no relatives<sup>7</sup>.

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<sup>7</sup> There are many MFIs that apply this rule. We report the example of Ujjivan Financial Services, an Indian microfinance institution, which provides loans and financial services

Evidence of separating equilibrium is studied by Ahlin (2007), who extends the Ghatak (2000) model to an additional dimension: he analyses the correlation of risks in microcredit projects. Using Thai data of BAAC (predominant rural lender in Thailand), he tests homogeneous sorting by risk and *intra* group diversification by risk, achieving a *univariate* and *multivariate* analysis. These tests demonstrate the presence of the homogeneity in both the levels analysed and the profitability of homogeneous matching on both dimensions. He says, "groups sort homogeneously in both dimensions: they match with similar risk type and, among those, with partners exposed to the same risk: anti diversification is straightforward" (p.3).

An additional empirical proof of homogeneity *intra* group has been provided by Huppi and Feder (1990), who procure formal evidence that successful projects lead to homogeneous matching of people with a similar business and from the same village.

On the basis of data collected in Tanzania, De Weerd (2004) highlights the empirical evidence of homogeneous groups, especially in rural areas, where physical proximity, tribe membership and friendship determine network formation, facilitating *peer selection* and enhancing *peer monitoring*. In the presence of these means a strong network appears where social bonds are solid and effective. The author observes that a shock might affect networks; however, strong networks can cope even in this situation. Unfortunately, analysing the dataset, he discovers that "poor households have less dense networks than the rich, making them more vulnerable in the face of idiosyncratic risk" (Chapter 10, p.19).

Moreover, McKernan (2002) provides an additional study, analysing the impact of participation in microfinance projects on three Bangladeshi MFIs: Bangladesh Rural Advancement Committee, Bangladesh Rural

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to the poor women in Bangalore, Kolkata, and New Delhi. In its projects' rules this society asks borrowers to form groups with other women that are not in the same family.

Development Board's Rural Development RD-12 program and Grameen Bank. The author finds a positive correlation between individual unobservable characteristics<sup>8</sup> which influence both customers' profits and borrower's participation in programs. The explanation is that, if borrowers are homogeneous in a group, they can provide a powerful network, which strongly increases the repayment rate. Moreover, McKernan says that "This positive correlation provides empirical evidence that joint liability, as used in Grameen Bank, may successfully screen bad credit risks" (p.109) and she highlights the coherence with theoretical models that analyse the adverse selection problem (Ghatak and Guinnane, 1999).

#### **2.4.1.1 Consequences of Separating Equilibrium**

There are several benefits of a separating equilibrium since homogeneity within groups procures stronger networks. For example, as we anticipated before, Devereux and Fisher in 1993 point out that the cost of *peer monitoring* decreases if members of the same groups are in the same trade. Moreover, if social sanctions are available, homogenous groups can enhance credit repayment and relax credit rationing: in small communities if people are relatively homogeneous the monitor of partners is easier and it reduces the case of moral hazard (Besly and Coate, 1995).

From the point of view of the lender, the separating equilibrium is the instrument that permits institutions to provide loans to both safe and risky people. We highlight that there are two possible menus of contracts: the first which proposes two products (one for safe people and the other for risky people) and the second which offers only a contract to both borrowers. Knowing that people form homogeneous group and, the portion of risky and safe borrowers in the population, the lender can provide credit for both categories of risky (Ghatak, 2000).

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<sup>8</sup> McKernan considers unobservable characteristics such as for example entrepreneurial ability or "taste for work"

An additional study (Armendariz de Aghion, 1999) shows that, in general, in the case of social penalties and efficient peer monitoring, which are easy in homogeneous groups, people decide to create less risky business.

#### **2.4.2 Pooling Equilibrium**

On the other hand, part of the literature considers that the spontaneous creation of groups leads to a pooling equilibrium where risky and safe borrowers match together. Kugler and Oppes (2005), Wydick (2001), Prescott and Townsend (2002) argue that the heterogeneity in groups can be the second best solution<sup>9</sup>, which implies a Pareto improvement and which is the result of the welfare maximizing actions of members of the group.

Sadoulet (2000) points out that in the absence of insurance market a pooling equilibrium can be a risk diversification instrument. In particular he allows the possibility to subscribe a group insurance: risky members can transfer to safe partners a risk-premia to be accepted as counterparts. Safer borrowers receive a sort of compensation for the increased probability of partners' default. In this way, the expected loss is rewarded at the beginning with a transfer of money or in nature. Moreover, Wydick in 2001 finds similar results, considering an empirical dataset of microfinance programs in Guatemala.

Analysing the situation in developing countries, Kugler and Oppes (2005) study the role of collateral in urban economies. They highlight that in contexts where information about partners is atomised and knowledge of neighbours is less strong, collateral<sup>10</sup> can increase the success of

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<sup>9</sup> The first best is the case of non-asymmetric information, in the first best the lender can recognize the type of the borrower (risky or safe customer). In this situation the lender is able to offer a contract with a high interest rate to risky borrowers and a contract with a lower interest rate to safe borrowers.

<sup>10</sup> The collateral can be a natural exchange or a sort of free labour service that cannot be considered as real collateral by the MFI, but it can be accepted by agents embedded in

microfinance. Kugler and Oppes find that heterogeneity within groups helps risk pooling and, moreover, it enhances default costs for low risk partners. This effect is possible when risky borrowers have collateral, because this tool can mitigate the negative effects of the riskiest projects. Risky borrowers use collateral to convince safe partners to accept them in the group. In addition, the authors discover that the presence of this tool facilitates the mutual insurance in group formation, since people with risky projects mitigate the risk with their collateral. However, they specify that the highest risky borrowers are the ones that form homogeneous groups to stay together since they are too risky and not accepted by the other partners.

As we stressed before, Ghatak (1999, 2000), Ghatak et alia (2005), find that transfers or side-payments are not convenient for anybody, since the gain of risky borrowers never exceeds the loss of risky borrowers, so people end up in homogeneous groups. By reaction, Kugler and Oppes (2005) point out that the homogeneity shown by Ghatak (1999, 2000) is only due to the fact that he takes into account the particular assumption of uncorrelated projects.

Moreover, heterogeneity in group formation finds evidence in pragmatic works. For instance, considering the data of an empirical study in Eritrea, Lensik and Mehrteab (2003) find that, in the program, groups are formed heterogeneously.

Despite the debate about heterogeneity or homogeneity within groups, in 2001, Saudolet and Carpenter argue that there is not always an optimal formula required. They provide empirical evidence of both homogeneous and heterogeneous groups in their analysis of microcredit projects in Guatemala. They maintain that group formation is endogenous and both

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the same social network. This is a transfer from risky people to safe borrowers to be accepted as members in the group.



possibilities can be present (there is no possibility to choose *ex ante* heterogeneity or homogeneity *intra* groups).

#### **2.4.2.1 Consequences of Pooling Equilibrium**

From the point of view of a microfinance institution, the main consequence of a pooling equilibrium is that heterogeneity in group formation may be seen as a risk diversification vehicle, which is a great instrument in the lender's portfolio. In the same group there are people with different skills and activities; due to the fact that these activities have different levels of risk, they can better react to possible shocks. With these assumptions, diversification can enhance loan repayments.

Nevertheless, we have to highlight that heterogeneity *intra* groups is always procured thanks to additional tools (for instance the presence of collateral or insurance), which are extra dynamic incentives and they are not always present; moreover, there is a dispute about the worth of these transfers, some authors point out that they may become too expensive for risky people. In addition, if we consider the traditional model of microfinance, which is the most common in developing countries, being focused on poverty alleviation, these tools rarely appear.

### **2.5 Environment with Imperfect Information**

Generally, microfinance literature considers an environment with perfect information within customers (Armendariz de Aghion and Gollier, 1996; Ghatak, 2000). However, this assumption matches with rural communities where people are able to build strong networks; on the other hand, in urban contexts the knowledge of potential partners is reduced, since social bonds may be weaker and mobility of people could be higher.

In 2000, Laffont and N'Guessan focus their attention on adverse selection in group foundation; they find that, when people do not know each other, there is no collateral effect. On the contrary, if borrowers

know their partners perfectly, group lending implements an efficient situation. In particular, assuming a continuum of risk neutral borrowers, the authors develop a model with a monopolistic institution that has no information about its customers. The authors consider that with imperfect information within customers, groups are formed randomly, so there is no collateral effect due to group lending. On the contrary, with perfect information, the lender can exploit the fact that safe types accept a high payment of joint liability component since they know that this cost rarely occurs to them. The bank provides two different contracts to sustain the separating equilibrium. In addition, if side contracts are possible, and perfect information is allowed, people form heterogeneous groups. As a consequence the lender offers a unique contract, but this contract is not efficient.

Another example of a model about imperfect information within customers is the work of Armendariz de Aghion and Gollier (2000). They expressly take into account an urban economy where migration flows and labour turnovers are high; consequently, borrowers are uninformed about each others' levels of risk. The authors assume that there is no *ex ante* information about the partners' types, people are forced to form their group randomly. A non *assortative* matching equilibrium emerges naturally *ex post*, where risky and safe people form groups together. Nevertheless, the authors show that even without perfect information group lending can be a successful tool. In fact, the authors find a reduction in the interest rate, due to the collateral effect, which allows safe borrowers to participate in microfinance projects. Here, peer group formation solves inefficient credit rationing.

Ghatak (2000) underlines that Armendariz de Aghion and Gollier (2000) analyse an interesting issue that he does not consider: the imperfect information between borrowers. Nevertheless, he stresses that there are

two particular features these authors do not take into account, and we consider in our analysis:

- 1) they do not allow for side payments among members in the group formation;
- 2) moreover, they do not use joint liability as a screening instrument to form homogeneous groups which leads to a separating equilibrium.

An additional point of difference between the present paper and the one of Armendariz de Aghion and Gollier is that they reject any possible forms of partners' knowledge. On the contrary, we assume imperfect information within customers, allowing that borrowers are not forced to match randomly, since they are able to observe a signal of potential partners, which indicates the riskiness of the counterpart's project. Observing this noisy signal, borrowers choose the members of their group according to their preferences. It is worth highlighting that we consider the possibility of different levels of knowledge of partners; these levels indicate the probability to discover that the signal people can observe during peer selection reveals the expected type of the counterpart.

### 3. The Model

#### 3.1 Introduction to the Model

The present model is built on the one Ghatak submitted in his paper in 2000. Between the two models, there is a substantial difference, Ghatak allows perfect information among agents who form groups; here, we allow imperfect information about counterparts in a group.

We imagine that clients partially know their partners and they choose them by observing a signal. This signal gives information about the counterpart's project which can be safe or risky.

In particular, we introduce a new variable, named  $\alpha$ , which indicates the probability that the signal borrowers observed reveals the real risk of the project. With  $\alpha$  probability the partner is exactly the type the borrower thought her to be during group formation; with  $(1 - \alpha)$  probability the partner is the opposite type the borrower imagined her to be.

##### 3.1.1 Borrowers and Preferences

In developing countries, as in developed economies, the poorest, and the most of low income people, do not have any possibilities of receiving loans because they lack sufficient personal wealth. In the present model, as in Ghatak, agents do not have any initial budget,  $I$ :

$$I = 0.$$

However, they need a sum  $A > 0$ , to create a new business or to expand the one they already have.

In the population there are two types of agents: safe and risky, characterised by the probability of success of their own project,  $p_s$  and  $p_r$ , and by the probability of failure,  $(1 - p_s)$  and  $(1 - p_r)$ .

In particular, we have that:

$$0 < p_s < 1$$

$$0 < p_r < 1$$

$$p_s > p_r$$

$$p_s \neq p_r$$

The microfinance institution (MFI) cannot understand if each agent is safe or risky, because it does not have adequate information and its acquisition is too costly. On the other hand, the MFI knows the proportion of safe and risky people in the population, which are, respectively,  $\theta$  and  $(1 - \theta)$ . For simplicity, in the present model we suppose that  $\theta$  and  $(1 - \theta)$ , both reach the value of  $1/2$ .

All agents live in an urban society with a large population normalised to unity, they possess a unit of labour each, and they want to undertake a risky investment. In his model, Ghatak supposes that borrowers have perfect information about people living in the same community, so they are able to exploit local information to form and sustain their groups. On the contrary, the present model considers an urban environment where people have no certain information about each other. For example, we can consider a group of immigrant in a developed country living in an urban environment. They might belong to the same community and social bond may be strong; nevertheless, due to the high mobility and work turnover, people cannot exactly know their partners: perfect information is not still allowed.

In microfinance customers are asked to form groups of  $n$  borrowers to co-sign a loan. In Ghatak peer selection is easy, because with perfect information borrowers know the partner's type and their level of risk.

In our model, with imperfect information, we suppose that during the group formation people can observe a signal about the riskiness of the partner. Nevertheless, this signal can reveal the real riskiness of the partner or not. We introduce a variable  $\alpha$ , that indicates the probability that the signal, that the agent observes about the partner, reveals the real type of the latter. Moreover, we assume that

$$0 \leq \alpha \leq 1,$$

if  $\alpha = 1$ , borrowers have perfect information about each others; on the contrary, if  $\alpha = 0$ , borrowers do not know their partners at all. If  $\alpha$  rises, it means that borrowers know better their possible partners, so the probability to be right about the counterpart increases.

The borrower is certain about her own type, but she is not certain about the type of the counterpart. The signal, people observe in group formation, is  $y$ , where  $y = t, nt$  (trustable or non-trustable). If the signal observed is  $y = t$ , (trustable, reliable, not dangerous) the agent perceives the partner as a safe counterpart; on the contrary if it is  $y = nt$ , the agent perceives the partner as a risky counterpart.

For example, if a safe agent wants to form a group with another safe agent, and she notices the signal  $t$  (trustable) about the project of a possible counterpart, she has the probability  $\alpha$  the partner is safe and the probability  $(1 - \alpha)$  the partner is risky. On the contrary, if a safe agent wants to form a group with a risky counterpart, and she observes the signal  $nt$  (non-trustable) about the potential partner, she has the probability  $\alpha$  the partner is risky and the probability  $(1 - \alpha)$  the partner is safe.

It is worth considering that signals are significant only with imperfect information, with perfect information borrowers know *ex ante* the type of other agents in the population and they are certain about their counterparts.

We highlight that the return of the project of a borrower  $i$  is a random variable  $y_i$  which can take only two values:

$$R_i > 0, \text{ where } i = r, s$$

when the project is successful; and

$$R_i = 0, \text{ where } i = r, s$$

when the project fails.

Borrowers are risk neutral. They maximize expected returns, and they have a given reservation payoff which indicates the utility, to do

something else (the utility of having an alternative occupation or the utility of doing nothing):  $\bar{u}$  .

### 3.1.2 Lender and Technology

In our model, the MFI is a risk neutral institution which faces a zero profit constraint. The opportunity cost of capital is  $\rho$ , where

$$\rho \geq 0 .$$

We consider that there is a unique MFI in the area and the population is relatively small compared to the credit market, as a consequence, we can say that the supply of loans is perfectly elastic at the rate  $\rho$ . The MFI appears as a monopolist in the market.

All projects are socially productive, the expected revenues cover both the costs of capital,  $\rho$ , and the cost of labour,  $\bar{u}$  :

$$R_i > \rho + \bar{u} .$$

As noticed before, the MFI has no information about borrowers, except of the proportion of safe and risky people in the population. Even if the lending institution is embedded in the urban area<sup>11</sup> it may be helpful to think it as an institution “external” to the village (Ghatak, 2000, p. 605), since the MFI cannot collect information about its clients.

The MFI’s objective is to maximize a weighted average of the expected utilities of a representative borrower (risky or safe), choosing the correct level of interest rate and joint liability component<sup>12</sup>. In the model, the institution is like a public lending institutions or a NGO, which is commonly the case of MFIs (as we highlight in the section dedicated to the microfinance supply: Section 5 *Microfinance Supply in the World*). On the contrary, if we consider a monopolist for profit institution, results change since the objective varies itself.

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<sup>11</sup> With this expression Ghatak means that the lender is present in the area and it is a well-known institution that people can trust.

<sup>12</sup> We explain the nature of the joint liability component in Section 3.1.3 *Contracting*

### 3.1.3 Contracting

The lender can provide two possible sets of credit: individual liability contracts and joint liability contracts.

Firstly, the individual lending is a standard contract in which the MFI proposes a fixed interest rate, named  $r$ , when the project is successful, and the maximum possible repayment in case of failure: 0 (nothing).

Secondly, the joint liability lending is a group contract in which the MFI proposes a fixed interest rate, named  $\hat{r}$ , and a joint liability component, named  $\hat{c}$ . The joint liability component represents the innovation of microcredit in contracting theory. As in the case of the individual liability contract, if the project is not successful the borrower repays nothing to the MFI and if both projects succeed each borrower should pay the interest rate:  $\hat{r}$ . However, with joint liability, if a borrower succeeds and, at the same time, the partner fails, the former, in addition to her regular interest rate, has to pay a sort of fee to the MFI, this sum is the joint liability component,  $\hat{c}$ .

It is worth remembering that the joint liability component should be paid for each component who fails in the group. In individual lending, when a customer fails, the lender does not receive anything; in group lending, when an agent fails, the MFI receives an amount from the other members of the group: the joint liability component multiplied by the number of the partners who fail in the group.

We want to highlight that, in the present model, we only consider the problem of asymmetric information, the additional problem of moral hazard is not taken into account<sup>13</sup>. Our assumption guarantees that, once groups are formed, borrowers always maximize their own effort, independently of the monitoring of the counterparts.

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<sup>13</sup> Moral hazard appears when people ask for a loan and they use the money for another activity or they do not make any effort in managing their business. For more information we suggest you to read Section 2.2 *Exclusion from the Credit Market*.



### 3.2 Individual Lending

In this section we explain what happens when the lender provides individual loans to both safe and risky borrowers. Assuming that there is no asymmetric information, the lender has perfect information about the borrower's level of risk, so it offers individual contracts with the following interest rate:

$$r_i^* = \frac{\rho}{p_i}$$

Where  $i = r, s$  are respectively risky and safe agents. The lender provides two different contracts: one for safe agents and the other one for risky agents. In particular, it is easy to notice that, since safe borrowers pay back more often, they are charged a lower interest rate. On the contrary, risky people should support a higher interest rate, since their possibility of default is higher:

$$\frac{\rho}{p_r} > \frac{\rho}{p_s} .$$

Nevertheless, if we suppose that there is asymmetric information between the lender and borrowers, and people have no collateral, the MFI cannot identify the type of each customer. Consequently, the financial institution offers a unique loan to both safe and risky agents at the same nominal interest rate:

$$r^* = \frac{\rho}{\bar{p}} ,$$

where  $\bar{p}$  is the weighted average probability of repayment between safe and risky probabilities of repayment, taking into account the proportion of the two types in the population:

$$\bar{p} = \theta p_s + (1 - \theta) p_r .$$

This situation leads to a market failure. The literature, investigating this issue, find that individual lending with asymmetric information, added to the unavailability of collateral, can procure two different situations: a

problem of underinvestment (Stiglitz and Weiss, 1981) or a problem of overinvestment (De Meza and Webb 1987).

*Problem of underinvestment:*

Ghatak, in order to explain the problem of underinvestment, describes the study of Stiglitz and Weiss (1981). In this scheme, safe and risky investments have the same average return, thus,

$$p_s R_s = p_r R_r = \bar{R},$$

as a consequence we have that

$$R_r > R_s.$$

The two authors find that if the lender is not able to discriminate between safe and risky people, it offers a unique contract charging the same interest rate to both safe and risky people. In this situation, safe borrowers are driven out of the credit market, since the presence of the risky counterparts leads the interest rate too high for them. In this situation the participation constraint of safe borrowers is not still satisfied (Ghatak, p.607).

As a consequence, now only risky people accept the contract and the interest rate becomes:

$$r^* = \frac{\rho}{p_r}.$$

This result leads to an underinvestment situation, where safe people are driven out off the credit market. Welfare is reduced, compared to the case of symmetric information. It is necessary to create an innovative tool that stimulates the safe borrowers to come back into the market: experts find that this instrument can be the joint liability component in group lending.

*Problem of overinvestment:*

On the other hand, explaining the problem of overinvestment, Ghatak considers the study of De Meza and Webb (1987) which maintains that all types of borrowers have the same return:

$$R_s = R_r = \bar{R}.$$

With this assumption, a risky project has lower mean return of a safe project: the expected return of the former is higher than the expected return of the latter:  $Rp_s > Rp_r$ . If there is asymmetric information the lender should provide a unique contract with a unique interest rate.

The authors show that, in this case, if the expected surplus from risky activity is positive, risky people, with unproductive projects, find it profitable to ask for a loan, since they are cross-subsidised by safe counterparts. This situation leads to an overinvestment problem.

For simplicity, in the present analysis, we only consider the first version mentioned: the one of Stiglitz and Weiss. We suggest for the future literature to investigate the situation with imperfect information within borrowers starting by the assumptions of De Meza and Weiss.

### **3.3 Group Lending**

In his paper Ghatak compares group lending and individual lending with asymmetric information between lenders and borrowers. He verifies that joint liability contracts enhance efficiency and repayment rates due to the fact that agents are able to exploit private local information, which the MFI ignores.

Ghatak explains how joint liability contracts can achieve higher loan repayment rates than individual lending, overcoming the adverse selection problem in asymmetric markets. In group lending, safe people come back in the market, since joint liability component allows the lender to propose a lower interest rate.

In the present paper we introduce asymmetric information, not only between the lender and the customers, but also within borrowers.

In our analysis, we follow the main concepts that Ghatak highlights and we discuss the results comparing the situation with perfect information to the one with imperfect information.

### **3.3.1 Group Formation**

The first step is the group formation. For simplicity, in our model the MFI proposes its contracts to groups composed by two agents. Most of the time, in the real world, institutions ask borrowers to form groups of five people (for instance in the projects of Grameen Bank).

In the review, we explain that there are two possible ways to match borrowers: people can form heterogeneous groups, which lead to a pooling equilibrium where safe and risky borrowers match together; or people can form homogeneous groups, which lead to a separating equilibrium where safe and risky agents stay in different groups.

It is important to assume that borrowers are not forced to form groups, but they choose their partner (peer selection) voluntarily.

Ghatak shows that a separating equilibrium occurs even if transfers or side-payments (between potential borrowers) are allowed. We know that people have no initial wealth, so the hypothesis of a transfer seems to be erroneous. However, the transfer can be a natural exchange or a sort of free labour service that cannot be considered as collateral by the MFI, but can be accepted by agents embedded in the same social network.

Since safe people succeed more often, having a safe partner means to pay less often the joint liability component; as a consequence everybody, safe or risky, prefers having a safe partner instead than a risky one. If side-payments are allowed, a risky agent may make a transfer to a safe borrower to be accepted in her group.

Nevertheless, Ghatak finds that the maximum amount risky borrowers are willing to pay is not enough to cover the loss of a safe borrower to

form a group with her. In other words, a risky borrower does not find profitable to have a safe partner after making a transfer which fully compensates the safe counterpart.

*Proposition 1 - Allowing imperfect information, joint liability contracts drive to a positive homogeneous matching only if the signal borrowers have about potential partners is sufficiently informative,  $\alpha > 1/2$ . In this case, safe borrowers match with safe partners and risky borrowers with risky ones.*

*Proof.*

*Situation with perfect information:*

In Ghatak, allowing perfect information about possible partners, the expected payoff of a borrower  $i$ , where  $i = r, s$  (risky or safe) having a partner  $j$ , where  $j = r, s$ , is in general

$$U_{i,j} = p_i R_i - [p_i r + p_i (1 - p_j) c].$$

Supposing that groups are homogeneous, we have

$$U_{i,i} = p_i R_i - [p_i r + p_i (1 - p_i) c],$$

on the opposite, supposing that groups are heterogeneous we have

$$U_{i,j} = p_i R_i - [p_i r + p_i (1 - p_j) c].$$

The author wants to demonstrate that, even if side-payments are allowed and people can form heterogeneous groups, this situation never happens.

The loss of safe agents is:

$$U_{s,s} - U_{s,r}$$

The gain of risky agent is:

$$U_{r,s} - U_{r,r}$$

Ghatak shows that the loss of safe agents is always higher than the gain of risky agents:  $U_{s,s} - U_{s,r} > U_{r,s} - U_{r,r}$ , always. (See Appendix 1)

*Situation with imperfect information:*

In the present model, we take into account the expected payoff of a borrower  $i$ , where  $i = r, s$  (risky or safe), who observes the signal  $y$ , of a potential partner, where  $y = t, nt$  (trustable or non-trustable). If the signal observed is  $y = t$ , the agent perceives the partner as a safe counterpart, on the contrary if it is  $y = nt$ , the agent perceives the partner as a risky counterpart. Moreover, we introduce  $\alpha$  which indicates the probability this signal reveals the right partner's type. As we say in Section 3.1.1 *Borrowers and Preferences*, this variable varies in relation to the level of the knowledge of possible partners. In particular, it increases when people have better information about counterparts, and it declines when people have a few information about them.

