THE UNIVERSITY
OF BIRMINGHAM

ACCESS TO FINANCE AND POVERTY REDUCTION

AN APPLICATION TO RURAL VIETNAM

A thesis submitted in fulfilment of the requirements of the degree of Doctor of Philosophy

in Accounting and Finance

By

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May 2005

Dedicated to my beloved family: Parents and brothers

With my love and apologies

DECLARATION

I, QUACH MANH HAO, declare that I am the sole author of this thesis, that during this period of registered study I have not been registered for any other academic award or qualification, nor has any of the material been submitted wholly or partly for any other award. I have personally carried out all the work of which this is a record. The program of study of which this is a part has been delivered by the Birmingham Business School, University of Birmingham, United Kingdom.

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ACKNOWLEDGEMENT

ABSTRACT

Providing access to finance to the poor has been proposed as a tool for economic development and poverty reduction. Our research aims to provide a deep analysis of how to enhance access to finance on a sustainable basis, focussing on rural Vietnam. It analyzes four main areas: (i) why access to financial markets by low-income households is severely constrained; (ii) how policy makers deal with the absence of financial markets for the poor; (iii) who are actually excluded from formal financial system; and (iv) the relationship between access to finance and poverty reduction.

It is demonstrated that market imperfections (such as asymmetric information and transaction costs) can explain the lack of access for the poor. However, the development of financial technologies, such as joint-liability group lending or lending through partnership with social/information intermediaries may enhance information availability and reduce transaction costs. The poverty reduction approach that many policy makers have been following has failed to generate finance for the poor on a sustainable basis. We suggest that a mixed approach which combines the poverty reduction with financial systems approach (i.e. recognises a balance between social and financial goals) may be appropriate.

This proposition is supported by empirical evidence from rural Vietnam where it is shown that the poverty reduction approach that the government has followed has not enabled financial institutions to achieve financial-self-sufficiency and this has reduced the outreach capacity. Moreover, we find that under the poverty reduction approach, the better-off households, rather than the very poor households, are more likely to gain access to formal financial sector. We also find that having access to finance has a positive impact on poverty reduction; but this impact is very small, suggesting that it may not be cost-effective.

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LIST OF ACRONYMS

ADB	Asian Development Bank
CWU	Commune Women's Union
FU	Farmers' Union
GDP	Gross Domestic Product
GSO	General Statistic Office
HEPR	Hunger Eradication and Poverty Reduction
HH	Households
ICB	Inter-commune Branch
INGO	International NGO
LIH	Low-income Household
LUC	Land-use certificate
LPC	Local People's Committee
MFI	Microfinance Institutions
NGO	Non-Governmental Organization
UN	United Nations
USD	United States Dollar
UNDP	United Nations Development Programs
PCF	People's Credit Fund
PC	People's Committee
ROSCA	Rotating Savings and Credit Association
ROSLEG	Rotating Savings and Lending Groups
RSHB	Rural Shareholding Bank
SHB	Shareholding Bank
SBV	State Bank of Vietnam
SO	Social Organization
S&C	Savings and Credit
SOE	State-Owned Enterprise
VBARD	Vietnam Bank of Agriculture and Rural Development
VBP	Vietnam Bank for the Poor
VND	Vietnam Dong (National Currency Unit)
VFU	Vietnam Farmers' Union
VWU	Vietnam Women's Union
WB	World Bank

OTHER INFORMATION

Currency Unit: Vietnamese Dong
Exchange Rate (as of January, 2005)
USD 1.00 = Approximately VND 16,000
GBP 1.00 = Approximately VND 30,000

CHAPTER 1

INTRODUCTION

1.1 The inspiration

Providing access to finance to the poor or microfinance has been considered as a tool for economic development and poverty reduction (ADB, 2000a; Morduch and Haley, 2002; Khandker, 2003). It is the interest of many policy makers and researchers in recent years. Although there are several different perceptions of microfinance (Rhyne, 1998; Robinson, 2001), it is commonly agreed that the central issue in microfinance has been the question of how to provide financial services to the poor and low-income households on a sustainable basis (Rhyne, 1998; Robinson, 2001; Gonzalez Vega 2003).

To answer this question, economists focus on understanding the dynamics of the financial markets (Stiglitz and Weiss, 1981; Callomiris and Hubbard, 1990; Williamson, 1987; De Meza and Webb, 1987, 1992) in general and explain why financial markets for the poor and low income households have been absent (Ed Mayo and Mullineux, 1998; Binswanger and McIntire, 1987). The widely used literature on this issue is the theory of asymmetric information (Alkerlof, 1970) which results in problems of adverse selection and moral hazard (Mishkin, 2001). Given costly screening and monitoring (Spence, 1973a, 1973b; Rothchild and Stiglitz, 1976; Townsend, 1979), asymmetric information based studies suppose that in the cases of excess demand for financial services, financial institutions cannot increase interest rates to clear the market but ration credit (Stiglitz and Weiss, 1981). The asymmetric information based studies also suggest that the use of collateral could be a solution to credit rationing (Bester; 1985, 1987, 1994).

The problem of asymmetric information in the financial markets for the poor and low income households is seen more serious for several reasons such as they are new markets and the costs of screening and monitoring are extremely high (Beck, Demirguc-Kunt and Levine, 2004; Yaron, 1998; Ed Mayo and Mullineux, 1998). Moreover, most of the poor possess a low education background and cannot provide standard collateral as required by the financial institutions (Binswanger and McIntire, 1987). As a result, they are excluded from the financial sector and in most cases must rely on the informal sector at extremely high costs (Meyer and Nagarajan, 1992, 2000).

Given the absence of financial markets for the poor, policy makers focus on the debate of to subsidize or not to subsidize financial institutions in providing financial services to the poor (Rhyne, 1998; Robinson, 2001; Gonzalez Vega, 2003). This debate leads to two approaches in microfinance: the poverty reduction approach and the financial system approach. The poverty reduction approach aims at providing cheap financial services to the poor, especially the very poor, through governmental subsidies with the main expectation that financial services could contribute to poverty reduction. The financial system approach on another hand aims at applying commercial finance principles and building a financial intermediation system for the poor without ongoing subsidy.

In Vietnam, the economic reform initiated in 1986 has transformed the nation from the central planning to a market oriented economy (Dao, 2001a, 2002). The reform has attained major achievements in terms of economic growth and poverty reduction. However, there has been a large gap between rural and urban areas. Therefore, rural development and agriculture are considered as a priory goal in the national development strategy. In this strategy, microfinance, which aims at ensuring rural households having access to financial services, is considered as an important component (SRV, 2002).

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The poverty reduction approach to microfinance with major subsidy from the government has increased the access of the rural households to financial services (Dao, 2002; McCarty, 2001). However, microfinance in rural Vietnam is not sustainable for a number of reasons (Quach, 2002): (i) subsidy approach has not allowed financial institutions to attain financial self-sufficiency; (ii) legal framework has not recognised the importance of various types of microfinance institutions in the process of microfinance development; (iii) there is a lack of innovations in financial technologies in accordance with international best practices; and (iv) government supports have ignored the role of social intermediation which is seen necessary to microfinance.

All of the above issues have impressed us much and encouraged us to follow this research. With a belief that microfinance can be sustainable and that sustainable microfinance is important to the poverty reduction, our research expects to recognize the ways to attain sustainability and provide supports to our arguments with theoretical and empirical proof.

1.2 What is microfinance?

1.2.1 Concept of microfinance

There have been several different understandings of microfinance concepts. The main difference among definitions is about the range of services and the targeted clients. For example, ADB (2000a) defines microfinance as the provision of a broad range of financial services such as loans, deposits, payment services, money transfers, and insurance to poor and low-income households and their micro-enterprises. The CGAP (World Bank) in their website basically defines microfinance as providing very poor families with very small loans (microcredit) to help them engage in productive activities or grow their tiny businesses. They however also indicate that overtime, microfinance has come to include a broader range of services (credit, savings, insurance, etc.) as it has been realized that the poor and the poorest

those who lack access to traditional formal financial institutions require a variety of financial products.

Legerwood (1999) proposes microfinance as a development approach, which comprises of financial and social intermediation, intended to benefit the low-income households. Financial services generally include savings and credit but some microfinance organizations also provide insurance and payment services. In addition to financial intermediation, Legerwood further supposes that many MFIs provide social intermediation services such as group formation, development of self-confidence, and training in financial literacy and management capabilities among members of a group. Thus, the definition of microfinance includes both financial intermediation and social intermediation. Microfinance is thus not simply a banking tool but also a development tool.

Box 1.1 - Concept of microfinance

- Provision of financial services, primarily credit and savings, but also other services such as insurance and payments to micro clients
- Micro clients are the poor and low-income households and enterprises having business opportunity (economically active) but lack access to formal financial services
- Social intermediation such as development of self-confidence and training in financial literacy and management skills and informational intermediation such as credit rating agencies are essential in microfinance

Source: Drawn from ADB (2002a) and Legerwood (1999)

Though there is somewhat different in the definitions of microfinance, it shows a comprehensive picture of the microfinance industry around the world. In our ideas, microfinance implies financial intermediation among the poor and low income households. The primary financial services include credit and savings, but other financial services such as insurance and payments to the poor and low-income households are also included together with the development of microfinance industry. Social intermediation such as trainings which aims at building capacity to the poor and low income households should be regarded as a

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supporting process, along with but not integrated in microfinance. We also introduce the concept of informational intermediation to include any supporting agencies (such as credit rating agency or Local People Committee in Vietnam) that enhance information on the low-income households.

1.2.2 Microfinance system

According to a study by Meyer and Nagarajan (1992, 2000), the microfinance system includes three core sectors: formal, semi-formal and informal sector. The formal sector includes various kinds of banks such as commercial banks, development banks, specialized savings banks, cooperative banks, and unit and regional rural banks; postal savings system; insurance companies; social security schemes; pension funds, and in some countries, capital markets. The formal sector is regulated and supervised by the regulatory authority.

The semiformal sector comprises of community development financial institutions[1] such as credit cooperatives and credit unions .etc; village banks, farmers' associations; self-help groups; integrated rural development programs; and nongovernmental organization financial programs. This sector is unlicensed and generally unsupervised. However, they may operate under particular laws and regulations. Some organizations, such as NGOs, provide microcredit but are usually not permitted to mobilize voluntary savings from the public. Some credit cooperatives, credit unions, and various forms of credit societies that are considered semiformal may provide their members with facilities for both savings and loans.

The informal sector serves multiple areas, financing households and small enterprises in a wide range of income levels and geographic areas. Informal financial markets are seen ubiquitous and are characterized, in most cases, by personal relationships, individual operators, ease of access, simple procedures, rapid transactions, and flexible loan terms and

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1 Ed Mayo and Mullineux (1998) recognise five types of development financial institutions (in the UK), including credit unions, community loan funds, microfinance funds, mutual guarantees societies and social banks.

amounts. The typical forms of informal sector may include (i) rotating savings and credit associations (ROSCAs) in which members both save and borrow; (ii) individual money lenders and savings collectors who are pawnbrokers, professional moneylenders, commodity wholesalers, shopkeepers, traders, employers, and landlords; and (iii) relatives, friends and neighbors from whom those in need can borrow, although primarily for emergencies or special purposes rather than for ongoing working capital needs.

Interactions among financial sectors indeed occur vertically as well as horizontally at national or regional level. Generally, the microfinance system is seen as a network in which formal financial sector is incorporated (unofficially or officially) into semi and informal sectors (Meyer and Nagarajan, 2000). The typical form is that the formal sector provides financial services through semi and/or informal sectors and this reduces information costs and risks within particular markets (Hoff, Braverman, and Stiglitz, 1993). Hence, in competitive markets, interlinked transactions may reduce risk, expand financial intermediation, and contribute to economic development at the local level. But the opposite may also occur in markets characterized by monopoly where land, credit, labor, and commodities markets converge in the person of the landlord-cultivator-employer-moneylender-trader.

1.2.3 Concept of sustainable microfinance

Although the term "sustainability of microfinance" or "sustainable microfinance" is commonly used to mention about the long-term prospective of microfinance, it is understood differently amongst researchers. Some (e.g. Schreiner, 1996) define *sustainable microfinance* to mean a system with the ability to adapt while respecting the subsidiary goal of providing in a viable way financial products and services to the poor. This definition however emphasizes on the capacity to expand outreach to the poor and ignores the role of financial sufficiency. Others (e.g. Christen and Drake, 2001) on the other hand emphasize the financial aspect of

sustainable microfinance. They see sustainability as the ability to provide financial services to the poor and low-income households profitably.

We understand that there is a close link between financial self-sufficiency and capacity to outreach, but a broad definition of sustainable microfinance should comprise of both. We propose that sustainable microfinance should be understood as the ongoing capacity to outreach based on the financial self-sufficiency. The capacity to outreach implies the number of poor households that gain access to financial sector. Financial self-sufficiency implies the ability to cover all administrative costs, loan losses, and financing costs from operating income, after adjusting for inflation and subsidies and treating all funding as if it had a commercial cost (CGAP, 1997; Micro Banking Bulletin, 2000).

However, it should be noted that a maximization of both financial and outreach goals is the ideal model and it seems to be difficult to attain because there is a trade-off between social and financial goal (Kanathigoda and Steinwand, 2003; Charitonenko and Rahman, 2002; Gonzalez Vega 1998; Schreiner, 1996). The goal of self-financial sufficiency obviously affects the capacity to outreach while widening outreach (for social goal) may reduce the ability for a financial institution to be financially self-sufficient. As a result, a balance between these two goals should be recognised (Charitonenko and Rahman, 2002). Thus, within this thesis, the concept of sustainable microfinance should be understood as the *ongoing capacity to expand outreach to a targeted market clientele on the basis of financial self-sufficiency* (Figure 1.1). Box 1.2 summarises the common properties of a sustainable microfinance.

Figure 1.1 – Concept of sustainable microfinance

Outreach

Maximization of outreach at a reasonable level of financial self-sufficiency

The ideal model: maximization of financial self-sufficiency and outreach.

B

A

C

Maximization of financial self-sufficiency or profit maximization.

Financial Self-Sufficiency

In this figure, direction A is the ideal model. Direction C aims at profit maximization and ignores the outreach (social goal). Direction B implies a balance between financial self-sufficiency and outreach (for social goal) and it is the concept of sustainable microfinance in this thesis. The task is to make direction B closer to direction A.

Sources: Schreiner (1996); Charitonenko and Rahman (2002); Robinson (2001)

Box 1.2 – Properties of a sustainable microfinance institution

The sustainable (successful) microfinance institutions:
- know their market, and therefore attain wide outreach to clients.
- charge market interest rates to cover both their operational and financial costs, knowing that the poor are willing to pay for access and convenience.
- use special techniques to reduce administrative costs such as simple procedures decentralized approvals of application
- use special techniques to ensure high repayment rates. These include the use of self-selected groups in which members guarantee each other's loans, intensive motivation and supervision of borrowers, incentives for borrowers, progressive lending, and compulsory savings requirements
- consider supporting activities such as training and technical assistance .etc

Sources: Rhyne and Otero (1994); Robinson (2001)

1.3 Objectives and hypothesis

1.3.1 Objectives

Clearly, ensuring access of the poor and low income households to financial services on a sustainable basis is the prime goal in microfinance (Rhyne, 1998; Robinson, 2001; Gonzalez Vega, 2003). However, the literature has shown that most of microfinance institutions have been not sustainable (Robinson, 2001; Gonzalez Vega; 2003). *The aim of our study therefore is to provide a deep analysis of how to attain a sustainable microfinance system, with an application to the case of rural Vietnam.* To realize this aim, our study recognises the key objectives as follows:

- Explain why the poor and low income households are generally excluded from the formal banking sector.

- Explain how the innovative lending technologies such as joint-liability lending can be employed to enable poor and low income households gain access to formal banking sector.

- Enhance the understanding that the poor and low-income households do have demand for various financial services, especially that they can save.

- Analyze the advantage and disadvantage of the poverty reduction and financial system approach and propose an appropriate approach to microfinance.

- Implement a comprehensive assessment of microfinance in Vietnam

- Recognise the key factors that affect the access of poor and low income households to financial services in rural Vietnam

- Analyze the impact of access to credit on household poverty reduction in rural Vietnam.

1.3.2 Hypotheses

The aim and objectives of our research are inspirited by the belief that microfinance can be sustainable and sustainability must be the key priority in the provision of financial services for the purpose of poverty reduction. The main hypothesis of our research therefore is as follows:

Given the right policy environment and innovative financial technologies, microfinance can be sustainable and sustainable microfinance can contribute better to the poverty reduction strategy.

To support this hypothesis, we make the following sub-hypotheses:

- Innovative technologies in microfinance can reduce the asymmetric information problem and thus enable the formal financial sector to enhance outreach to poor and low income households.

- A combination of the poverty reduction and financial system approaches to microfinance may be appropriate to microfinance.

- Very poor households are more likely to be excluded from the formal financial sector.

- Access to financial services has positive impact on household poverty reduction but the degree of impact is small.

Figure 1.2 - The structure of hypotheses and arguments
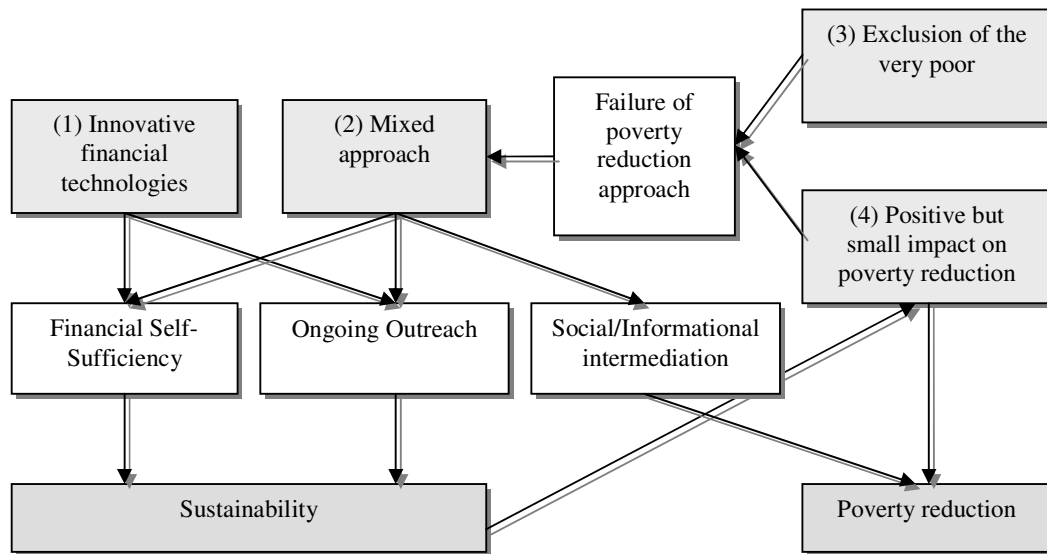
Figure 1.3 represents the linkages between the sub and main hypotheses of our research. This also represents the structure of key arguments that will be made in the research. Specifically,

A 1.   Innovations in financial technologies (1) reduce the problem of asymmetric information, the costs and risks related to provision of financial services. Hence, innovations increase the financial self-sufficiency and the capacity to outreach which are the essentials of sustainability. Suppose the positive impact of access to financial services on poverty reduction (4), sustainability ensures the on-going access to financial services by the poor and hence it contributes better to poverty reduction.

A 2.   The mixed approach (2) aims at creating a sound financial infrastructure and informational intermediation for the microfinance institutions to operate and providing social intermediation to the poor. Hence, on one hand, it increases the ability of being financial self-sufficiency and the capacity to outreach which result in sustainability. Sustainability then contributes to poverty reduction as in

argument A 1. On the other hand, social intermediation contributes directly to poverty reduction through development of skills, trainings and job creation .etc.

A 3.   The exclusion of the very poor implies that the poverty reduction approach has failed to realize its goal of targeting poor clients and thus the mixed approach could be more appropriate. The mixed approach then contributes to sustainability and poverty reduction as proposed in argument A 2.

A 4.   The positive but small impact of access to financial services implies that there must be a reconsideration of cost effectiveness under the poverty reduction approach. This is strengthened by the facts that the very poor are excluded and that microfinance institutions cannot attain sustainability. All of these suggest that the poverty reduction approach should be removed and the mixed approach is more appropriate. Further arguments continue as they are in argument A 3.

1.4 Methodology

The goals and hypotheses of our research are realized by employing both theoretical and empirical analyses. The theoretical analysis consists of literature review and modelling. The literature reviews are the desk-based research which uses various sources of secondary data and information such as books, journals, working papers, reports from the library, internet and email discussions. The modelling analysis follows the literature reviews. It includes the use of mathematical tools and the comparative analysis. The literature reviews are used in almost chapters while the modelling analysis is used mainly in chapter 2 and 3.

The *empirical analyses* consist of *case studies* and *econometric analyses*. *Case studies* are built using *primary information* obtained through *interviews* and *field trips*. The *econometric analyses* use *secondary data* that are drawn from two surveys on living standards in Vietnam, namely Vietnam Living Standards Surveys - VLSS 1992/1993 and VLSS

1997/1998. The discussion of these surveys is in Chapter 5 and 6. The computer software programs that we use to analyse these data include Stata, SPSS, Excel and E-views. Case study analyses are used mainly in chapter 4 while the econometric analyses are used in chapter 5, 6 and 7.

1.5 Structure of the thesis

The thesis is structured into 7 chapters including this chapter. Chapter 2 reviews and proposes some extensions to the relevant literature relating to banking with the poor and low income households. The analysis in this chapter focuses on the literature of asymmetric information (Alkerlof, 1970). We show that the poor are generally excluded from the financial sector under the effect of asymmetric information and the lack of collateral (Meyer and Nagarajan, 2000; Ed Mayo and Mullineux, 1998; Stiglitz and Weiss, 1981; Binswanger and McIntire, 1987). However, innovative lending technologies such as join-liability lending (Ghatak, 1999, 2000), prior savings lending and compensating balance lending may serve as the solutions to asymmetric information problems and the lack of collateral.

Chapter 3 starts with an emphasis that the poor do have demand for financial services and that the increased outreach to the poor is necessary (Gibbons and Meehan, 2002; CSD, 2000; Rutherford, 1998). We then discuss the two current approaches to the provision of financial services to the poor (Ronbinson, 2001), in which we concentrate on the strengths and weaknesses of each. We find that both approaches may not be appropriate for a sustainable microfinance which has been defined within this thesis. With a belief that microfinance can be sustainable, we propose that a mixed approach could be a good option.

In chapter 4, we focus on the case of rural Vietnam. We conduct a comprehensive assessment of microfinance in rural Vietnam, a country that follows the poverty reduction approach in microfinance. We find that the main constraints for a sustainable microfinance

include the legal and policy frameworks and the lack of innovative financial technologies in accordance with the best practices in microfinance. We propose that the poverty reduction approach should be removed, and instead, a mixed approach should be initiated.

Chapter 5 looks at the ways that the formal sector allocates credit to rural households. The main question in our analysis is that who gets credit in rural Vietnam. We find that the better-off rather than the poorer households are more likely to get credit. This finding suggests that the aim of poverty reduction that targets the very poor has failed and thus the reconsideration of the poverty reduction approach is necessary. Other than that, we find that the availability of formal credit at commune and village level is important. Hence, the extension of the branch network could enhance the access to formal financial services by the rural households.

Chapter 6 and 7 assess the impact of access to financial services (credit) on the household poverty reduction, using cross-sectional data and panel data. Findings from both chapters show that access to financial services indeed has positive impact on household poverty reduction, both short-term and long-term. Long-term impact (Chapter 7) implies that ongoing outreach to rural households is more important. However, the degree of impact is small and it raises the concern of the cost-effectiveness in providing financial services to the poor under poverty reduction approach. The small impact, together with the fact that most formal institutions cannot attain financial self-sufficiency and the necessity of ongoing outreach, strengthens the view that the mixed approach should be implemented.

The last chapter summarizes the key findings and policy conclusions made in the thesis. Figure 1.3 below presents the structure of the thesis.

Figure 1.3 – The structure of the thesis

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                    │     Chapter 1       │
                    │    Introduction     │
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│           General literature and discussion                        │
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│   │       Chapter 2          │      │       Chapter 3          │  │
│   │  Review and extensions of│ ───▶ │ Demand and approaches to │  │
│   │ the literature of access │      │   finance for the poor   │  │
│   │    to credit for LIHs    │      │                          │  │
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│                    │      Chapter 4       │                        │
│                    │ Microfinance in rural│                        │
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│   │  Chapter 5   │   │    Chapter 6     │   │    Chapter 7     │  │
│   │ Who gets     │──▶│ Impact of access │──▶│ Impact of access │  │
│   │ credit in    │   │ to credit on     │   │ to credit on     │  │
│   │ rural        │   │ poverty reduction│   │ poverty          │  │
│   │ Vietnam?     │   │ Cross-section    │   │ reduction: Panel │  │
│   │              │   │ Data             │   │ Data             │  │
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                    │     Chapter 8       │
                    │    Conclusion       │
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CHAPTER 2

CREDIT RATIONING AND ACCESS TO FINANCE FOR LOW INCOME

HOUSEHOLDS: A REVIEW AND EXTENSION OF THE LITERATURE

2.1. Introduction

The traditional but vital task for any bank is to ensure the repayment by borrowers to protect depositors and stakeholders again risks. There is a danger of systemic credit risk in which default borrowers worsen the whole banking system. Recent financial crises in 1990s have provided a very good illustration of how systemic credit risk may damages the whole banking system (Mullineux and Murinde, 2003; Mishkin, 2001; Mullineux, Dickinson, Ford, Fry, and Sen, 2000; Mullineux, 1998a). Therefore, banking requires significant expenses in gathering, processing and storing vast amounts of information on borrowers.

Like other economic agents, the banks must learn how to use information effectively in order to solve three basic economics problems: what kind of loan contracts to provide, to whom, and at what interest rate (Freixas and Rochet, 1997). Hence, banking is increasingly a business of information. With regard to rural areas, this business becomes more difficult since gaining information on rural borrowers is costly. This is due to a number of reasons, such as that the transactions costs are high and that rural borrowers do not have any previous relationship with banks so that they cannot be screened properly.

Recent literature on banking has concentrated on asymmetric information that explains how credit markets work and why they are less developed in rural areas (Beck, Demirguc-Kunt and Levine, 2004; Yaron, 1998; Ed Mayo and Mullineux, 1998; Meyer and Nagarajan, 1992, 2000). Asymmetric information creates adverse selection and moral hazard problems,

which are the sources of credit risk (Mishkin, 2001). The banks attempt to reduce credit risks by improving their expertise in collecting and analysing information about borrowers and their projects. The use of loan collateral (Bester 1985, 1987) is the most common method for reducing credit risks. With respects to rural credit markets, due to insufficient collateral, many countries use a group with join liability lending technology (Ghatak, 2000) to induce borrowers to use their local information to screen persons selected into the groups and apply peer pressure to encourage delinquent members to repay. The banks may also raise interest rates to cover risks, but there are several limitations to this approach such as credit rationing (Stiglitz and Weiss, 1981) or social resistance to charging higher interest rates for the poor.

In this chapter, we review and make some extensions to the relevant theories and practices regarding literature of banking with the low-income households (LIHs). First, we look at a typical credit market with asymmetric information as a benchmark for analysis of credit market for the poor. We explain why, under asymmetric information, credit rationing, underinvestment and overinvestment problems may occur in the market. We discuss the theory of collateral, which explains how collateral may help to reduce the effects of asymmetric information. Next, we focus on the analysis of credit market for the LIHs, where we discuss how joint-liability lending, compulsory savings and compensating balances may serve well as substitutes for collateral, and therefore help to reduce the effects of asymmetric information in the credit market for the LIHs. Overall, we show in this chapter that due to a number of reasons such as asymmetric information, transaction costs and the lack of collateral, the poor households are traditionally limited to access to formal financial sector. The evolution of banking with the low income households therefore requires an intensive innovation in lending technology.

The remainder of this chapter is organized as follows. Section 2.2 presents a review and extensions of literature regarding credit market and asymmetric information, which cover credit rationing and the use of collateral. In section 2.3, we discuss the lending technologies that are specifically used in lending to low income households. The final section, section 2.4, concludes the main findings and discussion raised in the chapter.