Now, if groups are homogeneous (safe borrowers with safe partners and risky borrowers with risky partners), the expected payoff is:

$$U_i^y = p_i^2 \alpha (R_i - r) + p_i(1 - p_i) \alpha (R_i - r - c) + p_i p_j (1 - \alpha)(R_i - r) + p_i(1 - p_j)(1 - \alpha)(R_i - r - c)$$

If we simplify it (see Appendix 2.a) it, we obtain:

$$U_i^y = p_i R_i - p_i r + [p_i^2 \alpha - p_i + p_i p_j - p_i p_j \alpha] c$$

As a consequence, the expected payoffs of a safe borrower and of a risky borrower are, respectively:

$$U_s^t = p_s R_s - p_s r + [\alpha p_s^2 - p_s + p_s p_r - \alpha p_s p_r] c$$

$$U_r^{nt} = p_r R_r - p_r r + [\alpha p_r^2 - p_r + p_r p_s - \alpha p_r p_s] c$$

On the contrary, if groups are heterogeneous (safe borrowers match with risky partners), the expected payoff is:

$$U_i^y = p_i p_j \alpha (R_i - r) + p_i(1 - p_j) \alpha (R_i - r - c) + p_i^2 (1 - \alpha)(R_i - r) + p_i(1 - p_i)(1 - \alpha)(R_i - r - c)$$

If we simplify (see Appendix 2.b) it, we obtain:

$$U_i^y = p_i R_i - p_i r + [-p_i^2 \alpha - p_i + p_i p_j \alpha + p_i^2] c$$

As a consequence, the expected payoffs of a safe borrower and of a risky borrower are, respectively:

$$U_s^{nt} = p_s R_s - p_s r + [-\alpha p_s^2 - p_s + p_s p_r \alpha + p_s^2] c$$

$$U_r^t = p_r R_r - p_r r + [-\alpha p_r^2 - p_r + p_r p_s \alpha + p_r^2] c$$

Consider now the expected loss of a safe borrower when her counterpart is a risky one instead of a safe one (see Appendix 3):

$$U_s^t - U_s^{nt} = 2 p_s^2 \alpha c - 2 p_s p_r \alpha c + p_s p_r c - p_s^2 c .$$

On the other hand, the gain of a risky borrower having a safe partner is:

$$U_r^t - U_r^{nt} = 2 p_r p_s \alpha c + p_r^2 c - 2 p_r^2 \alpha c - p_r p_s c .$$

We want to find out if the homogeneous matching in the model with perfect information within partners is still valid with imperfect information. As we demonstrate in Appendix 1, in Ghatak, we observe that the loss of safe agent is always higher than the gain of risky agent:

$$U_{s,s} - U_{s,r} > U_{r,s} - U_{r,r}$$

In our model, we should find the level of  $\alpha$  that leads to the same situation:

$$U_s^t - U_s^{nt} > U_r^t - U_r^{nt}$$

$$U_s^t - U_s^{nt} > U_r^t - U_r^{nt}$$

$$2 p_s^2 \alpha c - 2 p_s p_r \alpha c + p_s p_r c - p_s^2 c > 2 p_r p_s \alpha c + p_r^2 c - 2 p_r^2 \alpha c - p_r p_s c$$

$$2 \alpha c (p_s^2 + p_r^2) - 4 p_s p_r \alpha c + 2 p_s p_r c - c (p_s^2 + p_r^2) > 0 \quad (\text{where } c > 0)$$

$$(p_s^2 + p_r^2)(2 \alpha - 1) - 2 p_s p_r (2 \alpha - 1) > 0$$

$$(2 \alpha - 1)(p_s^2 + p_r^2 - 2 p_s p_r) > 0 \quad (\text{if } \alpha > 1/2)$$

$$p_s^2 + p_r^2 - 2 p_s p_r > 0$$

$$(p_s - p_r)^2 > 0$$

If the knowledge is high enough, in particular,  $\alpha > 1/2$ , this result is always valid since  $p_s \neq p_r$ .

As a consequence, we can affirm that  $U_s^t - U_s^{nt} > U_r^t - U_r^{nt}$ .

If  $\alpha > 1/2$ , a positive homogeneous matching is allowed. Safe people match with safe partners and risky people match with safe counterparts, even if side-payments are allowed. As Ghatak (2000, p. 609) says "assortative matching maximizes aggregate expected payoff of all borrowers over different possible matches".

The intuition is straightforward, the type of the counterpart is important only when the agent fails, everyone prefers safe borrowers because they fail less often. Nevertheless, the gain of having a safe partner instead a risky one emerges only when a borrower succeeds; in this way safe agents pay more attention to the choice of the partner than risky borrowers. A risky agent does not find profitable to bribe safe agent to form a group together, because the latter asks the former to compensate her own loss of having a risky partner with a large amount that the counterpart cannot pay.

In particular, with imperfect information, people selecting their partner observe a signal. If the signal is sufficiently informative, we find that  $\alpha$  has to be  $\alpha > 1/2$ , the borrower has great possibilities to end up with a borrower of the same type; in this case the signal she has observed reveals the right type of the partner with a high probability. Homogeneous matching is allowed. As a consequence, when the borrower knows that the signal she can observe is sufficiently informative, she prefers pay attention to the peer selection instead of matching randomly.

However, we have to say that, even if peer selection is still useful in creating group, and the signal allows to select homogenous partners, we find a *partial* separating equilibrium. We have many groups which are homogeneous, nevertheless, there are a few heterogeneous groups. These portions are linked to the value of  $\alpha$ : the higher is  $\alpha$ , the higher is



the probability of ending up with a partner of the same type (separating equilibrium).

### 3.3.2 Indifference curves

A second step is to draw indifference curves of risky and safe borrowers in the  $(r, c)$  plane. These curves represent the iso-profit curves of the MFI to lend a borrower of type  $i$ . Before drawing them in the graph, it is worth analysing the inclination of each indifferent curve.

*Situation with perfect information:*

In Ghatak, with perfect information, the expected payoff of borrower  $i$  under joint liability contract is:

$$U_{i,i} = p_i R_i - [p_i r + p_i (1 - p_i) c]$$

An indifference curve of type  $i$  in the  $(r, c)$  plane is represented by the line:

$$p_i r + p_i (1 - p_i) c = k$$

where  $k$  is a constant: the lower this constant, the higher the expected payoff of the borrower, and the lower the expected payoff of the bank.

Explicating it for  $c$  and doing the derivative by  $r$ , we obtain that

$$c = \frac{(k - r p_i)}{p_i (1 - p_i)}$$

$$\frac{dc}{dr} = - \frac{p_i}{p_i (1 - p_i)} = - \frac{1}{1 - p_i}$$

where  $p_i > 0$ .

For safe agents, we have:

$$- \frac{1}{1 - p_s},$$

and for risky agents, we have:

$$- \frac{1}{1 - p_r}.$$

Another step is to compare the indifference curves.

We find that the indifference curve of safe borrowers is steeper than the one of risky borrowers. To demonstrate this we compare the two denominators of the indifference curves. The one related to the indifference curve of risky agents should be greater than the one related to safe borrowers.

It is easy to see that:

$$\begin{aligned} 1 - p_r - (1 - p_s) &= \\ = 1 - p_r - 1 + p_s &= \\ = p_s - p_r & \qquad \text{where } p_s > p_r \end{aligned}$$

This result is always valid due to the construction of the model. The assumption  $p_s > p_r$  ensures that the absolute value of the derivative is higher for safe borrowers than for risky borrowers.

(The intuition of this result appears just after the following observation)

*Situation with imperfect information:*

In our model, the indifference curves are generally represented by the following line:

$$\begin{aligned} U_i^y &= p_i R_i - \{ p_i r + [ - p_i^2 \alpha + p_i - p_i p_j + p_i p_j \alpha ] c \} \\ p_i r + [ - p_i^2 \alpha + p_i - p_i p_j + p_i p_j \alpha ] c &= k \end{aligned}$$

To draw them in the plane, we explicit them for  $c$  and we do the derivative by  $r$ :

$$\begin{aligned} c &= \frac{k - p_i r}{- p_i^2 \alpha + p_i - p_i p_j + p_i p_j \alpha} \\ \frac{dc}{dr} &= - \frac{p_i}{- p_i^2 \alpha + p_i - p_i p_j + p_i p_j \alpha} = - \frac{1}{- p_i \alpha + 1 - p_j + p_j \alpha} \end{aligned}$$

For safe agents, we have:

$$- \frac{1}{- p_s \alpha + 1 - p_r + p_r \alpha},$$

on the other hand for risky agents, we have:

$$- \frac{1}{-p_r \alpha + 1 - p_s + p_s \alpha}.$$

We find that the indifference curve of safe borrowers is steeper than the one of risky agents. Even in this case, to demonstrate it we can make a comparison between the denominators: the denominator of the indifference curve of a risky agent should be greater than the one of a safe borrower.

It is easy to see that:

$$-p_s \alpha + 1 - p_r + p_r \alpha < -p_r \alpha + 1 - p_s + p_s \alpha$$

$$-2p_s \alpha + 2 p_r \alpha - p_r + p_s < 0$$

$$-2 \alpha (p_s - p_r) - p_r + p_s < 0$$

$$(p_s - p_r) < 2 \alpha (p_s - p_r)$$

where  $p_s > p_r$

$$\alpha > 1/2$$

This result is always valid, in our model, since we allows that  $\alpha > 1/2$  to assure homogeneity *intra* group.

The intuition is that risky agents have risky partners who often fail, so they have higher expected costs conditional to success than safe agents. Safe people pay the interest rate more often than the joint liability component, because they have a high probability of succeed and so have their partners.

Consequently, if the MFI promises a small reduction of the interest rate ( $r$ ), safe borrowers are willing to accept a higher value of  $c$ , the joint liability component, since they rarely have to pay it. On the contrary, for risky agent the situation is the opposite. These observations explicate the inclination of the indifference curves with perfect and imperfect information. In particular, these considerations are valid in both models, with perfect information and with imperfect information.

Now, we want to draw the curves we found in the two different cases, in the same plane  $(r, c)$ , studying their inclinations and the causes behind the results we obtain.

*Proposition 2 – If there is imperfect information within agents in a group, the indifference curves become less distinctive than in case of perfect information.*

*Lemma 1 – With imperfect information the safe indifferent curve becomes flatter than in the case of perfect information.*

*Proof.*

Consider the two indifference curves of safe borrowers:  $s'$  and  $s''$ . With perfect information we have that the indifference curve of a safe agent,  $s'$ , is

$$- \frac{1}{1 - p_s} .$$

On the other hand, introducing imperfect information, the line  $s''$  becomes:

$$- \frac{1}{- p_s \alpha + 1 - p_r + p_r \alpha} .$$

Now, compare the denominators to discover which curve is the steeper in the plane. We want to demonstrate that  $s''$  is flatter than  $s'$ , so the denominator of  $s''$  should be greater than  $s'$ .

$$\begin{aligned} & (- p_s \alpha + 1 - p_r + p_r \alpha) - (1 - p_s) = \\ & = - p_s \alpha + 1 - p_r + p_r \alpha - 1 + p_s = \\ & = - \alpha (p_s - p_r) + p_s - p_r = \\ & = (p_s - p_r) (1 - \alpha) \end{aligned}$$

This result is always:

$$(p_s - p_r)(1 - \alpha) \geq 0$$

because:

$$(p_s - p_r) > 0$$

since  $p_s > p_r$

$$(1 - \alpha) \geq 0$$

since  $\alpha \leq 1$ .

Our findings ensure that the absolute value of the derivative is lower for safe borrowers with imperfect information than with perfect information. As a consequence, now we can affirm that  $s''$  is flatter than  $s'$ . *Q.E.D.*

*Lemma 2 - With imperfect information the risky indifferent curve becomes steeper than in case of perfect information.*

*Proof.*

Secondly, consider the two indifference curves of risky borrowers. In the case of perfect information, the indifference curve of a risky agent,  $r'$ , is:

$$-\frac{1}{1 - p_r}.$$

Introducing the hypothesis of imperfect information,  $r''$  becomes:

$$-\frac{1}{-p_r \alpha + 1 - p_s + p_s \alpha}.$$

Now, compare the denominators to discover which curve is the steeper in the plane. We want to demonstrate that  $r''$  is steeper than  $r'$ , so the denominator of  $r'$  should be greater than  $r''$ .

$$\begin{aligned} (1 - p_r) - (-p_r \alpha + 1 - p_s + p_s \alpha) &= \\ = 1 - p_r + p_r \alpha - 1 + p_s - p_s \alpha &= \\ = -\alpha (p_s - p_r) + p_s - p_r &= \\ = (p_s - p_r)(1 - \alpha) & \end{aligned}$$

This result is always:

$$(p_s - p_r)(1 - \alpha) \geq 0$$

because:

$$(p_s - p_r) > 0$$

since  $p_s > p_r$

$$(1 - \alpha) \geq 0$$

since  $\alpha \leq 1$ .

It ensures that the absolute value of the derivative is higher for risky borrowers with imperfect information than with perfect information. Consequently, we can affirm now that  $r''$  is steeper than  $r'$ . *Q.E.D.*

The intuition is straightforward, if borrowers have imperfect information about their partners, their indifference curves, which represent their preferences, appear less distinctive. With perfect information, a safe borrower is certain that her counterpart is a safe one; in this case, the safe indifference curve is very steep.

However, if we introduce uncertainty, a safe borrower has only  $\alpha$  probability to have a homogeneous partner: allowing imperfect information people may end up with a heterogeneous partner. In this case, the indifference curve of safe borrowers becomes flatter. They are less willing to ask the lender for an increase of the joint liability component (but they still do it), to have a small reduction of the interest rate.

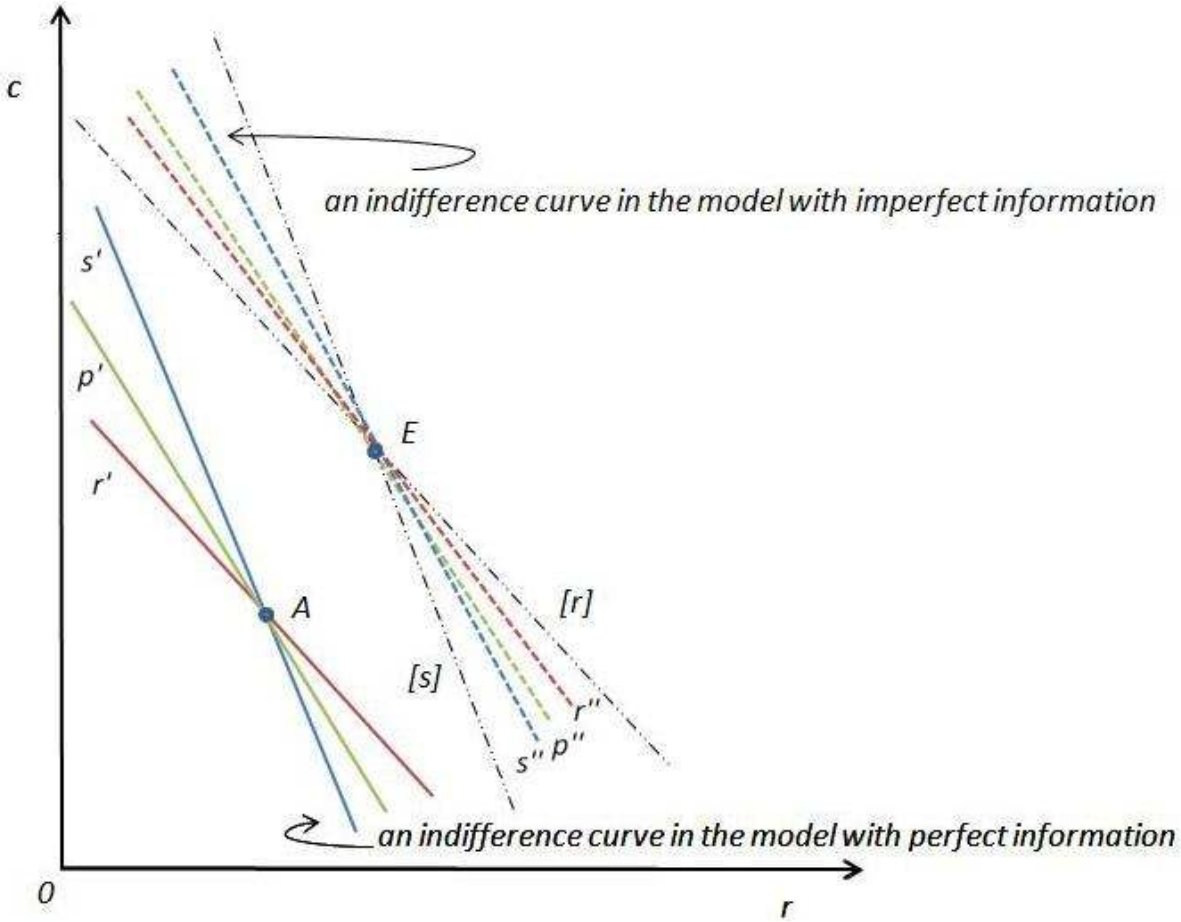
On the other hand, with perfect information, risky borrowers undoubtedly have risky counterparts and their indifference curve is very flat; if we allow uncertainty, the possibility of having a safe partner increases and the indifference curve becomes steeper.

The parameter  $\alpha$  mitigates the separating situation - we have with perfect information - reducing the certainty to find a homogenous partner.

Graph 1 represents typical indifference curves of safe and risky borrowers; in this section we are interested in exploring their inclinations.

It is important to stress that, for the moment, we do not consider the position of the points  $A$  and  $E$  in the  $(r, c)$  plane. In the present graph, these points lie in a temporary position, which will be investigated in the next section (Section 3.3.3 *Optimal Joint Liability Contract*).

The colour of the lines is important, in red are painted the indifferent curves of risky people:  $r', r''$ ; in blue the ones of safe agents:  $s', s''$ ; in addition, the green represents the indifferent curves where the pooling contracts lie:  $p', p''$ .



**Graph 1 - Indifference curves of safe and risky borrowers under joint liability in the case of perfect and imperfect information. In this figure, do not consider the position of the intersection points  $A$  and  $E$ ; for the moment, we focus on the inclinations of the indifference curves.**

In Graph 1, two sets of lines are drawn. Firstly, the set of indifference curves with perfect information drawn with regular lines,  $r'$ ,  $s'$ ,  $p'$ , which intersect at the point named  $A$ . Secondly, the set of indifference curves with imperfect information drawn with dotted lines,  $r''$ ,  $s''$ ,  $p''$ , which intersect at the point named  $E$ .

As anticipated before, the aim of the graph is to highlight the differences between the inclinations of the curves in the two sets. To help you to do it, we drew a parallel curve to  $s'$ , called  $[s]$ , which passes through  $E$ , the intersection point with imperfect information. In this way, it is easy to observe that  $s''$  is less steep than  $s'$ . The same has been done for  $r'$  and  $r''$ , drawing  $[r]$ . The line  $[r]$  passes through  $E$ , in this case, we observe that  $r''$  is less flat than  $r'$ .

It is worth highlighting that, in the  $(r, c)$  plane, utility increases as one moves toward the origin, since  $r$  and  $c$  appear on the graph lines.

### 3.3.3 Optimal Joint Liability Contract

A new step is to determinate the intersection point of the indifference curves. We introduce, at first, what happens in the model with perfect information, and we analyse later the situation allowing imperfect information. The intersection point is important since it represents the unique optimal equilibrium which maximizes the weighted average of expected utilities of borrowers. Moreover, it explains the value of the joint liability component and the interest rate that the lender is going to propose to its customers.

In our model, as in Ghatak (2000), the contracting problem follows this sequential game:

- i. Firstly, the MFI offers differential and limited contracts to the borrowers; in particular, a set of joint liability contracts:  $\{[r_1, c_1]; [r_2, c_2]; [r_3, c_3].\}$ ;



- ii. Secondly, agents who desire to accept one of these contracts select a partner in the population;
- iii. In the third step, groups of borrowers choose the contract they prefer (if there is more than one contract available);
- iv. Finally, projects are carried out, borrowers who decide to accept the contract receive the loan; in the opposite case, agents who choose not to borrow enjoy the reservation payoff of  $\bar{u}$ .

In general, we can restrict the range of optimal contracts to the one having no negative interest rate and no negative joint liability component:  $[r_i, c_i]$  where  $r_i \geq 0$  and  $c_i \geq 0$ .

Moreover, the MFI can create two equilibriums proposing two different sets of contracts.

Firstly, the MFI can opt for two separating contracts, proposing borrowers:  $\{[r_s, c_s]; [r_r, c_r]\}$ . Assuming that agents will form homogeneous groups (the issue is developed in Section 3.3.1 *Group Formation*), which leads to a separating equilibrium, the lender create the contracts to induce safe people to choose  $[r_s, c_s]$  and risky people to prefer  $[r_r, c_r]$ .

Secondly, the MFI can propose a pooling contract,  $[r, c]$ . Even in this case, people form homogeneous groups, which lead to a separating equilibrium; nevertheless, now, the lender proposes a unique contract to both types of agent  $[r, c]$ .

In our model, we only consider this second situation. The main reason is that Ghatak finds a non uniqueness of optimal contracts, if we allowed two different contracts for safe and for risky borrowers. He highlights that every set of two contracts where

$$r_s < \hat{r} \text{ and } c_s > \hat{c}$$

and

$$r_r > \hat{r} \text{ and } c_r < \hat{c}$$

is a possible result, if  $r_s + c_s \leq R_s$  (for more information, Ghatak p. 615).

On the other hand, if the MFI proposes a pooling contract, there is a unique optimal equilibrium equal to  $(\hat{r}, \hat{c})$ , and this contract achieves higher repayment rate than individual liability contracts (Ghatak, p.616).

### 3.3.3.1 List of Constraints

Now, following the list indicated by Ghatak, we investigate the objectives and constraints faced by the lender and by borrowers in the present model:

*i. Objective of the MFI*

The objective of the MFI is to maximize a weighted average of the expected utilities of borrowers.

In Ghatak, we have:

$$V = \theta U_{s,s} + (1 - \theta) U_{r,r}$$

In our model, we have:

$$V = \theta U_s^t + (1 - \theta) U_r^{nt}$$

*ii. Zero profit constraint of the MFI*

The MFI has to choose the expected repayments from each contract at least to cover the opportunity cost of capital  $\rho$ .

(To understand the following simplification we suggest the reader to see *Appendix 4*)

In Ghatak, when the MFI offers two different contracts, it should respect the following constraints:

$$\begin{cases} [r + c(1 - p_s)]p_s \geq \rho & s' \\ [r + c(1 - p_r)]p_r \geq \rho & r' \end{cases}$$

In case of pooling contract, the constraint becomes the following:

$$\theta [r + c(1 - p_s)]p_s + (1 - \theta)[r + c(1 - p_r)]p_r \geq \rho \quad p'$$

In our model, if the MFI chooses the separating contracts, the constraints are:

$$\begin{cases} [r + c(1 - p_r - p_s \alpha + p_r \alpha)]p_s \geq \rho & s'' \\ [r + c(1 - p_s - p_r \alpha + p_s \alpha)]p_r \geq \rho & r'' \end{cases}$$

If the MFI creates a pooling contract, the constraint becomes:

$$\theta [r + c(1 - p_r - p_s \alpha + p_r \alpha)]p_s + (1 - \theta)[r + c(1 - p_s - p_r \alpha + p_s \alpha)]p_r \geq \rho p''$$

It is worth highlighting that the *single intersection property* is satisfied. This property allows that the three indifference curves meet in a single point:  $s'$ ,  $r'$  and  $p'$  and, moreover,  $s''$ ,  $r''$  and  $p''$ . (see corollary 1 in Ghatak (2000) p. 611 and p.617).

iii. *Participation constraint of borrowers*

The participation constraint of each agent requires that her expected payoff is at least as large as the reservation utility  $\bar{u}$ . Simply, in Ghatak, we assume that

$$U_{i,i} \geq \bar{u} \quad \text{where } i = r, s ;$$

and in our model,

$$U_i^y \geq \bar{u} \quad \text{where } y = nt, t \text{ and } i = r, s.$$

iv. *Limited liability constraint*

The limited liability constraint does not allow a borrower to make a transfer to the MFI if her project fails, this means that

$$r + c \leq R_i \text{ where } i = r, s.$$

To satisfy this constraint we allow that

$$\bar{R} > \rho(1 + p_s/p_r)$$

Or, in case of pooling contract,

$$\bar{R} > \rho p_s/p_r + \beta \bar{u}$$

$$\text{Where } \beta = [(1 - \theta)p_r^2 + \theta p_s^2] / p_s \bar{p}$$

Where  $\bar{p}$  is the mean between  $p_s$  and  $p_r$ .

v. *Incentive compatibility constraint*

The incentive compatibility constraint is relevant only if the MFI decides to propose two separating contracts. In our model, the lender proposes a unique contract to both safe and risky agents. As a consequence, in this situation, we do not take into account the following constraint.