2.2. Credit market with asymmetric information

Alkerlof (1970) analyses "the market for lemons" with an implication that markets are imperfect in terms of information. He shows that for any transaction in the market, one side of a transaction has more information than his partner does. Today, this simple notion is well known as the *theory of asymmetric information*. With a specific application to a loan contract in credit market, the borrower knows better than the bank about either the probability of success of his project or whether he invests in project as committed or not, which, if known, affects the lending decision by the bank. Asymmetric information results in the problems of adverse selection and moral hazard (Mishkin, 2001) which are the main concerns for any bank.

Adverse selection problem occurs since one side holds private information *before* the transaction is launched. Moral hazard occurs as one side's action is not verifiable by his partner, or it receives private information (i.e. the conditions of the transaction are changed) *after* the transaction has launched. Specifically, because the bank does not know the probability of success of each project, it may reject safe but grant loans to risky applicants (adverse selection effect). Similarly, once given a loan, the borrower may alter his project which then alters the probability of repayment and thus alters the expected return to the bank (moral hazard effect). As a result, asymmetric information discourages bank to grant loans to all applicants or otherwise induces the bank to invest in risky projects.

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2.2.1. Credit rationing

The existence of asymmetric information requires extensive effort in screening and verifying borrowers to solve for adverse selection (Spence, 1973a, 1973b; Rothchild and Stiglitz, 1976) and monitoring borrowers to solve for moral hazard (Jensen and Mackling, 1976; Barnea, Haugen, and Senbet, 1985). If verification and screening are costly, one may argue that the bank can increase interest rates to cover the estimated risk of default. This, however, is not easy. On one hand, it is possible that the pool of borrowers becomes riskier since only borrowers with risky projects (which have a high probability of default) can afford the increased interest rate and thus faces the bank with greater adverse selection. On the other hand, a higher interest rate encourages borrowers to invest in riskier projects in order to cover the increased cost of loan, which implies higher probability of moral hazard or an increase in monitoring cost. Hence, it is not always a solution for the lender to react with asymmetric information by raising interest rate.

Ex ante asymmetric information, which assumes borrowers have more information than the banks about the projects to be financed at the time of contracting, has become a central assumption in the studies of credit rationing in credit markets. Extensive literature on *ex ante* credit rationing can be seen from various papers, for examples: Jaffee and Russel (1976), Keeton (1979), Stiglitz and Weiss (1981), Mankiw (1986), Callomiris and Hubbard (1990) and Bernanke and Gertler (1987).

Jaffee and Russell (1976) consider a credit market where they assume two types of borrowers: honest borrowers, who accept loans if and only if they expect to repay, and dishonest borrowers, who default whenever the costs of default are sufficiently low. Dishonest borrowers are assumed to prefer larger loans than honest borrowers do. The bank knows the proportion of honest and dishonest borrowers in the market, but it cannot

distinguish the type of each individual borrower. Because both types of borrowers are indistinguishable, i.e. adverse selection, the bank limits the amount of loan granted to reduce the probability of default and to induce the self-selection of borrowers. Self-selection occurs because the incentive for dishonest borrowers to engage in a loan contract decreases when the amount of loan decreases.

Keeton (1979) and Stiglitz and Weiss (1981) follow the view that an increase in interest rate may cause expected profits to fall, and therefore induce the lender to ration credit, for two reasons: adverse selection and moral hazard. First, because of adverse selection, the bank cannot distinguish the risk type of each individual borrowers, it offers the same interest rate to every applicant. However, at a prevailing interest rate, the least risky borrowers are the marginal borrowers (Stiglitz and Weiss, 1981), so if the interest rate increases, marginal (but safest) borrowers will be dropped out of the market. In other words, an increase in interest rate causes an increase in the proportion of bad borrowers and reduces the average probability of repayment. Hence, at some certain time, the bank would be better to ration credit.

Second, the probability of default could also rise because increased interest rate induces borrowers to take more risks, which the lender cannot monitor. This is moral hazard explanation for greater probability of default as shown by Keeton (1979) and Stiglitz and Weiss (1981). Assuming that a borrower chooses a privately optimal level of risk that provides an appropriate return to him, this return depends on the interest rate. If the interest rate rises, the lender takes a greater slice of whatever return is made, but an increase in interest has a proportionately greater effect on the borrower's return if he plays safe. Because the borrower's previous privately optimal level of risk is now too low, he can make himself better off by taking default, and hence, the expected loss resulted from borrower's default would impose on the lender. If this effect is sufficiently strong, the expected losses would be

high enough to reduce the lender's expected return overall, despite the fact that higher interest rate increases the lender's return in a non default state. Therefore, the lender would prefer to ration credit instead of increasing interest rate to clear the market.

Another branch of the credit rationing literature focuses on *ex post* asymmetric information (Williamson, 1986, 1987; Diamond, 1984; Gale and Hellwig, 1985; Boyd and Smith, 1994; Conning, 1996). In this branch, banks and borrowers are assumed to have the same information about the projects at the time of contracting a loan. However, once the returns from the projects are realized, only the borrowers can observe them. Banks therefore have to spend resources (i.e. monitoring) to obtain this information. Thus, information is asymmetric in perceiving the returns from projects. One of the important assumptions is that all borrowers are potentially dishonest and they will default or misreport their returns from projects if their expected return is increased by doing so. This is called ex-post moral hazard behaviour.

The main question is then how this *ex post* moral hazard behaviour may affect the bank's decisions. Williamson (1986, 1987) argues that monitoring decisions are made *ex post* rather than *ex ante*. Townsend (1979) shows that a random monitoring action is sufficient enough to overcome *ex post* moral hazard and to induce honesty. Cosci (1993) implies further that a perfect monitoring is costly but not necessary. Although monitoring is introduced differently, these models (e.g. Williamson, 1986, 1987 and 1988) consider the standard debt contract as an optimal arrangement and show that under *ex post* asymmetric information, credit rationing may also exist.

Williamson (1986, 1987, and 1988) discusses about this possibility by providing some theoretical examples. He emphasises on the verification and monitoring costs, and thus in some sense refers to economies of scale, as reasons for credit rationing. He argues that the

bank could respond to an excess demand for credit by increasing the interest rate on its loans, thereby increasing its expected return in non-default cases, but an increase in its interest rate would also raise the probability of default and thus increase expected verification costs. The net effect of an increase in interest on the bank's expected return is therefore ambiguous, and if the net effect is to reduce the bank's expected return, the bank will respond to an excess demand for credit by rationing credit.

According to him, since there exists economies of scale in investment projects, it makes little sense for a bank to give a borrower a small amount of credit, so the bank must either give a borrower a large amount of credit or give him no loan at all (i.e. rationing by restricting the number of loans). The bank could therefore find itself a situation where it faced identical demands for loans and choose to respond by giving loans to some but not to others. However, it is also the case that the pledging of entrepreneurial inside equity and collateral to projects encourages the lender to maximise the number of loans it makes, and therefore ration by restricting the size of his loans. Whichever the cases those who were denied loans would be credit rationed, but this credit rationing would be an equilibrium phenomenon in the sense that there would be no way for those who are denied credit could induce the lender to give them the (more) credit that was giving to others by offering higher interest rates.

Some other authors, for example Clemenz (1986), introduce a different set of assumptions under which credit rationing is also possible. The objective is to show under what reasonable circumstances a backward-bending supply curve can exist. Clemenz (1986) finds two additional situations: (i) borrowers differ in skills: if borrowers are risk neutral, they will take a loan only if the expected return is greater than the prevailing wage for their skills class. As the interest rate increases, the returns from using the loan decrease. As a result, high ability borrowers start to leave the market voluntarily, thereby hurting the quality of the

lender's portfolio. Only low ability borrowers or those with low reservation wage will stay in the portfolio; (ii) unobservable effort of borrowers: the probability of project success changes with effort. Being risk neutral, an increase in the interest rate reduces the expected marginal return of effort for the borrower. In order to maintain equality between marginal cost and the expected marginal return of effort, the borrower must decrease effort. This reduction in effort conspires against the interest of the bank.

The studies on credit rationing also pay attention to the recognition of it. Baltenspeger (1978) and Keeton (1979) propose the distinction between price and quantity credit rationing. According to Baltenspeger (1978), price rationing occurs when the borrower cannot pay the price of the loan. Quantity rationing occurs when the borrower is rationed through non-price devices. This distinction is important because it helps empirical researchers to recognise which terms and conditions affect the price and/or the quantity rationing.

Keeton (1979) and Swank (1996) define a clear distinction between two types of non-price credit rationing. Rationing in amount of loans (type I) occurs when all borrowers receive loans but the amount of loan is lower than the amount demanded at the prevailing interest rate. Quantity rationing or exclusion (type II) occurs when indistinguishable borrowers are treated differently: some receive loans while the others do not.

2.2.2. A model of credit rationing

To illustrate better how credit rationing may happen in a credit market, we develop a simple *ex ante* asymmetric information model as following. We consider a credit market where there are two sets of agents: households (hereinafter: borrowers) and banks. Each borrower has an opportunity (a project) to generate income but he lacks capital. Assuming that each borrower has an initial wealth in kind of labour, which if not employed by his own project, it can be rented in the labour market. The borrower therefore has to seek fund from

the bank. The bank lends on a market basis (i.e. seeking profit). We assume that information asymmetry is persistent in this market.

We follow the assumption made by Stiglitz and Weiss (1981) which assumes that projects have the *same expected return* (μ_i) but different probability of success (ρ_i) and *different return in case of success* (μ^s_i). The return to a project in case of failure is μ^f_i. The properties of project are not affected by borrower's behaviour. The bank is able to distinguish projects with different expected return, but is unable to distinguish probabilities of success of each project. The bank therefore offers the same contract (*r,B*): interest rate (*r*) and amount of loan (*B*) to every borrower with the same project expected return. This implies adverse selection problem (Mishkin, 2001).

The return in case of success is assumed to be higher than the repayment to the bank, *(1+r)B*, while the return in case of failure is assumed to be lower. Each project is launched if the expected return to borrower is not lower than the opportunity cost, *W*, which is the initial wealth of the borrower. There are two ways of explaining opportunity cost: borrower exerts labour effort, dedication and time, which otherwise can be rented in the labour market or a borrower uses a tiny amount of money for setting up the project, i.e. tiny equity, which if not used can be deposited at a risk free rate. We then can write the functions of expected return to a project and to a borrower:

$$\mu_i = \rho_i \mu^s_i + (1 - \rho_i)\mu^f_i \tag{2.1}$$

$$\pi(\rho_i, r) = \rho_i[\mu^s_i - (1+r)B] \geq W_i \tag{2.2}$$

Substitute (2.1) into (2.2), after some arrangement, we obtain:

$$\pi(\rho_i, r) = \mu_i - \mu^f_i + \rho_i[\mu^f_i - (1+r)B] \geq W_i \tag{2.3}$$

Differentiating (2.3) with respect to pi, we have:

$$\frac{\partial \pi(\rho_i, r)}{\partial \rho_i} = \mu_i^f - (1+r)B < 0 \tag{2.4}$$

Since return to a project in case of failure (μ_i^f) is assumed to be lower than the repayment to the bank, $\mu_i^f - (1+r)B < 0$, (2.4) implies that the expected return to a household is a decreasing function of the probability of success (ρ_i). Hence, at a certain interest rate, the least risky projects (marginal projects) have the lowest break-even point and the most risky projects have the highest.

Consider the marginal borrowers who satisfy zero expected return condition $\pi(\rho_i, r) = 0$ and use implicit function theorem to differentiate r with respect to ρ_i, we obtain:

$$\frac{\partial r}{\partial \rho_i} = -\frac{\partial \pi(\rho_i, r)/\partial \rho_i}{\partial \pi(\rho_i, r)/\partial r} < 0 \tag{2.5}$$

Derivative (2.5) implies that an increase in interest rate charged by the bank leads to a decrease in the probability of success. In other words, the marginal borrowers withdraw and thus the pool of borrowers becomes riskier if interest rate increases. This effect is well studied in Keeton (1979) and Stiglitz and Weiss (1981). What actually matters the bank is the number of potential safe applicants who would be dropped. This, however, is not discussed in those papers. Neyer (2001) shows that the effect depends on the degree of asymmetric information, level of internal finance, and number of marginal borrowers who operate at break-event point.

Figure 2.1 - Net expected return to a borrower and probability of success
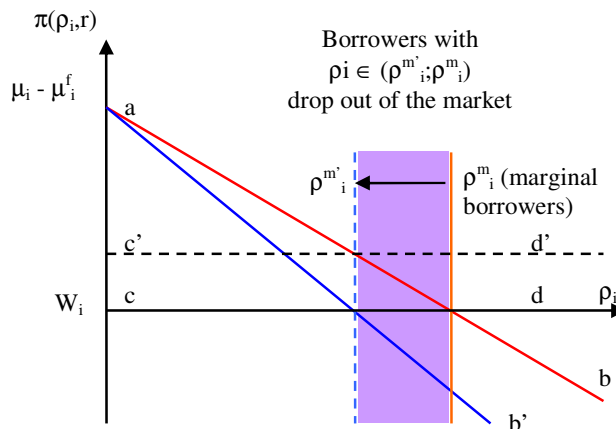
Figure 1 presents the effect of a change in interest rate on expected return to borrower and the effect of an increase in opportunity cost. The line *a-b* depicts function 2.3, representing the expected return to a borrower when probability of success varies; ρ^m_i is the probability of success of marginal borrowers. Since $\mu^f_i - (1+r)B < 0$, an increase in interest rate, *r*, leads to a move of expected return to borrower from *a-b* to *a-b'*. The expected return to a marginal borrower is then lower than the opportunity cost, and thus marginal borrowers drop out of the market. The new marginal borrowers are now with probability of success $\rho^{m'}_i$, which is lower than ρ^m_i, implying that the pool of borrowers becomes riskier. Similarly, an increase in opportunity cost (i.e. similar to Clemenz (1986)) from *c-d* to *c'-d'* will cause the same effect.

From the bank's perspective, the bank receives full repayment *(1+r)B* in case of success and receives the return to project (μ^f_i) in case of failure. We can write the function of expected return to the bank as follows:

$$\kappa(\rho_i, r) = \rho_i(1+r)B + (1-\rho_i)\mu^f_i = \rho_i[(1+r)B - \mu^f_i] + \mu^f_i \qquad (2.5)$$

Differentiating (2.5) with respect to pi, we obtain:

$$\frac{\partial\kappa(\rho_i, r)}{\partial\rho_i} = (1+r)B - \mu^f_i \qquad (2.6)$$

Since *(1+r)B* $- \mu^f_i$ *>0*, derivative (2.6) implies that the expected return to the bank is an increasing function of probability of success. If interest rate increases, there are two effects on the expected return to the bank: (i) an increase in the value of component *(1+r)B* $- \mu^f_i$, which is an increase in interest income; and (ii) a decrease in ρ_i (shown in 2.5) which leads to lower expected return to the bank (shown in 2.6) as lower-risk borrowers drop out of the market.

Figure 2.2 - Return to the bank and credit rationing

Figure 2a Return to the bank **Figure 2b Credit rationing**
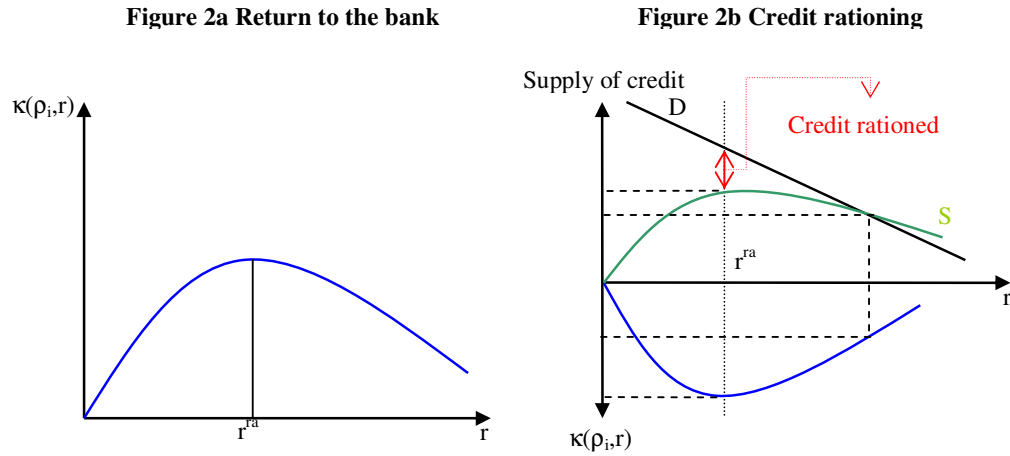
Hence, there exists a critical equilibrium interest rate (r^{ra}) where if the current interest rate (r) is lower than that, the bank can increase interest rate without any significant withdrawal of lower-risk borrowers and the expected return to the bank increases. However, if the interest rate increases beyond r^{ra}, lower-risk borrowers drop out of the market and the new (but riskier) pool of borrowers decreases the expected return to the bank. In such a case, the bank would prefer to ration credit at r^{ra} and there exists a problem of underinvestment.

Figure 2a shows r^{ra} as the critical interest rate at which the expected return to the bank is highest. Clearly, if at r^{ra}, the supply of loans meets the demand for loans, there is no credit rationing and the market is at equilibrium without any concerns. If, however, there is an excessive demand for credit, Stiglitz and Weiss (1981) show that it is better for the bank to ration credit, rather than to increase interest rate to meet the excess demand for credit. Figure 2b depicts how credit rationing happens. However, as De Meza and Webb (1987) shows, if the lenders use equity instead of debt contracts, that would solve the problem of adverse selection in the Stiglitz and Weiss model (Ghatak, 2000, pp.605).

2.2.3. Overinvestment

While the literature on credit rationing is extensive, there are some concerns about its assumptions. Slightly different assumptions can lead to completely different results. An outstanding example is presented by De Meza and Webb (1987, 1992). They show that if the *ex ante* asymmetric information in the Stiglitz and Weiss (1981) model concerns the mean rather than the variance associated with individual project returns, then adverse selection and credit rationing would not longer arise, while market equilibrium would exhibit over-investment rather than under-investment.

To illustrate this branch in the literature, we consider the assumption made by De Meza and Webb (1987) which assumes that projects have the same return in case of success (μ^s_i) but different probability of success (ρ_i), and thus they have different expected return (μ_i). Other assumptions are similar to the case of credit rationing. Looking back at the condition (2.2) and differentiating (2.2) with respect to ρ_i, we obtain:

$$\frac{\partial \pi(\rho_i, r)}{\partial \rho_i} = \mu_i^s - (1+r)B > 0 \qquad (2.7)$$

Derivative (2.7) shows that the expected return to a borrower $\pi(\rho_i, r)$ is an increasing function of the probability of success of project ρ_i . Thus, at a certain opportunity cost, the most risky projects (the marginal projects) have the lowest probability of success (ρ^{min}_i), as shown in Figure 3a. If we consider marginal households, their expected return function satisfies:

$$\pi(\rho_i^{min}, r) = \rho_i^{min}[\mu_i^s - (1+r)B] = W_i \qquad (2.8)$$

From the bank's perspective, it makes loans if its expected return exceeds its cost of fund, *(1+s)B*, i.e.:

$$\kappa(\rho_i, r) = \rho_i(1+r)B + (1-\rho_i)\mu_i^f \geq (1+s)B$$

$$= \rho_i[(1+r)B - \mu_i^f] + \mu_i^f \geq (1+s)B \qquad (2.9)$$

From (2.6) we know that expected return to the bank $\kappa(\rho_i, r)$ is an increasing function of the probability of success of project ρ_i. So, there exists a critical probability of success ρ_i^* which equalises the expected return to the bank to the opportunity cost (i.e. zero profit), as shown in Figure 3b. Apparently, if the bank knows the risk of each project, it may choose to make loans only to the borrowers with probability of success no less than ρ_i^*. However, because of asymmetric information, the bank cannot distinguish projects by their individual risks and hence, from a pool of applicants, the bank takes the average probability of success (ρ_i^*) to make loans at correspondent interest rate r^* (Alkerlof, 1970).

Figure 2.3 - Constraint for the borrower and for the bank

Figure 2.3a Constraint for the borrower   **Figure 2.3b Constraint for the bank**
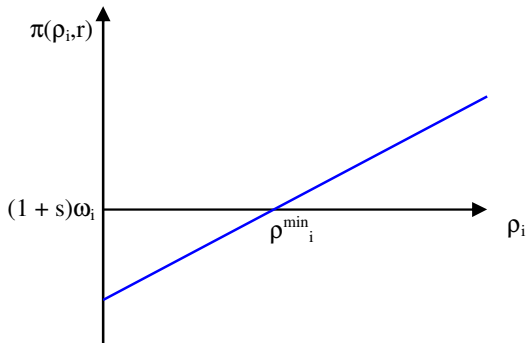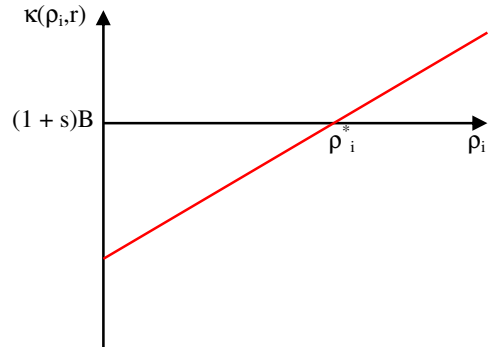
Figure 2.4 – Over-investment problem
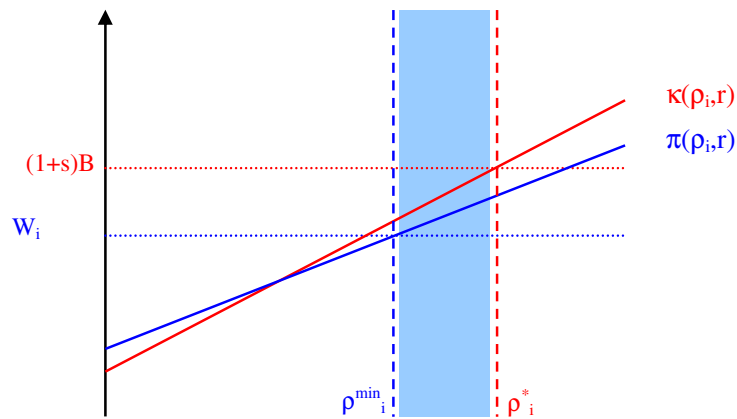
Consequently, there exist two groups of borrowers: (i) under-the-average risk borrowers, from them the bank makes negative expected return; and (ii) above-the-average risk borrowers, from them the bank makes positive expected return. This indicates that, under the effect of asymmetric information, some projects are financed but they bring negative return to the bank, i.e. adverse selection. In the Figure 2.4, the dark area represents group (i) of borrowers; $\pi(\rho_i, r)$ represents the expected return to a borrowers; and $\kappa(\rho_i, r)$ represents the expected return to the bank. Borrowers whose probability of success is not less than ρ_i^{min} apply for loans. Borrowers whose risk ranges from ρ_i^{min} to ρ_i^* bring negative return to the bank.

The existence of under-average-risk projects is well presented in De Meza and Webb (1987), which mentions it as the over-investment problem. Over-investment implies the fact that some projects are funded but not socially optimal, as a consequence of asymmetric information. We can see this clearly by looking at marginal borrowers who bring negative expected return to the bank:

$$\kappa(\rho_i^{min}, r^*) = \rho_i^{min}(1 + r^*)B + (1 - \rho_i^{min})\mu_i^f < (1 + s)B \qquad (2.10)$$

From (2.8) and (2.10), after some arrangement, we obtain:

$$\kappa(\rho_i^{min}, r^*) + \pi(\rho_i^{min}, r^*) = \rho_i^{min}\mu_i^s + (1 - \rho_i^{min})\mu_i^f < (1 + s)B + W_i \qquad (2.11)$$

Inequality (2.11) shows that the expected return to marginal projects, which is shared between borrower and the bank, does not cover the total opportunity costs (costs to bank and to borrower). This implies that, from the view of society as a whole, there is overinvestment problem. The reason is that the expected return to marginal borrowers cannot cover the loss to the bank for financing marginal projects. The "overinvestment" projects exist in the market because they are crossly subsidized by the above-average-risk projects.

In their later paper, De Meza and Webb (1992) show that information asymmetries should not be considered as the sole source of imperfections in financial markets. They show that in competitive markets and under <u>symmetric</u> information, credit rationing (loan size rationing) is also possible. Another important contribution of their paper is the notion that credit rationing maybe entirely consistent with an efficient market allocation. It is important "to recognize that the mere observation of credit rationing is not sufficient to conclude that market failure must be present and hence government action is worth considering" (De Meza and Webb, 1992). Although it may be difficult to justify symmetric information in financial markets, the paper sheds a light about credit rationing in a complete information framework.

2.2.4. Collateral as a sorting device

We have shown that asymmetric information may result in both over and under investment in the credit market. The main assumption is that banks are unable to distinguish risk types of individual loan applicants. Hence, in the states of excessive demand for loans, credit rationing is shown as an instrument for the bank to react. In this section, we will discuss another instrument that a bank can use to reduce the effects of asymmetric information, which is collateral policy (Bester, 1985, 1987, 1994; Bernanke and Gertle, 1989, 1990; Guttentag and Herring, 1984; Barro, 1976; Besanko and Thakor, 1987; Chan and Thakor, 1987). The central assumption in collateral literature is that the ability to pledge collateral is a sign of reliability. The assumption that borrowers who expect not to repay the loan will be the least likely to risk their assets by pledging them (Barro, 1976) may correct for adverse selection problems. Moral hazard problems can also be eliminated when a loan is collateralized (Guttentag and Herring, 1984).

Bester (1985), Besanko and Thakor (1987), and Chan and Kanatas (1985) suggest that, in credit markets with moral hazard or adverse selection, outside collateral serves as an

incentive, or screening device. They argue that outside collateral increases the punishment for default. If there is a sufficient amount of collateral available, credit rationing as introduced by Stiglitz and Weiss (1981) cannot persist. Bester (1994) suggests that, if a borrower can choose from a variety of risky projects, then collateral ensures that low-risk projects will be chosen. In the case of adverse selection, banks could offer a menu of contracts that rank loan applicants according to the risk of projects. In this scenario, Bester (1994) shows that safer borrowers reveal themselves by posting collateral, that is unattractive to high-risk borrowers.

It's clear to us that if borrowers could provide any amount of collateral, the bank could avoid any default losses by setting collateral requirements at a level high enough to ensure that the bank was always repaid in full, along with any incidental expenses (Bester, 1985, 1987; Bernanke and Gertle, 1989, 1990). If so, the bank would then be guaranteed against loss and since it would no longer have any reason to care about default, could offer borrowers whatever they wanted at the going interest rate, i.e. no credit rationing. Then, why do banks not simply supply fully collateralize loans?

The answer to this question obviously depends on the bank's approach. However, it is important to recognise that a fully collateralised loan policy would restrict banks to a limited segment of the market. Even though risk is totally eliminated, the banks' expected return function may not be maximized. There should be some set of contracts where some degree of certainty is sacrificed in order to increase expected profit. Nevertheless, more often than not, borrowers cannot provide perfect guarantees because their collateral is limited, and such collateralised loans are still risky.

The limited amount of collateral makes collateral policy more difficult. Collateral can be used in one of two ways, each of which gives rise to its own distinct testable hypothesis. The first hypothesis is that banks design collateral requirements on the basis of their

assessment of the risk that a particular loan poses. The more risky they perceive the loan to be, the more collateral they will require, which yields the prediction that observably more risky loans should be associated with greater collateral requirements. The other hypothesis is that borrowers who have private information that they are safer then average, and thereby reveal themselves to the bank in a way that less safe borrowers would be reluctant to emulate. This hypothesis predicts that greater amounts of collateral should be associated with loans to borrowers who had private information that they were relatively safe.

2.2.5. A model of collateral

To illustrate how collateral may serve as a sorting device in credit market, we consider a simple model as follows. We assume two types of projects in the market: risk ρ_r and safe ρ_s where $\rho_s > \rho_r$. Each project requires an investment of B. Return in case of success is μ^s_s and μ^s_r for safe and risk project, respectively. The return in case of failure is $\mu^f > 0$ for both. The expected return to project is the same for every project:

$$\mu_i = \rho_s \mu^s_s + (1 - \rho_s)\mu^f = \rho_r \mu^s_r + (1 - \rho_r)\mu^f \qquad (2.12)$$

Assuming that the bank operates on competitive basis i.e. bank makes zero profit. Given the loan size B, a loan contract is tailored by the loan rate r and the collateral C. We assume that the cost of collateralisation to a borrower and the cost of liquidation to the bank if the borrower defaults are η and ε percent of C.