Nevertheless, to specify also the former situation, we highlight that, if the lender may desire to propose two contracts, it is necessary that safe people choose the safe contract and risky people choose the risky contract. In this situation, we should allow that

$$U_{r,r} \geq U_{s,s} \quad \text{and}$$

$$U_{s,s} \geq U_{r,r} , \text{ with perfect information within borrowers.}$$

Or

$$U_s^t \geq U_r^{nt} \quad \text{and}$$

$$U_r^{nt} \geq U_s^t , \text{ with imperfect information within borrowers.}$$

Now there are all the elements to characterize the optimal joint liability contract.

### **3.3.3.2 Estimation of the Intersection Point: the Optimal Joint Liability Contract**

In Ghatak, the intersection point of the set of indifference curves of risky and safe agents is represented by the point  $A = (\hat{r}, \hat{c})$ . If the assumption we reported in the previous section are satisfied, this point is the unique optimal pooling joint liability contract in the plane.

$A$  exists and achieves higher repayments rate and welfare than individual liability contracts (Ghatak, p.616).

To calculate the optimal joint liability contract, it is necessary to take into account the zero profit constraint that satisfies the safe and the risky borrowers with equality.

*Situation with perfect information:*

In Ghatak we get:

$$\begin{cases} [r + c(1 - p_s)]p_s \geq \rho \\ [r + c(1 - p_r)]p_r \geq \rho \end{cases}$$

Solving this system we obtain:

$$\hat{r}p_r + \hat{c}(1 - p_r)p_r = \hat{r}p_s + \hat{c}(1 - p_s)p_s$$

$$\hat{r} (p_r - p_s) = \hat{c} [(1 - p_s) p_s - (1 - p_r) p_r] \quad \text{where } p_r - p_s \neq 0$$

$$\hat{r} (p_r - p_s) = \hat{c} [p_r - p_r^2 - p_s + p_s^2]$$

$$\hat{r} (p_r - p_s) = \hat{c} [(p_r + p_s)(p_r - p_s) - (p_r - p_s)]$$

$$\hat{r} (p_r - p_s) = \hat{c} [(p_r + p_s - 1)(p_r - p_s)]$$

$$\hat{r} = \hat{c} (p_r + p_s - 1)$$

Substituting  $\hat{r}$  in one of the two equations we obtain,

$$\hat{c} (p_r + p_s - 1) p_s + \hat{c} (1 - p_s) p_s = \rho$$

$$\hat{c} p_s [p_r + p_s - 1 + 1 - p_s] = \rho$$

The result is:

$$\hat{c} = \frac{\rho}{p_r p_s}$$

and

$$\hat{r} = \frac{\rho}{p_r p_s} (p_r + p_s - 1)$$

or better

$$\hat{r} = \frac{\rho (p_r + p_s - 1)}{p_r p_s}$$

Allowing imperfect information within borrowers, the unique optimal pooling joint liability contract corresponds to  $A = (\hat{r}, \hat{c})$  where  $\hat{c} = \frac{\rho}{p_r p_s}$  and  $\hat{r} = \frac{\rho (p_r + p_s - 1)}{p_r p_s}$ . This is the only point that satisfies the zero profit constraints for both type of agents with equality.

*What happens with imperfect information:*

Following the same scheme, in our model with imperfect information, we consider:

$$\begin{cases} [r + c(1 - p_r - p_s \alpha + p_r \alpha)] p_s \geq \rho \\ [r + c(1 - p_s - p_r \alpha + p_s \alpha)] p_r \geq \rho \end{cases}$$

Solving this system we get:

$$[r + c(1 - p_r - p_s \alpha + p_r \alpha)] p_s = [r + c(1 - p_s - p_r \alpha + p_s \alpha)] p_r$$

$$p_s \ddot{r} + p_s \ddot{c} - p_r p_s c - p_s^2 \alpha \ddot{c} + p_r p_s \alpha c = p_r \ddot{r} + p_r \ddot{c} - p_r p_s c - p_r^2 \alpha \ddot{c} + p_r p_s \alpha c$$

$$- p_s^2 \alpha \ddot{c} + p_s \ddot{r} + p_s \ddot{c} = -p_r^2 \alpha \ddot{c} + p_r \ddot{r} + p_r \ddot{c}$$

$$\dot{r} (p_s - p_r) = (-p_r^2 \alpha + p_s^2 \alpha + p_r - p_s) \ddot{c}$$

$$\dot{r} (p_s - p_r) = [\alpha (p_s^2 - p_r^2) - (p_s - p_r)] \ddot{c}$$

$$\dot{r} (p_s - p_r) = [\alpha (p_s - p_r)(p_s + p_r) - (p_s - p_r)] \ddot{c} \quad \text{where } (p_s - p_r) > 0$$

$$\dot{r} = [\alpha (p_s + p_r) - 1] \ddot{c}$$

Substituting  $\hat{r}$  in one of the two equations we have,

$$[\alpha (p_s + p_r) - 1] \ddot{c} + \ddot{c} (1 - p_r - p_s \alpha + p_r \alpha) p_s = \rho$$

$$[p_s \alpha + p_r \alpha - 1 + 1 - p_r - p_s \alpha + p_r \alpha] p_s \ddot{c} = \rho$$

$$[2 p_r \alpha - p_r] p_s \ddot{c} = \rho$$

$$[2 \alpha - 1] p_s p_r \ddot{c} = \rho$$

we obtain,

$$\ddot{c} = \frac{\rho}{p_s p_r (2 \alpha - 1)}$$

and

$$\dot{r} = [\alpha (p_s + p_r) - 1] \frac{\dot{\rho}}{p_s p_r (2 \alpha - 1)}$$

or better

$$\dot{r} = \frac{\rho [\alpha (p_s + p_r) - 1]}{p_s p_r (2 \alpha - 1)}$$

Allowing imperfect information, the unique optimal joint liability contract

is  $E = (\dot{r}, \ddot{c})$ , where  $\ddot{c} = \frac{\rho}{p_s p_r (2 \alpha - 1)}$  and  $\dot{r} = \frac{\rho [\alpha (p_s + p_r) - 1]}{p_s p_r (2 \alpha - 1)}$ .

Now, we have enough element to compare the value of these two points of interest  $A$  and  $E$  and to understand where they are positioned in the  $(r, c)$  plane.

*Proposition 3 – The value of the intersection point, which indicates the unique optimal pooling contract, is different with perfect information and with imperfect information. In particular making a comparison between  $A = (\hat{r}, \hat{c})$  and  $E = (\dot{r}, \ddot{c})$ , we find that  $\hat{c} < \ddot{c}$  and  $\hat{r} > \dot{r}$ . Introducing imperfect information, the lender proposes a contract with a higher value of joint liability component and a lower value of interest rate.*

*Proof.*

We start to consider the value of the joint liability component in the two points of interest:

In  $A$ :

$$\hat{c} = \frac{\rho}{p_r p_s}$$

and in  $E$ :

$$\ddot{c} = \frac{\rho}{p_s p_r (2\alpha - 1)}$$

We want to demonstrate that the joint liability with imperfect information ( $\ddot{c}$ ) is greater than the joint liability with perfect information ( $\hat{c}$ ):  $\hat{c} < \ddot{c}$ .

We should find for which level of  $\alpha$  it is possible:

$$\begin{aligned} \frac{\rho}{p_s p_r (2\alpha - 1)} - \frac{\rho}{p_r p_s} &= \\ &= \frac{\rho [1 - (2\alpha - 1)]}{p_s p_r (2\alpha - 1)} = \\ &= \frac{\rho [1 - 2\alpha + 1]}{p_s p_r (2\alpha - 1)} = \\ &= \frac{\rho 2 [1 - \alpha]}{p_s p_r (2\alpha - 1)} \end{aligned}$$

This result is always:

$$\frac{\rho 2 [1 - \alpha]}{p_s p_r (2\alpha - 1)} \geq 0$$

because:

$$p_s > 0,$$

$$p_r > 0,$$

$$\rho \geq 0,$$

$$(2\alpha - 1) > 0$$

since  $\alpha > 1/2$  by assumption,

$$(1 - \alpha) \geq 0$$

since  $\alpha \leq 1$ .

Consequently, we can affirm that  $\hat{c} < \ddot{c}$ : with imperfect information the joint liability component is higher compared to the situation with perfect information. *Q.E.D.*

Now, take into account what happens to the interest rate:

In A:

$$\hat{r} = \frac{\rho (p_r + p_s - 1)}{p_r p_s}$$

and in E:

$$\ddot{r} = \frac{\rho [\alpha (p_s + p_r) - 1]}{p_s p_r (2\alpha - 1)}$$

We want to demonstrate that the interest rate with imperfect information ( $\ddot{r}$ ) is lower than the interest rate with perfect information ( $\hat{r}$ ):  $\hat{r} > \ddot{r}$ .

We investigate the level of  $\alpha$  that makes it possible:

$$\begin{aligned} & \frac{\rho (p_r + p_s - 1)}{p_r p_s} - \frac{\rho [\alpha (p_s + p_r) - 1]}{p_s p_r (2\alpha - 1)} = \\ & = \frac{\rho (p_r + p_s - 1)(2\alpha - 1) - (\alpha p_s + \alpha p_r - 1)}{p_r p_s (2\alpha - 1)} = \\ & = \frac{\rho [2\alpha p_r + 2\alpha p_s - 2\alpha - p_r - p_s + 1 - \alpha p_s - \alpha p_r + 1]}{p_r p_s (2\alpha - 1)} = \\ & = \frac{\rho [\alpha p_r + \alpha p_s - 2\alpha - p_r - p_s + 2]}{p_r p_s (2\alpha - 1)} = \\ & = \frac{\rho [-\alpha (-p_r - p_s + 2) + 1(-p_r - p_s + 2)]}{p_r p_s (2\alpha - 1)} = \\ & = \frac{\rho (-p_r - p_s + 2)(1 - \alpha)}{p_r p_s (2\alpha - 1)} \end{aligned}$$

This result is always:

$$\frac{\rho (-p_r - p_s + 2)(1 - \alpha)}{p_r p_s (2\alpha - 1)} \geq 0$$

because:

$$p_s > 0,$$

$$p_r > 0,$$

$$\rho \geq 0,$$

$$(2\alpha - 1) > 0$$

since  $\alpha > 1/2$  by assumption,

$$(1 - \alpha) \geq 0$$

since  $\alpha \leq 1$

$$(-p_r - p_s + 2) > 0$$

since  $p_s < 1$ , and  $p_r < 1$ .



As a consequence, we can affirm that  $\hat{r} > \ddot{r}$ : the interest rate is smaller under the condition of imperfect information, than the interest rate with perfect information. *Q.E.D.*

We notice that when  $(p_s + p_r) \geq 1/\alpha$ , the interest rate  $\dot{r}$  is positive or zero.

$$\rho [\alpha (p_s + p_r) - 1] \geq 0 \quad \text{where } \rho > 0$$

$$\alpha (p_s + p_r) \geq 1$$

$$(p_s + p_r) \geq 1/\alpha$$

On the opposite case, when  $(p_s + p_r) < 1/\alpha$ , the interest rate becomes negative. As a consequence, we can say that if the level of the knowledge about potential partners decreases ( $\alpha$  decreases), to keep the interest rate positive the total probability of succeed must increase ( $p_s + p_r$  must increase).

It is worth highlighting that if  $\alpha = 1$ , there is perfect information in our model as in Ghatak's. As a consequence, there are no differences between the contracts proposed in the two models:  $\hat{c} = \ddot{c}$  and  $\hat{r} = \ddot{r}$ ; moreover, we obtain that  $A = E$ : the two optimal pooling contracts acquire the same value and intersection points lie in the same place in the graph. Decreasing the level of knowledge, the total probability of succeed have to increase to maintain the *status quo*.

Our analysis confirms that  $E$ , which indicates the optimal and unique pooling liability contract, still exists allowing imperfect information ( $\alpha \neq 1$ ). Nevertheless, it changes position.

In particular, comparing the case with perfect information and with imperfect information, we discover that in the latter situation the lender requires a higher joint liability component and a smaller interest rate.

In Section 3.3.2 *Indifference Curves*, we highlight that safe people are more likely to pay the interest rate (instead of the joint liability

component), because they succeed more often; therefore, they prefer a situation where the individual component is smaller and the joint component is greater. On the contrary, risky agents have opposite preferences.

Allowing imperfect information, safe people have not the certainty to end up with safe counterparts, so they may not be interested in signing the joint liability contract and they may get out of the market. To exclude this possibility, the lender can provide a contract with a lower interest rate and a higher joint liability component to satisfy the request of safe agents of reducing the interest rate. Safe borrowers come back in the credit market and they are encouraged to accept the joint liability contract.

An additional point is that, as we report in the section of *Microfinance Supply* (5.1.2.4), a high interest rate can lead borrowers to risk in more profitable activities. As in Stiglitz and Weiss (1981) we suppose that

$$p_s R_s = p_r R_r = \bar{R},$$

as a consequence we have that

$$R_r > R_s ;$$

risky activities are the one having a higher return.

Knowing that there is imperfect information within customers, safe borrowers may not want to sign the contract anymore, since people can decide to undertake a riskier business. On the contrary, if the lender decreases the interest rate, even risky borrowers can be encouraged to choose a less risky activity.

*Lemma 1 – When the value of  $\alpha$  decreases, the knowledge people have about their counterpart declines, and the optimal joint liability contract,  $E$ , shift from the position of the optimal joint liability contract with perfect information,  $A$ .*

*Proof.*

As we stressed before, if  $\alpha = 1$ , we are in a situation where people exactly know their partners; here, the points  $E$  and  $A$  lie together in the  $(r, c)$  plane, since the contracts are just the same. When the knowledge about possible partners decreases, the value of  $\alpha$  declines at the same time, consequently,  $\ddot{c}$  becomes greater and  $\ddot{r}$  smaller.

This happens because in the joint liability component  $\ddot{c}$ , where

$$\ddot{c} = \frac{\rho}{p_s p_r (2\alpha - 1)},$$

the parameter  $\alpha$  appears in the denominator. So, since all the factors in the formula are positive, if  $\alpha$  decreases,  $\ddot{c}$  increases.

In fact we know that:

$$\rho \geq 0$$

$$p_s > 0$$

$$p_r > 0$$

$$(2\alpha - 1) > 0$$

Consider now the interest rate,  $\ddot{r}$ , where

$$\ddot{r} = \frac{\rho [\alpha (p_s + p_r) - 1]}{p_s p_r (2\alpha - 1)}$$

with:

$$\begin{cases} p_s + p_r > 1/\alpha \\ 1/2 < \alpha < 1 \end{cases}$$

To understand the behaviour of  $\ddot{r}$ , when  $\alpha$  decreases or increases, we do the derivative of  $\ddot{r}$  by  $\alpha$ :

$$\begin{aligned} \frac{d\ddot{r}}{d\alpha} &= \frac{[\rho (p_s + p_r)] [p_s p_r (2\alpha - 1)] - \rho [\alpha (p_s + p_r) - 1] [2p_s p_r]}{[p_s p_r (2\alpha - 1)]^2} = \\ &= \rho p_s p_r \frac{(p_s + p_r) (2\alpha - 1) - [\alpha p_s + \alpha p_r - 1] [2]}{p_s p_r p_s p_r (2\alpha - 1)^2} = \end{aligned}$$

where  $p_s > 0$  and  $p_r > 0$ ,

$$\begin{aligned}
&= \rho \frac{[(p_s + p_r)] [(2\alpha - 1)] - [\alpha (p_s + p_r) - 1] [2]}{p_s p_r (2\alpha - 1)^2} = \\
&= \rho \frac{2\alpha p_s + 2\alpha p_r - p_s - p_r - 2\alpha p_s - 2\alpha p_r + 2}{p_s p_r (2\alpha - 1)^2} = \\
&= \rho \frac{2 - p_s - p_r}{p_s p_r (2\alpha - 1)^2}
\end{aligned}$$

All the factors are positive:

$$\rho \geq 0 ,$$

$$2 - p_s - p_r > 0 ,$$

since  $p_s < 1$  and  $p_r < 1$ , always

$$p_s p_r > 0$$

since  $p_s > 0$  and  $p_r > 0$ , always

$$(2\alpha - 1)^2 > 0$$

It is well-known that, if the derivative have a positive sign, if  $\alpha$  decreases,  $\dot{r}$  does the same, or, on the other hand, if  $\alpha$  increases,  $\dot{r}$  does the same.

*Q.E.D*

The intuition is that, if  $\alpha$  increases, the pooling joint liability contract with imperfect information (named *E*) shifts from a general position in the north-west area<sup>14</sup> to the pooling joint liability contract with perfect information (named *A*). The reason is that, as we highlighted before, if  $\alpha$  increases, its value tends to 1. And, if  $\alpha = 1$ , the two points *E* and *A* lie in the same place, meaning that perfect information is present in both models.

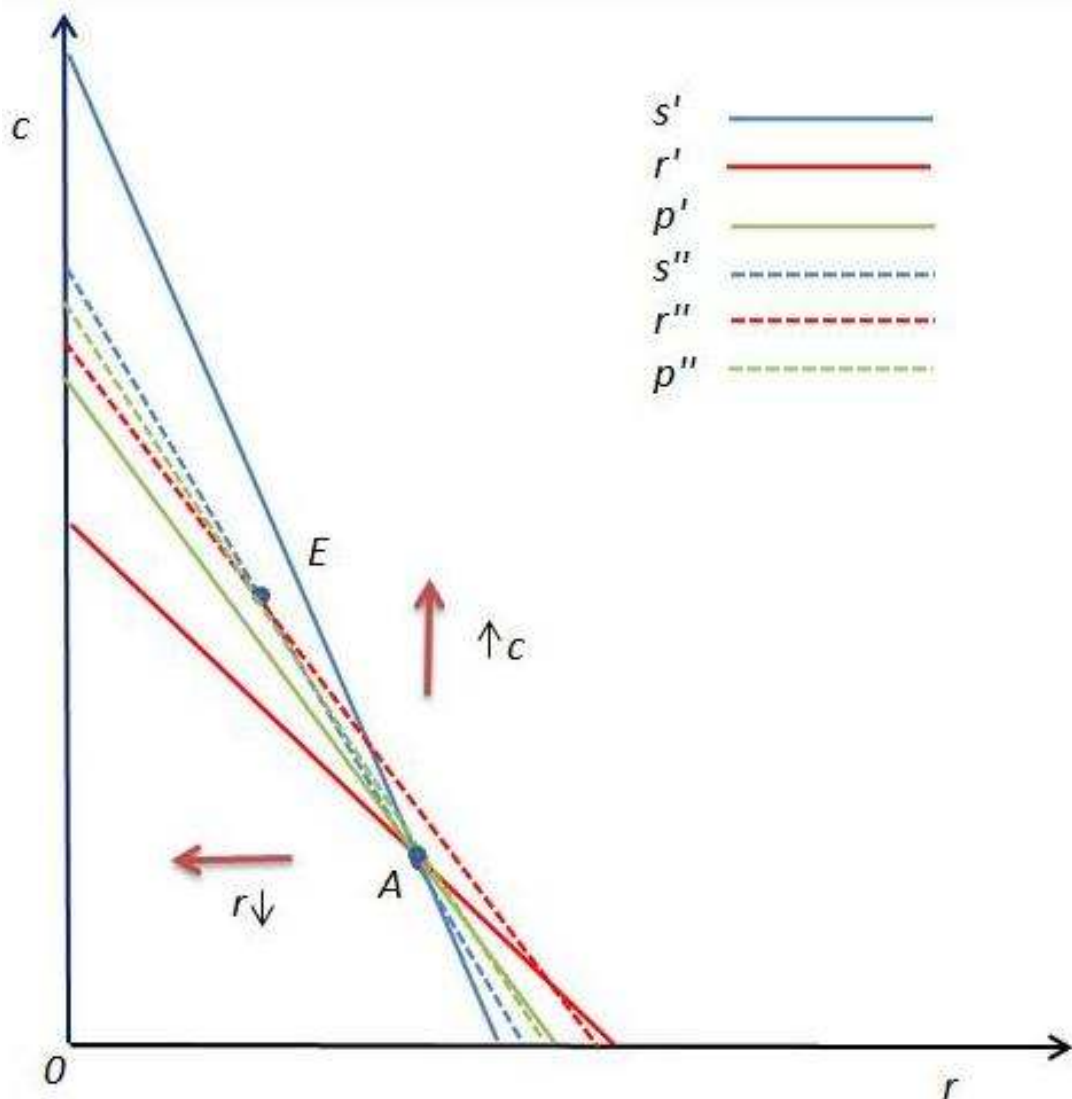
Graph 2 highlights the differences between the situation with perfect information and the one with imperfect information. It is worth observing the inclination of the curves and the position of the two points of interest: *A* and *E*.

In the present figure the point *E*, which represents the optimal contract with imperfect information, is the intersection point between  $s''$ ,  $r''$ ,  $p''$ ; the

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<sup>14</sup> With respect to *A*, the point that indicates the joint liability contract under the condition of perfect information.

corresponding contract with perfect information,  $A$ , is the intersection point between  $s', r', p'$ .



**Graph 2 - Indifference curves with perfect and imperfect Information and optimal joint liability contracts**

$E$  is located in a different position with respect to  $A$ . They both lie on their own pooling indifferent curve:  $p''$  for  $E$  and  $p'$  for  $A$ . However, since we demonstrated that  $\hat{r} > \check{r}$ ,  $E$  appears to the left of  $A$ ; moreover, since we found that  $\hat{c} < \check{c}$ ,  $E$  appears higher above  $A$ . We can say that  $E$  lies in the North-West area with respect to  $A$ .

The red lines in the graph illustrate the movements of the analysed point  $E$ . It is worth remembering that when  $\alpha$  decreases,  $E$  shifts from  $A$ , because the knowledge of the partners is reduced.

A limit of the present paper is not to consider where exactly the point  $E$  is located, we only explicit its position in relation to the point  $A$ . To discover the right position of  $E$  we should know the values of the variable in the model, such as  $\alpha$ ,  $p_s$ ,  $p_r$  and  $\rho$ .

Making a comparison between individual lending and group lending, it is easy to recognize that the welfare is higher in the second situation, even in case of imperfect information within borrowers. In microcredit, both safe and risky people have the access to the credit market and the chance to borrow money to develop their activity. The only constraint, borrowers have to face, is to find a partner in peer selection. The partner should be reliable (even in the case of a risky borrower), since people co-sign a contract and they have a joint responsibility for the loan repayment.

The past literature stresses that, if the lender provides only individual lending, safe people do not accept the contract because the interest is too high for them; as a consequence, they are driven out of the market. On the contrary, microfinance theory maintains that group lending brings safe agents back into the market: the presence of the joint liability component permits to lower the interest rate, and safe people become interested in co-signing a microcredit contract.

In particular, in an environment with imperfect information the lender proposes a contract with an exceptionally low interest rate to satisfy the participation constraint of safe people. Nevertheless, in this situation the joint liability component is higher than in the case of perfect information; the reason is that, with imperfect information, there is more uncertainty in the environment, as a consequence the social collateral should be stronger to guarantee the group lending mechanism.

#### **4 Microfinance Demand in the World**

The financial market should meet the necessities of everyone, including the poorest: even this category has a range of financial needs, as, for example, credit loans, saving services and insurance.

Nevertheless, more than 80% of the global population has no access to financial services, since they are considered *unbankable*. In addition to this, more than 3 billion people live on less than US\$2 per day<sup>15</sup> and 200 million people on less than US\$1<sup>16</sup>. The formal sector (traditional banks) does not take into account this part of the population; however, poor people are neither a niche nor an irrelevant market.

Data of the Microcredit Summit Campaign Report 2007<sup>17</sup> highlights that, as of December 2006, there were microfinance institutions (MFIs) are 3,316 around the world, and together they reached more than 133 million clients. Two third of the total of microfinance customers were below the poverty line when they took out their first loan (living on less than US\$ 1 per day). Moreover, data collected reports that 85% of the clients are women (79,130,581).

Taking into consideration data from 2006, and assuming that, in a family, there may be five people, we calculate that microfinance benefits could affect 460 million people on the whole. However, even if MFIs are growing as a number, and microfinance has great impact on people and on business environment, poverty still persists. An additional issue to consider is the different situations between countries in the world, which highlights various experiences of microfinance. The Microcredit Summit Report 2007 divides countries into two regions: Developing World and

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<sup>15</sup> Source: World Bank web site

<sup>16</sup> Source: Microfinance Summit Campaign (2007)

<sup>17</sup> At the moment data of 2006 is the most updated, by the end of the present year (in December 2008) it will be possible to analyse the one of 2007.

Developed World<sup>18</sup>. MFIs are placed in the whole world, however, there are some areas where institutions are more present and provide services for a great number of poor people (see Table 1).

| region                         | number of programs reported | number of total clients 2006 | number of poorest clients 2006 | number of poorest women 2006 |
|--------------------------------|-----------------------------|------------------------------|--------------------------------|------------------------------|
| Sub-Saharan Africa             | 970                         | 8,411,416                    | 6,182,812                      | 4,036,017                    |
| Asia and the Pacific           | 1,677                       | 112,714,909                  | 83,755,659                     | 72,934,477                   |
| Latin America & Carabbean      | 579                         | 6,755,569                    | 1,978,145                      | 1,384,338                    |
| Middle East & North Africa     | 30                          | 1,722,274                    | 755,682                        | 621,111                      |
| Developing World Totals        | 3,256                       | 129,604,168                  | 92,672,298                     | 78,975,943                   |
| North America & Western Europe | 39                          | 54,466                       | 25,265                         | 11,765                       |
| Eastern Europe & Central Asia  | 21                          | 3,372,280                    | 225,011                        | 142,873                      |
| Developed Countries Totals     | 60                          | 3,426,746                    | 250,276                        | 154,638                      |
| Global Totals                  | 3,316                       | 133,030,913                  | 92,922,574                     | 79,130,581                   |

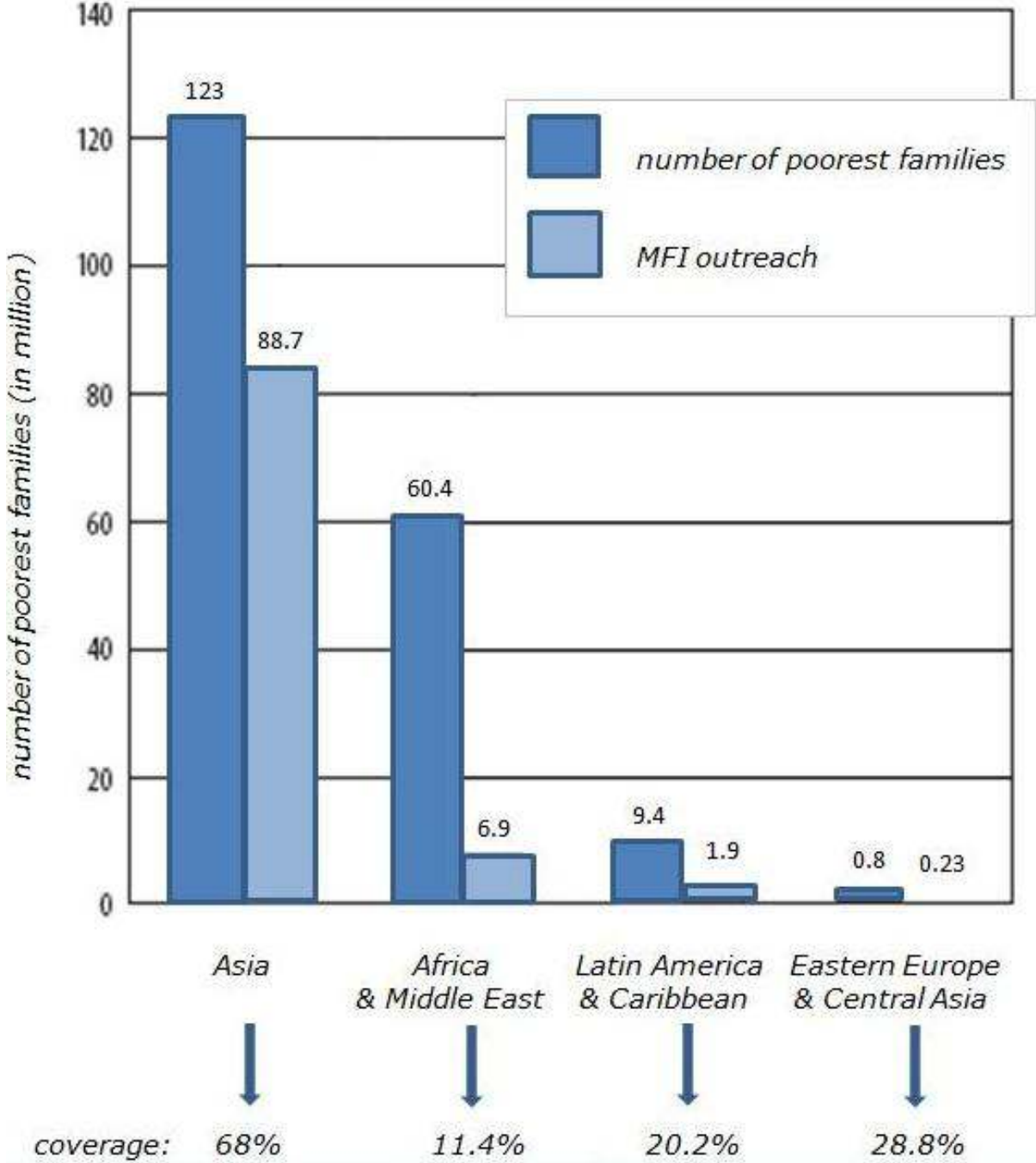
**Table 1 - Figures of The Microfinance Situation in the World as of 31th December 2006: Regional breakdown of microfinance data (Source: State of the Microcredit Summit Campaign Report 2007)**

The number of MFIs in developing countries is a long higher than the one of MFIs in developed countries. In addition, it is worth considering the enormous number of people reached in Asia and the Pacific: more than

<sup>18</sup> Even if our analysis considers Developing Countries opposed to European Countries, this data can be useful to understand some trends affecting microfinance clients and MFIs around the world.



112 million people: five times more than the sum of people reached in other countries (sum: 23,740 million).



**Figure 2 - Regional breakdown of access to microfinance, Source: Microcredit Summit Campaign Report 2007**

Moreover, Figure 2 represents the relationship between the number of household living in absolute poverty (people living on less than US\$ 1 per day adjusted for PPP, source: Microfinance Summit Campaign Report 2007), and the number of poorest household that MFIs service. Data is classified by four regions: Asia, Africa and The Middle East, Latin America, Eastern Europe and Central Asia. This graph gives us the microcredit demand covered by MFIs' programs.

It is easy to see that only in Asia supply overcomes half of the poor population, covering 68% of the demand. In Africa and in the Middle East the microfinance supply cannot reach all the demand, and the coverage is only 11.4% of people. This is a critical problem, since poverty in these areas is very high: there are 60.4 million poor people. In the other two areas (Latin America & The Caribbean, Eastern Europe & Central Asia) microfinance covers between 20% and 30% of the poorest households, a still small portion of the population.

Moreover, we can consider in our analysis an additional issue: why are poor people excluded from traditional credit systems?

Ciravegna and Limone (2006) lists different elements that may influence the exclusion of part of the demand from the credit market:

- 1) *Geographic exclusion* – In some areas, especially in developing countries, banks or financial organisations are not present all over the country. Most of the time, in rural areas, to reach the closest bank people have to travel a lot.
- 2) *Social exclusion* – It could happen that institutions do not focus their marketing policies on market niches less profitable than others. This consideration may reduce credit possibilities for poor people.
- 3) *Product exclusion* – Traditional institutions rarely consider products *ad hoc* for poorest people who cannot fit with general conditions required by traditional financial products.

4) *Self exclusion* – Sometimes, as in either developing countries, or industrialized economies, poor people are afraid to ask for a loan, since they do not have confidence in banking institutions which appear far from poor customers. So, people choose not to contact a bank to ask for a loan.

5) *Economic exclusion* - If the cost of loan repayment becomes prohibitive for poor people, they probably choose not to borrow.

All these types of exclusions bring the poor agent to the condition of unbankable or unbanked. However, the list of the reasons of possible exclusion can be longer:

6) *Job creation and enterprise creation* – In some institutional environments borrowing money is not always easy to do, even if the business project is suitable. Maybe clients do not have any collateral, or they do not have any previous experience.

7) *Business requirements and necessities* – Especially in developed countries, there are formal requirements that enterprises should respect, as for example, the publication of balance sheets. Furthermore, businessmen can find difficulties, since they may be asked to present a list of documents when requiring a loan, such as a business plan. This possible lack of knowledge that borrowers can face should be overcome by MFIs providing additional services, especially additional business services giving personal assistance and support to their customers.

#### **4.1 Microfinance Demand in Developing Countries**

*Note: We would like to highlight that with the term "developing countries"; we consider both developing countries (as emerging economies) and least developed countries.*

The greatest part of poor people in the world live in developing countries. As a consequence, there is an urgent need of microfinance

because it symbolizes the hope of change and rescue for many of them. The microfinance demand in these countries is urgent and huge, it represents the main part of the global demand itself, not only because it is stimulated by the presence of several MFIs, but also, there are so many poor in these areas that the majority of people are considered unbankable by traditional institutions. Most of the time, the agents asking for a loan (or additional financial services) are women since they are often socially and economically excluded from the society where they live.

#### **4.1.1 Microfinance Customers' Profile**

*Poverty level* – Analyzing the average customer of a MFI, we should define the idea of “poor” and the possible classifications of poverty we find in the literature.

Many experts try to describe and specify the concept of poverty. Poverty has many faces, changing from place to place and across time: a common method is to consider incomes or consumption levels of households. A person is “poor” if the level considered is below some minimum level necessary to meet basic needs, this minimum is called “the poverty line” and varies in time and place. Each country uses a different line which is in coherence with the level of social environment and norms, development and values. (World Bank Web Site)

Measuring the poverty level around the world it is worth using a common reference poverty line. For a better aggregation and comparison between different countries and zones, international institutions set the level at US\$ 1<sup>19</sup> and US\$ 2 a day.

UNDP<sup>20</sup> estimates that there are more than one billion people living at the margins of survival on less than US\$ 1 a day (193.6 million people<sup>21</sup>) ,

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<sup>19</sup> Nowadays, the World Bank has changed this level from US\$ 1 a day to US\$ 1.25 a day.

<sup>20</sup> UNDP: United Nation Development Program

<sup>21</sup> Microcredit Summit Report 2007

and 2.6 billion living on less than US\$ 2 a day, which represent 40% of the world population (source: UNDP website)<sup>22</sup>.

Microfinance aims to reach poor people. In particular, in Yunus<sup>23</sup>'s vision, the main goal of microcredit should be helping the poorest between poor, giving them the chance of redemption.

There are several classifications of the poverty levels. A first taxonomy is Remenyi's (1993) pyramid. The author develops a pyramidal model that highlights the diversity of economic positions inside the concept of poverty itself. He presents five groups in relation to the rank of their economic condition and to the number of poor people in the world. The result is critical: the largest group is the one on the bottom of the pyramid, which corresponds to the vulnerable people, the poorest among the poor.

The five groups of Remenyi's pyramid are reported in Figure 3:

- 1) *Near poor* – Employers whose family members have a job, but who live in a poor environment, consuming goods produced by other poor. This category includes for instance, drivers, cleaners, guards, gardeners.
- 2) *Entrepreneurial poor* – Self-employed people whose enterprise provides services for other poor; usually, they employ five or more people. For example, in this group, we find metal fabrication, textile trade, small production factories; they are generally men.
- 3) *Self-employed poor* – In this category there are people who work for themselves, but they do not have other employers in their business. Most of the time they provide daily services, as for example tailoring. They are usually women.
- 4) *Labouring poor* – Self-employed itinerant people called “underemployed”. They usually do daily jobs which are neither regular nor stable. For example daily construction workers.

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<sup>22</sup> This data is only an estimation; so, it may be possible that different organizations affirm to have found different levels of poverty.

<sup>23</sup> Yunus (1999)

5) *Vulnerable poor* – People who are dependent on other people’s earnings, even if they sometimes have part-time or daily occupations. They usually are old people who are not able to work anymore, or women and children socially and economically excluded from society.



**Figure 3 - Remenyi's Poverty Pyramid, Source: Sandra Nowland-Foreman, "Microfinance at Its Best" (2001)**

People in each category have different necessities varying in accord to the gender, environment, ethnic background and status. All the poor in Remenyi's pyramid represent the demand of micro financial services. Each MFI should find the target of people it wants to lend to. The first expression of microcredit, as for instance Grameen Bank, considers the mission to provide credit to the last category of people: vulnerable people.

Nevertheless, advanced experiences of MFIs underline the necessities to consider other categories, since they are excluded from the credit market by the traditional credit system.

It is worth to saying that the first categories in the list (for instance near poor or entrepreneurial poor) usually require credit for productive needs, as for example to expand their business. On the other hand, people belonging to the last categories, such as vulnerable people or labouring people require money for consumption needs; furthermore, they need income protection as the possibility to subscribe a micro insurance.

Moreover, a second criterion of classification of poverty divides poor people into six categories observed: Wealthy, Non Poor, Vulnerable Non Poor, Moderate Poor, Extreme Poor, Destitute. This criteria seems to focus more on the poorest (Figure 4).

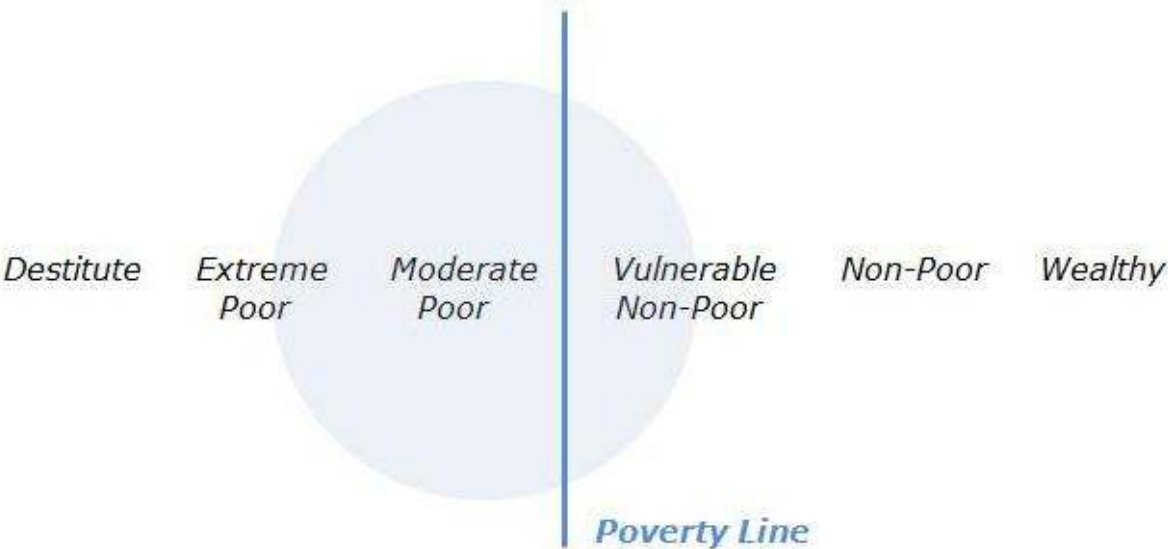
Sebstad and Choen's research (2003) finds out that most of the microfinance clients fall around or just below the poverty line. Wealthy, Non-Poor and Destitute are usually not microfinance clients, typical customers of MFIs are the Moderate Poor and other categories just around it. In its report in 2006, CGAP<sup>24</sup> highlights that another study, observing clients of seven MFIs in four countries (Bolivia, Bangladesh, Uganda, the Philippines), reinforces this result. The report proves that most microfinance borrowers are Moderate Poor or Vulnerable Non-Poor, only some Extreme Poor are present in the group. Moreover, if an institution decides to target the poorest between the poor, it chooses usually to serve Extreme Poor: Destitute are rarely taken into account by microfinance programs.

Moreover, the Microcredit Summit Campaign (2007) sustains that two-thirds of the clients of microfinance's programs are far below or less than the poverty line.

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<sup>24</sup> The CGAP is the Consultancy Group to Assist the Poor. It is housed at the World Bank, but it operates as an independent entity. In particular, it provides research, consultancy and more on the microfinance issues.

There may be incoherence of results between different institutions. Nevertheless, a data seems to be clear: providing credit for destitute households and the poorest is very difficult, nowadays. This means that microcredit and microfinance should improve their methods and their technologies. Innovation is needed to reach poorest people, too.



**Figure 4 - Microfinance Clients, Source: Sebstad and Cohen, "The Impact of Microfinance", July 2003**

There are great debates on moral issues. As we have already said, some pioneers, and Yunus among them, say that the main goal of microfinance should be helping destitute people: a lot of MFIs are accused of not considering this category of poor and to dedicate their attention to more profitable customers.

Moreover, a CGAP report (2006) highlights an additional question of public policy: there are great public investments in microfinance, so, public authority can demand that public funds go to programs which focus on the poorest people, since this niche is not usually considered by other microfinance institutions.



*Location* – Typically, in developing countries, microfinance clients live in rural areas, they are engaged in small income activities or they are small farmers. Nevertheless, many recent MFIs provide microloans for people living in urban areas, especially in the suburbs of the cities.

In urban areas people reached are usually heterogeneous: artisans, shop entrepreneurs, street vendors, farmers. Comparing microfinance between countries and regions, we discover that, in Latin America and East Africa, the demand of microfinance is prevalently in urban and semi-urban areas, however, in Asia, especially in the South, the pressing demand is from rural people, most of the time, women (CGAP research, 2006).

*Gender* – Most of the microfinance clients in developing countries are women. The Microcredit Summit Campaign Report 2007 states that there is an increasing number of very poor women reached by MFIs. As we said before, at the end of 2006, women present in microfinance programs were 79.1 million, 85.2% of 92.9 million of poorest clients reached in total.

Figure 5 reports the historical data of the past seven years, showing the growth in providing loans to poor women. A peak is present between 2002 and 2003; nevertheless, data stresses a great incrementing number of women clients around the world every year.

There are several reasons to explain the desire of women to take out a loan and the choice of MFIs to lend to them:

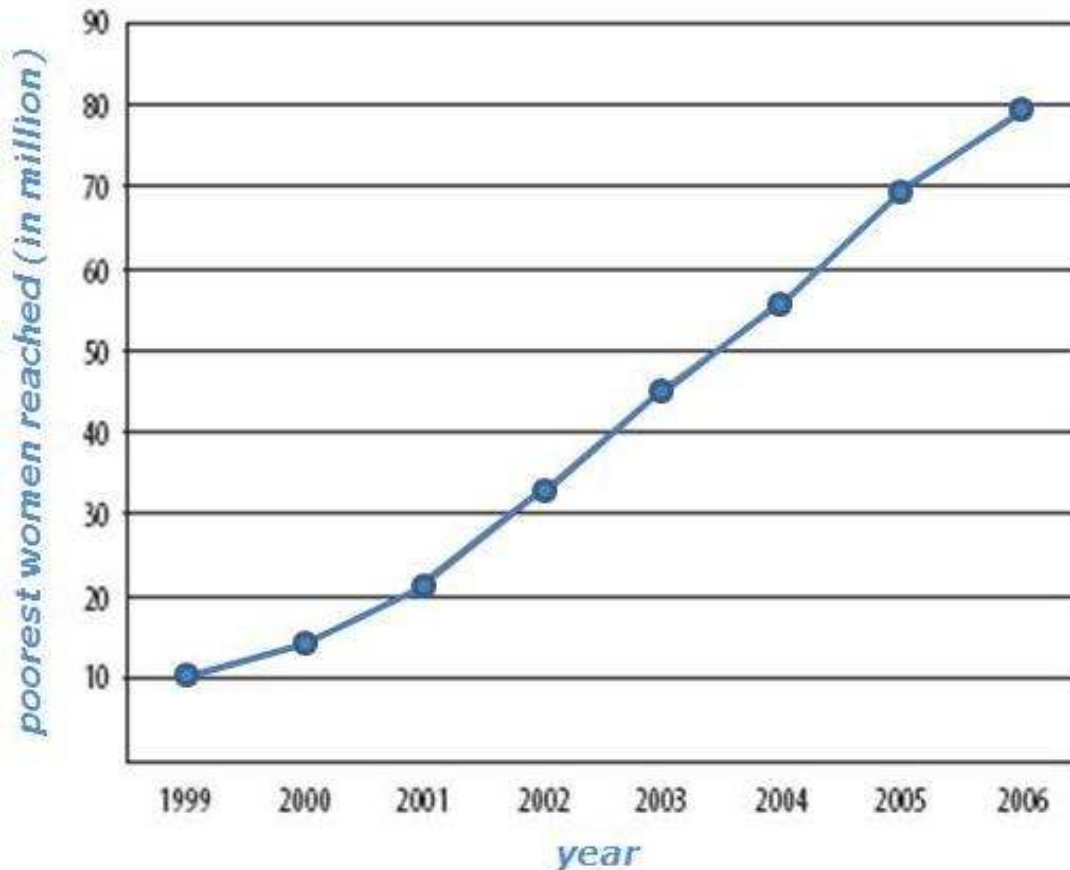
*1) More sensitive to the family necessities*

Several institutions affirm that women usually spend more of their income to help family necessities; UNCDF affirms that “assisting women therefore generates a multiple effect that enlarges the impact of institutions’ activities”<sup>25</sup>.

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<sup>25</sup> Source: Cheston and Kuhn (2002)

Moreover, credit to women has an intergenerational component since “the poverty of the women generally results in the physical and social underdevelopment of their children”<sup>26</sup>.



**Figure 5- Growth in poorest women reached by MFIs in the last seven years. Source: Microcredit Summit Campaign Report (2007)**

If a woman is poor, her children have little chance to go to school or to grow up with a good education, or in a healthy and dynamic social environment: on the contrary, they will probably become poor people. Microfinance can help women develop their capabilities, it can help their business create a better environment for themselves and their families.

<sup>26</sup> Microfinance Summit Campaign, web site. Why do MFIs target women?

## 2) *Good at risk*

IFAD (International Fund for Agricultural Development) reports in its website that usually poor women have the best credit ratings. For example in Bangladesh, women repayment default on loans are less than the one of men. A possible explanation is the fact that women have fewer chances to take out a loan; consequently, having lower opportunities, they should manage the credit MFIs' lend them in a better way.

## 3) *Women are the poorest of the poor*

INSTRAW (United Nations International Research and Training Institute for the Advancement of Women)<sup>27</sup> affirms that more than 1 billion people live in poverty in the whole world, and a great majority of them are women; furthermore, UNDP reports that 70% of the poor people are women<sup>28</sup>. It is commonly recognized that women are the poorest between the poor, having the highest unemployment rates<sup>29</sup> and being lower paid. Baden and Milward (1995) highlight that most of the time the problem is not the level of richness declared by women, but their vulnerability. Even if sometimes women are richer than men, once they become poorer, they have fewer opportunities to evade this condition. Microfinance can alleviate women vulnerability, since it can produce access to capital and chances to acquire more reliability on the eyes of the social environment. INSTRAW highlights that even if the international institutions focus their attention on the reduction of the gender inequalities and women poverty, however, the number of poor women is progressively increasing and reaching prohibitive levels.

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<sup>27</sup> Source: INSTRAW Web Site

<sup>28</sup> UNDP Human Development Report 1995 focus on women poverty reduction: "Gender and Human Development"

<sup>29</sup> World Bank website

#### 4) *General development*

UNDP, UNIFEM<sup>30</sup>, and the World Bank discover in their research that the gender inequality in developing countries inhibits economic and social development (Cheston and Kuhn, 2002). For instance, the UNDP discovers a correlation between gender empowerment measures and general gender development indexes. Moreover, the World Bank (2001) analyses the societies that discriminate women, finding a slower growth in their economies, general lower standards and weak political governance. Another example of how women can be relevant for the economic growth is the company's performance study done by Mc Kinsey (2008). Even if this survey is done on the company's level, it finds the same results of international organisations. The best performing companies have more women in its top management, considering women a great human resource. All this research stresses that women on the whole can have an active and dynamic role in society. Gender equality, in societies, as in companies, can be a critical component of successful strategies. In addition, if women can participate actively on the global work, the labour force becomes higher than the present one, and more people working means more resources in the national economy, reflecting the possibility of a higher GDP.

Microfinance can develop women's productivity, capacity and creation, since, as CIDA (Canadian International Development Agency) declares in its policy in 1999, "Development results cannot be maximized and sustained without explicit attention to the different needs and interests of women and men".

#### 5) *Gender issue*

In many traditional societies, women are excluded from the market economy: even if they have to work and look after all the family,

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<sup>30</sup> UNIFEM: United Nations Development Fund for Women

men manage money and cash income. Most of these societies are in South Asia, East and Central Africa. Microfinance can be an effective tool or a starting instrument to empower women, since they are responsible for the loan repayment and the bridge between the household and the financial institution. "Women themselves benefit from the higher social status they achieve within the home when they are able to provide income" (Microfinance Summit Campaign, web site). Even if the pioneering women taking loans were criticised severely, MFIs did not stop providing loans to women, and nowadays, in a great portion of societies, it is widely accepted that women can dynamically participate in business activity, and play a role in the local economy.

A second important point is that women's equal opportunity – to work, to have credit access, to manage their income – is a human right. A lot of international organisations, such as CEDAW (Convention on Elimination of Discrimination Against Women), BPFA (Beijing Platform for Action), Amnesty International, are promoting human rights all over the world, and they consider microcredit as a possible instrument to increase women's access to financial resources.