Borrower's perspective

The expected return to a borrower i ($i = r,s$) is:

$$\pi(\rho_i, r, C) \quad = \rho_i[\mu^s_i - (1 + r)B - \eta C] - (1 - \rho_i)(1 + \eta)C$$

$$= \mu_i - \rho_i[(1 + r)B + \eta C] - (1 - \rho_i)[(1 + \eta)C + \mu^f] \qquad (2.13)$$

If safe borrower has the same expected return as the risk borrower has, the following condition should be held:

$$\pi(\rho_s, r, C) = \pi(\rho_r, r, C) \qquad (2.14)$$

Rearrange (2.14) and note that $\mu_s = \mu_r$ (2.12), we obtain:

$$(\rho_s - \rho_r)[(1+r)B - \mu^f - C] = 0 \qquad (2.15)$$

Since $\rho_s > \rho_r$, (2.15) implies that the necessary condition for a safe borrower having the same expected return as compared to a risk borrower is:

$$C = C^* = (1+r)B - \mu^f \qquad (2.16)$$

We now consider borrowers having the same expected return (for simplicity, we assume zero profit) which satisfy:

$$\pi(\rho_i, r, C) = 0 \qquad (2.17)$$

Rearrange (2.17) to yield the function of interest rate:

$$r(\rho_i, C) \quad = \frac{\mu_i - \rho_i B - (1-\rho_i)\mu^f - C(1+\eta-\rho_i)}{\rho_i B}$$

$$= -1 + \frac{\mu_i - (1-\rho_i)\mu^f - C(1+\eta-\rho_i)}{\rho_i B} \qquad (2.18)$$

Consider a borrower i, the interest rate function (2.18) indicates the indifference function, which represents combinations of interest rate and collateral that give the same expected return to the borrower:

If $C = 0$, note that $\mu_s = \mu_r$ we yield $r_r - r_s = (\rho_s - \rho_r)(\mu - \mu^f)$. Since $\rho_s > \rho_r$ and $\mu > \mu^f$, so $r(\rho_r, C) > r(\rho_s, C)$.

If $C > 0$, differentiating (2.18) with respect to C, we obtain:

$$\frac{\partial r(\rho_i, C)}{\partial C} = -\frac{\eta + 1 - \rho_i}{\rho_i B} < 0 \qquad (2.19)$$

Figure 2.5 – The indifferent return lines

Figure 2.5a Safe borrowers accept larger increase in collateral resulting from a decrease in loan rate	**Figure 2.5b Zero bank return curve DF is steeper if contracts only chosen by type r borrowers**
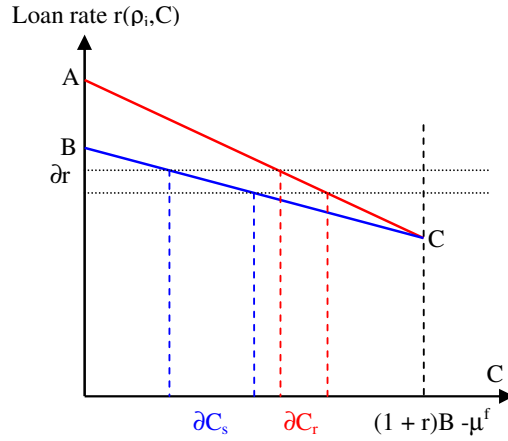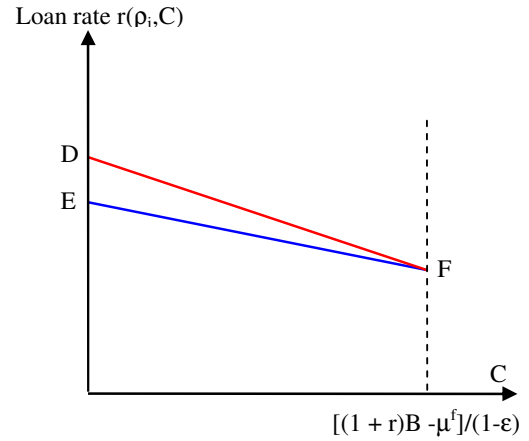
Derivative (2.19) implies that interest rate r is a decreasing function of collateral C. In other words, there must be a trade off between collateral and interest rate for a borrower to keep the expected return indifferent. Moreover, because $\rho_r < \rho_s$, from (2.19) we can observe that the indifference line of a risk borrower is steeper than of a safe borrower. Hence, for a certain decrease in interest rate, risk borrower tolerates a smaller increase in collateral than safe borrower does. In figure 5a, *AC* and *BC* represent the indifference lines of a risk and safe borrower, respectively. If interest rate decreases by ∂r, a safe borrower accepts an increase of ∂C_s in collateral, larger than ∂C_r, which a risk borrower accepts. The crossing point *C* indicates condition (2.16).

<u>Bank's perspective</u>

From the bank's perspective, it receives the full repayment if the project succeeds and receives the return to project plus collateral if the project fails. However, the bank has to bear a cost of liquidation. The expected return to the bank is therefore as follows:

$$\kappa(\rho_i, r, C) = \rho_i(1+r)B + (1-\rho_i)\mu^f + (1-\rho_i)(1-\varepsilon)C \quad \text{where } i = r, s \qquad (2.20)$$

The condition for the bank to get the same expected return from lending to a safe and risk borrower is:

$$(\rho_s - \rho_r)[(1+r)B - \mu^f - (1-\varepsilon)C] = 0 \qquad (2.21)$$

Since $\rho_s > \rho_r$, we can arrange for:

$$C = C^* = \frac{(1+r)B - \mu^f}{1-\varepsilon} \qquad (2.22)$$

We now consider the case where bank gets the same expected return (for simplicity, we assume zero profit) from lending to safe and risk borrower, i.e. the expected return to the bank satisfies:

$$\kappa(\rho_i, r, C) = 0 \qquad (2.23)$$

We then arrange to yield the function of interest rate as follows:

$$r(\rho_i, C) = -1 - \frac{(1-\rho_i)\mu^f}{\rho_i B} - \frac{(1-\rho_i)(1-\varepsilon)C}{\rho_i B} \qquad (2.24)$$

Note that the interest rate function (2.24) represents the indifference function of the bank.

If C = 0, $r(\rho_i, C) = -1 + \dfrac{\mu^f}{B} - \dfrac{\mu^f}{\rho_i B}$. Since $\rho_s > \rho_r$ so that $r(\rho_r, C) > r(\rho_s, C)$.

If $C > 0$, differentiating (2.24) with respect to C we obtain:

$$\frac{\partial r(\rho_i, C)}{\partial C} = -\frac{(1-\rho_i)(1-\varepsilon)}{\rho_i B} < 0 \qquad (2.25)$$

Derivative (2.25) implies that interest rate r is a decreasing function of collateral C. Since $\rho_r < \rho_s$, we can prove that the indifference line if bank lends to a risk project is steeper than that if to a safe project (Figure 5b). This implies that for a given interest rate, the bank

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typically requires more collateral from a risk borrower than from a safe household. Alternatively, for a given amount of collateral, the bank charges higher interest rate to risk household than to safe household.

The significance of the different preference in the collateral requirement is based on the fact that borrowers know their probability of success and decide whether or not they should bet their collateral for the benefit of interest rate reduction. Obviously, the difference in preference reveals the opportunity that if the bank can design a menu of contracts which meet individual preferences of borrowers, banks can classify the risk of borrowers.

Equilibrium

From (2.19) and (2.22), we obtain the following inequality:

$$-\frac{(1-\rho_i)(1-\varepsilon)}{\rho_i B} > -\frac{(\eta+1-\rho_i)}{\rho_i B}$$, which is then arranged for:

$$\eta + (1 - \rho_i)\varepsilon > 0 \tag{2.26}$$

Since η and $\varepsilon > 0$, the inequality (2.26) holds. Hence, the indifference line of borrower i $(i= r,s)$ is steeper than of the bank if it lends to the borrower i $(i=r,s)$. This implies that for a given risk type i, the indifference line of a borrower and of the bank satisfy the "crossing-property". Since we have different types of risk (s and r), there is an incentive for the bank to tailor its loan contracts to attract different type of borrowers.

This model is related to those of Bester (1985, 1987). The main finding is that collateral tailored contracts may serve as a self-selection mechanism. The key assumption for self-selection to work is that risky borrowers do not want to risk their collateral and therefore prefer a contract of high interest rate and low collateral, while safe borrowers are willing to bet their collateral because they have high probability of success and therefore they choose a

contract of low interest rate and high collateral. Moreover, because of the cost of liquidation and collateralisation, the banks and borrowers are assumed to prefer less collateral.

Figure 2.6 - Collateral acts as self-selection mechanism
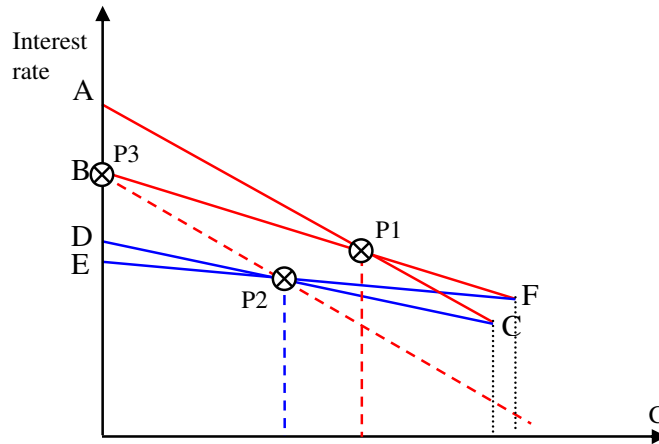
The use of collateral can be depicted in Figure 2.6. The suitable contracts must be at the crossing points, for examples: P1, P2, because they simultaneously meet the borrower's and bank's maximized utility. If the pair of contracts (P1, P2) is offered, both types of risk prefer contract P1 because it has lower interest rate and lower collateral, as compared to contract P1. Collateral therefore does not act as a device for risk screening. However, if the bank offers the pair of contracts (P2, P3), safe borrowers prefer contract P1 while risk borrowers prefer contract P3. The reason is that risk borrowers are indifferent in expected return if they choose contract P3 (compared to if they choose P2) but they prefer P3 because of lower collateral. Hence, the collateral can work as a device for self-selection. It is noted here that there is a wide range of pairs of contracts that the bank may offer. However, if we assume that the risky borrowers prefer the lowest collateral contract and that the costs of collateralisation and liquidation are high, the pair (P1, P3) is the best choice for the bank to offer.

Bester (1985, 1987) shows further that in cases of sufficient collateral, credit rationing in kind of Stiglitz and Weiss (1981) does not exist at equilibrium. This, however, is a binding constraint because not all borrowers can meet the collateral requirement, and if so, some credit rationing may still remain in the market (Chan and Thakor, 1987). It is also possible that borrowers with more assets to offer may be riskier borrowers. Stiglitz and Weiss (1981) and Wette (1983) explain that raising collateral requirements may worsen adverse selection effects. If collateral requirements are increased, only wealthy people would be able to get a loan. But wealthy borrowers may be those who in the past have succeeded at risky endeavours (Stiglitz and Weiss, 1981). As some of them may have succeeded just by chance, the group might be less risk adverse. Even in a world with diverse collateral requirements, credit rationing may still be an optimal bank's response.

In another paper, Stiglitz and Weiss (1986) develop a model where moral hazard and adverse selection problems and the role of collateral were jointly analyzed. They explain that equilibrium can take the form of pooling or separating contracts. In a pooling equilibrium, credit rationing may persist (even in the presence of collateral) because increasing the interest rate may have negative incentive effects and increasing collateral requirements may have negative adverse selection effects. In the separating equilibrium case credit, rationing may still occur for each one of the different contracts.

In conclusion, collateral requirements improve the bank's degrees of freedom. Better contracts can now be designed to differentiate among borrowers (Stiglitz and Weiss, 1987b). However, "as long as the dimensionality of the space of borrower characteristics is larger than the dimensionality of the space of contracts, it seems unlikely that perfect information can be obtained." (Jaffee and Stiglitz, 1990: pp.867)

2.3. Lending to low-income households

For many reasons, credit markets for the low income borrowers are special. Yaron, McDonald and Piprek (1997) and Yaron, McDonald and Charitonenko (1998) summarise the most common characteristics of a credit market for the LIHs. These characteristics are associated with high transaction costs and high credit risks. First, most low income clients (both households and small entrepreneurs) experience great difficulty in accessing the formal financial sector due to poor physical and financial infrastructure. The client dispersion in rural areas and typically small loan amounts lead to relatively high financial transaction costs both for banks and borrowers, and increase the perception of high risks, which banks usually associate with small clients. Moreover, most of the low-income clients do not have any previous relationship (such as savings or payment services) with banks so that they cannot be screened properly. As a result, asymmetric information problems are often seen greater for small clients and firms (Ed Mayo and Mullineux, 1998, pp. 8-9), and thus induce the banks to ration credit.

Due to these factors, the costs of reaching micro clients and small entrepreneurs are high for financial institutions, which charge high interest rates when compared to market rates in the formal banking sector. A discussion and summary of the above reasons is well presented in Ed Mayo and Mullineux (1998). More than recognizing the difficulties, they argue that relatively high fixed transaction costs induce the banks prefer to make larger loans, "unless small borrowers are likely to take up other financial products as well" (page 8). This in some senses suggests that a combination of financial services to the small borrowers could be visible.

Second, a conventional bank practice that protects the lender against possible borrower default is the requirement of loan collateral such as real estate. Banks use loan

collateral in order to screen potential clients (as a substitute for lack of customer information) and to enforce and foreclose loan contracts in the event of loan default (e.g. Bester, 1985, 1987; Bernanke and Gertle, 1989, 1990). The preferred form of conventional bank collateral is mortgage on real property, which, however, requires clear land titles and mortgage registration. However, most of low income households do not own assets that qualify as collateral (such as land titles). Hence, without secure loan collateral, it is expected that there will be a contraction in the supply of bank credit and this will result in reduced access of small and rural clients to finance (Binswanger and McIntire, 1987).

Another characteristic is the heterogeneous demand for credit. Most microfinance clients are from the rural areas with farm businesses. It is clear that different farmers have different investment needs, and may apply for seasonal and/or investment loans to meet specific financing requirements. Furthermore, the time of demand may be different among different types of businesses and therefore the clients may require a specific repayment schedule in accordance with their income flows. Closely associated with the difference in demand is the expected risk-return basis, which however is not of financial term. Factors such as weather and diseases, which cannot be forecasted exactly may affect the expected revenue flows and therefore affect the repayment. It should be noted that the same factors might have different effect on different types of businesses.

For these reasons, the search and verification costs in micro lending are relatively high. As a result, credit markets for the LIHs are characterised as under-developed complementary markets, being seen by not many institutions operating and services available in the markets. Also, providing credit and other financial services to LIHs is expensive, especially in relation to the size of the transactions involved. That is why many governments

have been trying to facilitate the process of providing micro financial services to micro borrowers, even in developed financial markets like US with Federal Farm Credit System.

Given the asymmetric information associated with credit markets, several forms of government intervention have been suggested (Robinson, 2001; Gonzalez Vega, 2003), including the operation of public development banks, to correct for such instances of market failure. Intervention is not, however, an appropriate solution, even in the presence of adverse selection and moral hazard, because the government faces very much the same information, agency and incentive problems as private lenders do. As a result, banking with the low income households relies on innovative lending technologies to gain information on and enhance access to potential borrowers. These technologies may include the tailored loan contracts (such as joint-liability, compulsory savings) or lending through partnership with social and informational intermediaries (such as credit rating agencies).

2.3.1. Joint-liability lending

Surveys of literature on micro-lending technologies (Ghatak and Guinnane, 1999; Morduch, 1999) indicate that many of studies have focused on how these lending technologies may be used to reduce the effect of informational problems. One of the innovative lending technologies that attracted attention from economists is "group lending" or "joint liability" lending. It is believed that joint liability lending can improve efficiency compared to standard debt contracts in the presence of asymmetric information. A well-known example of this type is the Grameen Bank's group lending program.

The study of group lending actually began with papers by Stiglitz (1990) and Varian (1990) that detailed how peer monitoring solves the moral hazard problem for groups without collateral. These papers follow the credit rationing paper by Stiglitz & Weiss (1981), describing how the lenders could induce the borrowers to take on the safe projects, structuring

incentives to guard the lenders against default. Several recent studies have taken off from this starting point, trying to explain how peer screening, peer-monitoring and peer-pressure among group members may help to reduce the problems of asymmetric information (Besley and Coate, 1995; Ghatak, 1999, 2000; Eric Van Tassel, 1999; Aghion and Gollier, 2000). Some other tried to identify the best form of joint liability and the optimal number of group members to maximize the repayment incentives (Impavido, 1998).

Stiglitz (1990), Besley and Coate (1995), Mosley (1996), Morduch (1999) show that the access to further and higher loans crucially dependent on the repayment of all borrowers in the group creates incentive for peer monitoring, peer support and peer pressure among borrowers. The main idea here is that because the group members want to keep the probability of default of the whole group as low as possible, they therefore not only keep their own probability of default low but also the probability of their peers by monitoring the other group members to ensure that the projects are carried out in the most profitable way as agreed on before the loan disbursement. Also, it is expected that group members will support each other with financial means, with information and with other means in the case one or more group members face the problem of repayment. As a result, the moral hazard problem is reduced as much as possible for the lender in the sense that it is transferred from the lender to the borrowing group.

Two recent papers on group lending with joint-liability are by Ghatak (2000) and Aghion and Gollier (2000). Ghatak (2000) demonstrates that group lending may lead to peer-selection, which alleviates problems of adverse selection. The key to this result is that joint liability contracts induce group members to self-select each other, which gives banks the possibility to use the joint liability instrument as a screening device. It can then be shown that in the presence of asymmetric information, a joint liability contract may help the safe

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borrowers - who otherwise might be excluded by individual contracts - gain access to loans. Aghion and Gollier (2000) show that joint liability lending reduces the interest rate and eliminates the credit rationing in the credit market through the "collateral effect" of joint liability. They also propose that peer group system can be viewed as an effective risk pooling mechanism.

Others, such as Bond and Raj (2002), study the use of collateral substitutes in microfinance markets and find that social sanctions and credit denial, which are generally seen as incentive effect in group lending, can serve the role of collateral. This, together with previous findings (Ghatak, 2000; Aghion and Gollier, 2000), ensures us to think that group lending may produce a "collateral effect" in either the form of joint liability or the social sanctions and credit denial. Besides, it is worth to recognise that lending to a group is a good way to minimize transaction costs, compared to individual lending.

Even though, there are some concerns around group lending with joint liability. The main concern of the group with joint liability lending arises from the fact that the whole group will be excluded from further access to credit or credit denial if they are not able to repay the previous loans of their members. At the worst, the domino effect may occur when one member defaults and other group members are not able or not willing to repay for him. Besley and Coate (1995) argue that, in such a case, it is the deliberate strategy for all group members to deny repaying the loans because the whole group will be excluded regardless their individual ability of repaying the loans. This outcome is definitely a disadvantage of group lending as compared with the individual lending, because all other group members in fact can repay the loans. Some other studies concern the size of group and the possibility of free riding within a group (e.g. MkNelly and Kevane, 2002) and matching problem when the demand for

credit and the repayment schedule do not suit all group members (e.g. Paxton, Graham and Thraen, 2000).

2.3.2. A model of joint-liability lending

To better understand how the group lending may work, we develop a simple model. We however do not consider group lending as a static model but in a context of competition where both individual and group lending are available to borrowers. We analyse the conditions for the bank and the borrower to decide to get involved in group lending. This is essential because the borrowers have the right to choose a source to borrow, such as from a money lender with individual lending or from a bank with group lending.

We consider a joint liability contract (r^G, C). C is the joint liability, which implies the amount of money that one borrower has to pay the bank if his partner fails. We again employ the assumption made in Stiglitz and Weiss (1981) that the probability of success of each project is ρ_i and different amongst borrowers, but the expected return to project is the same for every project. The expected return to a borrower i if he forms a group with a borrower j is as follows:

$$\pi^G(\rho_i, r^G, C) = \rho_i \rho_j [\mu^s_i - (1 + r^G)B] + \rho_i(1 - \rho_j)[\mu^s_i - (1 + r^G)B - C_i]$$

$$= \rho_i[\mu^s_i - (1 + r^G)B] - \rho_i(1 - \rho_j)C_i \qquad (2.27)$$

$$C_i = min [(1+r^G)B, \mu^s_i - (1 + r^G)B] \qquad (2.28)$$

Equation (2.27) indicates that the expected return to borrower i comprises of two components: his own return in case of success and his joint liability if his partner fails. Condition (2.28) implies that the amount of joint-liability C cannot exceed the full amount of his partner liability $(1+r^G)B$. This condition is not specified in Ghatak (2000) which, according to Gangopadhyay, Ghatak and Lensink (2005), may raise a problem that if the joint liability exceeds the personal liability and if there is one failed and one succeeded, the latter

may prefer to announce both succeeded and repay for both than to paying for himself and the joint liability for his partner.

Since borrower i knows his probability of success ρ_i, the probability of success of his partner ρ_j affects his return: the higher the probability of success of his partner, the higher the expected return to him. This implies that any borrower prefers to form a group with safer partners. Moreover, because it is more likely for a safe borrower to form a group with a risky borrower, he may prefer an individual loan to a joint-liability loan and hence there must be an incentive for him to choose a joint-liability contract. The fact that safe borrowers are more likely to form a group with risky borrowers is simple. If we rank borrowers by their risks i.e. the probabilities of success (ρ_i), the probability for the lowest risk (or safest) borrower to form a group with higher risk borrowers is equal to 1 because all other borrowers are riskier.

The borrowers' choice

Assuming that all borrowers are risk neutral, borrower's preference of contract type depends on his comparison of expected return. For a borrower i, the difference in expected return between joint-liability and individual borrowing is as follows:

$$D\pi \quad = \pi^G(\rho_i, r^G, C) - \pi^I(\rho_i, r^I)$$

$$= \rho_i B(r^I - r^G) - \rho_i(1 - \rho_j)C_i \qquad (2.29)$$

If $i^I = i^G$ then $D\pi = -\rho_i(1 - \rho_j)C_i < 0$. This implies that if borrower i joins a group and if there is no difference in the lending rates between two types of contract, his expected return decreases by an amount of joint liability $-\rho_i(1 - \rho_j)C$. Hence, if the bank offers a menu of joint liability and individual loan, there must be some benefit for borrowers to choose the joint liability loan such as a reduction in interest rate to compensate for the joint liability. The necessary condition for a borrower to be indifferent in choosing a joint-liability or individual lending is:

$$\rho_i B(r^I - r^G) = \rho_i(1 - \rho_j)C_i, \tag{2.30}$$

Since the right hand side is greater than zero, the left hand side must be greater than zero as well, which implies that the joint-liability lending rate must be lower than the individual lending rate. Therefore, we believe that group based lending may not be more attractive from the point of view of borrower than applying for a loan on an individual basis unless it leads to interest rate reduction.

<u>The bank's choice</u>

Consider the expected return to the bank if it makes a joint-liability loan to a group of two borrowers i and j:

$$
\begin{aligned}
\kappa^G(\rho_i, r^G) &= \rho_i\rho_j 2(1 + r^G)B + \rho_i(1 - \rho_j)[(1+r^G)B + C_i] + \rho_j(1 - \rho_i)[(1+r^G)B + C_j] \\
&= (\rho_i + \rho_j)(1 + r^G)B + \rho_i(1 - \rho_j)C_i + \rho_j(1 - \rho_i)C_j \tag{2.31}
\end{aligned}
$$

If the bank makes two individual loans to these two borrowers, the expected return to the bank is:

$$
\begin{aligned}
\kappa^I(\rho_i, r^I) &= 2\rho_i\rho_j(1+r^I)B + \rho_i(1-\rho_j)(1+r^I)B + \rho_j(1-\rho_i)(1+r^I)B \\
&= (\rho_i + \rho_j)(1+r^I)B \tag{2.32}
\end{aligned}
$$

Thus, the difference in expected return to the bank between two types of lending is:

$$
\begin{aligned}
D\kappa &= \kappa^G(\rho_i, r^G) - \kappa^I(\rho_i, r^I) \\
&= (\rho_i + \rho_j)B(r^G - r^I) + [\rho_i(1 - \rho_j)C_i + \rho_j(1 - \rho_i)C_j] \tag{2.33}
\end{aligned}
$$

We can see that if $r^I = r^G$ then $D\kappa = [\rho_i(1 - \rho_j)C_i + \rho_j(1 - \rho_i)C_j] > 0$, implying that the expected return to the bank is higher if it offers a joint-liability loan to two borrowers. The underlying idea behind this is that, by offering a joint liability contract, the bank has induced borrowers to provide an amount of his return as collateral for his partner. However, the case where $r^I = r^G$ is not realistic.

Because the bank has the right to design a menu of contracts, it may offer either joint-liability contracts only or individual contracts only or both liability and individual contracts. If the bank offers only one type of contracts, there is an opportunity for a new entrant such as a money lender to enter the market and offer the other type of contracts. As a result, the competition between lenders is a <u>necessary condition</u> for the existence of two types of contracts in the market. The <u>sufficient condition</u> must be the choice of borrower. The competition between lenders leads to the following condition:

$$\kappa^G(\rho_i, r^G, C) \; - \; \kappa^I(\rho_i, r^I) \qquad\qquad = 0, \text{ which is then arranged for:}$$

$$(\rho_i + \rho_j)B(r^I - r^G) \qquad\qquad = \rho_i(1 - \rho_j)C_i + \rho_j(1 - \rho_i)C_j \qquad\qquad (2.34)$$

The right hand side is greater than 0 so that $r^I > r^G$.

<u>Equilibrium</u>

Assuming that we can find a pair of interest rate (r^{I*}, r^{G*}) subject to $r^{I*} > r^{G*}$ which satisfies the conditions (2.30) and (2.34), two types of contracts will co-exist in the market. This result implies that if there are no constraints on the entry to the market and/or on the type of contracts offered, the group lending with joint liability induces lower interest rate, compared to individual loan contract. This indicates that joint liability lending can serve as a device to reduce interest rates in the microcredit market. This result is similar to findings in De Aghion and Gollier (2000), Krahnen and Schmidt (1994) and Madajewicz (1999).

However, the benefit gained from a reduction in interest rate is offset by an increase in the cost of joint-liability and therefore the effective cost to a borrower is unchanged. Obviously, whether or not a reduction in interest rate benefits borrowers depends on the quality of group: if all group members succeed, they all benefit. The result also suggests that if the individual loan lending method is too costly for both borrowers and lenders, joint liability lending is the better option. This explains why in microfinance, where is

characterised by high costs and insufficient collateral, group lending with joint-liability is popular.

<u>How do borrowers select partners?</u>

Another branch in literature on group lending focuses on how groups are formed (Ghatak, 2000; Aghiona and Gollier, 2000; Sadoulet, 1999; Morduch, 1999, and Eric Van Tassel; 1999). The assumption of homogeneous matching has become the key point in explaining the advantages of group lending in recent papers (e.g. Ghatak, 2000). However, others (for example, De Aghion and Gollier, 2000) argue that homogenous matching is not necessary in order for peer group lending to be welfare improving. They show that under an economy where borrowers are imperfectly informed about each others' types and *ex post* auditing by banks is costly, a random matching can be incentive compatible for all types of borrowers, even though group lending implies that safe borrowers will cross subsidise their risky peers with positive probability.