Even if many schemes in microfinance are designed to provide credit access for women, we cannot be sure that, after the disbursement, women are managing the money themselves the money or their position in the family is empowered.

*Business* – There is a growing understanding that not all poor people are entrepreneurs; MFIs have to take this into account when providing financial services to other categories of the population, too. The microfinance demand comes from factory workers or skilled working women. The recognition of the diversity of necessities and experiences

has great implications and it can develop a better financial environment, not just for small entrepreneurs, but it can satisfy the entire demand. For instance, pensioners need a safe system for receiving gradually their pension and people need mortgage loans to repair an old house or to buy another one. It is straightforward to understand that different people require different services. For further information, we suggest you to read the next section Needs of Poor People.

#### **4.1.2 Needs of Poor People**

MFIs should meet the market; consequently they should be able to really understand the demands of their customers, in order to provide the best of financial services. This explains the passage from microcredit (where the institution only lends money) to microfinance (where the institution proposes to customers a wide range of services such as micro insurance and money transfer, in addition to the credit loan). Moreover, in the last few years, MFIs have started to provide further business services to help people developing their business.

Nineteen years ago, a journalist interviewed Muhammad Yunus, Nobel Peace Prize winner for 2006, asking him what was the first thing a woman does after taking out a loan<sup>31</sup>. The expected answer was that she uses the money for sending her children to school, or feeding her family. The real answer was different, and it explains to us the painful situation of poor people in Asia and what they have to put up with: "The first thing she usually does is bring her children home" he said. This means that parents have not enough food to feed their children, so they send them to other families to work as servants, even if they are as young as six years old. The present case represents one of the most upsetting situations people have to face.

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<sup>31</sup> The interview is reported by Microcredit Summit Campaign 2007

However, there are different reasons for borrowing money, which change at different points of time. Rutherford (2005) in his book lists three main reasons why poor people borrow money:

- 1) *Life-cycle events* – In this category, we find all the once-in-a-lifetime occurrences, such as birth, marriage and death, moreover, occasional incidents, such as school fees, and, in addition, exceptional events such as home-building or special status, as widowhood. This need can be anticipated, although the exact date is not always known.
- 2) *Emergencies* – Some emergencies can be completely outside the control of people, as, for instance, personal crisis (sickness), theft, sudden loss of employment and injury. In addition to them, there are weather and environmental accidents, such as cyclones, floods, wars. For all these situations people have an urgent need of cash.
- 3) *Opportunities [of business]* – To develop an area or to help people overcome critical situations the access of credit can represent the beginning of a new activity: borrowers can transform themselves into entrepreneurs starting a new business or developing the old one. Additional investments can be land and household assets that make life more comfortable.

All the present circumstances involve the necessity of money. If the borrower is poor, and not considered by the traditional credit system, microfinance can be the answer to these necessities.

#### **4.1.3 Demand of Financial Services**

It is well-known that clients demand more than microcredit. Poor people need a range of financial services and options: credit, savings, micro insurance formulas, money transfer facilities etc. Furthermore, in particular situations, people ask for additional business services (see Section 4.2.4 *Demand of Business Services*). The CGAP, in its report

“Access for all” (2006), describes each financial service required by customers. Here we summarize briefly the main figures:

*Credit* – The main core of microfinance is microcredit: credit is given to poor clients who become bankable. As we describe in Section 2.2 *Exclusion from Credit market*, poor people are excluded from traditional banking systems. Nevertheless, they still have to borrow to develop their business activities or to increase their level of consumption. It is proved that if poor customers have the possibility to borrow money, they repay their loans more often than the other categories of borrowers, even if they have to sustain a higher interest cost. The collateral required is a social one: credit becomes possible as borrowers form groups and have a joint responsibility of the loan. Another tool used by MFIs is the promise of permanent access to future credit: if a borrower repays regularly, she can obtain additional loans in the future, this condition motivates customers to pay back on a regular basis. Moreover, repayments are scheduled very frequently.

*Savings* – Even poor people have to save. However, traditional banks do not consider their need, because of their low income. Christen, Rosenberg, and Jayadeva (2004) maintains a CGAP research which reveals that there are four times more savers than borrowers in the world, this means that the demand of saving is essential, even more than the need of credit. However, if we compare MFIs’ products, very few institutions dedicate their attention to proposing saving services to their clients. A possible hypothesis is that not many people believe that saving can eradicate poverty finding in credit services the right development tool.

Nowadays, some MFIs allow their customers to have a saving account to overcome any losses in the customer’s business. In addition to this, MFIs can provide services such as pension deposits. For example,



Grameen Bank, which proposes this possibility to its customers, reports that clients save more than the minimum required by the institution; in the last three years, the deposit fund was US\$ 37.2 million<sup>32</sup>.

The consequence of the absence of saving services is that, especially in developing countries, people save in informal ways, by for example keeping cash under the mattress or by buying an animal. These methods are risky (someone can steal the money) and sometimes illiquid (you cannot partition an animal to provide a small amount of money).

*Money transfers* – There is a lot of research explaining the great aid of remittances of migrants to their relatives, nevertheless, this way of transfer is not the only necessity of poor people. People need to transfer money, internationally and domestically, they may have a part of the family in other countries or cities. In developing countries, there are difficulties in transferring money from a point to another; for instance, travelling with a large amount of cash can be very risky as it might be get lost or stolen. Furthermore, some institutions are not terribly reliable, once a client gives the money to transfer it is not always sure that the receiver will see the money. MFIs that offer this service can cover the demand and increase the number of transfers within a country or around the world, making the service convenient, safe and cheap.

*Micro insurance* – Micro insurance is a protection against risks that can happen in life, such as a severe illness, the loss of a family worker, and the damage to a house or business assets. Since poor people are vulnerable, these situations are particularly harmful for them. The demand of micro insurance is high; however, it is a recent product for MFIs and it is still in an experimental stage. Technology should study the best balance between the necessary protection of households and the amount they can

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<sup>32</sup> Data from CGAP, 2006

pay to have this service. The range of insurance subjects required by poor people is wide, for instance, they might need an insurance policy related to their health, or to agricultural incidents, or, furthermore, to livestock (something that happens to the business property).

#### **4.2 Microfinance Demand in Europe**

The demand for microfinance in Europe is not as strong as in developing countries. There are several reasons to explain this, as for example, the fact that MFIs started working in Asia and in other poor countries and the experience in industrialized economies is still recent.

In this section we analyse the potential demand for microfinance in Europe: the main necessities people require and the major obstacles they have to face. European microfinance has two main goals: a social goal and an economic development goal, which correspond to two different customers' needs. First of all, poor people ask for a loan because they need money for themselves or for their family, facing a particular situation. This necessity is known as consumption smoothing (see Section 2.1 *Definition of Microcredit and Microfinance*). For example, in this category there are the unemployed, old people, people on low incomes, immigrants. A second point is that the demand of credit can come from micro entrepreneurs who want to create a job or to ameliorate their business. They can be unemployed people or not, immigrants or citizens, but their intention is the same: developing a business.

In the present description, we focus our attention on the second category of people that denotes the main portion of microfinance demand in Europe. The reason is that, if entrepreneurs create a job, they will probably find fewer problems to repay the loan; moreover, this experience can be a great tool in stimulating the social and economic environment.

### 4.2.1 Potential European Demand

The European Commission estimates that the potential demand<sup>33</sup> for microfinance in Europe could reach 6,299 million Euros for the people of EU-27<sup>34</sup> (713,232 loans). This data was collected in 2005, and it refers to 2004, considering people at risk of poverty, potential entrepreneurs, target groups in European countries (Commission of the European Communities, Brussels, 2007, COM (2007) 708 final). Figure 6 sums up these assumptions, representing the portion of people considered that correspond to the potential demand of microfinance in European countries.

*People at risk of poverty* – In this group there are people living in households where equivalised income is below the threshold of 60% of the national equivalised median income<sup>35</sup>. They represent a category in relative income poverty, and Eurostat declares an average risk of poverty of 16% in European countries.

*Potential Entrepreneurs* – People belonging to this group are of an active age (16-64 years old) and face the risk of poverty. Eurobarometer<sup>36</sup> 2005 estimates that only 45% of this group is able to set up a micro enterprise.

*Target Group* – Potential entrepreneurs that have already started a micro business. ILO<sup>37</sup> calculates that this group is only a portion of potential entrepreneurs: 3% or 4%.

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<sup>33</sup> Potential demand here is calculated considering only potential entrepreneurship programs.

<sup>34</sup> EU-27: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom

<sup>35</sup> Source: Eurostat

<sup>36</sup> Source: Commission of the European Communities, Brussels, 2007, COM (2007) 708 final

<sup>37</sup> International Labor Office (Study from 2002, Source: Commission of the European Communities, Brussels, 2007, COM (2007) 708 final)

Moreover, to calculate the potential demand of micro financial services in Europe, we should take into account the previous data, and divide European countries into two categories (EU-15<sup>38</sup> represents the group of old members of European Union, while, EU-12<sup>39</sup> represents the new members of the EU).

Consequently we obtain:

People in EU-27: 330.3 million people

EU-15: 258 million people

EU-12: 72.2 million people

People at risk of poverty: 16% of total population

EU-15:  $16\% \times 258 = 41.28$  million people

EU-12:  $16\% \times 72.2 = 11.552$  million people

Potential entrepreneurs: 45% of people at risk

EU-15:  $45\% \times 41.28 = 18.576$  million people

EU-12:  $45\% \times 11.552 = 5.1984$  million people

Target group: 3% of potential entrepreneurs

EU-15:  $3\% \times 18.576 = 0.55728$  million or 557,280 disbursed loans

EU-12:  $3\% \times 5.1984 = 0.155952$  million or 155,952 disbursed loans

Total:  $557,280 + 155,952 = 713,232$  disbursed loans

Furthermore, considering the average loan

EU-15: EUR 10,240

EU-12: EUR 3,800

The potential demand becomes:

EU-15:  $557,280 \times 10,240 = \text{EUR } 5,706,547,200$

EU-12:  $155,952 \times 3,800 = \text{EUR } 592,617,600$

Total:  $5,706,547,200 + 592,617,600 = \text{EUR } 6,299,164,800$

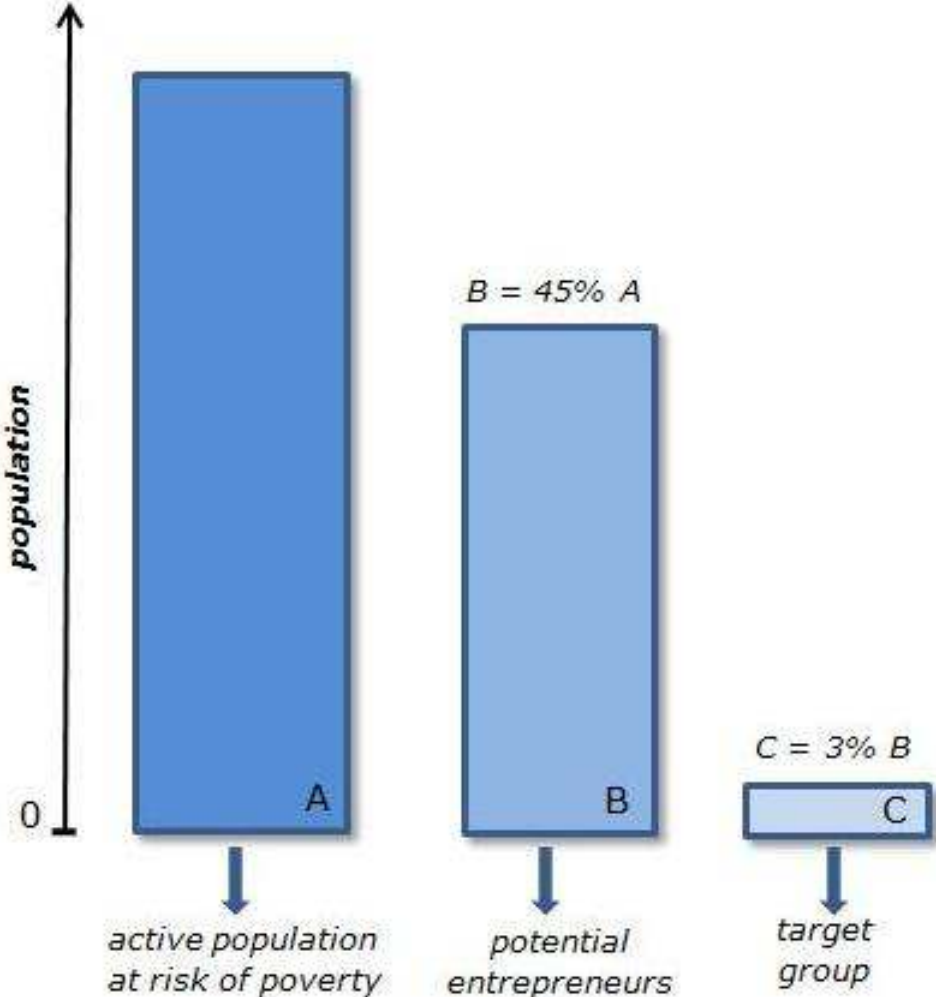
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<sup>38</sup> EU-15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Spain, Sweden, United Kingdom

<sup>39</sup> EU-12: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia

As a consequence, the potential demand for microcredit concerns more than 700,000 people and more than EUR 6,000 million. This market niche could produce profit for credit institutions and microfinance is a way to explore and exploit this market. This result could be even greater if we consider a higher target group, for example 4%.

Moreover, it is worth remembering that this data only concerns the potential demand of entrepreneurial demand in microfinance; for a more complete analysis we should consider other people who need micro financial services for consumption smoothing.



**Figure 6 - Potential demand of microfinance services in Europe, Source: European Commission (2007)**

#### **4.2.2 Major Trends Sustaining the Microfinance Demand**

There are some major trends that influence the demand of micro loans in Europe. Here, we present the most relevant examples:

*Unemployment and Exclusion* – In Europe<sup>40</sup>, the number of unemployed people is 18.5 million (Eurofi<sup>41</sup> web site), it represents 8.6% of the work force. Active population below the poverty line is 28 million people (European Commission, 2007)<sup>42</sup>. It is certain that microfinance can provide credit for a great number of unemployed people producing a new acceleration in job creation and self employment, which assure powerful means towards economic growth and social integration.

*Growing importance of Small Enterprises* – Most European enterprises are very small. In 2007, the European Commission reported that there were more than 21 million small firms (with less than 10 employees), 91.5% of the total number of enterprises in Europe (see Figure 7). Many of these business activities have no access to formal credit, since traditional banks consider lending to small and micro enterprises risky and cost intensive; banks are not interest in lending to small firms that have a high risk of default and low margins, which would not even cover transaction costs. However, the European Commission, through the Lisbon Strategy<sup>43</sup> and other policies, has on many occasions stressed the

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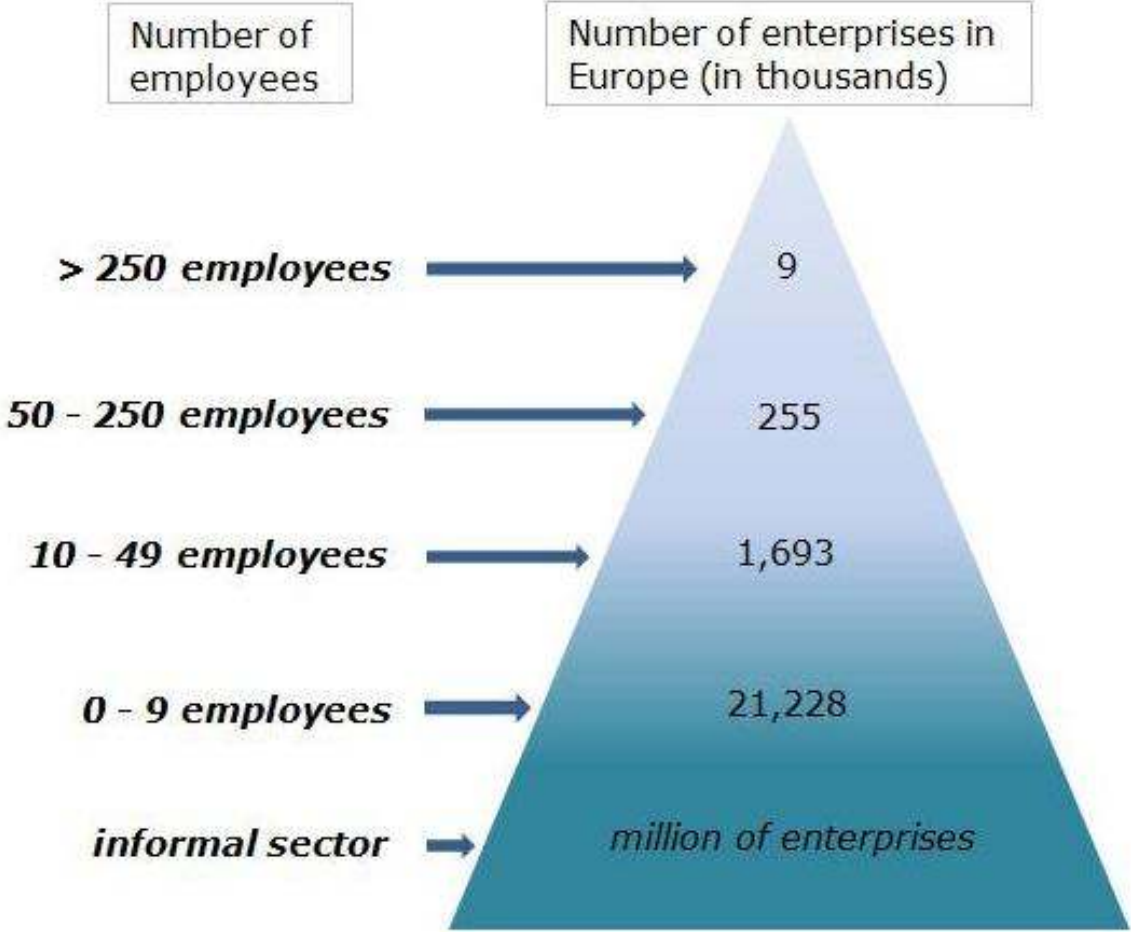
<sup>40</sup> Counting 25 nations: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom

<sup>41</sup> Eurofi is a European think tank dedicated to the integration and efficiency of EU Financial, Insurance and Banking Services markets which provide research on financial services in Europe. This organization counts amongst its members many leading financial institutions active across Europe

<sup>42</sup> Other international institutions or organizations give a different number of poor people. Eurofi, for instance, counts 69 million active people living under the poverty line in Europe

<sup>43</sup> Lisbon Strategy was set up in March 2000 by the European Council. It is a plan of actions, guidelines and goals to develop the market of the European Union. Its aim is to make the EU "the most dynamic and competitive knowledge-based economy in the world

importance of small enterprises in developing the European economy and in stimulating a higher level of employment.



**Figure 7 - Number of European enterprises in thousands classified by company size, Source: Communication of the Commission policies on SME, 10 October 2006, according to Eurostat 2006**

*Role of Informal Sector* – According to some studies in Europe, as in other OECD countries, there is a large informal sector<sup>44</sup> that generates

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capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010".

<sup>44</sup> The definition of informal sector given by ILO (International Labour Organization) is the following: "The Informal Sector is broadly characterized as consisting of units engaged in the production of goods or services with the primary objective of generating employment and incomes to the persons concerned. These units typically operate at a low level of organization, with little or no division between labour and capital as factors of production and on a small scale. Labour relations - where they exist - are based mostly

great incomes. Eurofi reports that in OECD countries the shadow economy's worth is about 14.2% - 15% of the national GDP. In this sector there are three types of activities: crime, undeclared unemployment (which are two categories that we do not consider here) and small activities that generate revenues (which we are interested in). People working in this sector have to be integrated into formal economies to become official and safely grow.

#### **4.2.3 Microfinance Customers' Profile**

*Gender – Location – Business* – The demand of microfinance in Europe is not homogeneous, moreover, there is no typical client profile. We can summarise that borrowers are social welfare recipients, unemployed, members of minority, unbankable, nevertheless, it is not possible to say which job they do, exactly. In addition to this, it is worth remembering that some of them are simply entrepreneurs who want to develop a small or a micro business, and they cannot get a loan for job creation: for 20% of small businessmen in Europe credit access is still a huge constraint<sup>45</sup>.

In addition to this, we cannot generalise about the gender of borrowers, since, usually, there are not institutional policies about any gender preferences.

Another point is that, even if, in developing countries, many programs are present in rural area, on the contrary, in Europe, microfinance projects are usually offered in the most disadvantaged urban areas.

*Immigrants* – Immigrant entrepreneurs represent a possible high potential demand for MFIs in Europe. It is recognized their potential contribution to the European economy, since they show a particular

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on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees”

<sup>45</sup> Data from European Commission, 2003



dynamism and willing in develop enterprises, however, they face more problems than other small entrepreneurs.

|                                 | Belgium                              | France                       | Germany  | Ireland                            | Norway   | Spain  |
|---------------------------------|--------------------------------------|------------------------------|--|------------------------------------|--|--|
| year                            | 2003                                 | 1999                         | 2004   | 2002                               | 2006   | 2005   |
| population (thousand)           | 10,396                               | 58,521                       | 82,532   | 3,859                              | 4,64   | 44,109   |
| number of immigrants (thousand) | 860                                  | 3,263                        | 7,342  | 274                                | 350  | 3,731  |
| % of the population             | 8.3%                                 | 5.6%                         | 8.9%   | 7.1%                               | 7.6%   | 8.5%   |
| number of immigrants from       |                                      |                              |  |                                    |  |  |
| Third World                     | 291                                  | 1,958                        | 5,066  | 87                                 | 252  | 2,956  |
| % of total immigrants           | 34%                                  | approx. 60%                  | 69%  | 39%                                | 72%  | 79%  |
| % of the population             | 2.8%                                 | 3.3%                         | 6.1%   | 2.2%                               | 5.5%   | 6.7%   |
| area of origin                  | 66% EU-15<br>15% Africa              | 40% Africa<br>40% EU         | 80% Europe<br>31% EU<br>12% Asia                                 | 60% EU<br>10% Eastern Europe       | 72% non-Western  | 46% South America<br>18% non-European<br>18% North Africa      |
| largest communities             | 9,5% Marocco<br>4,8% Turkey<br>Conqo | Magreb<br>Sub-Saharan Africa | 26% Turkey<br>F.Yugoslavia<br>Russia<br>Marocco<br>Iran<br>China | USA<br>Nigeria<br>China<br>Romania | Pakistan<br>Vientnam<br>Irak<br>Bosnia-Herzegovina<br>Somalia<br>Iran<br>Turkey<br>Sri Lanka | 55%:<br>Morocco<br>Ecuador<br>Romania<br>Colombia<br>Argentina |

**Table 2 – Non national population by country. Examples of six European countries. Source: Miriam Guzy (2006)**

Miriam Guzy (2006), working for EFN, reports a survey done in different countries, which shows the number of immigrants in six European countries: Belgium, France, Germany, Ireland, Norway and Spain. Table 2 indicates the non national population by country. On average, 7.6%<sup>46</sup> of

<sup>46</sup> The operation is done taking into account the data of Table 2: this is a mean between the percentages of foreign people in the whole population.

the population comes from foreign countries. This data highlights the importance of immigrants in the European labour market.

Moreover, in Table 2 we see the number of people from the Third World, a category which is most of the time more afflicted by poverty than other categories of immigrants. In many countries (Norway, Spain, Germany in the survey) people from the Third World make up the greatest portion of foreigners.

In addition, we report the data about the bigger immigrant communities in the European nations of the survey. In general there is a large diversity of origins, people are from all continents, however, it is easy to see that some communities are prevalent, as for example Turkish people in Germany.

There are both pull and push factors that stimulate immigrants to develop a self enterprise. A first element is that, in Europe, many immigrants are not always socially integrated, moreover, the labour market does not always consider their potential, and as a consequence, self employment can assure high earnings and a social advancement. Guzy reports in her paper (2006) that among many immigrant communities there is a great desire to start an enterprise, far more than the same tendency for other citizens. For example the Network Credit Norway studied in a 10 year period the behaviour of immigrants in the country and it discovers that many of them see self employment as a natural option.

Most of the time, the reason is not the unavailability of waged labour, but it is the presence of a previous personal experience, or an experience of their relatives in the business. A second point is that they face more difficulties in the labour market. For example, they are more affected by unemployment and they are often employed in temporary, dangerous and

damaging jobs<sup>47</sup>, moreover, their skills and capabilities are usually underestimated.

The situation of unemployment can affect the desire to create a new job: a study, done by Constant and Zimmerman in 2004, explains that in Germany unemployed migrants are two times more willing to start an enterprise than employed migrants. In addition to this, they can find market opportunities, since they have complementary skills or networks with citizens; as they have different backgrounds, they speak a different language and they tend to have foreign contacts (maybe for exporting or importing exotic products).

Nevertheless, even if immigrants are strongly motivated in job creation, there are many obstacles they have to face, as for example the need of a diploma for some professions in Europe, or the knowledge of the legal and administrative environment. Moreover, they need all the micro products MFI can provide, such as insurance, money transfer, additional business services etc.

*Awareness* – One of the main problems of providing microfinance in Europe is that MFIs have to make expensive marketing campaigns to reach customers. Firstly, clients have to be found in a huge market: small entrepreneurs are only a small portion of the European population, and they represent a niche market compared to the one of developing economies<sup>48</sup>. Secondly, even if there is an extreme demand of credit, most of the time poor people are not informed about possibilities of rescue. Moreover, in industrialised economies, MFIs rarely send their staff into the field to propose their products to potential borrowers, because it would be

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<sup>47</sup> Guzy (2006) writing for European Microfinance Network

<sup>48</sup> In industrialized countries, people are used to being employees and working in medium or small companies, instead of becoming entrepreneurs.

cost-prohibitive; however, we know that this marketing strategy is the most relevant in developing countries.

*Micro Enterprises* – Micro enterprises need investments to grow; entrepreneurs need credit to create a job and develop their businesses. In this section we want to analyse the attributes of small enterprises which are the main potential clients for MFIs. Some authors (Ciravegna and Limone, 2006, for instance) explain that this type of firm is both the cause and consequence of microfinance in developed economies, since the characteristics of micro enterprises influence the sector development of microcredit and other related financial services. In Europe, it is not the small firm which adapts itself to microcredit; on the contrary, it is the latter which becomes accustomed to this particular customer. On the other hand, microfinance is the means that permits the proliferation of small enterprises.

Most of the small firms that are microfinance clients provide services for their customers, such as baby-sitting, dog-sitting, cleaning services for house and office etc. This category of enterprises has a low added value, a low requirement of human and physical assets, a low need of credit and not very high returns. Nevertheless, there are other categories that can be taken into account and can represent a new potential demand for MFIs: for example young layers or management consultants (Ciravegna and Limone, 2006) who maybe do not have access to traditional credit not having any collateral. This category is a portion of microcredit demand that is rarely taken into account by MFIs.

A critical point for micro firms in Europe and in industrialized countries is that initial capitals necessary to start a business are elevated; furthermore, entrepreneurs have to respect a detailed bureaucracy full of extraordinary and particular requirements. Evading these fulfilments can

be possible in developing countries, but it is not very easy in Europe, since controls and supervisions are often severe.

Moreover, during the micro business activity, the entrepreneur can have managerial problems due to the fact that the success of the business is a mix of great abilities, good network, adequate knowledge of law and legal environment, sufficient managerial skills. As a consequence, small entrepreneurs ask for additional services. The demand for microcredit becomes a demand for micro financial services to support the enterprises, and more business services (see Section 4.2.4 *Demand of Business Services*).

#### **4.2.4 Demand of Business Services**

Micro entrepreneurs and, most of all immigrant businessmen face some obstacles in their business, since they may not have the necessary capital, which can be elevated, to start their work; they might find problems in filling in all the bureaucratic documentation and in understanding a wide range of administrative requirements; moreover, they may have no experience or knowledge in proposing a business plan or in explaining their mission and vision; many of them have insufficient management skills to correctly supervise a business. All of these situations represent the necessity of support, a real demand to be satisfied.

The major instruments demanded by small entrepreneurs are:

- 1) *Administrative requirements and access to information* – Complete access to information and full comprehension of requirements are great elements to acquire before and during a business activity. Most of the time customers need help to understand legal issues, tax law or financial planning about their business. Inexperienced people demand correct information, since these features can menace the enterprise from its beginning. This is a relevant problem for immigrants: in developing countries people are not accustomed

to respecting such a regulated mechanism, since they work in a less rigid environment, and they may not understand the necessity of European bureaucracy. Ignorance of administrative requirement represents the main obstacle for micro entrepreneurs, often aggravated by languages issues.

- 2) *Documentation* – Before starting a new business, entrepreneurs are asked to present a business plan that explains their vision and the business prospective. Poor people or immigrants do not always know how to compose such a document or they may ignore the use of it, preferring to start their business right away.
- 3) *Marketing services* – Poor people may have the need to understand the market in a better way and the chance to develop a business, since they may have a lack of knowledge. A Norwegian research reports by Guzy (2006) stresses the need of small entrepreneurs, especially foreign ones, to learn more about marketing, product selection and pricing or about the recent research analyzing market niches. Sometimes, poor entrepreneurs choose to serve only a small portion of the market, only because they ignore additional possibilities of developing their firm.
- 4) *Management consults* – During business activity entrepreneurs may face managerial problems that they are not able to solve, however, the cost of a management consultant is often prohibitive for them. The characteristics of the support demanded changes with the maturity of the business and the skills of the entrepreneurs. Nevertheless, it is worth recognizing its increasing necessity. Sometimes the only thing that is needed is a bit of advice based on experience, in other situations the demand requires the suggestion of new trajectories or improvements.

## 5 Microfinance Supply in the World

There are more than 3,000 microfinance institutions (MFIs) around the world which providing funds to *unbankable* people. There are a variety of institutions and organizations that provide microcredit and microfinance services around the world: the microfinance umbrella is considerable in size. Firstly, there were only non-profit institutions, but, recently, even banks have found it profitable to enter into the microfinance market. Moreover, there are experiences of hybrid institutions.

Nowadays, as we highlighted in Section 4 *Microfinance Demand in the World*, microfinance customers are 133 million, although, there is an estimation of 500 million potential clients who can be reached<sup>49</sup>. In addition, in Europe, Planet Finance estimates that the microfinance industry, which is still young nowadays, has an annual growth rate of 30%<sup>50</sup>.

Moreover, Morgan Stanley Research (2008) points out that, since the microfinance sector is so young, the growth potential is very high at the moment. Nevertheless, the environment is highly important for MFI evolution: favourable policies can help the growth of these institutions which can mature even more than expected. In addition, the future progress of these institutions is driven by the size of the demand as by the clients' awareness of micro loans and micro financial services. However, the microfinance supply *panorama* is not homogeneous: there are few divergences between countries.

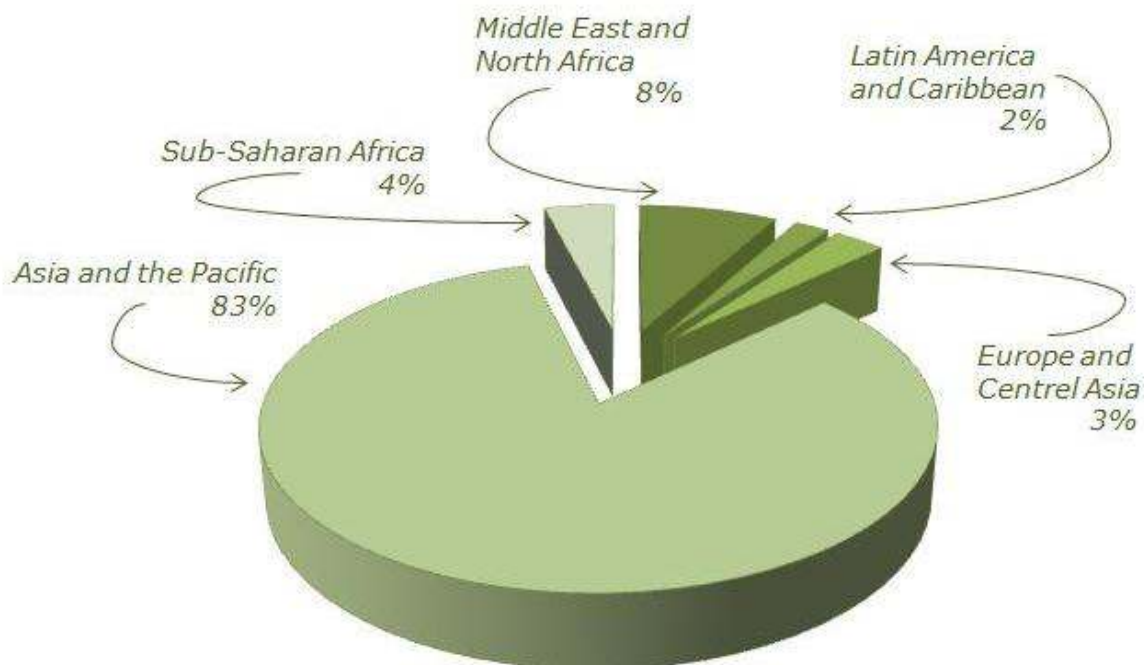
Figure 8 reports the number of MFIs in the world accounted by regions (Source: Christen, Rosenberg, Jayadeva, 2004). It is easy to see that the major part of institutions (83% of the total) is placed in Asia and the Pacific. The other part (only 17%) is divided between the rests of the

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<sup>49</sup> Source: Planet Finance Web Site. Planet Finance is a non Governmental Organization which operates all over the world, and which aims to alleviate poverty through the development of micro financial services.

<sup>50</sup> Nevertheless, the European Community (2007) highlights that the growth rate in Europe was not so high: only 15% between 2004 and 2005.

world: Middle East and North Africa (8%), Latin America and Caribbean (2%), Europe and Central Asia (3%), Sub-Saharan Africa (4%).



**Figure 8 - Accounts by region, Source: Christen Rosenberg and Jayadeva (2004)**

To simplify our analysis, in the present section, we describe the microfinance supply in the world, describing before the situation in developing countries, and later in Europe. The reason is that within these two areas there are homogeneous elements that influence the supply of microfinance services. Brief sections are organised in parallel to facilitate a comparison between the two different regions.

### **5.1 Microfinance Supply in Developing Countries**

In developing countries, microfinance experiences are changing from the paradigm of “financial development” to the new one of “developing financing”. If at the beginning Microfinance Institutions (MFIs) had a social mission, nowadays, they are becoming and more professional and sustainable organizations. Frequently, they have left their social status to



acquire the right to lend as commercial banks providing a wide range of services and increasing their revenues.

### **5.1.1 History of Microfinance**

*Hui* in China, *chit funds* in India, *Arisan* in Indonesia, *Paluwagan* in the Philippines, moreover, *Xitique* in Africa, *Tanda* and *Pasanaku* in Latin America: these are only some examples of instruments that were used by developing countries in the past few decades (Seibel, 2005). Nevertheless, these experiences represented some isolated examples of microcredit, and, in general, credit access remained a real problem for most of the population. Credit market failure became more and more evident, in history. Lending to low-income people was inconvenient for banks: costs were too high, poor people lacked experience and education, and few of them could present collateral (Morduch 1999). The only way for poor and low-income people to have access to the credit market was through moneylenders who had incredibly high interest rates, sometimes one hundred percent, or more. The situation was critical, especially in Asia, where every year a lot of farmers or small businessmen were in trouble, and sometimes, not knowing how to repay their loans, they committed suicide.

At the end of the XX century, policymakers started to offer subsidies to banks which were lending to low-income agents. Nevertheless, the cost of these practices became too high, decreasing governmental reserves and budgets of banks forced them to lower interest rates<sup>51</sup>. On the other hand, as Morduch (1999) notices, borrowers were not competent savers, moreover, they perceived that banks would not last long; consequently, they did not repay loans, and the default rate accelerated. Moreover, experts notice that these subsidies were given to politically favoured and

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<sup>51</sup> Morduch (1999) reports the case of some banks that were obliged to reduce interest rate "into to compensate for the low rates on loans" (p.1573)

not to poor individuals (Adams and Von Pischke, 1992). The situation was dangerous since subsidies were not helping in the right way and low-income households did not find the way to rise above the poverty line.

In the middle of 1970, Muhammad Yunus started lending small loans to poor women in rural villages in Bangladesh. He wanted to solve the economic problems of poor people of his country and to stimulate entrepreneurial female development, allowing women to run and develop simple businesses. He decided to create a new mechanism of lending, without the classic theory taught at university. He said: "I wanted to learn economics from the poor in the village next door to the university campus" (Banker To The Poor: Micro-Lending and the Battle Against World Poverty, 1999). His mission became lending to smart people who do not have any chances of receiving a loan because they are *unbankable*. These agents were excluded from formal financial services; on the other hand, they received credit from moneylenders who were charging incredibly high interest rate. Later, in 1983, after some successful experiences Professor Yunus decided to create the Grameen Bank formalising his theory; moreover, he planned to expand this model around the world.

Despite the difficulties of classifying the experiences of microcredit, we can state that this term appears in 1970 when banks and trade unions start to do significant programs to lend to poor people, in developing economies, and Grameen paradigm becomes a new model for microcredit institutions, making people aware of this issue internationally.

Moreover, in the middle of 1990 the donor Consultancy Group to Assist the Poor (CGAP) develops the concept of microfinance and lists the principles of it, discovering that multitude of institutions are working in this sector, around the world, giving not only credit but offering different kinds of financial assistance. "Microcredit revolution" becomes "microfinance revolution" (Seibel, 2005).

### **5.1.2 Characteristics of Microfinance Institutions**

Various models have been developed, due to the increasing commercialization of microfinance projects. Down through the years, the two main changes have been the transformation of NGOs (not governmental organizations) into commercial banks and the cooperation between institutions.

Generally, MFIs, working in developing countries, have a good business structure having a solid management and, most of the time, being self supporting. As a consequence, they present themselves as real financial institutions.

#### **5.1.2.1 Business Model**

Recent research done by Morgan Stanley (2008), classifies microfinance institutions into three groups: NGOs, NBFIs (Non banking Financial Institutions) and Commercial Banks. There is no evidence about the best institutional business model among them; the legal structure should be coherent with the strategy of the organisation, the local environment and the governmental regulations. For each status, there are advantages and disadvantages. Here, we present a brief list which is also summarized in Table 3.

- 1) *NGOs* – There are many advantages of the NGO status, such as, for example, soft supervision or fiscal advantages (a low taxation). Moreover, these organizations receive governmental investments and they are supported by financial donors, all over the world. Nevertheless, there are some disadvantages too, for instance NGOs rarely have a great experience in managing the organization and they can offer a very limited range of financial services in term of

funding and products. (NGOs represent 45% of the microfinance supply<sup>52</sup>)

2) *NBFIs* – These institutions can offer more sophisticated products than NGOs. They acquire a more specialised management and the permission to provide a great range of financial products. Nevertheless, they are more regulated than NGOs and the government monitors them with regular supervision. They should provide the necessary equity capitalisation, but, they still have a limited deposit. These institutions are a sort of bridge between the not specialised NGOs and the full status of banks. (NBFIs represent 30% of the microfinance supply)

3) *Banks* – Many Third World bankers find that lending to the poor is not just a good thing to do, but could be also profitable (Morduch, 1999). Nowadays, specialised rural banks offer microcredit programs. Banks can provide a full range of financial products, moreover they have the possibility of collecting public funds: some important characteristics that other MFIs do not have. However, these institutions should meet the requirements of a regulated bank, significant requirement of minimum equity capitalisation and strict legal requirements. Moreover, banks are heavily taxed and they should compile regular reports on the status of the financial credit and deposit. In this stage, MFIs require a more robust government and more experienced management. (Banks represent 10% of the microfinance supply)

Most of the time, the three categories of MFIs come as a temporal evolution of the institution: they usually appear as NGOs, sustained by donors, later, they become a NBFIs and, finally, in the third step, they are

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<sup>52</sup> Cull, Demirgüç-Kunt and Morduch (2008) investigate the microfinance supply analyzing the tensions and the opportunities of MFIs that choose to compete in the credit market as other institutions. They draw a dataset with 346 MFIs which covers nearly 18 million active borrowers.

transformed into commercial banks, growing in term of portfolio, clients, geographical expansion and increasing the capabilities of recognising profits.

|       | Advantages   | Disadvantages   |
|-------|--|---|
| NGOs  | Soft supervision;<br>Donors support the organisation;<br>Governmental Investments;<br>Focus on social mission (discussion point --> self sustainability);<br>Low Taxation; | very limited range of financial services in term of funding and products                                    |
| NBFIs | More sophisticated products  | Limited deposit;<br>Regular supervision;<br>Necessary equity capitalisation                                 |
| Banks | Full range of financial product<br>Possibility of collection of public funds   | Significant capital and legal requirements;<br>High taxation;<br>Necessity of reports;<br>Robust governance |

**Table 3 - Categories of MFIs appearing in Morgan Stanley’s Report (2008)**

Moreover, Cull, Demirguc-Kunt and Morduch (2008) add to the preceding classification:

4) *Local Authorities and Rural Banks*

Government (central banks or sometimes rural banks, government departments and local authorities) is often involved in the microfinance direct support. Especially in poor countries, local authorities sustain the development of microfinance through the

defining of relevant legal frameworks, national sustainable development strategies and rural bank programs. (Rural banks are only 5% of the microfinance supply)

#### 5) *Credit Unions*

Credit unions are mutual financial cooperatives providing loans to their members who have a common bond of membership between them. This strong link stimulates a great network and community for cooperatives, for example motivations of this bond are: common interest, geographical proximity, vocation to a cause)

(Credit unions represent 10% of the microfinance supply)

In 2007, Ever, Lahn and Jung, working for the European Microfinance Network (EMN), proposed four business models of MFIs at an international level. These categories are not strictly different from the ones Morgan Stanley listed before; some of them can be easily overlapped. The EMN recognises:

- 1) *Upgrading* – all the NGOs that have microfinance projects;
- 2) *Downscaling* – Existing banks which enter into the microfinance market;
- 3) *Linkage Banking* – Banks which cooperate with organisations or self groups;
- 4) *Greenfield project* – formal financial institutions specialised in the microfinance area.

Alternative classifications, such as the one of Cull, Demirgüç-Kunt and Morduch (2008) put the emphasis on the status of for-profit and non-profit microcredit institutions, analysing their behaviour in lending money. These authors find that banks, compared to NGOs, lend a much higher volume of money: even if microcredit banks are fewer than NGOs, they account for over half of all the total assets. Nevertheless, NGOs reach more customers than banks, especially more women.

It is worth remembering that banks and financial intermediaries work in a commercial environment. As Yunus says in his book (1999), microcredit is a tool that tries to reduce poverty allowing *unbankable* people to participate in capitalism. Microcredit is embedded in the capitalism system and it is not a tool which is created to subvert the *status quo*.

#### **5.1.2.2 Mission**

*"Microfinance has lost its innocence" a Compartamos<sup>53</sup>-supporter declared. "To mourn this loss of innocence would be wrong... To attract the money the need, micro-lenders have to play by the rules of the market. Those rules often have a messy result"*

*Von Stauffenberg, 2007*

*Mission* – There is a huge debate about microfinance mission: some institutions and experts think that microcredit should be a social business, driven by a social mission (New York Times, author: Malkin, 2008). On the contrary, other institutions prefer a profit-driven view to obtain a self financial sustainability of the organization.

Usually, MFIs in developing countries provide loans to help poor people to engage in productive activities or grow their tiny businesses. The

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<sup>53</sup> The case of Compartamos appears in The Economist on 15th May 2008 ("Poor people, richer returns, is it acceptable to profit from the poor?") and it shocks the public and other MFIs. Compartamos is a Mexican bank who, in April 2007, did a public offering of its stock, attracting private investment in the microfinance sector. Nevertheless, the main theme of the protests against Compartamos was the high interest rate proposed to customers: interest rate reached 94% a year. Muhammad Yunus was strongly against this experience, explaining that the high interest rate and great profit were unconscionable and the bank's strategy should be condemned (Velasco, 2007). Another criticism was made by Chuck Waterfield of Microfin, who accuses the Mexican bank of "monopolistic exploitation of the poor". On the other hand Compartamos admits its high interest rates but it explains they are studied to permit the bank to grow quickly considering the vast Mexican demand. From the experts' point of view, the interest rate will follow expanding the microfinance supply and increasing the competition in this industry.

mission of these institutions is to promote entrepreneurship in poor regions, reducing poverty and stimulating poor economies. Experience shows that microfinance can help the poor to increase their income, build viable businesses, and reduce vulnerability to external shocks (Microfinance Centre Web Site). Moreover, microfinance is a powerful tool for self-empowerment by facilitating customers, most of the time women, to have a greater role in the local economy becoming economic agents of change: women can also build empowerment and confidence because they represent the bridge between family credit and microfinance institutions.

*Range of services* – Moreover, MFIs, in developing economies, offer a range of financial services, compared to the MFIs in developed countries which only focus on credit services. Poverty is a multi-dimensional issue. For this reason, MFIs provide access to financial services (microfinance) especially where governments and markets are not able to offer these services. For instance, in rural areas the credit market is not developed, yet; so, people have access only to informal credit, as for example moneylender loans. Moreover, illiterate people do not have an idea about management and legal issues (as for example the importance of having insurance), microfinance can facilitate routine issues and make business easier.

### **5.1.2.3 Products**

*Credit Technology* – There are two broad categories of microcredit in the world: group lending and individual lending. Usually microfinance in developing countries concerns group loans: a joint liability agreement for the repayment and, sometimes, the joint administration of loans. Using joint liability component, as an additional tool to individual component (the interest rate), the group lending places more emphasis on collective social pressure (Morgan Stanley Research, 2008). The reason is that



people living in a rural society, know neighbours perfectly, and they can exploit local information which allows peer selection and peer monitoring, before and during the utilisation of micro loans. The social network in this contest permits them to use peer instruments as social collateral instead of financial collateral. Nevertheless, the knowledge of the partner is a fundamental tool in this model because customers in a group have a joint responsibility about the credits lent by the MFI. This is why group loans are not very common in Europe. Should the reader be more interested on microcredit instruments, we suggest him/her to go back to Section 2.2 *Exclusion from the Credit Market*. In addition to this, we have to consider that, even within group lending experiences, there are great differences, for instance, different rules that customers have to follow to obtain the loan, or different sizes of the group, or, more, different repayment rules.

#### **5.1.2.4 Structure**

*Transaction Costs* – Providing credit to the poor is very expensive, particularly for the size of transactions involved, consequently, financial institutions do not like to provide financial services for this niche of market: microfinance is a labour intensive business. Transaction costs include the costs for identifying and screening the client, for processing the loan application, for completing the documentation, for disbursing the loan, for collecting repayments and for following up on non payment (Shankar, 2007). The fact that micro loans are particularly small implies that the transaction costs tend to be higher on a percentage basis, compared to other types of credit: the nature of transaction costs is never proportional to the credit amount. In particular, considering a microfinance program it is easy to understand that high costs are due to the high frequency of repayments (usually weekly), the necessity of a regular supervision, the traineeship of clients.

Some authors (Ciravegna and Limone, 2006) underline that, even if, in developing countries as in developed ones, microcredit transaction costs are elevated, fixed costs are much higher in richer economies. As a consequence, in these countries the development of MFIs has to face more obstacles.

*Interest Rate* – The interest rate issue is particularly problematical. It is important to highlight that there are dramatic differences around the world in the microcredit interest rates. Keinding and Rosenberg find that the global interest rate mean is about 35 percent. Figure 9 reminds us the differences among some developing countries. The reasons for these differences and for the high interest rate are just the same. Here, we make a list of the tools that influence the level of the interest rate; the reader should take into account that these motivations are considered differently among countries.

*1) Operational costs (+)*

First of all, as we stress before, operational costs in providing micro loans are high and they cannot be reduced; as a consequence, the MFI has to find a way to cover them correctly, guaranteeing the financial sustainability in the long run and permitting other people to have credit access in the future. Operating expenses make on average up to 50% of nominal interest rate (Gonzales, 2008). Moreover, Gonzales (2008) highlights that for MFIs in the first six years of activity, one year more reduces the operational cost between two and eight percentage points. Therefore, he finds that a young MFI has necessarily highest costs at the beginning of its activity; however, these costs are going to decrease in additional years of experience. Moreover, especially if the mission of the institution is to finance a large number of business activities, the financial sustainability is important in the long run. A special section

of the present paper is dedicated to this issue, for more information see *Financial Sustainability* in Section 5.1.2.4 *Structure*. Nevertheless, it is worth remembering that the diminutive loan size is only a factor of high interest rate.

2) *Giving loans to poor people is very risky (+)*

Another point is that microcredit provides loan to poor people and, generally, this kind of credit is classified as highly risky. Firstly, because *unbankable* people usually do not have any collateral, so if they fail the bank receives nothing from clients; secondly, a high interest rate encourages borrowers to invest in risky activities with a high return to be able to repay the high interest rate; as a consequence, in this case the riskiness of the investment is consciously elevated.