We now continue by reviewing a simple model by Ghatak (2000) which shows that if there is no intervention in the group formation process i.e. self-selection, groups are formed homogeneously. His idea follows the comparison between the gain and loss for a borrower to form a group with safe or risk partner. From (2.32), we specify four possibilities of matching, as follows:

Safe borrower to have a risk partner:

$$\pi_{sr}(\rho_s, r, C) \quad = \rho_s[\mu^s_s - (1 + r)B] - \rho_s(1 - \rho_r)C \qquad (2.35)$$

Risk borrower to have a safe partner

$$\pi_{rs}(\rho_r, r, C) \quad = \rho_r[\mu^s_r - (1 + r)B] - \rho_r(1 - \rho_s)C \qquad (2.36)$$

Safe borrower to have a safe partner

$$\pi_{ss}(\rho_s, r, C) \quad = \rho_s[\mu^s_s - (1 + r)B] - \rho_s(1 - \rho_s)C \qquad (2.37)$$

Risk borrower to have a risk partner

$$\pi_{rr}(\rho_r, r, C) \qquad = \rho_r[\mu^s_r - (1 + r)B] - \rho_r(1 - \rho_r)C \qquad\qquad (2.38)$$

If a risky borrower forms a group with a safe partner (2.36), his expected return is higher than the expected return if he forms a group with a risky partner (2.38). Hence, the gain for a risky borrower to have a safer partner is:

$$\pi_{rs}(\rho_r, r, C) - \pi_{rr}(\rho_r, r, C) = \rho_r(\rho_s - \rho_r)C \qquad\qquad (2.39)$$

Similarly, if a safe borrower forms a group with a risk partner (2.35) his expected return is lower than the expected return if he forms a group with safe partner (2.37). The expected loss for a safe borrower to have a risky partner is:

$$\pi_{ss}(\rho_s, r, C) - \pi_{sr}(\rho_s, r, C) = \rho_s(\rho_s - \rho_r)C \qquad\qquad (2.40)$$

From (2.39) and (2.40) we see that: because $\rho_r < \rho_s$, so that $\rho_s(\rho_s - \rho_r)C < \rho_r(\rho_s - \rho_r)C$. This means the expected loss for a safe borrower having a risky partner is greater than the expected gain for a risky borrower having a safe partner. Thus, there cannot be a case where the risky borrower compensates safe borrower to form a group. The group matching is therefore homogeneous (Ghatak, 2000).

Ghatak (2000) also points out that homogeneous matching may increase the aggregate return to the borrowers as a whole. Because $\pi_{rs}(\rho_r, r, C) - \pi_{rr}(\rho_r, r, C) < \pi_{ss}(\rho_s, r, C) - \pi_{sr}(\rho_s, r, C)$, so we obtain:

$$\pi_{rs}(\rho_r, r, C) + \pi_{sr}(\rho_s, r, C) < \pi_{ss}(\rho_s, r, C) + \pi_{rr}(\rho_r, r, C) \qquad\qquad (2.41)$$

The left hand side indicates the aggregate return in case of heterogeneous matching and the right hand side in case homogeneous matching.

Ghatak (1999, 2000), Morduch (1999), and Eric Van Tassel (1999) are some of valuable papers in this literature. They show that the incentives derived from joint liability, accompanied by various additional incentives of the lending mechanism such as access to

further loans or dynamic incentives, induce that similar risk types are grouped homogeneously, if and when the borrowers have <u>sufficient</u> information about each other. According to Ghatak (2000), the main reason why homogeneous matching occurs is that the benefit of having a safe partner is positive to all group members but the expected loss of a safe borrower because of having a risky partner is higher than the expected gain of the risky borrower. This implies that risky borrowers cannot compensate for the safe borrowers to be accepted in the group, and hence the group are formed homogeneously.

Some empirical works (e.g. Vigenina and Kritikos, 2002; Wenner, 1995; Paxton, 1996) have provided some supports to this literature. For example, Vigenina and Kritikos (2002) test the hypothesis of homogeneous matching and the relationship between joint liability properties and the high rate of repayment with data from Georgia. They find that after an intensive self-selection process, the better risk borrowers indeed form groups with better risk borrowers and vice versa by making use of local information. The information on individual creditworthiness used in the traditional, document-based, credit evaluation processes cannot help the lender identify risk types. They also find that because of borrowers' self selection and effective screening efforts of the loan officers, applicants with the worst risk characteristics did not apply for this loan type. Virtually, all borrower groups succeeded in repaying their loans, also supporting the hypothesis of an efficient self-selection given by the incentives of the lending methodology.

However, it is noted that homogeneous matching property in Ghatak (2000) is true only in cases where there is only one contract is offered and in a one-period lending model. We believe that if the bank offers a menu of joint-liability contracts and if the risk borrower may enjoy lower interest rates gained from forming a group with safe borrowers, there should be the case for the risk borrower to compensate the safe borrower to form a group with him.

Also, if we consider repeated periods of borrowing and that the safe borrowers want to access further loans while the risky borrowers can enjoy the lower interest rates, there is also a case for the risky borrowers to compensate the safe borrowers. This is because if the risk borrowers can form a group with safe borrowers, their expected return increases. Hence, they are willing to pay for the safe borrowers to keep the groups (Sadoutlet, 1999; Sadoulet and Carpenter, 2001).

Sadoulet (1999) presents a model of repeated lending which results in a heterogeneous group matching. The key assumption in Sadoulet's model is that borrowers seek insurance arrangement for further access to loans. As a result, where insurance markets are absent, borrowers have to seek for those arrangements with their groups. This assumption is reasonable because even in cases of homogeneous matching, some failures may still exist and thus the whole groups will be excluded. Hence, it can be a wiser way if insurance arrangement is made to ensure the group repayment, whatever the outcome is.

Specifically, Sadoulet proposes that there should be a payment transfer between group members in a way that risky borrower compensates his safe partner in cases of success to cover for his failures when needed. Sadoulet argues that this insurance arrangement is an important part of the group formation process. Consequently, he finds that safe borrowers may form groups with riskier partners while riskier borrowers may form groups with either safe borrowers or with similar risk types. It, however, should be noted that Sadoulet comes up with this result since in his model the incentive for borrowers to seek partners is the access to further loans, rather than reduced interest rates as in Ghatak (2000).

While the support for homogeneous matching seems not to be strong, some empirical research has shown that groups are formed heterogeneously. For examples, Sadoulet and Carpenter (2001) investigate credit groups in Guatemala show that credit groups are formed

heterogeneously. Lensink and Mehrteab (2002) follow the methodology suggested by Sadoulet and Carpenter (2001) and test the matching hypothesis by employing the data from two micro credit programs in Eritrea. They found that the groups are formed heterogeneously.

<u>Joint-liability contract as a sorting device</u>

Although the nature of group matching is ambiguous, we may still see the advantage of group lending as a sorting device. We assume that we observe a pool of homogenous groups of loan applicants. If risk borrowers have compensated for safe borrowers to form groups with them, the groups are then deemed to be homogeneous as well. Now if we consider each group as a single loan applicant, we may see that the bank again faces the asymmetric information problems since it cannot distinguish safe and risk groups of borrowers.

However, if the bank offers a menu of joint-liability contracts (r,C), in which each contract specifies a fixed amount of joint-liability C and an interest rate r, it may distinguish the risk types of groups: safe groups prefer a high joint-liability and low interest rates while risk groups prefer the opposite. This effect of joint-liability on borrower's preference is very similar to the basic case of collateral that we have discussed in section 2.3. Moreover, Ghatak (2000) shows that as the expected borrowing cost for risk types is higher than safe types because their partners are more likely to fail, it is expected that there are only safe types applying for loans with joint liability if the joint liability is sufficiently high so that the expected return is negative for risky borrowers. Therefore the adverse selection can be solved not only at the borrower level but also the group level.

The assumption that one borrower should pay a limited amount of joint liability as above is more reasonable in reality. However, this fixed joint liability should not exceed the individual liability (condition 2.28). If the joint liability is unlimited, the successful borrower

is expected to pay all the repayment for himself and for his failed partner in order to get access to further loans. However, if the successful borrower has a return just enough to pay for himself but not for his partner, it may be deliberate for him to report failed as well. If this happens, group lending may cause a domino effect and cannot serve as a screening device.

2.3.3. Compulsory savings

Although not well-known as the group lending with joint liability, it is well shown that compulsory savings prior to loan disbursement is an essential tool to enforce micro lending. This lending technology is quite popular in many countries such as Vietnam (for examples, People Credit Fund and Pilot Credit Programs run by NGOs). On one side, compulsory savings help poor borrowers manage and smooth their cash flows better. On the other hand, it implicitly assumes a transfer of wealth from the borrowers to the bank which creates a collateral substitute effect and thus reduces the problem of asymmetric information.

To illustrate how this mechanism may work, we consider a market where a bank offers two types of contract: individual loan contracts (r^I, B) without prior savings and compulsory savings loan contracts (r^S, B). We assume there is a thread of competition from other lenders, such as a Rotating Credit and Savings Association (ROSCA), so that the expected returns to the bank gained from offering two different types of contract should be equal. Borrowers have the choice of choosing a compulsory saving loan or an individual loan, depending on their expected returns. For compulsory saving contracts, each borrower is required to save an amount of S before receiving a loan from the bank. The borrower earns an interest τS on his savings if he repays the loan and looses his saving plus interest if he fails.

Borrower's choice

The expected return to a borrower i if he chooses a compulsory saving loan contract is:

$$\pi(\rho_i, r^s, S) = \rho_i[\mu^s_i - (1 + r^s)B + \tau S] - (1 - \rho_i)(1 + \tau)S \qquad (2.42)$$

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If he chooses individual loan contract, his expected return comprises of his expected return from project and his expected return from his savings S. Hence, the difference in expected return $D\pi$ gained from two different types of contract is:

$$D\pi \quad = \pi(\rho_i, r^s, S) - \pi(\rho_i, r^I)$$

$$= \rho_i[\mu^s_i - (1 + r^s)B + \tau S] - (1 - \rho_i)(1+\tau)S - [\rho_i[\mu^s_i - (1 + r^I)B + \tau S]$$

$$= \rho_i (r^I - r^s)B - (1-\rho_i)(1+2\tau)S \qquad (2.43)$$

The necessary condition for a borrower to be indifferent between two types of contracts is:

$$\rho_i (r^I - r^s)B = (1-\rho_i)(1+2\tau)S \qquad (2.44)$$

The right hand side is greater than zero, which implies that $r^I > r^S$ for the condition to be held. In other words, compulsory saving lending technology must charge a lower interest rate, compared to standard individual lending, for a borrower to be indifferent between them.

Bank's choice

The bank may offer a menu of contracts (compulsory saving loan and standard loan), which maximises its profit. The expected return to the bank if it makes a compulsory loan contract is:

$$\kappa(\rho_i, r^S, S) = \rho_i(1 + r^S)B + (1 - \rho_i)(1+\tau)S \qquad (2.45)$$

The difference in expected return $D\kappa$ between the two types of contracts therefore is:

$$D\kappa \quad = \kappa(\rho_i, r^S, S) - \kappa(\rho_i, r^I)$$

$$= \rho_i B(r^S - r^I) + (1 - \rho_i)(1+\tau)S \qquad (2.46)$$

In a competitive market, if the bank offers only one type of contract of its interest, there is an opportunity for the new entrants to offer the other type of contract which offers some incentives (such as a reduction in interest rate) to capture borrowers. As the result, the difference in expected return between the two types of contracts should be zero:

$$\rho_i B(r^S - r^I) + (1 - \rho_i)(1+\tau)S = 0 \tag{2.47}$$

Equation (2.47) implies that $r^S < r^I$. Specifically, in a competitive market, the compulsory saving lending technology charges lower interest rate, compared to the individual loan contract.

Equilibrium

Conditions (2.44) and (2.27) are necessary for two types of contracts to simultaneously exist in the market. We assume further that there exists a pair of interest rates (r^{I*}, r^{S*}) which satisfies these conditions for the equilibrium in the market to be attained. Then, we can see that $r^{I*} > r^{S*}$. In other words, individual lending with compulsory saving charges lower interest rate, compared to a standard individual lending.

Compulsory saving as a sorting device

Another advantage of compulsory saving lending is that it may act as a sorting device in the presence of asymmetric information. We will show that the bank may tailor a menu of compulsory saving loan contracts to distinguish borrowers who choose this type of contract. From (2.42), differentiating r with respect to S, we obtain the indifference return function of borrower:

$$\frac{\partial r}{\partial S} = \frac{\tau(\rho_i - 1) + \rho_i(\tau - 1) - 1}{\rho_i B} < 0 \tag{2.48}$$

Assuming that $\tau < 1$, derivative (2.48) < 0. This implies that interest rate is a decreasing function of compulsory saving. We also observe that since $\rho_s > \rho_r$, then $\partial r(\rho_s)/\partial S > \partial r(\rho_r)/\partial S$, which implies that the risk borrowers have steeper indifference line.

From (2.45), differentiating r with respect to S, we get the indifference return function of bank:

$$\frac{\partial r}{\partial S} = -\frac{(1 - \rho_i)(1 + \tau)}{\rho_i B} < 0 \tag{2.49}$$

Derivative (2.49) indicates that interest rate is a decreasing function of compulsory savings. Moreover, if $\rho_s > \rho_r$, then $\partial r(\rho_s)/\partial S > \partial r(\rho_r)/\partial S$ implying that indifference return line is steeper if the bank makes loans to riskier borrowers.

From (2.48) and (2.49), we see that for a specific type of risk, the indifference line of bank is steeper than that of borrower. This satisfies the crossing property and thus we come back to the basic case in section 2.2.5, which indicates that compulsory savings may serve as collateral effect. The bank therefore can design a menu of contracts to attract different types of borrowers. Safe borrowers prefer a contract with higher compulsory saving and low interest rate while risk borrowers prefer low compulsory saving and high interest rate.

In many countries, such as Vietnam, compulsory savings are normally combined with group lending technology. Each group member is required to contribute to group savings in order for the whole group to borrow from banks. This practice enhances the advantages of group lending as it forces the members to tie their personal savings to group and therefore they become more responsible for the group. Hence, we believe a group lending with joint liability and compulsory savings technology could speed up the business of banking with the poor.

2.3.4. Compensating balances

Compensating balances are not a popular lending technology but it may be worth to consider as it, in some sense, encourages the banks to enter the market in the absence of collateral. Kroll and Cohen (2000) propose this lending technology as a solution to the problem of credit rationing. Compensating balance does not require the borrowers to have a prior saving, but borrowers have to deposit part of their loan at the bank. Specifically, the bank provides a loan of B plus an amount of compensating balance *CB*. Compensating balance is deposited at the bank and earns a risk free-interest rate τ. However, the borrower

has to repay the full amount of *B+CB* plus interests. The compensating balance lending method is used because it increases the expected return to the bank. The reason is that the borrower transfers part of their net return to the bank by agreeing to take the "compensating balance". We will show how this method works in a simple model as follows.

Borrower's choice

The expected return to a borrower i if he chooses the compensating balance borrowing is:

$$\pi(\rho_i, r, CB) = \rho_i[\mu^s_i - (1 + r^C)(B+CB) + \tau CB] \tag{2.50}$$

Hence, the difference in the expected return between compensating balance loan and individual loan is:

$$D\pi = \pi(\rho_i, r^C, CB) - \pi(\rho_i, r^I)$$
$$= \rho_i B(r^I - r^C) - \rho_i CB(1 + r^C - \tau) \tag{2.51}$$

The necessary condition for a borrower to be indifferent between the two types of loan contract is:

$$\rho_i B(r^I - r^C) = \rho_i CB(1 + r^C - \tau) \tag{2.52}$$

The right hand side is greater than zero, so this implies that the necessary condition for a borrower to be indifferent between two types of lending is $r^I > r^C$: the interest rate charged by compensating balance method must be lower than the individual loan method.

Bank's choice

The expect return to the bank if it makes a compensating balance loan is:

$$\kappa(\rho_i, r^c, CB) = \rho_i[(1 + r^c)(B + CB) - \tau CB] \tag{2.53}$$

Therefore, the difference in expected return to the bank between the two types of contracts is:

$$D\kappa = \kappa(\rho_i, r^c, CB) - \kappa(\rho_i, r^I)$$

$$= \rho_i B(r^c - r^I) + \rho_i CB(1 + r^c - \tau) \tag{2.54}$$

In a competitive market, the difference in expected return to the bank equals zero:

$$\rho_i B(r^c - r^I) = - \rho_i CB(1 + r^c - \tau) \tag{2.55}$$

The right hand side is lower than zero, so this implies $r^c < r^I$.

<u>Equilibrium</u>

Assuming that we can find a pair of interest rates (r^{I*}, r^{C*}) which satisfies conditions (2.52) and (2.55), then $r^{I*} > r^{C*}$. In other words, at equilibrium, compensating balance lending reduces the interest rate charged, compared to the standard individual lending. However, it should be noted that a reduction in interest rate does not mean that borrowers are better off but that there is a payment transfer from borrowers to the bank and therefore encourages the bank to enter the market.

<u>Compensating balance as a sorting device</u>

Our next concern is whether the compensating balance can serve as a sorting device. From (2.5) and (2.53), we get the same derivatives:

$$\frac{\partial r}{\partial CB} = -\frac{1 + r - \tau}{B + CB} \tag{2.56}$$

The derivative (2.56) indicates that interest rate is a decreasing function of compensating balance. More specifically, if the bank requires high compensating balance, the interest rate must be low. We can see that individual loan is just a special case of compensating balance where compensating balance equals zero. However, compensating balance can not serve as a sorting device because the indifference line of borrower and of bank does not depend on the risk type of borrowers

2.4. Conclusion

In this chapter we have reviewed the relevant theories and practices regarding credit markets in general and credit markets for the low-income households in particular. We have

focused on the asymmetric information problems to explain how the credit markets work. It is important to note that asymmetric information causes the problems of adverse selection and moral hazard, which result in credit rationing in credit markets. The requirement of collateral can be used as a screening device and to insure the banks against credit risks. However, not all borrowers can provide sufficient collateral.

The credit markets for the low-income households are characterised by high costs, high risks and insufficient collateral. All these factors explain why banks are generally reluctant to make loans to low-income borrowers. That is why an intervention from the government into the market is sometimes called. However, governmental intervention is not the optimal solution since the government faces very much the same problems of asymmetric information. Hence, the better solution is to find efficient lending technologies in order to encourage banks to enter into the market. These lending technologies may include the tailored contracts (such as joint-liability) or lending through partnership (such as informational credit rating agencies).

Much of the literature on micro-lending (Ghatak and Guinnane, 1999; Morduch, 1999) has focused on the group lending (e.g. the Grameen Bank model) with joint liability. It is believed that group lending may reduce the problem of adverse selection through peer-screening and joint liability while it may reduce moral hazard through peer-monitoring and peer-pressure. It is also argued that group lending reduces interest rates in the market and minimizes the cost of lending to the borrower. However, group lending also has some disadvantages. The most important is the domino effect where one group member fails may lead the failure of the whole group and possibly the whole group lending system. The central point to this possibility is a strategic default where a successful borrower may refuse to pay for his failed partner and report group default if his expected return from not paying at all is higher.

The models of lending with prior savings and compensating balances are alternative solutions for the banks in order to enter the credit market for the low-income households. These two lending technologies are based on a simple idea that a borrower transfers a part of his expected return to the bank in order to obtain loans. By requiring prior savings and compensating balances, banks are able to attain information and screen potential borrowers more properly.

In short, what we have presented in this chapter are actually the general means for banks to reach the poor. Other innovations in lending technologies may include lending through partnership with social or informational intermediaries such as NGOs or credit rating agencies. For examples, NGOs may introduce a non-state subsidy, especially in the form of cheap subsidized basic bank services such as micro savings (even if the actual micro-credits are not subsidized), to gain information on micro borrowers. Lending through a partnership between banks and these intermediaries may then develop. Lending through partnership may be preferable since it combines the professional skills of banks and the knowledge on low income households (by the social or informational intermediaries).

The role of social and informational intermediaries and lending through partnership will be discussed further in the next chapter when we look at the approach to microfinance. We will show that different countries and institutions may follow different approaches to microfinance. For example, some believe that microfinance should be provided on a subsidized basis for the purpose of poverty reduction, while others argue that it should be provided on a market basis for a sustainable outreach. This basically shows a part of policy issues in microfinance. We will suggest that a mixed approach that emphasizes the leading role of financial intermediation and the supporting role of social and informational intermediaries in providing financial services to the poor is more appropriate.

CHAPTER 3

DEMAND FOR FINANCIAL SERVICES AND APPROACH TO FINANCE FOR THE POOR AND LOW INCOME HOUSEHOLDS

3.1 Introduction

The basic economic theory tells us that the market performance of goods or services depends on supply, demand and market conditions. In previous chapter, we have discussed the supply side of financial services (i.e. credit) for the poor. We have shown that the formal banking sector is reluctant to extend loans to low-income households for a number of reasons such as asymmetric information, transaction costs, risks and collateral. Market failure in extending credit to low-income households induces people to think that a direct intervention by the government in credit markets for the poor could be of help. However, governments face very much the same problems as the banks do and it is shown that subsidized credit programs by the governments have failed in expanding outreach to the poor on a sustainable basis.

Given this context, what can we do? How can we improve the outreach of financial services to low-income households? The answer to these questions is crucially important if we know that there is an excessive demand for financial services from the low-income households (Gibbons and Meehan, 2002). There are both theoretical and empirical evidences to strengthen the view that the poor indeed need financial services, especially credit and savings, to enhance their lives (Hulme and Mosley, 1996a; Rutherford, 1998; ADB, 2000a; Morduch and Haley, 2003). Considering social aspect, if financial services are available to the poor and if the poor can make of use of them, it is significant to the goal of poverty reduction (Morduch and Haley, 2003). Even if we ignore the social and are interested in business aspect, financial services for the poor could be a good business if we can find the appropriate

mechanism and technologies in reaching the poor profitably (Robinson, 2001; Gonzalez Vega, 2003).

In this chapter, we aim at finding an appropriate approach to financial services for the poor. We discuss why the poverty reduction approach (Rhyne, 1998; Gulli, 1998; Robinson, 1999, 2001), which bases on subsidized credit programs, has failed in expanding outreach to the poor on a sustainable basis and for the goal of poverty reduction. We believe that a direct intervention from the government, such as controls of interest rates and credit quota allocation, does not encourage financial institutions to expand their activities because the costs of services can not be covered and thus financial services for the poor are inefficient (Gonzalez Vega, 2003; Robinson, 2001). Moreover, the poverty reduction approach basically targets the extremely poor while it is evident that for these people financial services may not be the basic needs and they could be harmful for them (Gonzalez Vega, 2003; Robinson, 2001; Charitonenko and Rahman, 2002). If we insist on this approach, we have ignored a large proportion of better-off poor, who are believed to be able to make use of financial services (Robinson. 2001; Hulme and Mosley, 1996b).

The financial system approach (Rhyne, 1998; Gulli, 1998; Robinson, 2001), which proposes an application of market principles and builds a financial intermediation system to the poor, is then analyzed. We show that the financial systems approach could be more appropriate because it aims at building a system of financial intermediation for the poor on a sustainable basis (Robinson, 1999; 2001; Christen and Drake, 2001; Charitonenko and Rahman, 2002). However, this approach targets only the economically active poor i.e. better-off poor and we expect some exclusion of the extremely poor. The targeted clientele could be reasonable if we ignore the social aspect, but even in this sense the question is still that what

could happened if the financial institutions find it unprofitable to provide financial services to the poor?

The answer is clear that in order to do their business, financial institutions must find innovative financial technologies in reaching the poor effectively and efficiently (Gonzalez Vega, 2003; Charitonenko, 2002). However, this goal depends on many factors such as the physical and financial infrastructure that without supports from the governments can not be improved. Hence, we believe that, a mixed approach in which financial institutions play their role as financial intermediaries and the governments and donors provide necessary supports could be a good option. On one hand, the governments and donors should create a sound financial infrastructure and establish supporting informational intermediaries such as the credit rating, credit bureaus or credit scoring agencies to facilitate the operation of financial institutions. On the other hand, the government and donors may provide supporting services such education, healthcares, transportations, job creation and business skills i.e. provide social intermediation for the poor (Ledgerwood, 1999), especially the extremely poor in order for them to have access to financial services at low costs and be able to make use of them.

The remainder of this chapter is organized as follows: first, we discuss briefly the relevant theories and present empirical evidence showing that the poor do have demand for financial services and that there is an excessive demand for financials services from the poor. Second, we analyze the poverty reduction approach in which we emphasize on why poverty reduction approach has failed in reaching the poor. Next, we focus on the discussion of financial systems approach and we highlight with supports why this approach could be more appropriate. We then raise a question of whether or not we need a new approach. We also propose our idea in this section that a mixed approach could be a good option at this stage. In the next section, we focus on the role of the government in building up a sound financial

infrastructure for microfinance. Conclusion section summarizes the main findings and recommendation made in the chapter. .

3.2 Do the poor have demand for financial services?

Like other markets, financial markets for the low income households are affected by three factors: supply, demand and market imperfection (Ed Mayo and Mullineux, 1998). We have shown in Chapter 2 that due to market imperfection, the supply of financial services to the poor is limited. The situation is worsen in financial markets for the poor where the transactions costs are typically high and the poor basically do not have sufficient physical assets to serve as collateral. As a result, it is believed that there is an excessive demand for financial service from the poor (Gibbons and Meehan, 2002), and if so, it could be a significant gap that any country, especially developing countries, has to overcome in order to make a better life for their residents.

However, it could be argued that whether the poor have demand for financial services? If the poor do not have any demand for financial services, the discussion of supply of financial services to the poor becomes senseless. Our answer is yes, the poor do have demand for financial services, like everyone else. While the demand for credit is understandable, the demand for other services such as savings makes many people confused as they believe that the poor are too poor to save. Hence, the understanding of the poor' demand for financial services should be important because it helps to understand why there is an excessive demand for financial service by the poor.

3.2.1 Theoretical background

In economics, the most influential theories, which explain individual behavior in response to a decision towards consumption and savings/borrowing, include "Life Cycle Hypothesis" (Ando and Modigliani, 1963; Modigliani and Ando, 1957; Modigliani and

Brumberg, 1954) and the "Permanent Income Hypothesis" (Friedman, 1957). These hypotheses are based on the assumptions that individuals and households are rational beings who respond in predictable ways to changes in incentives, and that borrowing or savings are the ways to "smooth consumption" in facing income fluctuations. The definition of consumption varies but we do imply that for the poor and low-income households, a small investment in their small enterprises is one kind of consumption.

It's however worth noting that although these models assume perfect capital markets, they do imply a possibility that households in general consider their consumption based on their income pattern. Therefore, the analysis of these models helps understand household's behaviors in response to its income expectation. Furthermore, the analysis is a reference for the interpretation of the Rutherford's (1998) model which analyzes the poor and their money with some modification.

Model of two-period consumption

The *model of two-period consumption* is based on the perception that an individual maximizes his or her level of satisfaction received from present consumption C_p and from future consumption C_f. The constraint to this satisfaction function is that the consumption choice is dependent on the current income (Y_0), the expected level of income ($E[Y_f]$) and the initial wealth (W_0) which can be used to produce assets. The general model takes the following form:

Maximization: $U = f(C_o, C_f) = U(C_o) + U(C_f)(1+\rho)^{-1}$ (3.1)

Constraint: $[Y_p - C_p](1+r) + W_o = C_f - Y_f$ (3.2)

where the future satisfaction value is discounted at the "rate of time preference" ρ and r is the interest rate representing a payment or reward for current consumption. The rate of time preference implies the importance of future consumption considered at present value for a

given individual. An individual with high rate of time preference means that he or she considers current consumption relatively higher than future consumption. For this type of individuals, they tend to consume as much as their current income. The rate of time preference is assumed to be stable in short run.

With the above assumption, the left hand side of the equation (3.2) implies the "current resources" or current income for future consumption in exceed of the future income, which is represented on the right hand side. The current savings $[Y_p - C_p]$ is multiplied by an interest rate factor $(1+r)$ for future value of savings. Rearranging the equation (3.2) in order to see the future consumption as a function of current consumption, we have the linear function as follows:

$$C_f = [Y_p(1+r) + E(Y_f) + W_0] - (1+r)C_0 \qquad (3.3)$$

Equation (3.3) implies that the current consumption must be at the expense of the future consumption. In the Figure 3.1, the indifference curves U_i $(i = s,b)$ represent levels of satisfaction received from combination of present and future consumption activity. The position of an indifference curve depends on the individual's own rate of time preference ρ. Higher ρ results in the position of U_i closer to current consumption (U_b) and vice versa (U_s). The constraint line (the function of future consumption) represents the possible levels of consumption in the two periods given the individual's level of present income, future expected income and the prevailing interest rate r. This constraint line has a slope equal to $-(1+r)$. There exists a point in the constraint line, namely the "balanced point" G, where the net savings equals zero and therefore future consumption and income must also be equal.