3) *Public intervention (-)*

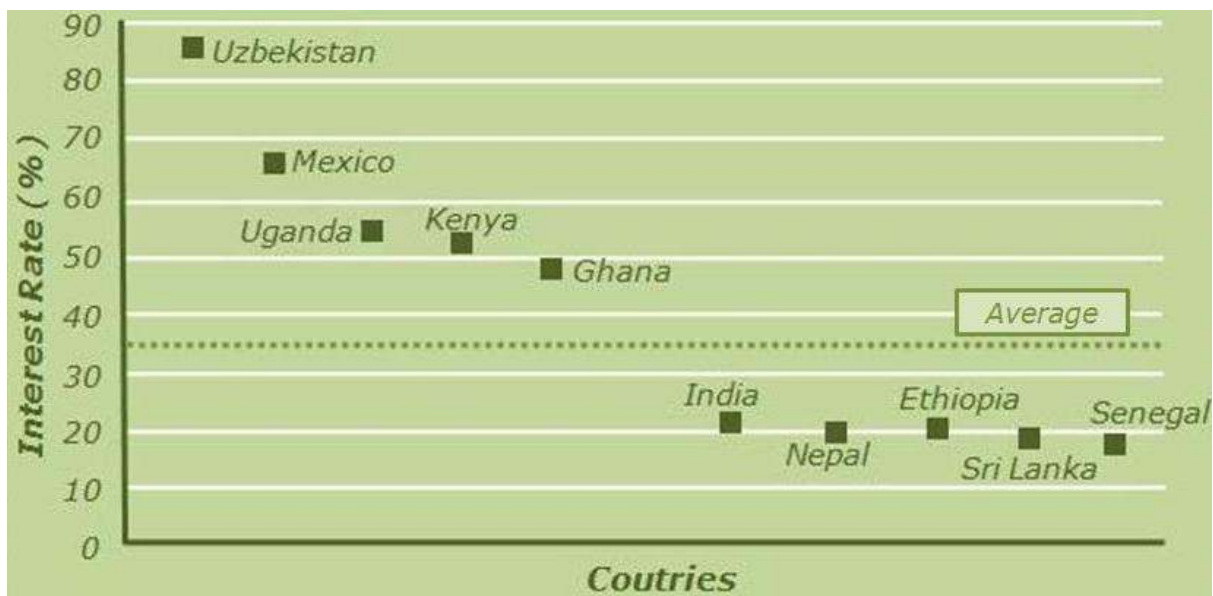
Microfinance permits poor people to borrow money, so people usually believe that it is not fair to require high interest rates to them. Many governments keep microfinance interest rates under a certain level driven by political considerations (Helms and Reille, 2004). These government procure subsidies to MFIs or they limit the maximum level of the interest rate that financial institution can raise.

4) *Selection tool (+)*

A high interest rate is a selective tool which can separate people that have no real access to the credit market from people that may have an alternative way to receive a loan. If the interest rate is low, everybody would like to receive a microloan because this option is cheaper than a traditional loan provided by the bank. In this way, there is a congestion of micro loan demands. If the interest rate is high, only people that are really excluded by the traditional credit

system are willing to require a micro loan. The others prefer alternatives with a lower interest rate.

To understand better the *inter* region differences, we report the examples of the average interest rate in two countries: Uzbekistan and Senegal (data from CGAP paper, Kneiding and Rosenberg, 2008). In Figure 9 we observe that in Uzbekistan the average interest rate is 80 percent, in Sri Lanka is only 16 percent. The reasons are several: firstly, operational costs are very low for Sri Lanka: 7.7 percent, on the opposite in Uzbekistan they add up to 39 percent, maybe due to the relative youth of the microfinance sector in the latter country; moreover, a lot of Sri Lanka MFIs are carried out by government and they receive public subsidies, something that does not happen in Uzbekistan; a third point is that in Uzbekistan there are few institutions compared to the demand (50 MFIs provide loans for 60,000 customers and a population of 26 million); as a consequence, these institutions can ask for a higher interest rate.



**Figure 9 - Differences in Microcredit Interest in Developing Countries - Source: Keinding and Rosenberg, 2008**

*Financial Sustainability* – Financial sustainability produces a trade off between self-sustainability (all the costs on the shoulders of poor people) and, the subsidization through public or private funds (allowing MFIs low interest rates). This trade off highlights the right and left theories (Morduch, 1999) of microfinance: the former focus on business creation, on the contrary, the latter on poverty alleviation and on macro effects within communities.

The previous experiences of microfinance were sustained by external agents, especially private donors. In the 1980s and 1990s, people declared that microfinance should be profitable, and MFIs had to become financially sustainable. Microfinance experts had the ambition to renovate MFIs, converting them into institutions with a full commercial status; as a consequence, many NGOs were forced to transform themselves into financial intermediates changing their status. There are three steps policymakers usually consider in order to sustain this argument (Cull, Demirgüç-Kunt and Morduch, 2008): firstly, small loans have huge administration costs for banks, but it is believed that poor people could support high interest rates; secondly, the access to financial supply is more important than its price; an additional point is that subsidies are not enough to cover the huge demand of money to stimulate Third World economies, other mechanisms should provide this result. The commercial status of microfinance institutions is strongly maintained by Prahalad (2004).

Financial sustainability is important since it is an element considered by international rankings to receive commercial investments by the private sector, nevertheless, as Cull, Demirgüç-Kunt and Morduch note, “the market is a powerful force, but it cannot fill the gaps” (Cull, Demirgüç-Kunt and Morduch, 2008, p.3). Moreover, the authors stress that microcredit innovation is a great tool, nevertheless, it would be

fundamental to overcome the challenges of the too high microfinance costs.

#### **5.1.2.5 Environment**

*Competitiveness* – There is a little reliable data on competition in the microfinance sector (Kneiding and Rosenberg, 2008). Nevertheless, it is easy to notice that, in developing countries, the financial system is not very advanced, and, as a consequence, MFIs can start providing credit without difficulties or obstacles. For instance, there are a lot of niche markets, especially in rural areas, where national banks have no capillarity. These new institutions can serve a range of different customers and can apply cross selling strategies between them.

For example, in a monopolistic situation, a MFI is able to permit customers to start their own business, later, when the business expands and it acquires a greater market, the institution does not have to compete with other banks to sustain the developed firm. Other products can be offered to the customer such as leasing, home loans, consumption loans, which are even more profitable for the MFI.

An additional advantage, in developing regions, is that, if the MFI is the only institution to offer loans in the local area, customers are willing to repay the loan since they do not have alternative possibilities for receiving credit, because other banks do not exist. As a consequence, the moral hazard problem becomes less frequent.

*Institutional environment* – Governmental regulation in poor countries is sometimes as strict as the one in developed economies, the main difference between the two regions is that in poor economies the institutional monitoring of national agencies concerning credit institutions is not very rigorous, as a consequence, MFIs have more possibilities to develop their business and strategy (Ciravegna and Limone, 2006).

Moreover, microfinance is a great tool for undeveloped areas, and institutions have grown up inside local communities down through the years; for this reason, governmental legislation often supports microcredit projects, and public administration studies a special institutional environment to permit a microfinance evolution.

An additional point is that there are a lot of international organisations and NGOs (such as ONU, World Bank) that put pressure on political parties to stimulate innovative tools of development and entrepreneurship in the less developed areas of the world, assuring greater investment and financial aid.

*Subsidies* – In developing countries the government is not able to offer the same services provided in a rich welfare state of a developed country. The absence of these subsidies stimulate poor people to develop small businesses and self employment to achieve money and survive, having no alternative for receiving money.

## **5.2 Microfinance Supply in Europe**

There are substantial process of change affecting Europe. In particular, the aging of the population, the de-industrialization process and precarious waged labour have driven developed economies to uncertainty. New technologies and innovative instruments should create a reduction in the cost of credit (Maria Nowak, President of European Microfinance Network, *in* Ever, Lahn and Jung, 2007). In this scenario, microcredit is a financial tool which can stimulate the private sector and self employment, developing microenterprises, even in Europe.

The microfinance supply is diversified but very limited in Europe, the rate of penetration of the market is only 5%, nowadays (Maria Nowak, Committee on Budgets Hearing on microcredit in the EU, European Parliament, February 2007).

### 5.2.1 History of European Microfinance

It is very difficult to draw a synthetic and definitive picture of the history of microfinance, since the problem of exclusion of a large part of the population from the credit system existed more than hundred years ago. In Europe, there have been examples of primitive microfinance systems since the middle of the nineteenth century.

It is worth highlighting that the definition of microcredit is not unique and there is a range of interpretations we can take into account. Nevertheless, in order to solve the problem of the origin of microcredit, analysing each credit experience, Guinnane, an economic historian at Yale, in 1994, provided a two-point test to discover if the historical examples could be defined as microcredit. The test concerns expected repayments and the mission to provide financial services to low-income people. He discovers that the first entity to lend money to poor people was in 1462 *I Monti di Pietà*, created by San Bernardino in the city of Perugia, but this institution, compared to our definition of microfinance, required natural collateral, as for example jewellery or precious thing (Ciravegna and Limone, 2006).

Another example of European microfinance is the experience of Friedrich Wilhelm Raiffeisen, who developed the concept of a credit union in Germany in the middle of XIX century, creating the *Raiffeisen Bank*, the first *cooperative bank* in history. His projects were addressed to poor farmers and this model becomes famous in Europe, cooperatives started to lend and collect, growing up and, later, becoming banks like the commercial ones.

Moreover, in Ireland, in 1822, hundreds of independent local microloan societies were lending to poor people through *Irish Reproductive Loan Fund*. Their mission was to give access to credit by providing competitive products without public funds, these tools successfully solved the problem of moral hazard, adverse selection, moreover, they were able to procure



incentives (Hollis and Sweetman, 2002). Another Anglo-Saxon experience of micro loans was the *Lending Charity* in England.

A significant turnover is represented by *Casse Rurali* in Italy; in this model a strong relationship was present between the lender and borrowers. Moreover, people organised themselves in groups, substituting financial collateral with the joint liability concept. In particular, the issue of group lending and dynamic incentives was used in the agreements between *mondine*<sup>54</sup>, at the beginning of the XX century.

This democratic view of credit was destroyed by the appearance of capitalism, which exalted the idea of profit and declared necessary the possession of collateral to obtain a loan.

Nevertheless, microfinance reappears in Europe in the last years of the XX century, after the successful experiences of microfinance institutions in developing countries, as for example Bangladesh and Bolivia. At the beginning of the XXI century, new organizations develop significant experiences of microfinance taking in account the practises and the models studied in other countries (Philippe Guichandut, Manager of REM, Réseau Européen de la Microfinance, 2006). However, we should notice that, for the moment, in Europe, this sector is still young and it is not as developed as in the Third World.

In Europe, the *panorama* of microcredit institutions is heterogeneous. If we make a comparison between countries, we discover a strong microfinance development in the Eastern Europe, including some new EU Member State, a data which contrasts with the with slower, patchier growth in the other Western Europe countries (web of Microfinance Centre for CEE and MIS). Moreover, the European Commission calculates that

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<sup>54</sup> The *Mondine* were women who worked in the countryside to harvest rice. They were usually very poor and, typically, *unbankable*. To have credit access for their necessities, they formed groups and, in turn, they receive a loan. Everyone in the group was responsible of the loan repayment. On one hand, the group feeling was very high, they were colleagues and long time friends; on the other hand, if the loan was not repaid the other partners could not receive credit anymore.

65% of MFIs disburse no more than 100 loans a year (2007)<sup>55</sup>, a vary little portion of the loan disbursed around the world.

## **5.2.2 Characteristics of Microfinance Institutions**

There are different types of microfinance institution in Europe. In the present section, we try to summarise the characteristics of the various experiences in our Region. It would be useful to make a comparison between the following description and the one we give in the section concerning the situation in developing countries. We facilitate the reader respecting (if possible) the same scheme in the analysis.

### **5.2.2.1 Business model**

It is worth knowing that, in Europe, as in most developed countries, the majority of the microfinance experiences are projects attended by different heterogeneous agents, such as banks, NGOs, bank foundations, charity associations, etc. (Ciravegna and Limone, 2006). Moreover, in most European countries, the legislation allows only banking institutions to provide credit to the customers (with a few exceptions<sup>56</sup>), and, in addition the law is not always adequate for the microcredit necessities.

Microfinance projects are usually considered by banks as a consequence of the political pressure or the desire to achieve a social mission in addition to the traditional one. The first banks to enter in the system were Finnvera (KERA) in Finland and Kreditanstalt für Wiederaufbau (KfW) in Germany. This lack of enthusiasm is due to the perception of a completely non-profitable microfinance market in Europe by the commercial banks (Ever, Lahn and Jung, 2007). Moreover, most microfinance experiences in Europe have been developed in the formal sector, not in the informal one.

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<sup>55</sup> Commission of the European Community, Brussels, 2007, COM (2007) 708 final

<sup>56</sup> As for instance some institutions approved by the Central Bank of each country

Moreover, there is always a stringent regulation they have to take into account.

The European Microfinance Network, (Ever, Lahn and Jung, 2007), highlights different possible business models appearing in European countries, partially different from the one in developing economies.

*1) NGOs – with microfinance driven approach*

The first model includes all the non-profit institutions that are providing micro financial services and which are expressively inspired by the success in developing economies. Some institutions, observing the great success in poor countries, try to transfer the microcredit experience to Europe. These organisations focus on credit loans and financial services to disadvantaged people, pursuing a model of professional management and efficiency. Nevertheless, many attempts fail due to the fact that they cannot reach the number of borrowers they expected at the beginning. Examples are Adie (France), ANDC (Portugal), Aspire (UK; North Ireland), Street UK (UK).

*2) NGOs – with a target group approach*

On the other hand, some NGOs provide additional business services. They usually serve a specific target group and they address people who know a little about management and legislation, for example migrants, unemployed, illiterate people who are starting a new similar activity. A strong additional business support is necessary to assist new entrepreneurs and to increase the repayment rate of clients that do not have any previous experience of managing a business. For instance, in this category we have the micro loan fund of Hamburg (Germany), Weetu (UK), Hordaland Network Credit (Nordway). A comparison between countries reveals that this kind of NGO is particularly present in France, Spain and UK.

### *3) Supported Programs in Existing Institutions*

Most of the time, as a consequence of public interest or political pressure, existing institutions and development banks elaborate projects for micro enterprises in their regular portfolio. In this way, existing infrastructures are used to provide an innovative credit tool, and distribution channels, already opened, assure a large knowledge of the initiatives. Nevertheless, the EU Commission highlights that there are some problems, linked to the size of the small loans required (for instance 5,000 EURO).

An additional point is that, perceiving the MFI as a traditional bank, clients are not motivated to repay, since there is no commitment or social prospective. Moreover, knowing the public participation in the funds, customers perceive microcredit as a subsidy, and they are less encouraged to repay back the loan. Examples of these institutions are Finnvera in Finland, KfK in Germany, ICO in Spain, BDPME-Oséo in France.

### *4) Specialized Unit of Banks*

Sometimes, banks decide to outsource a unit to provide microfinance services to its clients. In this way, microfinance units are not obliged to do marketing themselves and they can use the supply channels of traditional banks to interface with customers. Micro financial services are sold in ordinary branches, even if they refer to a specialized unit which accepts and monitors credit. This way of providing micro loans is still young in Europe and there is little experience. Nevertheless, in Spain, Cajas is a specialized unit for microfinance of Caixa Catalunya Bank and it represents a successful experience. In Italy, there is the recent experience of Banca Intesa Sanpaolo which created, some months ago, Banca Prossima as a new bank unit. Banca Prossima offers micro loans to the groups working in the tertiary sector as NGOs, cooperatives,

charity and religious associations. Moreover, Banca Prossima has a great number of agreements with other organizations to provide microfinance projects to disadvantaged people.

#### 5) *Specialized banks*

Maria Nowak (President of EMN), in her intervention at the European Parliament in Brussels in February 2007, adds to the list “specialized banks” appearing in Europe nowadays and which are focused on microfinance projects. ProCredit Banks are an example of this category of bank.

### **5.2.2.2 Mission**

*Mission* – In Europe, the mission of MFIs is to promote social inclusion and introduce poor, or better, disadvantaged people to the real economy. In this way institutions give less importance to economical sustainability and the project’s profitability. Moreover, micro loans have the additional scope to satisfy temporary needs of families that are in a transitory situation (for example: loss of a job) or that are facing special circumstances (for instance: teeth tutor for children). The important thing in disbursing loans is the ethical use of the credit that the borrower makes.

*Focus on Microloans* – If, in developing countries, MFIs often provide a range of financial services, institutions in Europe prefer to focus on credit service, providing micro loans and, sometime, but not often, offering additional services to assure regular repayments (for instance, some MFIs do a correct and continuous monitoring). This choice is consistent with microcredit demand: the real, and stronger, necessity of clients is the access to the credit market which is not possible through other institutions.

### 5.2.2.3 Products

*Credit Technology* – Usually, in Europe, MFIs prefer to give individual loans instead of group ones. The reason is that *peer monitoring* is not easy in an urban and individualistic society as the one in the richest areas in the world. The close relationship between neighbours developed in a rural society disappears with industrialisation and capitalism; as a consequence, people may not be glad to co-sign a group contract assuming a joint responsibility. Institutions believe that, since people have imperfect information about the level of risky of possible partners, group lending instruments find more obstacles to be implemented.

Moreover, we should take into account practical disadvantages: rarely a group of people require credit at the same time and concerning the same amount. However, the mutual necessity of loan can arise, for example, in group of immigrants who come from the same region and migrate in the same moment. These groups probably have the same contingent necessities and aspirations. In addition to this, in some particular situations, for examples, in small group of immigrants from the same cultural experience, the knowledge of possible partners in a group and the group feeling can be high. These states can be a great example of potential group lending programs, as we have in developing economies.

An additional experience of microfinance in Europe is the formation of projects based on the social network of well-known associations. In this case collateral is not necessary since an external agent (typically involved in the tertiary sector or in the religious field) directly guarantees for the customer and monitors her/his situation. Before receiving the loan, the association has to present the potential borrower to the MFIs; after obtaining the loan, the association helps the borrower offering a range of services and sustaining her/his in critical circumstances. For example, in Italy, there are many religious organizations (as local Caritas) that offer this innovative kind of assistance.

*Amount* – The EU Multiannual Program (MAP)<sup>57</sup> identifies that, in Europe, the maximum amount of micro loan is 25,000 EURO. Nevertheless, it is very difficult to understand which experiences are exactly micro credits to estimate a mean of loan amounts. Nevertheless, it is sure that the average loan in developing countries is only a small fraction of the one in developed countries. The reason is straightforward: start-up costs of any activities and living cost of the two areas are strictly different.

However, we can make a comparison considering the purchasing power. Ciravegna and Limone (2006) find out that the aggregation of micro loans in developed economies is 10% or 20% of the GDP, in developing countries this aggregation can reach, or even be greater than, the national GDP. On one hand, this surprising result highlights the different role of microcredit in the world, or maybe, the relative youth of microfinance sector in rich economies. On the other hand, we should take into account that, in Europe, giving micro loans becomes riskier because the average amount required is higher than the one in developing countries; consequently, in developed countries there is a lower risk distribution.

#### **5.2.2.4 Structure**

*Transaction Costs* – As we highlighted for developing countries, microfinance projects have high operational costs. The amount disbursed per head is relatively small, however, the MFI has additional costs as the face-to-face relationship which is very expensive, moreover the institution has to support the client during the loan repayment.

In developed economies fixed costs are incredibly high and small loans cannot repay the operational costs. As a consequence, most MFIs, especially banks, prefer to focus on the loan disbursement, and to achieve

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<sup>57</sup> Commission of European Community (2004)

an agreement with other organizations (NGOs, for instance) that are able to assist the client with additional services.

Moreover, we highlighted before that every MFI has higher costs at the beginning of their business: the European Commission (in its declaration on microcredit programs in 2007<sup>58</sup>) finds that most MFIs are still very young in Europe: 70% of them were set up after 2000, and 17% from 2005. We can suppose that costs will decrease in the next few years of experience.

*Interest Rate* – Taking into account the situation presented for developing economies (see Section 5.1.2.4 *Structure*), we can add some information to understand the level of interest rates in Europe. In developed countries, the interest rate is monitored and chosen by the national banks which supervise the operations of commercial and development banks. MFIs are not free to choose the interest rate that they prefer and this impossibility limits institutional strategies and pricing.

There are many reasons to understand why the government want to regulate the interest rates:

- 1) Firstly, legislations do not admit usury and the interest rate at that level. National rules have been created to eradicate the usury which was very common until the last century
- 2) Moreover, in developed countries, governments often employ microcredit as an alternative solution to financing without securities. Furthermore, this behaviour can be a successful tool to increase political consensus.

In addition to these points, institutions provide microcredit as a marketing tool to attract more customers, especially the ones who are the most ethically involved. In this way banks (or organizations) can have a

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<sup>58</sup> Commission of the European Community, Brussels, 2007, COM (2007) 708 final



great image return, especially nowadays, since microfinance is particularly well-known;

Analysing the mission of MFIs we discover that many microfinance experiences in developed countries do not focus on creating or stimulating a new market, instead, they have a social vision, which is not compatible with high interest rates.

*Sustainability* – Financial sustainability is important in order to continue to offer good quality services in the long run. Nevertheless, it is worth highlighting that institutions in Europe do not take into account this issue because they solving a market failure they receive financial aid from the public sector. Governments are the main donors of financial funds to MFI. As a consequence, these institutions do not have the need to become financially sustainable, and they classically appear as an extension of the public system or a powerful tool to enhance public reputation.

Moreover, the main mission of microcredit in developed economies is to help and stimulate unemployed and disadvantaged people, giving them a sort of redemption and promoting social inclusion. Therefore, in these situations, financial sustainability is a distant objective (Philippe Guichandut, 2006).

Nevertheless, data of microfinance repayments are encouraging: the European Commission highlights that the sector's average repayment rate is 92% (Commission of the European Community, Brussels, 2007, COM (2007) 708 final), the level is strictly higher than the one of traditional loan repayments.

*Collateral in developed countries* – As we highlighted before, nowadays, in European countries, there are a few examples of group credit, many MFIs prefer individual micro loans. As a consequence, the institutions

cannot exploit collaterals as peer selection and peer monitoring that are the main microfinance tools in the Third World.

In Europe, MFIs pay attention to alternative kinds of collateral, as for example the long run incentives, the analysis of customer's social and economic situation, the supply of a free consultancy offered to customers, or more, the use of a collateral fund.

#### **5.2.2.5 Environment**

*Competitiveness* – In many developed countries, MFIs do not suffer from the competitiveness of other banking institutions. Banks are rarely interested in the microfinance niche because it offers loans to people who are too poor to be considered bankable. In Europe, the lending legislation requires a high initial capital cost with high start up costs and high barriers to enter in the financial market. Moreover, R&D research done by the small MFIs can be easily replicated by traditional institutions eroding the competitive advantage of the first mover.

Additionally, in advanced financial markets, people have more possibilities to receive a loan. Most of the time, even for disadvantaged people is possible to offer a small collateral to the bank in order to receive a loan, moreover, sometimes, some associations can provide credits *una tantum* without any urgencies.

An additional point is that, having more loan possibilities of borrowing from different institutions, some immoral clients can behave in an incorrect way asking for credit with no intention of repaying it.

*Institutional environment* – In Europe, the institutional environment does not encourage the improvement of microfinance, since government does not consider the particular microcredit necessities. The main difficulties of microfinance are the caps on interest rates that prevent MFIs from covering the high transaction costs of providing small loans.

Moreover, in Europe, there is a monopoly of banks in supplying credit which is a relevant barrier for non-bank institutions that would like to get into the microfinance sector. These obstacles were built in the European history prevention of usury. However, nowadays, they are not justified since new forms of credit have been studied to ameliorate people's possibilities of borrowing, and competition is increased in the banking sector. Moreover, some experts believe that Basel II, the New Accord on banking regulation and supervision, approved in May 2004, is a great problem in microfinance institutions' development (see Section 5.3 *Basel II and Microfinance*).

*Subsidies* – Another point to be considered is that, in developed economies, governments provide subsidies to people that are not working through the welfare state. As a consequence, in this situation, people have two possibilities: the first one is to ask for a loan and start a new business, nevertheless, in this case, borrowers face an entrepreneurial risk and they may lose everything if their project fails. The second possibility is to continue receiving money regularly from public policies without any risk.

As a consequence, if the welfare system is too benevolent, attracting customers becomes really difficult for MFIs. The European Commission suggests governments to make a gradual transition from the welfare program to the possible alternative of microfinance system.

For instance, from 2002, in Germany, there is a special law, the Hartz Law, which guarantees a progressive unemployment benefit lasting 36 months after the loss of the job. German authorities registered that the number of entrepreneurs, who were unemployed in a first moment and became business men thanks to the project, rises from 123.000 to 330.800 people in the two first years of the projects, stimulating people to create or find a new job (Source: Limone and Ciravegna, 2006).

### 5.3 Basel II and Microfinance

Basel II is a new Capital Accord on banking regulation and supervision approved in May 2004. It succeeds the first international accord named Basel I, signed in 1988. The new accord tries to promote best practices for risk management; moreover, it creates a new environment with a correct regulation, an accurate supervision and a significant market discipline.