In figure (3.1a), the indifference curve Us represents the behaviour of a net saver who has the low rate of time preference or has strong preference for future consumption. The maximization of satisfaction is achieved at the point (C0,Cf) where C0<Y0 and Cf>E(Yf). In

figure (3.1b), the indifference curve Ub represents the behaviour of a net borrower who has high rate of time preference or has a strong preference for current consumption. For this individual, he has to borrow funds to finance his current consumption.

Figure 3.1 – Borrowing and saving in two-period consumption model
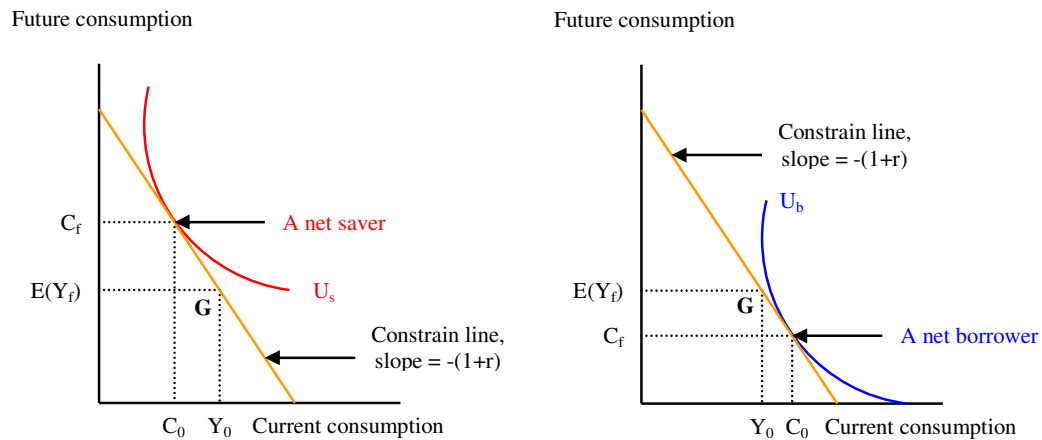
There are two important implications interpreted from the above analysis. First, for a given income pattern (stable interest rate and expected – current and future - income), an individual becomes a borrower if he or she has a higher rate of time preference or becomes a saver if he or she has a lower rate of time preference. Thus, the explanation of why individuals and households demand for credit and saving services become the question of how the rate of time preference move over time.

Second, from the equation (3.3), it is clear to us that an increase in the expected future income $E(Y_f)$ or the current income (Y_0) would lead the constraint line to move to the right. As the rate of time preference is assumed to be stable in the short run, the indifference curve would also move in parallel to the right. This results in an increase in the net savings for an observed period. In other words, for a given rate of time preference and within the observed period, an individual with higher current and/or (expected) future income would be more likely to be a net saver.

The initial results suggest that high-income households are more likely to demand for savings services while low-income households are more likely to require credit services. If we apply this notion into microfinance, it is expected that the better off poor could demand savings services and the poorest of the poor could demand credit. This implies that the poor in general do have demand for financial services.

<u>Model of Life Cycle Hypothesis</u>

The Life Cycle Hypothesis is an extension of the two-period consumption model with a lifetime view. It considers the life-length basis of an individual rather than the two-period basis. The idea is similar that individual will act in a way which maximises the satisfaction from consumption over time and is based on the constraint that life-length consumption must equal income. The model takes the following form:

Maximisation: $\qquad U_t \qquad = \Sigma^L[U(C_t)(1+\rho)^{-t}] \qquad\qquad (3.4)$

Constraint: $\qquad \Sigma^L C_t(1+r)^{-t} \quad = \Sigma^N Y_t(1+r)^{-t} + W_o \qquad (3.5)$

where $U(C_t)$ is the satisfaction received from consumption in time period t, C_t is the level of consumption in time period t, Y_t is income in time period t, ρ is the rate of time preference - a measure of individual preference between present and future activity and is assumed to be constant in short run and W_o is an initial level of income producing assets.

Equation (4) can be rearranged as follows:

$U_t = U(C_0) + \Sigma^L[U(C_t)(1+\rho)^{-t}] \ \ (t = 1..L) \qquad\qquad (3.6)$

If it is safe to assume that the poor and low-income households are those who have to live for today, or in other words they consider current consumption more important than future consumption, equation (3.6) indicates that rates of time preference for low-income households are higher than for the high-income households. This is easily seen because within a given satisfaction level U_t, higher current satisfaction $U(C_0)$ means relatively lower total

satisfaction $\Sigma^L[U(C_t)(1+\rho)^{-t}]$. Therefore, the rate of time preference must be high. This again shows that the better-off poor households are most likely to become the net savers and the extremely poor households are more likely to become the net borrowers.

Model of Permanent Income Hypothesis

The *Permanent Income Hypothesis* considers a series of period income in the lifetime. It does not view the degree of satisfaction as the key direction for consumption behaviour but the expected income/consumption pattern does matter. For a given period, it decomposes the aggregate income (Y) into two separate components: Y^P as the projected level of income or the permanent income and Y^T as the temporal change or difference between the observed levels of income and the projected income or most simply we can understand as the error parameter from the permanent income. Thus, the first assumption takes the form:

$$Y = Y^P + Y^T. \tag{3.7}$$

Because the level of difference (Y^T) is only temporal and may be either positive or negative, the expected value of the differences equals zero $(E[Y^T_t] = 0)$. In other words, in long run, the observed levels of income (Y) are equal to the permanent income (Y^P).

The second important assumption made by the permanent income hypothesis is that consumption expenditure is proportional to permanent income:

$$C = kY^P \tag{3.8}$$

The parameter k, a constant, represents both the average propensity to consume and the marginal propensity to consume. The implication of the permanent income hypothesis therefore is that, in short run, there is a different between temporal and the permanent levels of income. When the temporal change is positive, households tend to save. However, when the temporal change is negative, it does not necessarily mean the potential for borrowing. In such a case, the households may use their previous savings to smooth their consumption

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pattern and the borrowing occurs only if the previous savings is not sufficient (see the figure below).

Figure 3.2 – Borrowing and saving in permanent income model

Consumption

$C = kY^P$

Positive Y^T or
Potential Savings

Negative Y^T or
resources needed

Short-run
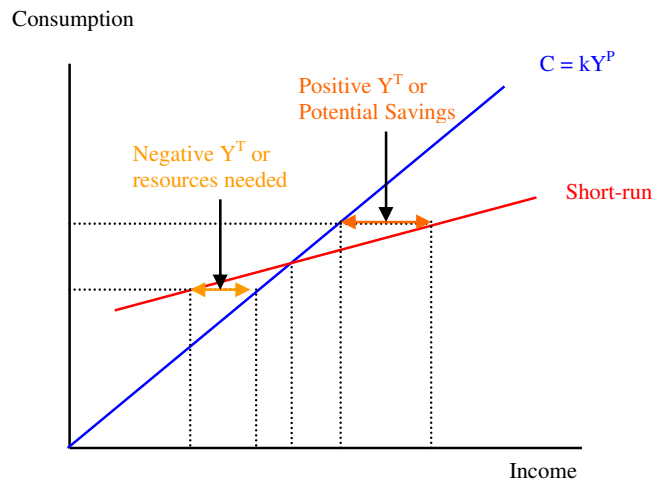
Income

It seems clear to us that the implication of the Permanent Income Hypothesis is important to understand why the low-income households may well become both the borrowers and savers. The low-income households do not have the regular income mainstream and therefore their time income may be different from their permanent income. This is especially true for the farm households whose income basis is dependent on the seasonality. However, as Gulli (1998) argues, even low-income households have capacity and desire to save but the impediments in policies and instruments of savings are more important than the households' preference. This implies the improvement or innovation in mechanism of provision of financial services may be of help.

Model of Lump Sum Money

The most recent convincing essay explaining why and how the poor and low-income households do need the basic financial services is by Rutherford (1998). Although his explanation of why the poor need basic financial services is based on the main assumption

that they need the "lump sum" or "large sum" money at a certain point in time, it does reflect the hypothesis of permanent income. Rutherford sees three processes namely saving up, saving down and saving through:

- *Saving up* implies a series of savings from now in exchange for a large sum needed in the future. The time amount of saving is not necessarily the same.

- *Saving down* implies a series of savings in the future in exchange for a large sum used today, normally regarded as a loan. The time amount of saving may be the same in the form of instalment.

- *Saving through* implies the combination of the two above processes. Specifically, if the saving up process generates insufficient amount when needed, a further loan may be taken and then repaid by the next savings.

Figure 3.3 – Borrowing and saving in Lump Sum Money model
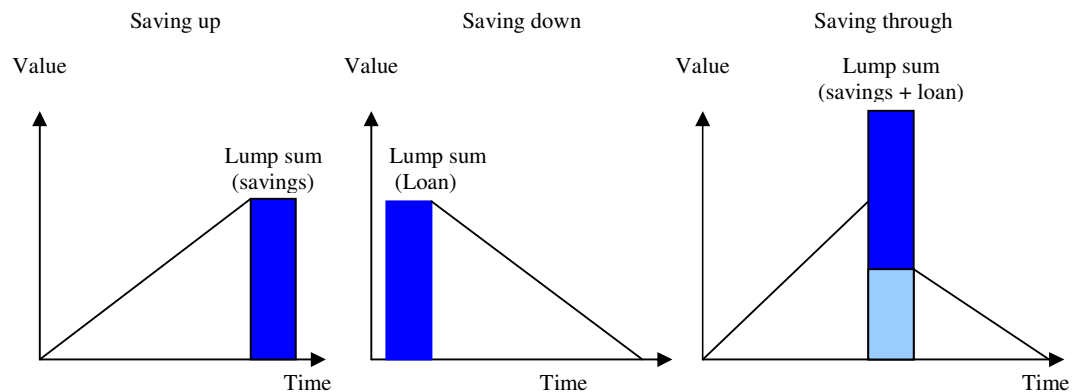
Source: Adapted from Rutherford (1998)

Hence, Rutherford (1998) shows that the poor and low-income households do use both savings and loans to acquire the lump sums that they often need for such purposes as emergencies, social and religious obligation, and investment in their businesses. Therefore, in theory, it is proved that the poor and low-income households as anyone else do have the

demand for basic financial services. The fact that they are financially excluded thus must be reasoned from somewhere else rather than the demand side.

3.2.2 Empirical evidence

Millions of the poor and low-income households need financial services for various reasons: their demand for livelihood activities such as foods, health care and education; and for small business opportunities, which generate jobs and income. However, it can be observed that the lack of works and the quality of works are amongst the major concerns. If the poor and low income households have opportunities to access to credit, it is believed that they may increase their living standard from returns on their investments. Hence, it is well recognized that the primary concern is the excessive demand for credit and that "credit is essential for economic activity" (Ed Mayo and Mullineux, 1998, p 6), from both poor households and micro-enterprises (ADB, 2000a).

Box 3.1 - Demand for microfinance services

Poor and low income households have effective demand for a range of microfinance services including:
- Safe and convenient deposit services — so they can save for emergencies, investment, consumption, social obligations, and the education of their children
- Credit services — for consumption smoothing, and to finance livelihood activities and large expenses for education, housing improvements, migration, etc.
- Other financial services — such as insurance and funds transfer services.

Source: ADB (2000a)

Basically, most of people in developing countries live in the rural and remote areas, where there are a few chances for them to be employed and salaried. Their earnings if any normally come from the occasional sources such as hired labor or low paid employment from the local small and medium enterprises. Some of them may run their own small business from home such as farming and small trading. Our argument is clear that if we can help to establish a network of small businesses, the low income households can benefit from it in two ways (i) by running the business, the business owners can realize their business opportunities which

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create jobs and income for themselves; and (ii) if the business is expanded, a number of other low income households may be employed by these businesses.

However, for those who have their own business opportunity, to set up such a small business, they need money. Because not many of them can afford for such amount of initial capital, the only way for them is to borrow money from any sources that they can access. Generally, the commercial banks are reluctant to lend to them for several reasons, such as high costs and market imperfections (see Chapter 2). As a result, the low-income households with business opportunity have to decide (i) to borrow from informal sources of credit such as moneylenders, who charge very high interest rate; or (ii) to give up their business startup because of lacking money. To us, both decisions are economic inefficiency.

Besides credit, there is demand for savings and other services such as insurance. The low-income households need safe and convenient savings services. Contrary to some preconceptions, there is much evidence that the poor have the capacity and willingness to save (CGAP, 2004; Rutherford, 1998; CSD, 2000). They need to save for emergencies, future investment, consumption, social obligations, the education of their children, and many other purposes. Poor and low-income households also have a demand for other financial services, such as insurance. Migration, whether international or internal, also tends to create a demand for funds transfer services (ADB, 2000a).

The excessive demand for financial services by the poor and low income households can be seen from the gap between number of low income households and number of households having access to financial services (Donald, 1976; Zeller and Sharma, 1998; Gibbons and Meehan, 2002; Navajas and Gonzales Vega, 2002; Wenner, Alvarado and Galarza, 2002; Zeller, 2003). Gibbons and Meehan (2002) show that of about 234.9 millions poor households around the world, there are only around 19.6 millions households having

access to financial services, making only 8.3% coverage ration. Most of the poor households (67.2%) are from Asia, where the coverage ratio is 9.3%. The low coverage ratios tell us much that there are many works to be done in order to help poor households having access to financial services.

One of the reasons for low coverage ratios is that most of MFIs are NGOs (CGAP, 2004) and too small in providing financial services: 63% (70%) of MFIs have less than 2,500 clients (poorest households) and only 2% have more than 100,000 clients and poorest households (Graph 1a,b). This implies that the providers of financial services to the poor are still reluctant and microfinance has not been seen as a *business* which is the interest of larger financial institutions, and thus the evolution of microfinance requires a participation of large financial institutions such as commercial banks. Hence, in our idea, the important task to enhance the development of microfinance sector is to build up a financial system which attracts the participation from formal financial institutions. This, however, requires a revolution in the perception of financial services for the poor.

Figure 3.4 – Access to financial services by the poor

Outreach coverage
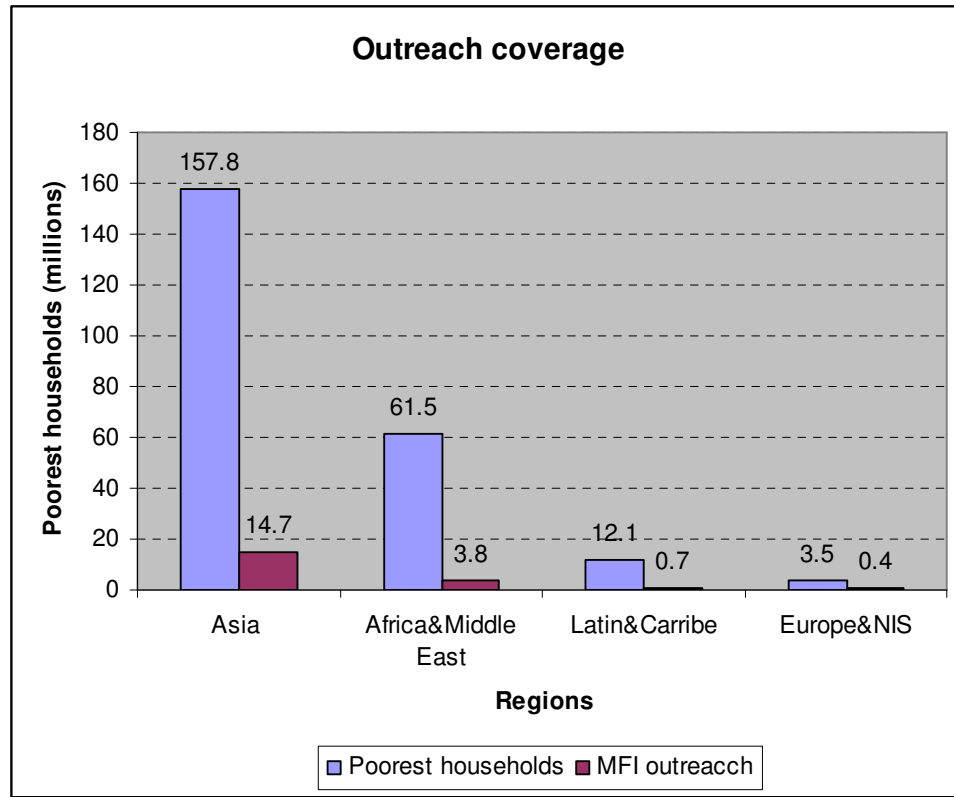
Source: Gibbons and Meehan (2002)

Figure 3.5 - Outreach by size of MFI
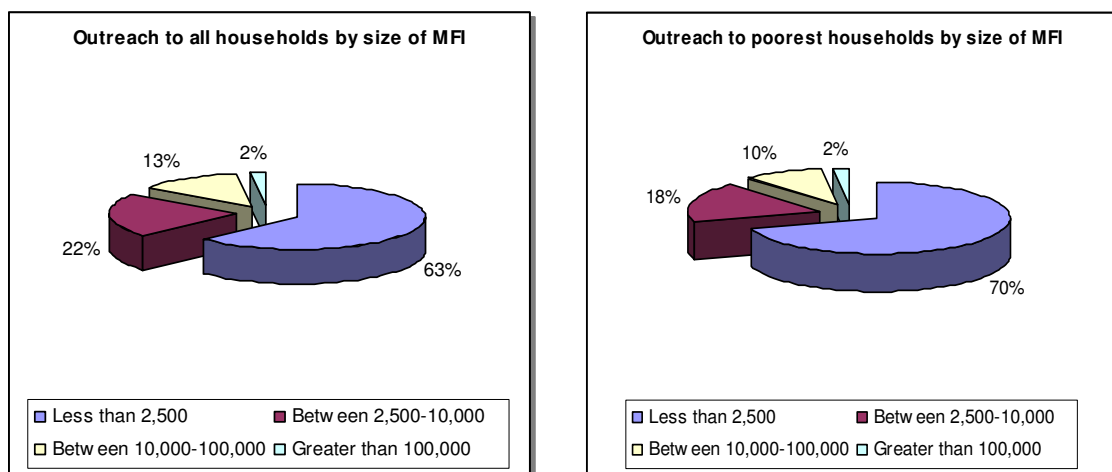
Source: Gibbons and Meehan (2002)

3.3 Approaches to microfinance

The perception of microfinance is important because it decides the ways that financial institutions provide financial services to the poor. According to a study by Churchill (1998, 1999) microfinance was initiated from three different development initiatives. First, several countries promoted the establishment of small and medium enterprises (SMEs) with supports from donor projects. Second, microfinance services were originated in projects to alleviate poverty. These projects are normally based on subsidy basis. Third, many microfinance institutions emerged to provide financial services on the market basis for low-income households and small firms who are not served by the formal financial sector. The objective of these MFIs is neither supporting the SMEs nor the poverty alleviation, but for profit.

The origin of microfinance suggests us that there have been two separate goals in providing financial services to the poor: (i) for development goal such as SMEs development or poverty reduction and (ii) for profit. We can see that the first goal implies microfinance as a policy tool while the second one considers it as a business. Separate goals then result in two different approaches in microfinance, which in literature are mentioned as the *poverty reduction approach* and the *financial systems approach* (Robinson, 2001, Rhyne, 1998).

We believe that microfinance industry is at the stage of transition, where people are considering between the two approaches. As Christen and Deborah (2001) show, there is a process of commercialization in microfinance where MFIs are transforming from poverty reduction approach into financial systems approach. However, our main concern is not the process and characteristics of transition but where would this transition lead the microfinance sector to and how could we make a better financial sector for the poor? Finding answers to these questions takes us to the discussion of strengths and weaknesses of current approaches

to microfinance. We will show that a mix of the two approaches could be a good option at this stage.

3.3.1 Poverty reduction approach

Robinson (2001) and Rhyne (1998) review the two approaches in microfinance. According to these studies, the poverty reduction approach considers microfinance as a tool for poverty reduction. This approach claims that the overall goal of microfinance should be poverty reduction and empowerment, and thus there is no need to discuss financial sustainability if services provided do not have any impact on clients' poverty levels. The poverty reduction approach concentrates on reducing poverty through subsidized credit (Robinson, 2001).

Hence, under this approach, credit is provided to poor borrowers typically at below market interest rates and often through the network of government agencies such as state owned development banks and donors. The target of this approach is to reach the large population of the poor, especially the extremely poor, with cheap credit to help them get out of poverty. Other services, such as mobilization of local savings, are normally not a significant part of the poverty reduction approach, except some compulsory savings required as a condition of receiving a loan (Gulli, 1998; Robinson, 2001).

However, there is a concern on the impact of credit on households. Although there are some evidences that show positive effect of access to credit on household poverty reduction, the degree of effect is very small (see Chapter 6, 7). Moreover, it is questionable that whether all the poor and low-income households can make use of financial services such as credit and repay them. Robinson (2001) argues that credit is a powerful tool that is used effectively when it is available to the economically active poor who have the ability and willingness to repay them. But for the extremely poor households, because of lacking profitable self-

employment and high risks involving in using loans (Hulme and Mosley, 1996a), they may not be able to use the loans effectively (Robinson, 2001), and thus credit may be even harmful for them (Charitonenko and Rahman, 2002).

In a detailed analysis of how credit could improve the poor households, some authors (Gonzalez Vega, 2003; Gonazlaez Vega, 1998a; Zeller et al., 1997) propose that the relationship between the access to financial services and poverty reduction is ambiguous. If there exist some productive opportunities, financial services can (i) help poor households get out of poverty (Gonzalez Vega, 2003); (ii) assist in stabilizing incomes and eliminating vulnerability to risk (Zeller and Meyer, 2002; Zeller, 2003); and (iii) assist in processes of acquiring physical and human capital to allow households to overcome poverty traps (Maldonado, Gonzalez Vega and Romero, 2002). However, if productive opportunities do not exist, repayment capacity will usually be missing and the enforcement of debt contracts will impoverish borrowers. Thus, depending on the circumstances, financial services can increase or decrease poverty (Gonzalez and Vega, 2003).

Another concern is that whether credit or another development tool (such as education, infrastructure) are more effective to enhance poverty reduction? It is believed that for the extremely poor households, they require basic needs such as food, shelter, skills training and employment before demanding credit (Robinson, 2001; Charitonenko and Rahman, 2002). Some studies (Gulli, 1998; Gonzalez Vega, 2003) also show that credit is not always the main constraint for low income households and that low income households demand a wide range of financial services (rather than just credit) for different business and households purposes. For example, Gonzalez Vega (2003) shows that loans cannot create productive opportunities, which are essential to income generation, particularly when other constraints are binding. He argues that credit cannot build the roads that are missing but needed to bring the crop to

market; credit cannot discover the farming technology that does not exist; credit cannot generate key inputs that are not available; credit cannot create or destroy comparative advantages or change consumer preferences (Gonzalez Vega, 1994 and 1998a).

While the goal of poverty reduction approach is suspicious, some studies (Robinson 2001, Gonzalez Vega, 2003) believe that even if we assume a positive relationship between access to credit and poverty reduction, it is clear that sustainable microfinance built on cost-effectiveness basis is more likely to deal with it (Robinson, 2001). This is because of two reasons: (i) financial self-sufficient MFIs can leverage substantial funds for their portfolios by mobilizing public savings, accessing commercial debt, or attracting for-profit investment; and (ii) if financial services are important to the poor households, a long-term access should be more important.

However, it is evident that financial services for the poor following poverty reduction approach can not be sustainable. Most MFIs that provide subsidized credit, have failed to meet the excessive demand for financial services from the poor households, in terms of both outreach and financial self-sufficiency (Robinson, 2001). In an analysis of rural finance, Gonzalez Vega (2003) shows that although there were many attempts to expand the supply of agriculture subsidized credit and despite the massive use of public funds for this purpose, the majority of the rural population of the developing countries has actually never had access to formal financial services. Only 10% to 15% of all rural households in developing countries had ever had access to formal credit by the mid 1970s and this proportion has not changed much over time (Donald, 1976; Zeller and Sharma, 1998; Navajas and Gonzales Vega, 2002; Wenner, Alvarado and Galarza, 2002; Zeller, 2003). Furthermore, empirical evidences also suggest that the better-off poor rather than the poorest of the poor are most likely to get access to formal financial services (see Chapter 4, 5 and 6).

The weak outreach to the poor households is believed to be a consequence of not self-financial sufficiency. Under poverty reduction approach, the successful mobilization of voluntary savings and the operation of subsidized micro credit programs can both be found, but not both together (Robinson, 2001). Financial institutions which follow this approach, whether savings-led or credit-led, cannot provide micro credit and savings services—on a large scale. Even the best of the institutions (e.g. Grameen Bank) that operate with subsidized loan portfolios are effective only either in capturing savings or in providing micro loans with wide outreach but not both (Robinson, 2001). They cannot afford to be effective in both because their lending interest rates are too low to cover the costs and risks involved in the practice of large-scale sustainable microfinance. Thus, microfinance could attain wide outreach only outside the subsidized credit model, in financial self-sufficient institutions (Robinson, 2001).

It also a concern that the poverty reduction approach often links financial services with training programs in a belief that such a linkage has positive impacts on clients. The underlying assumption is that to use their financial services properly, the poor need training in skill development, business, literacy, finance, agriculture, and so on. But two problems can arise when training is linked *directly* to credit programs. First, institutional sustainability is hindered because training costs are rarely covered by revenue. Second, the training provided is often not considered valuable by the trainees. The real problem is not the value of training in general but the linkage of credit and training (Adams and Von Pischke, 1992). Thus, we understand that the essential is not the integration of training into financial services but the *right training* at *right time* to *right people* who can make *right use* of financial services

In conclusion, somewhere else governments and donors have been following poverty reduction approach because they believe that access to credit may enhance poverty reduction.

Indeed, access to credit and other services may contribute to the poverty reduction in some circumstances but this is not always the case (Gonzalez Vega, 2003). Thus, if the interventions are based on incorrect perceptions about the nature of relationships or reflect wrong expectations about the role of finance in the process of poverty alleviation, they can be useless. Therefore, it is important to understand when financial actually matters the poverty.

Evidences show that poverty reduction approach with subsidized credit, interest controls and administrative credit allocations is no longer favored. Direct production of financial services by the state has been seriously suspected. Formal financial institutions are unable to charge interest rates that cover their operating costs and associated risks (Gonzalez Vega, 2003). All these facts suggest that microfinance can not be sustainable under the poverty reduction approach and thus a new approach to financial services for the poor should be considered.

3.3.2 Financial systems approach

The failure of poverty reduction approach in reaching the poor has led to the new perception of microfinance towards financial systems approach, which emphasizes on the role of microfinance as financial intermediation among the poor and low income households. The introduction of group lending model (Ghatak, 1999, 2000) and the success of village banking model initiated by the BRI in Indonesia create effective benchmark tools for MFIs to reach the low-income households and constitute the belief that microfinance can be profitable on market basis. Also, the increasing recognition of the importance of a wider range of financial services such as savings, payments instruments and remittance services (Gonzalez Vega, 2003; Patten and Rosengard, 1991; Adams, 1995; Robinson, 1998) and concerns with the absence of insurance markets and other tools to manage risks (Townsend, 1995; Zeller et all.,

1997; Thompson, Miranda, and Gonzalez Vega, 1998; Skees, 2003) have strengthened the view that a development of financial intermediation is important.

The foundation of financial systems approach is set by the Bank Rakyat Indonesia when it proves its model of sustainable micro-banking system operating profitably at large scale without subsidy (Robinson, 2001). The most important feature of the financial systems approach is that it focuses on applying the principles of commercial finance (with necessary adaptations) into the growing knowledge of the microfinance market that then constitutes the term *commercial microfinance*. The philosophy of this approach is to build up an intermediation of financial services for the poor and low income households. It is believed that by employing new financial and informational technologies, the profitable provision of small loans is made possible by the tailored lending methodologies, pricing, products, and services that are designed specifically for microfinance clients (Robinson, 2001).

The argument supporting for the financial systems approach against the poverty reduction approach is simple that if loans are demanded and repaid in time, the market has demonstrated that the services provided are valuable for both financial institutions and clients, so there is no need for further impact studies. Moreover, the services should not be targeted only to the poorest as in the poverty reduction approach, but to the underserved market niches in general. Debts and financial services are not the effective tool for helping the poorest enhance their economic conditions (Ronbinson, 2001; Adams and Von Pischke, 1992). According to this approach, the potential for outreach in future is represented by financial and institutional sustainability, rather than the availability of funds. Thus, there is no rationale for subsidies and NGOs are seen as having only a minor role in the microfinance market (Gulli, 1998).