Even if the accord is planned for an international environment, and a lot of countries said “yes” to the agreement, implementation differs in relation to the national specific environment<sup>59</sup>. In particular, Basel II was applied first to the Basel Committee member countries<sup>60</sup>; nowadays other countries (for examples, emerging economies and developing countries) have the possibility to sign the agreement.

Basel II rests on 3 pillars. The new Accord differs from the old in that it has a more flexible approach to managing and monitoring the risk, since it introduces two additional pillars which represent the new great tools:

#### 1) *Minimum capital requirements provisions*

The main goal of Pillar 1 is to better link capital requirements of a certain bank to its specific credit risk: this pillar describes the calculation of necessary capital of credit risk, operational risk and market risk. The new Accord is more sensitive to the risks that enterprises face, compared to the old one.

Moreover, Basel II provides a menu of approaches to identify the bank’s portfolio at risk. The minimum acceptable capital-to-risk weighted asset ratio remains 8 percent.

#### 2) *Preventive supervision*

The second pillar considers the first one, and, in addition, it covers capital for other risks and overall capital adequacies. It provides elements to assist supervisors in investigating the real risk of

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<sup>59</sup> For example, Italy implemented the agreement at the beginning of January 2008

<sup>60</sup> Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, the United States

institutions and in evaluating activities and risk profile of banks; supervisors may decide that an institution should provide a higher level of capital than the minimum.

### *3) Market discipline, transparency and market disclosure*

Institutions should show any financial information on bank's activities and the risk related to them. The scope of this last pillar is stimulate a prudent management through an higher transparency and disclosure of banks' information.

One of the most relevant changes in the Basel scheme is the presence of different approaches in calculating the credit risk of each institution for deriving the capital ratio. There is a menu of possibilities: The Standardized Approach, The Foundation Internal Rating Based (IRB) and The Advantage Internal Rating Based.

Under the Standardized Approach, nothing changes, MFIs adopt the fixed risk weights given by various portfolio kinds; under the IRB approach, institutions can develop an internal method to calculate expected and unexpected losses for every type of portfolio and to determinate the capital requirement for exposure. This last method procures great advantages to institutions, such as flexibility.

However, experts do not agree about microfinance possibilities: some of them, like Kathryn Imboden (2005), believe that the IRB approach can be used only in large banks with great experience and a skilled management, others, like Navarrete and Navajas (2006), consider this instrument a brilliant possibility which can be applied by MFIs, since it allows institutions to develop their own internal models and parameters to estimate their need of economic capital.

There are huge debates about the implementation of the agreement, especially concerning its effects on small and medium enterprises. In the preset paper, we try to understand the particular effect of Basel II on microfinance activity. The literature rarely considers the case of MFIs and

many articles on this issue show a political pressure which creates, most of the time, only prejudices.

It is difficult to say a definitive opinion about the consequences of Basel on MFIs, since there is little evidence: many MFIs are present in developing countries, and, in this area of interest, governments have not implemented the Agreement, yet.

Moreover, the major part of the population believes that Basel II procures only disadvantages to small and medium size enterprises (SMEs) or to MFIs. People are sure that the credit access of this category of enterprises is reduced because of the bad rate of risk small firms have in Basel II.

To study the relation between microfinance and the new Accord, we highlight the two aspects of the lending institution: firstly, we take into account the microfinance institution as a lender that provides credit for its customers, secondly we consider the MFI as a borrower that attracts investments from other banks and that asks money to develop its activity.

### **5.3.1 Microfinance Institution as a Lender**

In her research, Kathryn Imboden (2005) highlights that national governments are not forced to apply the Agreement. It has not been the intention to apply Basel II in a premature environment: each country has to recognise the right moment to put into practice the new rules, considering its conditional financial legislation, since in some countries, banks and supervisors are not ready, yet.

Moreover, it is worth knowing that Basel II does not force the Central Bank to apply the regulation to all the institutions immediately, or in the long run. For example, there can be some other supervisory priorities such as a joint supervision or the emergence of common standards, especially in countries where the financial market is weak.

In addition, it seems that Basel II guidelines, in establishing the pool of banks to which the agreement should be submitted, exclude microfinance institutions<sup>61</sup>. Kathryn Imboden (2005) lists a series of motivations for this choice: the complexity of microfinance operations and mission, the size of the institutions, the particular bank's risk profile, the interaction with international markets, their international presence (a possible element of portfolio diversification which is not considered by Basel II). Taking into account these assumptions the supervision national authority should not apply the new agreement to MFIs. Nevertheless, the Accord itself declares that the government has to discern to which financial institutions Basel II must be applied (and to which not). If the government decides to apply Basel II to MFIs, it should create a specific "soft" legislation taking care of the issues highlighted in the present paragraph.

Nevertheless, here we want to list the consequences to apply the new Agreement to MFIs without an *ad hoc* legislation:

- 1) First of all, microfinance portfolio falls into the category "other retail exposures with annual sales of up to 1 million EUR"<sup>62</sup> (Navarrete and Navajas, 2006). In this way, the regular capital for the portfolio-at-risk is reduced for microfinance banks compared to other categories as banks with residential mortgages in their portfolio<sup>63</sup>. Considering this element, it seems that MFIs can benefit under the Basel II scenario.
- 2) Nevertheless, we should take into account a second point: perceiving microfinance as a risky industry, supervisory authorities

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<sup>61</sup> Basel Committee on Banking Supervision, "Implementation of Basel II: Practical Considerations", July 2004.

<sup>62</sup> As defined in Paragraph 231 of the New Capital Agreement (BCBS, 2004) Microcredit are: "Loans extended to small businesses and managed as retail exposures are eligible for retail treatment provided the total exposure of the banking group to a small business borrower (on a consolidated basis where applicable) is less than €1 million. Small business loans extended through or guaranteed by an individual are subject to the same exposure threshold."

<sup>63</sup> It is worth to stress that, opposite of general believing, Basel II does not want to penalize credit union or other low risk financial institutions.

can choose to assign a higher risk weight to MFIs. This possibility is present in the framework of the Accord. As a consequence, the regular capital for the portfolio can rise to the maximum level required. This situation would eliminate the advantage explained in the previous point.

- 3) In addition to this, under Basel (I or II) there are some factors that increase the MFI's capital requirements and which are not due to the international legislation, but to the nature and choices of MFIs. In 2005, Kathryn Imboden explains that, most of the time, there is an overcapitalisation of MFI: firstly, it is due to the desire to send a signal of financial strength to the market, and, secondly, it is due to the MFIs' difficulties in leveraging up since they are considered too risky by other institutional investors.
- 4) Hypothetically Pillar 2 can benefit MFIs, regulating the supervisory activity and motivating these institutions to acquire additional private resources. However, these possibilities would be helpful only after a good understanding of microfinance by the authority and a great acceptance of the agreement by the MFIs.
- 5) Considering Pillar 3, we can discover a great accordance between microfinance principles and Basel II guidelines. As said before, this pillar announces the necessity of disclosure and transparency, these two attitudes are very important and still present in microfinance policies offering the opportunity to enhance and increase the MFI's credibility, and, representing the chance to attract private and public investments.

In addition to the previous points of interest, Navarrete and Navajas (2006) study the case of Basel II applying it to four Latin American MFIs. They define two different elements that the risk calculation should take into account: the systemic risk and the idiosyncratic risk. They notice that the MFIs are less involved in the systemic risk than other institutions:



they are “more insulated”, having less correlation with the environment. This means that MFIs present less correlation with indices of systemic risk; as a consequence, the credit risk capital required should be less. They do an empirical study which finds that the situation of MFIs is not radically different in Basel II comparing with the present legislation<sup>64</sup>.

Moreover, they consider that the IRB approach can be applied by MFIs and the present element would represent a great advantage for these institutions. However, more empirical and detailed studies should be done.

### **5.3.1 The Microfinance Institution as a Borrower**

In the present section, we consider a MFI as a borrower: a microfinance banking institution that has loan necessities.

Eurofi<sup>65</sup> (2006) explains that Basel II encourages lending loans that are easy to value being based on a traditional method; on the other hand, other categories of loan, even if safe, are disadvantaged, since they should be evaluated by a different methodology. The main point is that in Basel II there is no recognition of international diversification in portfolio strategies. It is well-known that MFIs are internationally present in different areas in the world, this diversification can lead to a less risky portfolio. Nevertheless, Eurofi highlights that the advantages of portfolio diversification are not taken into account by the Accord. Moreover, Griffith-Jones, Segoviano, Spratt (2004) emphasizes that risk would be overestimated if this diversification is not taken into account.

An additional point is that, on the contrary of other bigger institutions, MFIs are rarely rated by traditional rating agencies. Basel II maintains

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<sup>64</sup> Navarrete and Navajas consider the portfolio of five MFIs in Latin America: FIE in Bolivia, Finamerica in Colombia, Banco ProCredit in Ecuador, Banco del Trabajo in Peru. They risk calculate a possible scenario using the criterion of Basel II, in particular IRB approach, since information about each loan of the MFIs is available. The results are that Basel II produces lower or higher provisions than the amounts calculate with present method.thre are not radical changes.

<sup>65</sup> Eurofi is an European think tank dedicated to the integration and efficiency of EU Financial that provides a great range of financial services and microfinance research.

that, in a certain country, an institution that lends money to a bank which is not rated should set aside a less favourable conditions, compared to the case of lending to a rated bank (always with the same nationality). In the last situation the lending institution, giving a loan to the rated institution, applies the Sovereign Rate (Kathryn Imboden, 2005). However, we should consider that this situation does not happen in developing countries, because institutions (traditional banks and small banks) rarely have a national rating (or Sovereign Rate); as a consequence, there, MFIs are not disadvantaged as borrowers. Nevertheless, Imboden (2005) says that "with regard to the borrowing of MFI's in capital markets, the evidence is not conclusive, as to whether lending to MFIs will be less attractive under Basel I than Basel II"<sup>66</sup>.

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<sup>66</sup> Kathryn Imboden (2005), "Basel II and Microfinance: Exercising Nation Prerogatives", 2005, p.16

## **6 Conclusion**

We build on Ghatak's model (2000), introducing imperfect information within borrowers. We want to analyse if a pooling joint liability contract for both safe and risky people can be provided without access to perfect information.

We find that the lending institution can still provide group lending with imperfect information; however, since there is more uncertainty about members within the groups, a pooling contract is possible only with some restrictions. In our model we allow for the fact that borrowers are able to notice a signal from potential partners. We find that if this signal is sufficiently informative a separating equilibrium is still possible.

We discover that, allowing for imperfect information, safe borrowers may not be encouraged to co-sign a joint liability contract, since they are not sure to end up with safe borrowers who rarely fail. For this reason, the microfinance lender has to propose a contract with a lower interest rate compared to the case of perfect information, to keep safe customers in the credit market. In this situation, the interest rate decreases and the joint liability component increases at the same time.

The main objective of this paper is to explore if joint liability contracts are still possible in a realistic environment with imperfect information. Nevertheless, despite the main literature, we consider in our analysis the possible – even if reduced – knowledge of potential partners. In the past literature, nobody analyses the potential characteristics of peer selection allowing imperfect information, and authors simply assume a random matching.

In our research we introduce an innovative tool: borrowers who want to form a group can observe a signal from their potential counterparts, and on this basis they select partners with the same level of risk. The result is a sort of separating equilibrium where the more the potential partners

know of each other, the greater the chances are of ending up with homogeneous partners.

The model proposed by Ghatak, with perfect information within customers, can be difficult to apply in the real world, since agents rarely know their partners very well, even if they live close to them. The author makes it clear that his model considers only little rural areas, especially in developing countries where borrowers know everything about their partners. In these environments, social bonds are strong and people know the possible obstacles or difficulties of their neighbours.

On the other hand, our work can be useful in understanding microcredit programs even in developed urban areas, for example in European cities. In fact, in these environments there is a high turnover of work, and people are relative mobile, which can make social bonds weak. In this situation people have imperfect information about potential counterparts. Nevertheless, if people know each other sufficiently well, they should be able to notice a correct signal during group formation which would show the real level of the risk of the agent's project.

In our dissertation, we find some insufficiencies between the demand and the supply of microcredit, especially in developed countries, such as Europe.

In the analysis of microfinance demand, we highlight the fact that immigrants represent a large majority of people who ask for microfinance services. Statistics stress that, in the richest areas of the world, the number of immigrants is growing nowadays. Moreover, we discover that in many European countries there are often communities with the same cultural background, the same geographical provenience, and the same values; as a consequence, it is easy to suppose that in these situations, immigrants are embedded in strong communities, where social bonds and peer monitoring can have its effects. In other words, people are able to form groups of borrowers who are happy to co-sign a loan.

However, the analysis of microfinance supply shows that, in Europe, few microfinance institutions understand the possibility of group lending, and they only offer customers individual loans. We recognize that there are many difficulties in giving out micro loans in a developed area, such as the high start up costs or the stringent legislation of lending. Nevertheless, we demonstrate that peer selection and group lending are still possible even in environments with imperfect information.

On the other hand, we recognise that our model is based on many simplified assumptions. For example, we introduce a signal observed by the people in peer selection: this element is just a small part of the more complicated noisy signals theory. In addition to this, our work considers risk-neutrality of borrowers; it would be interesting to observe the contextual presence of imperfect information and risk-adverse borrowers. Moreover, we assume that the MFI is an NGO<sup>67</sup> or a lending institution that provides loans maximising the weighted average of the expected utilities of representative borrowers. Future research may analyse the implication for a for-profit institution which provides loans to borrowers with imperfect information about partners.

Moreover, this paper highlights several aspects that should be investigated more thoroughly. For instance, we consider only the underinvestment problem found by Stiglitz and Weiss (1981); an additional research should take into account the market imperfection due to the overinvestment problem that De Meza and Webb highlighted in 1987.

In our analysis, we highlight the inexistence of an *ad hoc* legislation for micro lending institutions, both at international and national level. Policy-makers should take into account the great characteristics of poverty alleviation of microcredit and create a legal environment where

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<sup>67</sup> We investigate the case of a no-profit institution since they are more common in our area of interest: the developed countries.

institutions providing micro loans and micro financial services can work successfully. For example, there is not one single law in Europe to regulate microfinance institutions. In this region, institutions can move only short steps; as a consequence, their work is incomplete.

Moreover, we want to point out some recommendations for microfinance institutions in developed countries. These organizations should consider the potential of group lending programs even in areas where people do necessarily have perfect knowledge of potential partners. There, information between customers may be imperfect; nevertheless, we demonstrate that this condition does not inhibit successful group lending.

Microcredit, and especially group lending, is a powerful tool in microcredit because it consents to use a social collateral to give poor people credit access in order to create business, meet people's necessities and develop poor areas. We should miss this opportunity to apply the same mechanism even in the richest countries of Europe.

## 7 Appendix

### Appendix 1

For a safe agent who choose a safe partner, Ghatak considers the following expected payoff:

$$U_{s,s} = p_s R_s - [p_s r + p_s (1 - p_s) c],$$

and for a risky agent who choose a risky agent:

$$U_{r,r} = p_r R_r - [p_r r + p_r (1 - p_r) c].$$

In alternative, he supposes that a safe borrower can choose a risky partner, in this case, her payoff becomes:

$$U_{s,r} = p_s R_s - [p_s r + p_s (1 - p_r) c],$$

and for a risky borrower who chooses a safe counterpart:

$$U_{r,s} = p_r R_r - [p_r r + p_r (1 - p_s) c].$$

If side payments are allowed and people form heterogeneous groups, safe borrowers who accept the transfer from risky partners, have the following loss:

$$\begin{aligned} U_{s,s} - U_{s,r} &= \\ &= p_s R_s - [p_s r + p_s (1 - p_s) c] - \{p_s R_s - [p_s r + p_s (1 - p_r) c]\} = \\ &= p_s R_s - p_s r - p_s (1 - p_s) c - p_s R_s + p_s r + p_s (1 - p_r) c = \\ &= c (-p_s + p_s^2 + p_s - p_s p_r) = \\ &= c [p_s (p_s - p_r)] \end{aligned}$$

As a consequence safe agents require risky partners a side payment that can fully repay their loss:  $c [p_s (p_s - p_r)]$

On the other hand, the gain of risky borrowers who have a safe partner is:

$$\begin{aligned} U_{r,s} - U_{r,r} &= \\ &= p_r R_r - [p_r r + p_r (1 - p_s) c] - \{p_r R_r - [p_r r + p_r (1 - p_r) c]\} = \\ &= p_r R_r - p_r r - p_r (1 - p_s) c - p_r R_r + p_r r + p_r (1 - p_r) c = \\ &= c (-p_r + p_s p_r + p_r - p_r^2) = \\ &= c [p_r (p_s - p_r)] \end{aligned}$$

As a consequence the maximum side payment that risky people would pay to safe borrowers is  $c [p_r (p_s - p_r)]$ .

Nevertheless, it is easy to observed that, since

$$(p_s - p_r) > 0$$

and

$$c > 0 ,$$

we obtain

$$c [p_r (p_s - p_r)] < c [p_s (p_s - p_r)] .$$

It means that the gain of risky borrowers having a safe partner is always lower than the side-payment safe people require them to form a group together. Ghatak demonstrates that risky borrowers do not want to form a group with safe agents anymore, and heterogeneous groups never appear.

### Appendix 2.a

If homogeneous groups are allowed the expected payoff of a borrower, taking a partner of the same type is:

$$U_i^y = p_i^2 \alpha (R_i - r) + p_i(1 - p_i) \alpha (R_i - r - c) + p_i p_j (1 - \alpha)(R_i - r) + p_i(1 - p_j)(1 - \alpha)(R_i - r - c)$$

If we simplify, we obtain

$$\begin{aligned} &= \{ [p_i^2 \alpha + p_i(1 - p_i) \alpha + p_i p_j (1 - \alpha) + p_i(1 - p_j)(1 - \alpha)] R_i \} + \\ &+ \{ [-p_i^2 \alpha - p_i(1 - p_i) \alpha - p_i p_j (1 - \alpha) - p_i(1 - p_j)(1 - \alpha)] r \} + \\ &+ \{ [-p_i \alpha (1 - p_i) + -p_i(1 - p_j)(1 - \alpha)] c \} = \\ &= \{ [p_i^2 \alpha + p_i \alpha - p_i^2 \alpha + p_i p_j - p_i p_j \alpha + p_i - p_i p_j - p_i \alpha + p_i p_j \alpha] R_i \} + \\ &\{ [-p_i^2 \alpha - p_i \alpha + p_i^2 \alpha - p_i p_j + p_i p_j \alpha - p_i + p_i p_j + p_i \alpha - p_i p_j \alpha] r \} + \\ &+ \{ [p_i^2 \alpha - p_i \alpha - p_i + p_i p_j + p_i \alpha - p_i p_j \alpha] c \} = \\ &= p_i R_i - p_i r + [p_i^2 \alpha - p_i + p_i p_j - p_i p_j \alpha] c \end{aligned}$$



### Appendix 2.b

$$U_i^y = p_i p_j \alpha (R_i - r) + p_i (1 - p_j) \alpha (R_i - r - c) + p_i^2 (1 - \alpha) (R_i - r) + p_i (1 - p_i) (1 - \alpha) (R_i - r - c)$$

If we simplify the expected payoff of a borrower we obtain

$$\begin{aligned} & \{ [p_i p_j \alpha + p_i (1 - p_j) \alpha + p_i^2 (1 - \alpha) + p_i (1 - p_i) (1 - \alpha)] R_i \} + \{ [-\alpha p_i p_j + \\ & - p_i (1 - p_j) \alpha - p_i^2 (1 - \alpha) - p_i (1 - p_i) (1 - \alpha)] r \} + \{ [-p_i \alpha (1 - p_j) + \\ & - p_i (1 - p_i) (1 - \alpha)] c \} = \\ & = \{ [p_i p_j \alpha + p_i \alpha - p_i p_j \alpha + p_i^2 - p_i^2 \alpha + p_i - p_i^2 - p_i \alpha + p_i^2 \alpha] R_i \} + \\ & + \{ [-p_i p_j \alpha - p_i \alpha + p_i p_j \alpha - p_i^2 + p_i^2 \alpha - p_i + p_i^2 + p_i \alpha - p_i^2 \alpha] r \} + \\ & \{ [-p_i^2 \alpha + p_i \alpha - p_i + p_i^2 - \alpha p_i + p_i p_j \alpha] c \} = \\ & = p_i R_i - p_i r + [-p_i^2 \alpha - p_i + p_i p_j \alpha + p_i^2] c \end{aligned}$$

### Appendix 3.a

Simplify the expected gain of a risky borrower having a safe partner:

$$U_r^t - U_r^{nt}$$

$$\begin{aligned} U_r^t - U_r^{nt} &= \\ &= [p_r p_s \alpha (R_r - r) + p_r (1 - p_s) \alpha (R_r - r - c) + p_r^2 (1 - \alpha) (R_r - r) + \\ & p_r (1 - p_r) (1 - \alpha) (R_r - r - c)] - [p_r^2 \alpha (R_r - r) + p_r (1 - p_r) \alpha (R_r - r - c) + \\ & p_r p_s (1 - \alpha) (R_r - r) + p_r (1 - p_s) (1 - \alpha) (R_r - r - c)] = \\ &= \{ p_r R_r - p_r r + [-p_r^2 \alpha - p_r + p_r^2 + p_r p_s \alpha] c \} - \{ p_r R_r - p_r r + [p_r^2 \alpha - p_r + \\ & + p_r p_s - p_r p_s \alpha] c \} = \\ &= p_r R_r - p_r r - p_r^2 \alpha c - p_r c + p_r^2 c + p_s p_r \alpha c - p_r R_r + p_r r - p_r^2 \alpha c + p_r c + \\ & - p_r p_s c + p_s p_r \alpha c = \\ &= 2 p_r p_s \alpha c + p_r^2 c - 2 p_r^2 \alpha c - p_r p_s c \end{aligned}$$

### Appendix 3.b

Simplify the expected loss of a safe borrower having a safe partner:

$$U_s^t - U_{sr}^{nt}$$

$$U_s^t - U_{sr}^{nt} =$$

$$\begin{aligned}
&= [p_s^2 \alpha (R_s - r) + p_s(1 - p_s) \alpha (R_s - r - c) + p_s p_r (1 - \alpha)(R_s - r) + p_s(1 + \\
&- p_r)(1 - \alpha) (R_s - r - c)] - [p_s p_r \alpha (R_s - r) + p_s(1 - p_r) \alpha (R_s - r - c) + \\
&p_s^2 (1 - \alpha)(R_s - r) + p_s(1 - p_s)(1 - \alpha) (R_s - r - c)] = \\
&= \{p_s R_s - p_s r + [p_s^2 \alpha - p_s + p_s p_r - p_s p_r \alpha] c\} - \{p_s R_s - p_s r + [-p_s^2 \alpha - p_s + \\
&p_s^2 + p_s p_r \alpha] c\} = \\
&= p_s R_s - p_s r + p_s^2 \alpha c - p_s c + p_s p_r c - p_s p_r \alpha c - p_s R_s + p_s r + p_s^2 \alpha c + p_s c + \\
&- p_s^2 c - p_s p_r \alpha c = \\
&= 2 p_s^2 \alpha c - 2 p_s p_r \alpha c + p_s p_r c - p_s^2 c
\end{aligned}$$

#### Appendix 4

In Ghatak (2000), to calculate the expected payments the MFI will receive from borrowers, it is worth considering the utility function of a borrower and finding out the costs she supports.

$$U_{i,i} = p_i R_i - [p_i r + p_i (1 - p_i) c] \text{ where } i = s, r$$

The costs of a borrower are the following:

$$c = -p_i r - p_i (1 - p_i) c$$

It means that the MFI receives this amount from every agent who succeeds, moreover this value should cover the cost of capital, the MFI supports:

$$p_i r + p_i (1 - p_i) c > \rho$$

or better

$$\begin{cases} [r + c(1 - p_s)] p_s \geq \rho \\ [r + c(1 - p_r)] p_r \geq \rho \end{cases}$$

In the model with imperfect information, supposing that homogeneous group formation is allowed, the expected payoff of a borrower is the following:

$$U_i^y = p_i^2 \alpha (R_i - r) + p_i(1 - p_i) \alpha (R_i - r - c) + p_i p_j (1 - \alpha)(R_i - r) + p_i(1 + p_j)(1 - \alpha)(R_i - r - c) \text{ where } i = s, r \text{ and } y = nt, t$$

If we simplify, see Appendix 1, we obtain

$$U_i^y = p_i R_i - p_i r + [p_i^2 \alpha - p_i - p_i p_j \alpha + p_i p_j] c$$

Now, remembering that the repayment should be large enough to cover the cost of capital, we have

$$[r + c(1 - p_j - p_i \alpha + p_j \alpha)] p_i \geq \rho$$

or better

$$\begin{cases} [r + c(1 - p_r - p_s \alpha + p_r \alpha)] p_s \geq \rho \\ [r + c(1 - p_s - p_r \alpha + p_s \alpha)] p_r \geq \rho \end{cases}$$



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