The central concept in enhancing financial systems approach is the commercialization of microfinance institutions or commercial microfinance institutions. In terms of conditions, commercial microfinance institutions refers to institutions that finance their loan portfolios from locally mobilized savings, those that access to commercial debt and for profit investment, and those that use retained earnings to finance their lending (Robinson, 2001). In terms of methodology, commercialization means the application of market-based principles to microfinance (Charitonenko and Rahman, 2002).

Specifically, commercialization of microfinance implies a development towards for-profit operation with diversified and demand-driven financial services on the basis of full costs recovering pricing strategy. The essential and expected goal of commercialization of microfinance is to attain a sustainable microfinance which comprises of both institutional sustainability (wider outreach) and financial self-sufficiency. Commercialization also implies a transition towards for-profit formal financial institutions which are subject to prudential regulation and supervision and are able to operate as commercial financial intermediaries (Charitonenko and Rahman, 2002). Figure (3.6) demonstrates the progress of commercialization.

It is noted that commercial financial intermediaries are the highest level of commercialization of microfinance. In stages of transitions, the term of commercial microfinance institutions refers to any institutions that apply market principles into operation. Hence, the term may include institutions that provide microfinance to the public such as banks and those that serve only their members such as credit unions. The term may also include institutions that provide only microfinance as well as those that offer microfinance as part of a wider set of financial services. Overall, commercial microfinance institutions are

differentiated from informal commercial lenders who lend money for profit, from subsidized formal credit and from unregulated NGOs.

Figure 3.6 - Progress toward commercialization

| Increased cost recovery | Achievement of operational self-efficiency | Achievement of financial self-sufficiency | Utilization of market based sources of funds | Operation as a for-profit MFI as part of the formal financial system |
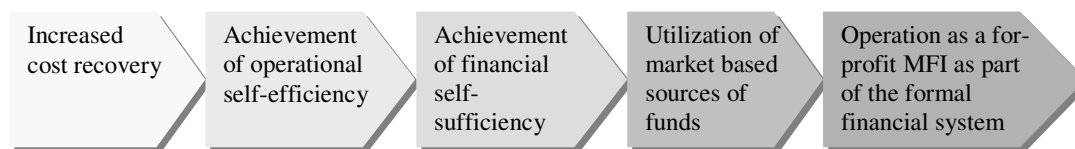
Source: Charitonenko and Rahman (2002)

Another important feature of the financial systems approach is that it considers the sustainable provision of financial services to the low income households who are able to make use of financial services, but not necessarily the poorest of the poor (Rhyne, 1998; Gulli, 1998). This approach originates from the belief that given enabling macroeconomic, political, legal, regulatory, and demographic conditions, financial institutions can be developed to provide sustainable financial intermediation for the economically active poor and low income households at the local level *profitably without subsidy[2]*, and with wide coverage (Robinson, 2001).

By doing so, the financial systems approach aims at achieving large scale outreach to the economically active low-income households with broader range of services, including credit, savings and others (Robinson, 2001). The goal of financial systems approach therefore is to reach *sustainable microfinance,* which is carried out by commercial microfinance institutions that deliver financial services at interest rates that enable them to cover all costs and risks and to generate profit. It is also noted that the financial systems approach may use subsidies to disseminate lessons from the best practices of fully sustainable microfinance

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2 We imply that microfinance institutions charge full costs of providing financial services. It is necessary to recognise that the costs of microfinance services are higher than the costs of conventional commercial financial services, as percentage (Christen, 1997). Hence, charging the costs that are equal to the costs of conventional commercial financial services may be understood as "subsidy".

systems and to finance the development of financially self-sufficient microfinance institutions (Robinson, 2001).

Some studies have shown that formal sector commercial microfinance has proven itself able to make financial services, both credit and savings, available to low income households on a large scale, and to do so profitably (Robinson, 2001). Institutions such as BRI and BancoSol have demonstrated that wide outreach to economically active poor households can be achieved without ongoing subsidies. By the late 1990s commercial microfinance was no longer limited to a small group of scattered institutions. It was an industry. In this context, the development of BRI's micro banking system and of somewhere else like BancoSol are of particular interest, both because of the scale on which they conduct continuously profitable operations and because of their leadership roles in the development of the commercial microfinance industry. These banks were the first of the self-sufficient microfinance institutions to develop the management, organizational structures, information systems, staff training systems, and internal supervision and control that, along with their commitment to full cost recovery and institutional self-sufficiency, enabled them to provide microfinance profitably on a large scale.

To make the financial systems approach viable, it requires commitments by governments to financial market liberalization, reduced targeting of loans, and better pricing of financial products. Sustainable microfinance on a national scale depends on institutional governance, management, and organization as well as on products, pricing, and knowledge of the market. The financial frontier is being pushed outward to include several innovative financial institutions, programs, and products designed to service those previously excluded from formal finance (Von Pichske, 1991). The approach emphasizes voluntary savings

mobilization rather than funding from government or donors, which is consistent with the objective of creating independent institutions.

The financial systems approach also requires employing the new concepts and methodologies that have been developed to enable MFIs to provide financial services profitably on a market basis, without ongoing subsidy. These concepts and methodologies may include innovative lending technologies that reduce costs and risks; suitable products that meet the demand of the poor and low-income borrowers and savers; interest rate spreads that permit institutional profits; innovative operating methods and information systems; widely dispersed small service outlets; specialized staff training and incentives; the financing of loan portfolios from locally mobilized savings and from commercial debt and investment; and others.

The development of new concepts and methodologies are clearly essential in microfinance as it increases the capability of outreach to the poor. However, the goal of providing financial services on a sustainable basis implicitly implies that MFIs provide financial services to the poor whenever they find it profitable to do so. The concern for any policy maker is then what would if the MFIs found non-profitable? It is clear that the costs and risks of providing microfinance services are high and MFIs find it less attempting (see Chapter 2). Thus, if we employ the financial systems approach, there might be the case that the financial markets for the poor do not develop at all while the demand from the poor is excessive.

Moreover, if we agree that financial systems approach is necessary for a sustainable microfinance, the conflicts and overlapping of policies within microfinance market may prevent this approach to work well in practice. The reasons are that different types of MFIs (e.g. NGOs, banks) may be differently regulated and supervised. For examples, in many

countries, such as Vietnam, NGOs are not regulated by the banking law and are not permitted to mobilize savings while the banks (such as VBARD, VBP) are. This results in the fact that these all MFIs are not competing fairly in the market. Unfair competition could make the market for the poor become even worse as the market occupiers may act on their own interests.

Figure 3.7 – Poverty reduction approach and financial systems approach

3.7a: Financial Systems Approach

Microfinance Institutions

Microfinance services: Market basis

Micro borrowers:
Targeting the low-income households but not necessarily the poorest

Full obligation in time and demand for further services

NO

YES

Comparable goal implicitly achieved: **Poverty Reduction**

Ultimate goal achieved: **Sustainability**

Start a new period

3.7b: Poverty Reduction Approach

Microfinance Institutions

Micro borrowers:
Targeting the poorest

Positive Impacts

NO

YES

No need for discussion of Sustainability

Ultimate goal achieved: **Poverty Reduction**

Start a new period

Source: Drawn and adapted from Robinson (2001)

3.3.3 The key difference

A summary of difference between the two approaches is presented in Box 3.2. Key differences result from the different goals that each approach follows. The poverty reduction approach emphasizes on microfinance as a tool for poverty reduction while the financial market approach considers microfinance as a business of serving the poor, i.e. financial intermediation. For example, Gonzalez Vega (2003) argues that poverty reduction approach considers financial services for the poor as a policy tool while the financial systems approach considers them as intermediate inputs in the process of production and consumption at household level. In other words, financial systems approach considers microfinance sector as a productive sector for the poor with its own firms, production functions, outputs, prices and markets (Shaw, 1973).

The differences in perception then lead to the differences in the ways of providing services and the target market. Poverty reduction approach focuses on providing credit to the poor at subsidized level and to the poor households, while the financial market approach commits to providing a broader range of services at market level and to the economically active low income households. According to Gonzalez Vega (2003), the poverty reduction approach concerns how to control or redirect the supply of financial services, in order to pursue specific non financial objectives, while the financial systems approach concerns how to promote an outward shift of the supply, in order to improve the delivery of financial services as intermediate inputs. That is an issue of how to further expand the frontier of financial services.

Another difference between the two approaches is the targeting clients. The poverty reduction approach aims at providing financial services to the poor households, especially the poorest of the poor, in order to help them get out of poverty, while the financial systems

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approach aims at the economically active households or better-off poor households. The poverty reduction approach argues that the poorest of the poor are those who need helps because they are normally unemployed, low education .etc and are unable to get access to financial services. The financial systems approach however argues that providing financial services to the poorest of the poor could harm both the poorest and the lenders because the poorest need basic needs rather than debts and thus it affects their ability to repay the loans.

Nevertheless, it is necessary to recognize that these two approaches have similar goal of expanding their activities i.e. attain a broader scale of outreach. Poverty reduction approach sees outreach as an immediate means to achieve poverty reduction and thus outreach is always considered as a goal of poverty reduction. Financial market approach, on the other hand, considers outreach as a result of the business. MFIs following this approach may see that if they are successful in providing financial services to the poor on the market basis, they may expand their market share and enjoy economies of scale.

Box 3.2 - Primary features of the old and new paradigms

Features	Poverty Reduction Approach	Financial Market Approach
Problem definition	Overcome market imperfection	Lower risk and transaction costs
Role of financial markets	• Promote new technology • Stimulate production • Implement state plans • Help the poor	Intermediate resources more efficiently
View of users	Borrowers as beneficiaries selected as targeting	Borrowers and depositors as clients choosing products
Subsidies	Large subsidies through interest rates and loan default Create subsidy independence	No or few subsidies Create independent institutions
Sources of funds	Governments and donors	Mostly voluntary deposits
Associated information systems	Designed for donors	Designed for management
Sustainability	Largely ignored	A major concern
Evaluations	Credit impact on beneficiaries	Performance of financial institutions

Figure 3.8 - Targeting clients: Poverty Reduction versus Financial Systems Approach
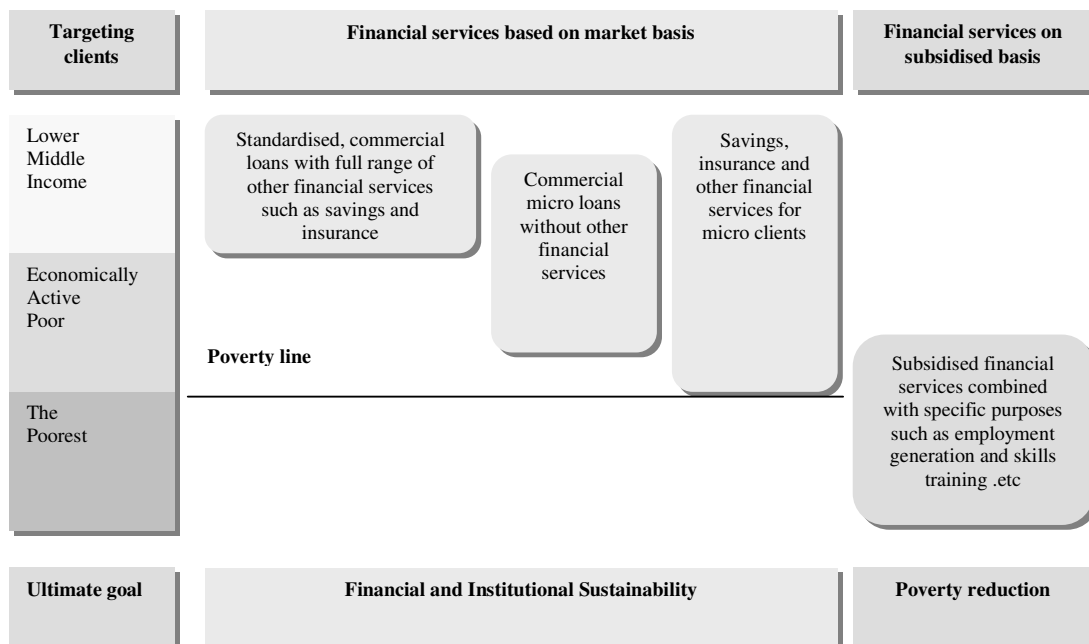
Source: Adapted from Robinson (2001)

3.4 Do we need a new approach?

3.4.1 Major concerns

Although the financial systems approach is mentioned as the newly generated approach, many developing countries continue to follow the traditional poverty reduction approach through their directed programs, especially in agriculture and rural development. This indicates that there still has not been a common view towards the development of sustainable microfinance. However, it is recognized that there has been a significant shift from the poverty reduction to financial systems approach (Christen and Drake, 2001; Robinson, 1997; Vogel and Adams, 1997). The success of the Unit Desa System of BRI in Indonesia, and of the Grameen Bank in Bangladesh, which has changed its view towards financial systems approach (Yunus, 2001), have made important contributions to the progress of new approach.

We, like Robinson (2001), support the financial systems approach as we believe microfinance can be profitable and that it is the right approach which enables the development of sustainable microfinance. People may see commercial microfinance is feasibly profitable when they observe how moneylenders make their money. However, it should be emphasized that moneylenders may exploit local information gained from living close to their clients and thus reduce the risks and costs associated with their transactions. Hence, the priory factor that decides the profitability of a commercial microfinance is the ability to charge cost-covering interest rates that the clients can afford and willing to pay.

There are two issues in this assumption. First, whether microfinance borrowers are willing to pay high cost-covering interest rates? Studies (Robinson, 2001) have shown that even the costs of accessing informal funds from money lenders are low, compared to formal financial institutions, the micro clients have to pay extremely high interest rates that ends up

with extremely high total cost of borrowing to borrowers. The existence and popularity of moneylenders in many developing countries therefore imply that in fact the poor can afford for such high interest rates when they have a demand. Therefore, it is feasible that commercial microfinance institutions can charge cost covering interest rates (Charitonenko and Rahman, 2002).

Second, whether MFIs can charge the interest rates that the micro borrowers can afford? It is clear that if the commercial microfinance institutions could provide financial services at the costs that the money lenders are providing, they would be profitable. Moreover, the commercial microfinance institutions may have some advantages gaining from the poor' preference: the poor usually prefer not to be indebted to individuals, especially in rural areas. It is also another advantage that that formal financial sector may provide large scale of financial services and be understood as being able to provide financial services on a long-term basis, which is essential to poor borrowers.

We have now come up with a major concern that given the excessive demand for various types of credit, savings and other financial services (Gonzalez Vega, 2003), if the poor can afford for high interest rates and microfinance is profitable (Robinson, 2001), why has the demand not been met? Why there is still a huge number of poor and low-income households having no or insufficient access to financial services (see section 3.2)?

Robinson (2001) recognises that the most likely reasons for the above concerns, assuming financial systems approach, include: (i) the lack of appropriate and efficient financial technologies; (ii) insufficient accurate information about the dynamics and interactions of local markets that are available to bankers, economists, and policymakers; and (iii) the limited interest in microfinance among policy makers and managers of financial institutions. While the first two reasons can be solved time by time when microfinance

industry develops, the limited interest in microfinance is seen to be a problem of cost-effectiveness (Gonzalez Vega, 2003), which shows extremely high costs to provide commercial microfinance in areas of very low population density (Robinson, 2001).

It is important to recognise that the cost-effectiveness problem can be solved if we can (i) develop innovative financial technologies that enable financial institutions to reduce the costs associated with financial transactions; and (ii) creating a sound financial environment that makes information available to participants in the microfinance market (Gonzalez Vega, 2003). The purpose of these solutions is to create an efficient mechanism that allows financial intermediation for the poor and low-income households. This is similar to the implication by Rutherford (1998) which suggests that provision of financial services for the poor people is simply to create an efficient mechanism which enables them to convert a series of savings into useful large lump sums and that financial services for poor people are to help them get hold of usefully large sums of cash when they need cash or have an opportunity to invest it. Hence, a more favourable policy environment and particularly appropriate innovations in financial technologies and improvements in the institutional design of financial organizations can allow a cost effective expansion of the formal financial sector services to broader sectors of the population in the developing countries (Gonzalez Vega, 2003; Chaves and Gonzalez, 1996).

Given the cost-effectiveness problem, the next concern relates to social issue in providing financial services to the poor. Since commercial microfinance institutions target the better-off poor who have investment opportunities, the poorest of the poor are left aside. Moreover, even if the target at the better-off poor is acceptable, what would happen if the commercial microfinance institutions are able to offer financial services only at the costs that are much higher than those that better-off households can afford? Apparently, this problem indicates that in such a circumstance there should be a balance between the commercial and

social goal (Charitonenko and Rahman, 2002) in order to enable the development of microfinance industry. Hence, we believe that some kind of subsidy should be needed, but the question is then how much subsidy should be acceptable and in which forms?

We suggest that it is necessary to help the poorest of the poor become bankable and gain access to financial intermediation under financial system approach. Labour intensive development programs, job creation, skills development, heath care services .etc could be necessary for the poorest of the poor before they are able to make use of financial services. It is also noted that the provision of these services is normally accompanied within the poverty reduction approach (Robinson, 2001). However, it is combined simultaneously with credit and thus does not help the poorest make use of it. What we do imply here is a subsidy from the government (or relevant agency) to provide these services separately from the financial intermediation which keeps its commercial principles. In other words, we need social intermediation for the poorest before financial intermediation and these two processes should be coordinated.

3.4.2 The mixed approach?

Given the considerations of cost-effectiveness and the balance between commercial and social goals, we propose that the *pure financial systems approach* is not a good option at this stage. A new approach which encourages the development of commercial microfinance, and thus enables the development of sustainable microfinance and simultaneously keeps keep the balance of commercial and social goals would be more ambitious and necessary at this stage of transition. The performance of *alternative financial institutions*[3] which do not maximize their profitability and are successful at getting double bottom-lines (i.e. financial self-sufficiency and social goals) has promised the potential future of new approach in

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3 See CGAP (2004)

microfinance (CGAP, 2004). This indicates our concept of sustainable microfinance presented in Chapter 1.

In thinking of the new approach, we suppose that two main forces affecting the development of sustainable microfinance industry include the process of commercialization of microfinance and the supports from governments and donors. We expect that if these two forces are realized, tailored and implemented carefully, they would shift the microfinance productivity frontier from a *low outreach and unprofitable* to a *higher outreach and profitable* productivity frontier (see Figure 3.9).

Figure 3.9 – Two forces and new productivity frontier
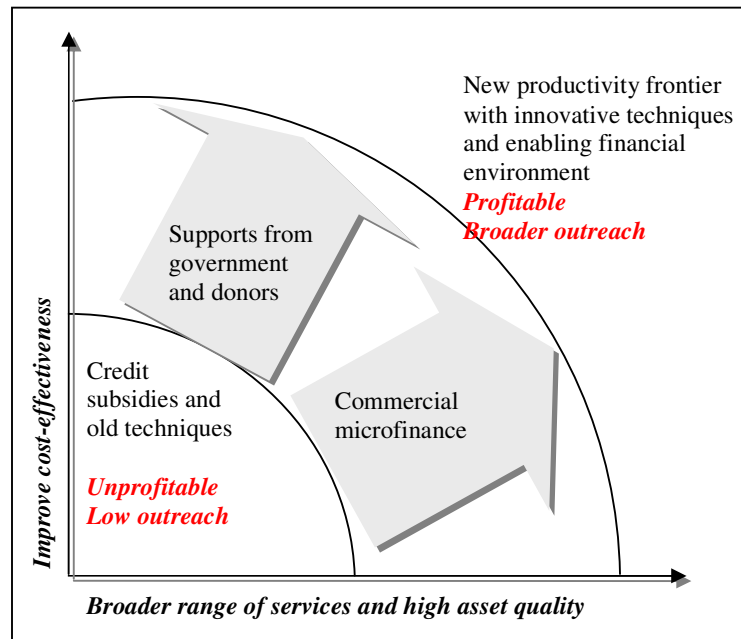
In order to increase the productivity, we propose a *mixed approach*. Figure 3.10 details the mixed approach with relation to poverty reduction and financial system approach. Following this approach, microfinance should be understood as financial intermediation for the poor and low-income households with supports from governments and donors. The overall goal for any microfinance institution is to unlock the "Black Box" of how to provide financial

services at the costs that the clients can afford, rather than the goals of financial sustainability or poverty reduction. Our idea is simple that if the "Black Box" of microfinance is unlocked, it enables the goal of wide and sustainable outreach and thus contributes to both the goal of poverty reduction and financial sustainability.

Under this mixed approach, supports from the government and donors can be in two forms. First, the government should create a sound financial environment and informational intermediaries that facilitate the development of financial intermediation for the poor. Government and donors should intervene in financial markets for the poor households with actions towards institutional mechanism development rather than direct financial (Gonzalez Vega, 2003). Government and donor actions are needed in order to (i) encourage the development and adoption of new financial technologies that would make it possible at reasonable costs to reduce the risks of financial transactions for all market participants; (ii) build additional institutional infrastructure that would support the implementation of the new financial technologies; and (iii) build new institutional designs that would guarantee the adoption of these technologies by organizations with the vocation and capacity to become sustainable (Gonzalez Vega, 2003).

Specifically, government and donor actions may include the supports towards the creation of informational intermediation such as credit scoring, credit rating agencies and payment systems. They may also comprise of any support that contributes to an efficient mechanism of financial intermediation such as new allocation network, risk management techniques, credit scoring solutions and partnerships. All microfinance institutions should be granted access to this information and techniques. Donors may encourage the establishment of informational intermediaries such as credit rating agencies that collect information about clients of non-regulated institutions (such as Mass Organizations in Vietnam), which are

potential partners in microfinance partnership. The prudential regulation and supervision are also necessary.

Second, the government and donors should provide non-financial supporting services such as physical infrastructure improvements (e.g. transportation, telecommunications), trainings on business skills, job creation, health care and education i.e. social intermediation (Robinson, 2001) to the poor, especially the poorest of the poor. It should be noted that favourable economic and sector policies are a necessary condition but not sufficient for expanding the frontier of financial services, especially in rural areas (Gonzalez Vega, 2003). The establishment of a physical and institutional infrastructure that facilitates the smooth operation of financial markets is indispensable for rural financial deepening. Many components of this physical and institutional infrastructure contain elements of public goods and, without state intervention, they would be underprovided. All of these supporting actions can be understood as some kind of subsidies of the government and donors in order to help commercial microfinance institutions develop, but they should not be in the forms of direct subsidy to costs of financial services.

In brief, in an attempt to develop a sustainable microfinance industry, it is necessary to recognise that there is always a conflict between profitability and social goal. The *pure poverty reduction approach* fails because it focuses on social goal but forgets the profitability aspect which is important for operation on sustainable basis. The *pure financial system approach* aims at profitability goal but it ignores the social goal, if it finds microfinance unprofitable. Hence, a mixed approach which keeps the balance between profitability and social goal could be more appropriate at this stage of transition. However, the mixed approach that we have suggested does not mean a *partly subsidy* but a combination of financial intermediation (which follows principles of financial systems approach) and social and

informational intermediation (which is separated and supported by government and donors). Microfinance institutions which operate on commercial basis may benefit from building partnerships with these intermediaries.

Figure 3.10 – The mixed approach to microfinance

Supports from government and donors	**Poorest of the poor**

2

1

3

The mechanism of services provision:
Cost effectiveness
Balancing commercial and social goals

Microfinance Institutions Operating on market basis	**Flows of financial services**	**Microfinance clients: Targeting at the economically active**

Macro level: Sound framework
Micro level: Innovative methodologies

Sustainability		**Positive impacts**
Financial systems approach	**New approach**	**Poverty reduction approach**

Notes

1) Government and donor supports to create a sound financial infrastructure and informational intermediation. Actions include: (i) the creation of informational intermediaries, such as credit scoring, credit rating agencies; (ii) the creation of efficient mechanism of financial intermediation such as new allocation network, risk management techniques, credit scoring solutions and partnerships; (iii) Establishment of prudential regulation and supervision in microfinance.

2) Social intermediation: government and donor supports to provide non-financial supporting services such as physical infrastructure improvements (e.g. transportation, telecommunications), trainings on business skills, job creation, health care and education i.e. to the poor, especially the poorest in order to make them bankable and gain access to financial services.

3) The process of becoming bankable for the poorest of the poor.

3.6. Financial policies and microfinance development

3.6.1. The role of government

We believe that a sound business environment plays a critical role in enabling the emergence of microfinance as an industry. As analyzed in the above sections, the new views on microfinance require a more favorable "playing field" which encourages the participation of financial institutions in microfinance market. For most cases, the task of creating a favorable playing field in financial sector is assumed to be of the central banks. The discussion of the role of central banks basically starts with their overall objective and functions related to the financial system and the economy. As Chandavarkar (1996) analyzes, there is a distinction between *developmental* and *promotional* functions of a central bank.

Developmental activities include credit guarantees and insurance, participation in the capital and management of development institutions, priority sector lending, differential interest rates, preferential rediscount rates and facilities, and setting target credit/deposit ratios for rural branches of banking institutions. The promotional functions emphasize the role of central banks as "creating traffic" agent in terms of filling the gaps in the financial structure in respect of instruments, institutions, markets and personnel. Chandavarkar (1996) also argues that promotional activities should be the measures to reduce transaction and information costs. Promotional activities may include support for pilot projects using innovative approaches to microfinance, the conduct of research, the collection and publication of data, and advocacy and training.

With respect to microfinance, Gonzalez Vega (2003) shows that for a proper development of commercial microfinance, the role of the state (central bank) should be to promote the smooth and efficient operation of markets, rather than to substitute administrative allocations for market forces. The central bank should not intervene in the determination of

interest rates and other prices of financial services and impose portfolio quotas and other quantitative instruments to redirect the supply and to administratively influence the allocation of credit. Borune and Graham (1984) also suggest that any direct production of rural financial services by the state (central bank) should not be encouraged.

Overall, we believe that the central bank should not subsidize or get involved directly but promote microfinance. However, as Ed Mayo and Mullineux (2000) argue, it should be aware that in case of market failure, a "careful subsidy" can, in principle, promote the development of microfinance through competition. The creation of such supporting agencies like Development Bank or Small Business Agency (for examples the Farm Credit Administration and the Farm Credit System Insurance Corporation in the US), which perform the function of supporting the development of microfinance by providing loan guarantees and ensuring the soundness and safety of MFIs (rather than subsidizing loans directly) and business training supports could be more valuable than any of the directed actions (see section 3.5).

3.6.2. Does financial liberalization help?

The government may also affect the emergence of commercial microfinance through its perception towards a financial reform. Generally, the foundation for financial reform depends on the belief of whether financial repression or financial liberalization is important to economic development. Although it has been increasingly seen that financial liberalization is more preferable (Caprio, Atiyas, and Hanson, 1996), but somewhere else, it is believed better to keep the financial system repressed (Stiglitz, 1994, 1996).

However, it is not our purpose to argue about the choice of financial repression or financial liberalization, but how these two options may affect the development of microfinance. Even though, we recognize that in fact, the rules that govern the activities of

MFIs are not appropriate with MFIs for a simple reason that in most cases those rules were not designed with the MFIs in mind, and so the simple point is to remove any regulatory barriers and create a fairer basis for competition (Ed Mayo and Mullineux, 2000).

Financial repression

Shaw (1973) sees financial repression as "distortions of financial prices including interest rates and foreign exchange rates". The works of McKinnon (1973) and Shaw (1973) discuss about the weaknesses of the financial repression with a message that financial repression is no longer appropriate for economic development. However, on the other hand, others (see for example: Stiglitz, 1994, 1996) believe that financial repression is necessary in some certain circumstance. There are a number of reasons for the persistence of financial repression. The most seen reason shows the approach that the governments may attempt, through their central banks, to encourage what they regard as priority activities. As to economic development in general and microfinance in particular, this is crucially important if the government believes in the poverty reduction approach.

One example of financial repression from practice could be the case of Vietnam and similarly, China. In these countries, there existed the so-called "mono banking" system. There were no separate commercial banks, and the central bank acts as both the regulatory authority and the commercial banks. The central bank was directly involved in developmental activities on behalf of the government, extending loans at administered interest rates to particular industry sectors and state-owned enterprises in accordance with the centrally determined credit plan. The major changes in attempt to remove the restrictions on financial system i.e. in some sense towards financial liberalization were made in 1986 and 1978 (but not yet in effect of financial sector until 1998 and 1995) in Vietnam and China respectively when these two countries introduced their economic reforms. However, the central bank still has

responsibility for some developmental activities. For instance, the list of legislated central bank functions includes the power to administer financial institutions and to control financial markets. Indeed, the central bank still carries out government policy directives of a developmental nature.

Under financial repression, in our idea, it seems less evident to see such policies of controlling interest rates and directing credit for developmental purposes have been effective. First, controlling the interest rate (normally below the market rate) discourage saving and thus induces saving and investment below their socially optimal level. Second, directed credit and (manual) credit rationing distort the allocation of bank lending between projects, reducing the average quality of investments. Third, high level of the state ownership in financial sector – normally as a consequence of financial repression – might be associated with slower financial development and lower growth in per capita income (as shown in the study of La Porta et al, 2000).

These reasons suggest that the government through central bank should not support microfinance through measures such as directed credit programs, interest rate controls, and high ownership of financial institutions. Interest ceilings – frequently combined with high rates of inflation or the overvaluation of the domestic currency, restriction on entry into financial intermediation and constraints on competition, portfolio quotas and other quantitative and qualitative controls on credit portfolios as well as controls on the terms and conditions of loan contracts and on banking procedures – had discouraged experimentation and innovation in financial technologies (Gonzalez Vega (2003).

Financial liberalization

The policies of financial liberalization have been gradually introduced since the mid 1980s (Gonzalez Vega, 2003). Building on a more favorable macroeconomic environment,

given the success of stabilization measures, these policies have attempted to improve efficiency in the operation of financial markets and to take advantage of the gains from transactions that take place through markets and on market terms. Indeed, in past two decades, financial liberalization and other financial policy reforms in many developing countries and economies in transition have opened spaces for innovation in financial technologies that had previously been frustrated by financial repression (Westley, 1999).

Recent research (e.g. Levine, 1997) has shown the empirical evidence that rapid financial development, which results largely from legal and policy changes to liberalize the financial system, has been associated with rapid economic growth in many developing countries. However, we should remind about the "rapid" financial liberalization in light of the Asian financial crisis. In one hand, rapid financial liberalization can contribute to economic growth, but on the other hand it can also create the conditions for financial collapse (ADB, 2000b). It is believed that the financial liberalization can be effective if it is accompanied by complementary legal, regulatory, human resource, and informational reforms (see for examples: Demirguc Kunt and Detragiache, 1998; Cole and Slade, 1999).

As regarding microfinance, among other things, many researchers believe that central banks can and should contribute to the development of microfinance through careful and appropriately sequenced financial liberalization. Liberalization enables the financial system to reach some households that would otherwise not have access to formal financial services. However, the task has been to find the ways in which liberalization can contribute to the development of a sustainable microfinance sector, such as through deregulating interest rates and removing barriers to entry of new institutions into the formal financial system.

It is clear that financial liberalization by itself is not a sufficient condition for ensuring that large numbers of poor households have access to financial services on a continuing basis

(Gonzalez Vega, 1993; Westley, 1994). The formal financial system reaches only a small proportion of households in developing countries. As interpreted from Fry et al. (1996), it is not to remove restrictions on financial markets but also to impose a positive encouragement of financial markets in order to get the goal of reaching poor households on sustainable basis. This suggests a possible role for central banks in promoting financial systems.

Moreover, as Gonzalez Vega (2003) shows, financial reforms have arrived into the rural areas, where demands for micro-financial services come from, more slowly than to other sectors of the economy. In many quarters, there is still a deep-felt view that farm households are too poor to save and to demand deposit facilities or to acquire financial assets, and they cannot pay market interest rates on loans or determine by themselves the best possible uses for loan funds.

Another aspect of financial liberalization is reform in framework for prudential regulation and supervision. According to Gonzalez Vega (2003), the commercialization of microfinance requires a regulatory framework that (i) promotes competition and lower barriers to entry into microfinance markets; (ii) eliminates unnecessary fragmentation in rural financial markets, resulting from specialized charters that prevent competition and the emergence of economies of scale, economies of scope and portfolio diversification; (iii) eliminates credit programs housed in non-financial institutions; and (iv) establishes a road map for the closing, sale or privatization of state-owned development banks.

3.7 Conclusion

We have shown in this chapter that the poor do have demand for the financial services (Rutherford, 1998), like everyone else. They need financial services for a number of reasons such as to invest in business opportunities and to smooth consumption (Morduch and Haley, 2002; ADB, 2000a). The convincing theory by Rutherford (1998) indicates that for the poor,

financial services such as credit and savings help them to accumulate "large sum" money when they need. Even though, the ratio of coverage by microfinance institutions is too low and thus, there is an excessive demand for financial services from the poor and low income households (Gibbons and Meehan, 2002). One of the reasons for the low coverage is that most microfinance institutions are NGOs and are too small and unable to reach the poor on large scale (CGAP, 2004; Gibbons and Meehan, 2002). This implies that an enhancement of formal financial sector for the poor on sustainable basis is necessary.

In attempts to meet the excessive demand for financial services from the poor, microfinance institutions and governments have followed two different approaches, namely poverty reduction approach and financial systems approach (Rhyne, 1998; Robinson, 1999, 2001). On one hand, the poverty reduction approach bases on the belief that financial services have positive impact on household poverty reduction and thus commits to providing cheap financial services (mainly credit) to the poor, especially the poorest of the poor, on subsidy basis. On the other hand, the financial system approach aims at building a financial intermediation system among the poor, especially the economically active poor, on a sustainable basis with an application of market principles into microfinance.

We find that both approaches have their own disadvantages. The poverty reduction approach expects a positive impact of credit on household poverty reduction but literature shows that the degree of impact is too small, which raises an issue of cost-effectiveness debate (Morduch and Meehan, 2002; Gonzalez Vega, 2003). Some studies also have indicated that the positive impact is not always been found and that it depends on certain circumstances (Gonzalez Vega, 2003). Moreover, it is suspected that the target at the poorest of the poor may not be a right policy as for the extremely poor they need basic needs and are not able to make use of financial services and thus the provision of financial services is even harmful for

them (Robinson, 2001; Charitonenko and Rahman, 2002). Empirical studies also indicate that under this approach better-off households are most likely to be granted credit (see Chapter 4, 5 and 6). As a result, it has been shown that this approach has failed in achieving its goal of outreach and it is no longer favored (Gonzalez Vega, 2003; Robinson, 2001).

The financial systems approach has developed with a belief that microfinance can be profitable on sustainable basis and indeed it is shown by the case of Bank Rakyat Indonesia. The key element of this approach is the application of market principle into microfinance, of which charging full costs on financial services provided is essential (Charitonenko and Rahman, 2002; Christen and Drake, 2001). While this notion is feasible if we know that the poor potentially can afford services from money lenders at extremely high costs, there are some concerns with the cost-effectiveness problem. It is possible that the financial institutions may find their cost of supply much higher than the maximum cost that the households can afford, and thus they decide not to operate in the market. It also possible that because this approach targets the economically active households, the extremely poor are often excluded. Both these possibilities indicate that there should be a balance between social and financial goal in developing a sustainable microfinance industry (Charitonenko and Rahman, 2002).

In recognition of the balance between social and financial goal in microfinance, we propose a mix of the two approaches. We suggest that financial institutions should follow their objective of being a commercial microfinance institution i.e. follow financial system approach and the governments and donors should provide supports to this approach in two ways: (i) create an enabling financial infrastructure and informational intermediation to assist (but not subsidize) microfinance institutions to reduce costs; and (ii) to provide social intermediation, such as physical infrastructure, education , health, job creation and business skills to the poor, extremely poor in order for them to be able to make use of financial services

and gain access to financial system. We also have made some recommendation on the role of the government in the implementation of financial policies to support the proposed approach.

To some extent, we have supported the view that financial repression may not be of help and financial liberalization may release some freedom for the formal financial sector to increase its outreach to the poor and low income households. However, it should be noted that some economists (e.g. Hellmann, Murdock and Stiglitz, 1997) argue that some controls and restrictions on competition create franchise value in financial markets that reduce moral hazard behaviors among financial intermediaries. Lending rate controls may also increase the efficiency of intermediation by reducing agency costs in loan markets. This set of financial policies is called the *financial restraint* which distinguishes from the financial repression in that the financial restraint *extracts rents* from private sector while the financial repression calls for the government to *create rent opportunities* in this sector. However, again, our purpose in this chapter is not to discuss the choice of policy pattern but to emphasize that the right policies are clearly important for stimulating the development of microfinance sector.

In conclusion, we have discussed briefly the choice of approach to microfinance with a view that the perception of microfinance may play an important role in its development. We believe that there will be a revolution of microfinance in the near future towards a commercialization of finance for the poor and this revolution will enhance its performance. The detailed analysis of commercialization of microfinance and how it would affect the performance of microfinance is necessary and important, but it however is not the purpose of our study and we expect it for further research.

In the next chapter, we start investigating the study: microfinance in rural Vietnam. We will present a picture of microfinance in Vietnam, a country that follows the poverty reduction approach. We will discuss the structure of microfinance in rural Vietnam, with a

detailed analysis of each type of microfinance institutions, including performance and strength and weakness. We will also analyze the governmental policies and approach to microfinance and explain why microfinance in Vietnam has not been sustainable. Finally, we will make comments on building a microfinance sector following a mixed approach, which has been proposed in this chapter.

CHAPTER 4

MICROFINACE IN RURAL VIETNAM

4.1 Introduction

In Chapter 2, we have explained why formal financial sector is generally reluctant to provide financial services to the poor and low income households. We also have discussed in Chapter 3 that government interventions in the financial markets for the poor could be also not a solution. The poverty reduction approach, which aims at cheap credit for the poor, has shown its failures and weaknesses in reaching the poor (Gonzalez Vega, 2003; Robinson, 2001). The financial systems approach, which aims at developing a commercially financial intermediation for the poor could be also not a solution at this stage because of financial self-sufficiency issues and the exclusion of the extremely poor. Hence, a mixed approach could be more appropriate.

In Vietnam, finance for the poor has been the interest of the government for about ten years. The economic reform taken in 1986 has transformed the country towards a market-oriented economy and achieved some significant results in terms of economic growth (Dao, 2001a, 2002). However, the rural Vietnam seems to be lagged behind while most of the population are from the rural areas, resulting in a large gap in income and living standards between the rural and urban areas. In this context, the national development strategy has emphasized on the importance of agriculture and rural development. One of the important components of this strategy is to ensure the rural poor having access to financial services (SRV, 2002).

As a result, the government of Vietnam follows the poverty reduction approach in providing financial services to the poor. Cheap credit from governments and donors is provided to the poor through the network of state-owned banks with a perception that credit

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improves the poverty reduction in rural areas (SRV, 2002). While the impact of credit on household poverty reduction, which will be discussed in Chapter 6 and 7, is found positive but small, the formal financial sector has shown itself unsustainable in reaching the poor. The main reason is that the poverty reduction approach does not allow financial institutions to be financially self-sufficient. Other reasons may include (i) the lack of supports from the government and donors to enhance the financial infrastructure and information intermediation which does not enable financial institutions to reach the poor at lower costs; and (ii) the lack of innovations in financial technology which does not help financial institutions to reach the poor more efficiently and effectively.

The purpose of this chapter is to analyze the current situation of microfinance in rural Vietnam in order to make possible recommendations towards a strategy for sustainable microfinance. To do so, we look at the performance of the microfinance markets with specific interests on the role of government shown by policy frameworks and the strengths and weaknesses of financial institutions. Generally, we suppose that formal financial institutions are not financially self-sufficient in providing financial services to the poor in rural Vietnam. We therefore suggest that the poverty reduction approach with subsidized credit should be removed, and instead, a mixed approach should be launched. The government and donors should invest more in social and informational intermediation while the financial institutions should learn from the successful experiences such as from the BRI or NGOs in reaching the poor and in pricing their services.

The remainder of the chapter is as follows. The next section discusses about the economic reforms and the rural poor and their incomes. In section 4.3, we present a picture of microfinance in rural Vietnam. In this section, we focus on the market structure i.e. who are providing microfinance services in Vietnam and the outreach to the poor. Section 4.4 analyzes

the lending technologies that are generally used in rural Vietnam. We then conduct a brief assessment of microfinance in rural Vietnam which covers all of the above issues in the next section. Section 4.6 reveals our major recommendations towards a sustainable microfinance in Vietnam. The last section summarizes the main findings of this chapter.

4.2 Reforms and the rural poor

Box 4.1 – Profile of Rural Vietnam

Vietnam – Rural Microfinance Profile

- 61 provinces, 527 districts, 9 801 communes and 45 000 villages.
- Total Population: 78 million people.
- Total number of households: 15 million.
- Inflation rate was 8.9% as of February 1999 and -0.6% in 2000.
- Average per capita income is 200 USD in 1998 and 300USD in 2001.
- 80% of population living in rural area giving a total of 12 million rural households.
- Average per capita income is approx. 80USD in 1998 and 100USD in 2001.
- Five groups of rural population
    1. Hungry Poor   : 10% of population (1.2 million households)
    2. Poor   : 15% of population (1.8 million households)
    3. Average   : 40% of population (4.8 million households)
    4. Better-off   : 25% of population (3.0 million households)
    5. Rich   : 10% of population (1.2 million households)
- Total Rural Households (HHs): 12 million HHs
- Low Income Households (LIHs): included groups 2 and 3.
- LIH was estimated at 55-56% of the population, or 6.7 million LIHs.

Source: Vietnam – Canada Rural Finance Project, 2001

4.2.1 Economic reform and strategy for poverty reduction

Vietnam has been transforming itself from a centrally planned to a market oriented economy since Doi Moi, or economic reform, was initiated in the late 1980s. Significant improvements in terms of economic growth rate have been achieved. On average, the GDP growth rate has increased from 4.6% on average in 1980s to 7.6% in 1990s. However, there is a significant inequality in the development of rural and urban areas. Recent average national per capita income is estimated at US$300, but for rural areas, accounting for 80% of population, the figure is at US$100 (Dao, 2001a, 2002). Therefore, the rural development has

been set as one of the prime goals of the Vietnamese Government's strategic development plan (SRV, 2002).

The first government's rural development initiative was launched in 1997 when a national poverty alleviation strategy was introduced to give poor and low-income households opportunities to have a better life. One of the major components of the government poverty alleviation strategy is to ensure that the rural poor have access to credit and financial services. The government concluded that improving access to microfinance in rural areas was one of the most tangible ways of assisting low-income households (SRV, 2002).

However, the outreach of formal banking sector to rural areas is limited. A recent study (McCarty, 2001) indicates that the formal banking sector meets only 30 % of rural credit needs. The majority of rural borrowing is from informal sources and often at interest rates that are many times higher than those charged by formal institutions. Although the informal sector (mainly money lenders and rotating savings and credit associations) satisfies some of the rural credit needs, the high interest rates charged are regarded as usurious for low-income households and it provides no assistance in the field of savings mobilization (Dao, 2002). Improving the supply of banking services in rural areas therefore appears to be important to enhance low-income households' capacity to improve their living conditions and to increase financial intermediation in general.

Even though, the government has not issued any specific policies on microfinance. The main policy that relates the importance of microfinance and poverty alleviation is the national strategy for Hunger Eradication and Poverty Reduction (HEPR). The strategy aims at reducing poverty headcount percentage to 10% of the population by the year 2005. In this strategy, subsidized credit is considered to be one of the most important elements (SRV, 2002). To enable this strategy, government has established the Vietnam Bank for the Poor

(VBP) in 1995 with a primary duty of providing soft loans to poor households and promoting poverty alleviation programs. The government also reinforces the Vietnam Bank for Agriculture and Rural development (VBARD) to emphasize its role as a government agent in the development process.

4.2.2 Banking sector reform

As part of the economic reform program, the banking sector has been transformed from a Soviet-style mono banking system toward a *two tier system* in which the big four state-owned banks are commercialised and play the major role in banking market and there is a central bank. The banking sector reform also creates the opportunities for the participation of non state-owned banks and credit institutions in the credit market. In rural areas, there are several banks and credit institutions operating, including the Vietnam Bank for Agriculture and Rural Development (VBARD), the Vietnam Bank for the Poor (VBP)[4], Rural Shareholding Banks (RSHBs), Peoples Credit Funds (PCFs), Credit Cooperatives and some other types of microfinance institutions (MFIs). VBARD has the largest branch network and has become the largest player in this market (McCarty 2001). VBP was formed in 1995 and operates through the network of VBARD as a result of an initiative by the government to provide subsidised credit to poor households (Dao, 2001a, 2002).

One of the most important areas of banking sector reform affecting rural credit is interest rate policy. The Law on Banks and Credit Institutions determines and regulates interest rates at banking institutions. Since 1996, the government has gradually liberalised interest rates (World Bank, 2002). The ceiling interests were replaced by the base rate plus margins. However, banks and credit institutions operating in the rural market regard the rates to be too low to permit them to be financially sustainable. The banks have little or no

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4 This bank has been transformed into the Policy Bank since 2003.

flexibility when trying to cover expenses and make a return or profit. The regulation that the spread between lending rates and rates on savings cannot exceed 0.3% and 0.5% per month for short-term loans and medium- and long-term loans, respectively, has further discouraged rural financial institutions from extending small loans to the rural poor and low-income households, given the high transaction costs for small loans (Dao, 2002)[5].

4.2.3 The rural poor and their incomes

A recent study by Dao (2002) suggests that if we consider 12 million rural households, 65% can be categorised as poor or low-income households. However, it is noted that this classification is drawn from the government's criteria (see Appendix 4.1). If we use the criteria set by the World Bank, it could be that most of the rural households are poor and low income households (see Appendix 4.2). Statistical data has also shown that living standards of rural borrowing households are slightly lower than those of non-borrowing households (Table 4.1). This indicates that the poorer households in rural Vietnam indeed demand credit.

Table 4.1 - Selected indicators of household welfare (in thousand VND)

| Selected household living standard | 1997/1998 | | | 1992/1993 | | |
	Rural households	Rural borrowing households	Urban households	Rural households	Rural borrowing households	Urban households
Per capita expenditure	2361.29	2248.61	5230.33	1161.85	1119.1	2286.14
Per capita food expenditure	1306.81	1251.24	2117.3	702.76	679.36	967.67
Per capita non-food expenditure	1054.48	997.38	3113.04	459.09	439.74	1318.47
Average of poverty status [1..5]	2.85	2.75	4.34	2.84	2.75	4.13
Average amount of borrowing	4626.07	4626.07	13098.42	1328	1328	6215.85

Source: VLSS92/93 and VLSS 97/98

The most evident characteristic of rural borrowers in Vietnam is the lack of sufficient collateral, partly due to the former state-landownership system. Only a small number of households have the collateral required by formal financial institutions. These institutions only accept legally registered assets as collateral – the primary asset being the official Land

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5 It should be noted that the interest rate ceiling has been removed since 2003 in the *commercial financial sector*, but for rural development and poverty reduction lending programs, the government still commits priory or cheap credit. However, the spread on interest rates is relevant for the period before 2003.

Use Certificate (LUC). However, as by June 2001, no province in Vietnam had yet finalized the issuance of LUCs to households (Dao, 2002). Moreover, each household can have only one LUC, which provides eligibility for only one loan at a time. Assets used as collateral are usually of low value, and are usually under-valued in comparison to the land price stipulated by the government.

The low level of education of rural borrowers causes difficulty in understanding and completing the necessary forms and documents (e.g. business plans and statements on loan utilization). Most rural borrowers reside far from financial service points, resulting in time-consuming travel to the bank branches. Furthermore, the publicity about financial services is both inefficient and late. Rural borrowers are also inexperienced in preparing loan applications and many rely on credit officers to help them. For most applications, credit officers are consulted on the preparation of business plans and loan utilization, or simply in order to get loan application forms.

However, credit officers are limited in number and, in the case of VBARD, one officer regularly has to deal with three communes with hundreds of borrowers without a fixed working schedule. Consequently, applicants spend a lot of time and money on preliminary activities, which in some cases do not even result in the submission of an application form. Furthermore, households want to use funds for various purposes, but formal financial institutions only finance a certain number of specified uses (McCarty, 2001). The expenses (certification fees, photograph, application form, travel and work lost etc.) incurred to borrow from the banks are unaffordable for many low-income households who thus effectively face financed exclusion.

The task of getting outreach to the rural poor households is therefore important. As we will see further in Chapter 5, 6 and 7, the poor households are in general difficult to get access

to the formal financial sector for a number of reasons, but they indeed benefit from having access to financial services. For example, studies by Dao (2001b, 2000) suggest that the number of working hours for rural households, which almost are relying on agriculture such as rice farming and animal husbandry , increases if they gain access to financial services (see Table 4.2) and hence the household income increases (Figure 4.1).

Table 4.2 - Number of full working months a year of households

Region	Before borrowing (% households)				After borrowing (% households)			
	1-3 months	3-5 months	5-7 months	7-12 months	1-3 months	3-5 months	5-7 months	7-12 months
North	0.95	5.87	22.16	71.02	0.19	1.52	13.83	84.47
Central region	0.15	4.32	15.77	79.76	0.00	0.89	9.67	89.43
Central Highland	1.75	3.06	15.72	79.48	0.87	1.31	3.93	93.89
South	2.98	4.47	15.88	76.67	0.74	2.48	9.43	87.34
Country	1.20	4.64	17.65	76.50	0.33	1.48	10.11	88.25

Source: Dao (2001b)

Figure 4.1 - Household Monthly Income (per capita) Pre- and Post-Borrowing
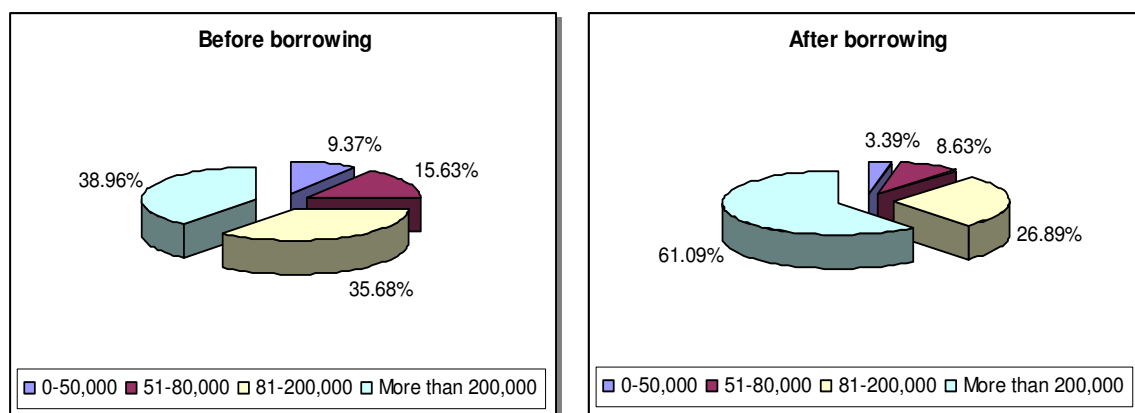
Before borrowing, the percentages of households who have a monthly per capita income of between VND81-200,000 and more than VND200,000 are 35,68% and 38.95%, respectively …

…But after borrowing, these figures are 26.89% and 61.09% implying that households indeed benefit from borrowing.

Source: Dao (2001b)

4.3 Microfinance structure and outreach

4.3.1 An overview

The rural financial market in Vietnam is segmented into three core sectors: formal, semi-formal and informal. In the formal sector, the key providers of microfinance services are VBARD, VBP, PCFs and RSHBs. The semiformal sector is dominated by National Programs,

Microfinance Programs of Social Organisations (SOs), and Savings & Credit Schemes supported by NGOs and donors. Typically, formal and semi-formal financial sectors in Vietnam provide credit to rural households for the specific purposes of rural development and/or poverty reduction at cheaper interest rates. Thus, these sectors basically employ their own criteria in selecting and screening borrowers who are eligible to receive loans from them. The formal and semi-formal schemes however, were either unable to meet the huge demand for financial services or they could not reach the poor. In such cases, the poor have to rely on the informal credit sources, which consist mainly of credit extended by rotating credit associations, moneylenders, families, friends and traders. Figure 4.2 at the end of this section presents an outline of the structure of rural credit market.

Prior to 1990, formal credit institutions (state-owned banks and credit cooperatives) provided credit only to state enterprises and production cooperatives. International NGOs were not allowed to operate in the country; and social organizations did not offer financial services. Individual farmers and households therefore could not access credit from formal institutions. The Doi Moi policy, begun in 1990, and followed by reform of banking sector and land use, has changed the face of rural credit service development. The percentage of rural households having access to credit has increased significantly.

There has been an increasing role of formal credit in the rural credit market. As the Table 4.3 shows, in 1998, there were only 49% of the total rural households and 40% of the total rural LIHs having access to formal and/or semi-formal credit, but in 2001, the figures were 70.2% and 61.5%. Most of rural households and LIHs had access to formal financial sector, of which the major sources are from the VBARD and the VBP. Semi formal source of financial services cover a very small market clientele, 1% of rural households and 1.8% of LIHs in 2001. However, there are still a large proportion of households with no access to

either formal or semi-formal credit: 51% of rural households and 60% of LIHs remained unable to access financial services in 1998, and 29.8% and 38.5% in 2001. These households are assumed to have to seek financial services from informal at extremely high costs, or have no demand for financial services.

The reasons for borrowing from the informal sector are various, of which smoothing consumption (Rutherford, 1998; Morduch and Haley, 2002) is important. A survey in 2001 conducted by Microfinance Resource Center, National Economics University reveals another reason that almost 99% of interviewed households took loans from the informal sector at higher interest rates as a result of restricted access to the formal sector (Dao, 2001)[6]. Because rural households in Vietnam traditionally dislike being indebted to individuals, informal borrowing can be viewed either as distress borrowing, or the second choice. Households may however borrow from relatives or friends at very low interest rates, but there are normally not in the forms of contracts and are therefore temporary.

Table 4.3 - Comparative Indicators of Rural Financial Institutions

Institution	Outreach to Rural Households				Outreach to Rural LIHs			
Population: 78 million people in Vietnam; Total rural households: 12 million Estimated low-income households: 6.7 million								
	1998		June 30, 2001		1998		June 30, 2001	
Formal	*5,910,000*	*49%*	*8,303,000*	*69.2%*	*2,700,000*	*40%*	*4,000,000*	*59.7%*
VBA	4,000,000	33 %	5,000,000	41.7%	1,800,000	27 %	2,350,000	35.1%
VBP	1,300,000	11 %	2,571,000	21.4%	600,000	9 %	1,250,000	18.6%
PCF	600,000	5 %	720,000	6.0%	300,000	4 %	400,000	6.0%
RSHB	10,000	0.08%	12,000	0.1%	-		-	-
Semi-formal	*NA*	*NA*	*120,000*	*1%*	*NA*	*NA*	*120,000*	*1.8%*
Total served	**5,910,000**	**49%**	**8,423,000**	**70.2%**	**2,700,000**	**40%**	**4,120,000**	**61.5%**
Informal or No access	**6,090,000**	**51%**	**3,577,000**	**29.8%**	**5,000,000**	**60%**	**2,580,000**	**38.5%**

Source: Dao (2002), McCarty (2001)

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6 The author participated in this survey as a team leader in conducting household interviews and processing data in 15 selected provinces across the country from May to July 2001.

4.3.2 Providers of formal financial services

There are four formal institutions which provide formal financial services to the rural households and LIHs, including VBARD, VBP, PCF and RSHBs. Most of loans made by these institutions are for specific purpose such as rural development or poverty reduction on subsidy basis. In other words, these institutions are the vehicles of the government in carrying its poverty reduction approach (see Chapter 3).

Vietnam Bank for Agriculture and Rural Development (VBARD)

VBARD is the state owned bank and the biggest financial institution that provides financial services in rural areas in Vietnam through a nation-wide network. It has the largest market share among the formal financial sector. The market clientele of the VBARD includes a mix of rural households and the LIHs. In 1998, it accounts for 68% of the rural households and 67% of the LIHs who had access to formal financial services. In 2001, these figures were 60% and 59%, respectively (see Table 4.4 and 4.5). These figures indicate that VBARD is the key player in the outreach process and the leader in the government's strategy in rural development and poverty reduction.

Vietnam Bank for the Poor (VBP)

In reality, the VBP is institutionally "merged" with VBARD. VBP branches have been established within VBARD's district branch network in all provinces. Until 2002, VBP had no plan to set up its own network. It has been transformed into a "policy bank"[7]and basically based on the foundation set by the VBP. One of the bank's functions is to extend credit to poor households with government's subsidy. This bank is also encouraged to cooperate with Credit & Savings Schemes run by NGOs and SOs. With major support from the government, VBP has increased its market share from 22% in 1998 to 31% in 2001 to the rural households

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7 The "Policy Bank" has been set up in 2003 to replace the VBP but with the same function of providing cheap credit to the low-income households. In our idea, this is typically a rename.

who had access to formal sector (Table 4.4 and 4.5). It should be noted that most of VBP's clients are the rural poor households, i.e. the LIHs. This signals a prospective that VBP or Policy bank would be the key player in outreach strategy to the poor households in the future.

People's Credit Funds (PCF)

A People's Credit Fund is a small community based cooperative and social financial institution owned, operated, and governed by shareholder members who are from the commune in which it is located. PCFs perform an active financial intermediation function; they improve the access of rural borrowers and savers to financial services, emphasising savings and credit discipline. A PCF provides a safe and easy place for commune members to keep their savings, provides a source of loans to families who no longer qualify for the VBP, makes loans that create local businesses and jobs in the commune, helps to displace community money lenders who charge very high rates for their loans, and can lend funds fast for household income earning purposes. The PCF network, however, plays a minor role in rural financial markets, accounting for only 5% and 6% of the rural households who had access to formal sector in 1998 and 2001 (Table 4.4 and 4.5).

Rural Shareholding Bank (RSHB)

RSHBs are the result of the reorganization or merger of rural credit cooperatives (they are thus sometimes referred to as Credit Cooperatives) in which the government has a 10% stake. The main advantage of such banks is that their lending procedures are simple with credit officers relying on their knowledge of and close relationships with borrowers who are often family or friends. The credit officers also help the applicants complete the required documents. The reliability and low cost of this process are brought about by the dual roles of most staff, as technical personnel and shareholders. However, the market share of RSHB is very limited.

Table 4.4 - Formal Sector Outreach

Institution	Outreach to Rural Households				Outreach to Rural LIHs			
	1998		June 30, 2001		1998		June 30, 2001	
VBA	4,000,000	33 %	5,000,000	41.7%	1,800,000	27 %	2,350,000	35.1%
VBP	1,300,000	11 %	2,571,000	21.4%	600,000	9 %	1,250,000	18.6%
PCF	600,000	5 %	720,000	6.0%	300,000	4 %	400,000	6.0 %
RSHB	10,000	0.08%	12,000	0.1%	-		-	-
TOTAL	**5,910,000**	**49%**	**8,303,000**	**69.2%**	**2,700,000**	**40%**	**4,000,000**	**59.7%**

Assumptions: i) A loan to a borrower actually serves a household.

ii) LIHs include those who borrowed 3 million VND or less.

Source: Dao (2002), McCarty (2001)

Table 4.5 - Market Share of Rural Borrowing Households

Institution	Borrowing - Rural Households				Borrowing - LIHs			
	1998		June 30, 2001		1998		June 30, 2001	
VBA	4,000,000	68%	5,000,000	60%	1,800,000	67%	2,350,000	59%
VBP	1,300,000	22%	2,571,000	31%	600,000	22%	1,250,000	31%
PCF	600,000	10%	720,000	9%	300,000	11%	400,000	10%
RSHB	10,000	-	12,000	-	-		-	-
TOTAL	5,910,000	100%	8,303,000	100%	2,700,000	100%	4,000,000	100%

On June 30, 2001, while VBARD's HH borrowers account for 60% of total borrowers, its' total outstanding loans represent 75% of all outstanding loans in VND from any source.
Source: Dao (2002), McCarty (2001)

4.3.3 Providers of semi-formal financial services

Semi-formal credit plays a minor role in rural financial markets. The total market share of this sector accounts for only 1% and 1.8% of the rural households and the LIHs who had access to formal sector in 2001 (Table 4.3). Semi-formal microfinance is mainly provided by three groups, including (i) national programs; (ii) financial services from Social Organizations (SO's); and (iii) Credit and Savings Schemes of the International NGOs.

National Programs

National programs are basically funded by the State Budget and have different objectives. Several national programs also include in their activity a credit component that is used to support the pre-set objectives. Examples of main programs can be listed such as Job Creation, Greening Bare Hill and the National Program for Eradication and Poverty

Reduction etc. Financial services such as credit are usually provided in supporting these programs rather than driven by demand from rural poor households.

Micro-finance Services of Social Organizations (SOs)

The prime interest of a social organization is the economic improvement of its members. Credit not only serves this interest but also acts as a catalyst in support of other activities. The two basic approaches of social organizations in credit activities are as (i) they own and manage members' savings and grants from donors such as international NGOs; and (ii) they serve as facilitators or financial vehicles for the VBARD, VBP. The credit service offered by social organizations, such as Vietnam Women Union (VWU), Vietnam Farmer Union (VFM) .etc is highly appreciated because it can be channelled directly to targeted beneficiaries at the grassroots level. Moreover, because it is community-based so it has more direct and closer contact with customers than a formal credit institution has. This is why many International NGOs and the formal financial institutions such as the VBP-Policy Bank have chosen to cooperate with SOs in their development programs (see Box 4.2 and 4.3 for case studies).

International NGOs - Rural Microfinance Schemes

Many International NGOs in Vietnam have run their microfinance schemes integrated with other activities with specified purposes. Microfinance schemes integrated with other activities can exploit economies of scope, which can piggy-back microfinance on top of other organizational frames (e.g. collectives that emerge around irrigation services), or exploit complements in household production and welfare improvement. Many NGOs therefore view microfinance as a means to an end rather than the end in itself. However, Credit and Savings schemes by NGOs are typically small in scope and they cover a very small number of rural

households. Some NGOs have tried to cooperate with the VBP and SOs in order to increase its capacity to outreach (see Box 4.2 for a case study).

4.3.4 Providers of informal financial services

In Vietnam, the sources of informal microfinance are families, friends, relatives, traders, unregistered private moneylenders, and traditional rural credit associations.

<u>Private Moneylenders</u>

Moneylenders provide credit on a range of terms (seasonal, daily) whatever the client may wish. They are usually the better off in rural areas and have a deep pocket of money or goods. It is estimated that in each village there are 2 or 3 permanent and 5 to 10 seasonal private moneylenders. The hidden nature of this activity means there is no data on the number of people using moneylenders. The main features of moneylenders are that they observe a market approach in providing credit and negotiate for a high rate with payments made on a monthly basis around 3-10% per month (Dao, 2002). The service is flexible but bearing a high opportunity cost.

<u>Traditional Rural Credit Associations: Ho, Phuong and Hui</u>

- Ho

The name means Relatives or Friendship and originates in the North of Vietnam. It is a traditional small credit group organized by local people. Each group comprises from 5 to 20 members. The members often have the same career e.g. groups of farmers, groups of traders, groups of war veterans etc. Each group operates as an individual organization having no relation to other groups or to formal institutions. A group leader is elected by members to collect deposits and keep records. Members deposit savings to form funds, which will be lent to each group member in rotation. Savings can be in cash, paddy or gold. The amount of monthly cash savings depends on the agreement reached within the group. This system can be

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understood as a ROSCA but the major difference is that in Vietnam the Ho is not an association but isolated local credit groups.

- Phuong.

Phuong does not charge interest on loans. Each member deposits required periodic savings and is entitled to receive an interest-free loan once in a credit cycle. Minority groups in mountainous areas, where interest-bearing loans are not considered a friendly way to help each other, favour this approach. The groups are smaller than in the Ho, varying from 5 to 8 members. One may understand this mechanism as a rotating savings and lending group.

- Hui.

The name of Hui originates from the South of Vietnam. The Hui has operated somewhat like a Ho in the north. Unfortunately many members borrowed as much as possible by offering incredibly high interest (5 to 20 per cent per month). The loans were used to invest in land, trading or assets for speculative purposes. Such investments earned a high return during the boom 1985-98. However it ended because some members even borrowed from one person to repay the other, anticipating that the future returns would cover all debts. Many Hui collapsed (VO HUI) as borrowers lost the ability to make repayment. As a result, Hui is now considered as "cheating credit" in Vietnam.

Borrowing from Friends or Relatives

This kind of credit is normally free of interest with flexible terms. Credit terms depend on the relationship with the borrowers and on the availability of extra income sources. The poor are not likely to borrow from relatives or friends because of the social implications. The culture dictates that one should help poor friends or poor relatives by handing over the money rather than lending it to maintain good relations.

Figure 4.2 - Microfinance Services Structure
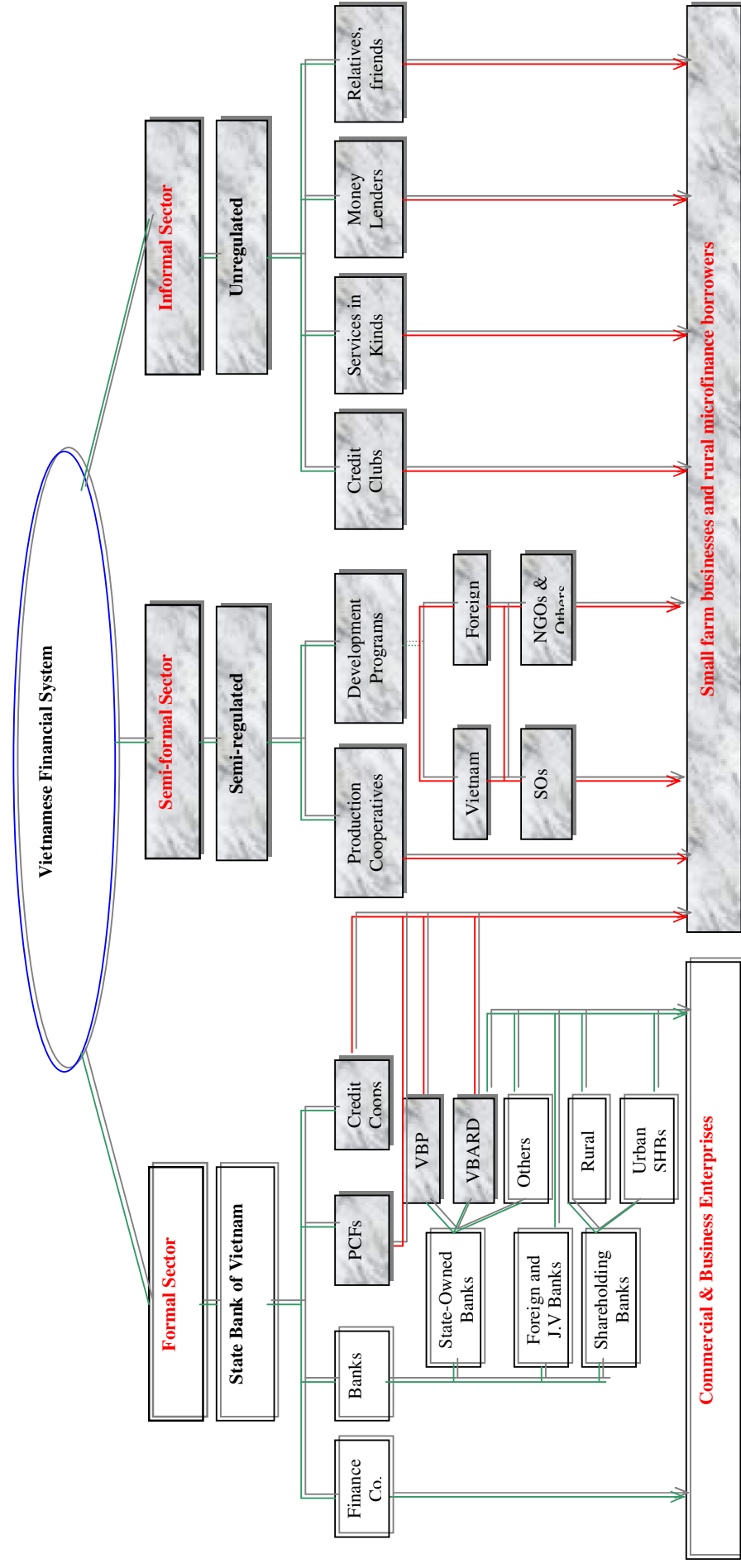
PCFs: Peoples Credit Funds; VBARD: Vietnam Bank for Agriculture and Rural Development; VBP: Vietnam Bank for the Poor; SOs: Social Organization

Source: Microfinance Resource Centre (2001)

4.4 Lending technologies

4.4.1 A brief

As in many other countries, the common methods of lending in rural Vietnam are individual and group lending. It is observed that around 90% of loans are made on the basis of group lending (Table 4.6), but this method of lending in fact works mainly as a mechanism to reduce transaction cost, rather than as a joint-liability mechanism. Most loans are provided by formal institutions on the basis of collateral/guarantee, whether for individual or group lending. The assets listed and used as collateral include land use certificates (LUCs), houses and fixed assets; of which LUCs are the most widely used by rural borrowers. Movable assets such as televisions, bicycles, and animals do not qualify as collateral. Moreover, the administrative procedure requires that the local peoples' committee must certify the list of assets and their total value.

The monthly interest rate charged in the formal sector is on average relatively low, at 1.26%, compared to the 3.95% charged in the informal sector (McCarty, 2001). The average loan size is typically small at around 3.2m VND (around USD180) for formal and semiformal lenders and 1.75m VND (USD110) for informal lenders (Table 4.7). It is worth noting that the VBARD usually grants approximately 50% of the actual loan amount requested by a LIH and the most decisive criteria for lending is the list of assets of the potential borrower. The most commonly accepted form of asset/collateral is the LUC. If a household has not been provided with the LUC, certification by local authorities that the land is free from disputes can be used as a loan guarantee (Dao, 2002).

As a government policy, formal financial institutions offer loans only for the purpose of production (Dao, 2002). In 1998, loans for production capital accounted for about 63.7% of all the loans taken from all sources (McCarty, 2001). Borrowers must present a business

proposal when applying for a loan. Furthermore, although the government requires no collateral for loans of up-to VND 10 million (equivalent to USD 600), households in general are required to provide their LUCs as collateral in order to a secure a loan (Dao, 2002). Business plans and LUCs are therefore important criteria for the screening of applicants (Mishkin, 2001: Ch. 8, pp 187-198) by formal lenders.

There are several factors that affect the lending technologies by the formal MFIs. First, although the interest rate has been liberalised gradually, the low basic interest rates and the government commitment to providing cheap credit to poor households have discouraged formal institutions from extending to more rural households due to high transaction costs creating financial repression (McKinnon, 1973 and Shaw, 1973). Second, the issuance of LUCs has been slow and has not yet been completed in many provinces. This reduces the probability of access of rural households to formal credit. Furthermore, an effective use of LUCs as collateral requires a market for transferring LUCs, which does not exist.

Table 4.6 - Comparison of group and direct lending to farm households of VBARD

Lending method	1995	1998	30/06/2001
Direct lending	1.9%	7.9%	12.4%
Group lending	98.1%	92.1%	87.6%
Total	**100.0%**	**100.0%**	**100.0%**

Source: McCarty (2001)

Table 4.7 - Rural household loans and average loan sizes by sources

Lenders	Average loan size (1,000 VND)
Informal financial sector	**1,752**
1.Money lenders	2,141
2.Relatives	1,861
3.ROSCA and other individuals	1,366
Formal & semi-formal financial sector	**3,209**
4.Private banks and cooperatives	2,230
5.Government banks	3,512
6.Government programs and others	1,547

Source: McCarty (2001)

4.4.2 Individual loan with guarantee and collateral

Following this method, loan approval, and particularly loan size, depends on the collateral provided. The non-collateral loan limit has been increased from 5 million VND to 10 million VND (approximately US$300 and US$600) but however the applicants are usually required to provide the list of assets as collateral and the total value of listed assets must be certified by the Local People Committee. Land use certificates (LUCs) seem to be the most common loan security. In some circumstances such as in cases of applying for loans from the VBP, poor rural households are required to submit a certification from the Local People Committee which guarantees that they are the poor households and eligible to apply for loans.

The administrative procedure for loan disbursement is a time consuming process (see Figure 4.3). The main reason is the lack of branch network at the grassroots levels. For example, in the case of VBARD which has a nationwide branch network, the branch network is extended only at the district levels[8] and thus credit officers, in most cases especially in remote and far communes/villages, have to travel around to deal with loan applications. To make a lending decision, credit officer must consult the loan proposal which is in a form of the so-called "a business plan" and get advice from the Local Committee. Maximum loan amount is also determined by credit officer and is normally equal to 70-80% of the total value of the listed assets (Dao, 2002). However, the final decision is made by the branch director.

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8 The hierarchy is as follows: province, district, commune, village and so on.

Figure 4.3 - Individual Lending Procedure to farmer households by VBARD
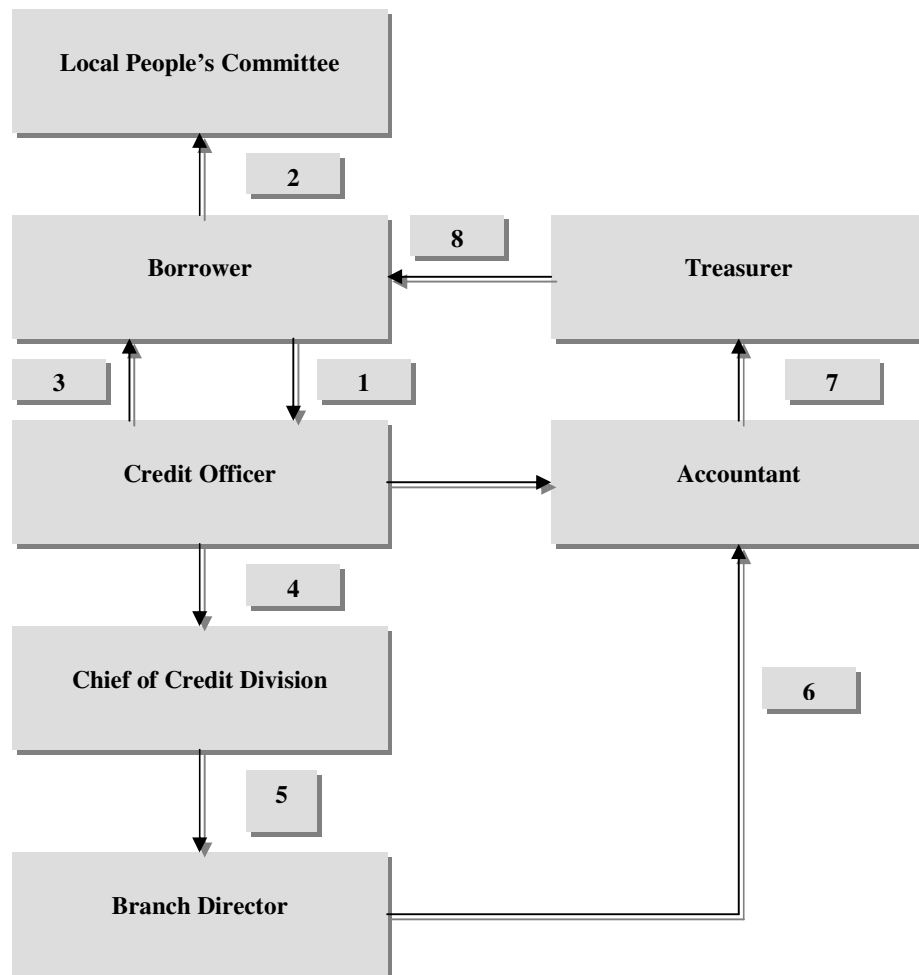
Explanation:

1 - Loan requested by borrower who purchases loan application
2 - Loan Application certified by LPC
3 - Credit Officer reviews loan documents and makes appraisal
4 - CO recommends loan amount, duration and interest rate
5 - Chief of Credit division recommends loan
6 - Approval by Branch Director who sends loan documents to accountant
7 - Accountant completes loan contract and sends to Treasurer
8 - Disbursement made to borrower

Source: *Dao (2002)*

4.4.3 Group lending

Literature has shown that group lending with joint liability is the most well known lending technology used by microfinance institutions around the world (see Chapter 2). It has proved that this lending technology may help to reduce the problems of asymmetric information, the lack of collateral and associated risks through peer selection, monitoring and pressure (Ghatak, 1999, 2000; Aghion and Gollier, 2000). Following this technology, potential borrowers are asked to form borrowing groups. The primary and important feature of borrowing group is the joint-liability which means that all group members are required to repay for their defaulted partners in order to receive further loans.

In Vietnam, it is estimated that about 90% of loans to rural poor households are made through borrowing groups (Dao, 2002). However, most of financial institutions (except from the Credit and Savings Schemes run by international NGOs) are making group loans without clearly-specified joint-liability. Borrowing groups are formed mainly by the SOs. Each borrowing group then must be certified (that they are poor households) by the Local People Committee in order to apply for loans. Borrowing process then continues as it does in individual lending model (see Figure 4.4). Credit officers disperse loans and collect repayments directly from each group member.

The joint-liability property is in fact ignored. The group leader is responsible for the whole group but without any liability specified. His tasks simply are (i) to provide information relating to group's members to credit officers; (ii) to collect loan applications from group members; and (iii) to convince the members to repay their loans. Moreover, due to both the lack of effective procedures and the limited knowledge of management skills, group leaders in many cases cannot manage their groups properly. In cases of default, other group members do not have to pay anything but they may put some pressure on the defaulted

partners in terms of social consequence (e.g. fames). The responsibility of dealing with defaulted borrowers is of the credit officers and the group leader may help persuade them to repay.

As a result, although group lending is popular, it is simply a mechanism to reduce transaction costs rather than a mechanism to reduce default risks. Hence, others may consider this lending technology as *individual lending through groups*. However, this technology is very much different from the normal individual lending because it lends to *certified groups*. By requiring that groups are formed by the SOs and certified by the Local People Committee, the financial institution can exploit information on a group of borrowers and make individual loans to them. The cooperation or partnership with the SOs and the Local People Committee therefore reduces the problems of asymmetric information which is persistent in typical individual lending.

Figure 4.4 - Group Lending Model at the VBARD
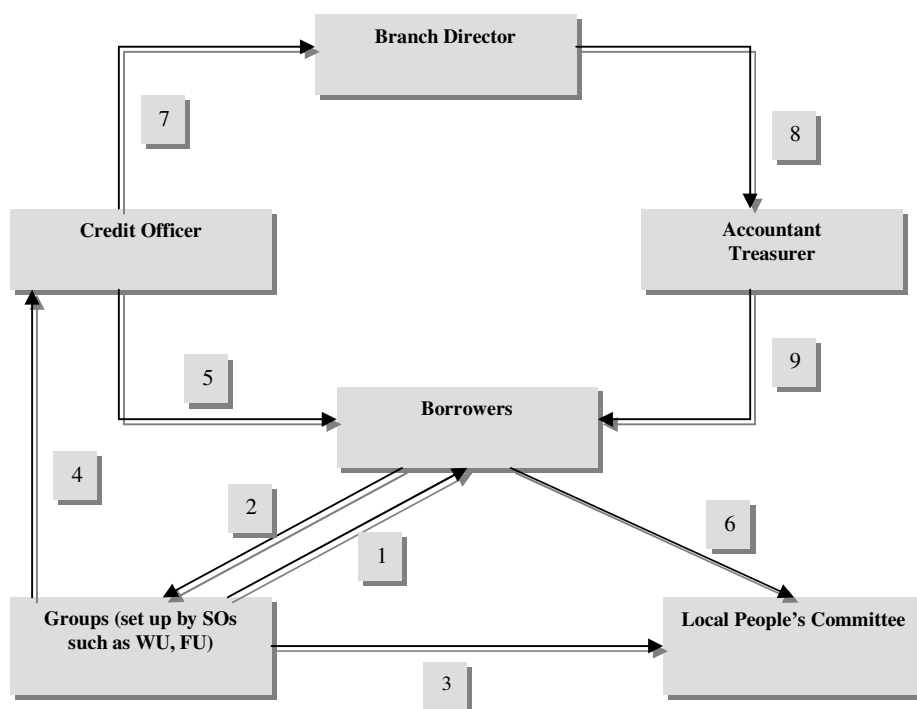
Explanation:

(1) - Group establishment: collecting members (5 – 25 members)
(2) - Appoint group's leader and agree on group's regulations
(3) - Submit to Local People's Committee (LPC) for approval of group establishment.
(4) - Send LPC's approval to VBARD
(5) – Credit officer appraises and reviews loan's documents from group members or borrowers
(6) - Loan's applications of group members are certified by LPC
(7) – Credit officer submits loan applications for approval
(8) – Branch director approve loan applications
(9) – Accountant treasurer issues contracts to borrowers and makes disbursement.

Source: Dao (2002)

4.5 An assessment of microfinance in rural Vietnam

4.5.2 Policy environment

Although the government of Vietnam has followed the poverty reduction approach in microfinance, the major concern is that the government has not yet formulated a specific policy and strategy in favour of microfinance sector. The banking laws and legal framework do not attract various kinds of MFIs to participate in the microfinance market. Most formal MFIs now operate under a legal framework that is common to all banking and credit institutions while it is well recognised that microfinance sector should be treated specially (see Chapter 3). Semi-formal MFIs, especially international NGOs and SOs which are seen as being able to apply the best practices in microfinance, seem to be excluded from providing financial services in real terms.

The absence of a specific policy and strategy in favour of microfinance could lead to a less development in terms of both outreach and interests. Experiences from countries in the region, such as Indonesia, Thailand, and Philippines, where financial markets have been liberalized and microfinance has been defined, and to some extend favoured, could be good lessons to consult. For example, in the mid-1980s, the Philippine government took its first steps toward financial liberalization, which opened the banking industry to greater competition (McGuire, Conroy and Thapa, 1998). The Bangko Sentralng Philipinas (BSP), the central bank, abandoned its restrictive bank entry and branching policies and encouraged the entry of new players in the industry. The BSP removed all restrictions on the opening of branches in rural areas in 1989 and lifted the moratorium on the entry of new banks in 1990 (Benjamin and Seibel, 2000). More significantly, the Philippines adopted a national policy on microfinance in 1997 and, in 2000, included a specific microfinance policy and activities in

the amended general banking law (Gallardo, 2001). As a result, this policy environment enabled the development of network of microfinance with participation of all kinds of MFIs.

Given the current policy framework, the second concern is the policy toward interest rates. The government commitment to providing priory and cheap credit to rural poor households has not recognised the necessity of self-sufficiency for MFIs, especially for the formal sector which is the leader in microfinance, to increase their outreach. Most of formal MFIs cannot cover the high costs of lending to the poor and thus they are unable to achieve financial sustainability (McCarty, 2001; Dao, 2002). For example, in the VBARD system, the average spread between input and output rates as of 30 June 2001 is 0.36% per month while, as calculated by microfinance experts, the sustainable spread requires at about 0.6 to 0.7% per month (Dao, 2002). As a result, most formal MFIs are reluctant to provide microfinance services unless under sponsored projects funded by international development institutions such as the WB, ADB and UNDP.

The difference in interest rate policy and the resulting effect on performance can be seen from the case of Indonesia where there are no restrictions on interest rates, for example the Bank Rakyat Indonesia (BRI). The deregulation of interest rates since 1983-1984 has allowed BRI to set their own interest rates on loans and savings. BRI uses 2.7% per month on flat rate basis (based on initial amount of loan) on its loans. This is an effective rate of 44 % yearly while the average cost of funds is 28% for a gross margin of 16% or the equivalent of 0.98% monthly, much higher than that of 0.36% for the case of VBARD (Table 4.8; Dao, 2001a, 2002).

Table 4.8 - Comparison of interest rates between Vietnam and Indonesia

MFIs	Interest policy	Output rate	Input rate	Spread
VBARD (Vietnam)	Regulated: basic rate of 0.6% per month	~1.05%	~0.69%	0.36%
BRI (Indonesia)	Deregulated since 1983	~ 2.7%	~1.72%	0.98%

Source: Microfinance Resource Center of Vietnam

4.5.3 Lending methods

As seen in previous section, the most common lending technology in Vietnam is the group lending. However, this technology is different from the popular model i.e. Grameen Bank's model. The main advantages of the group lending in Vietnam include: (i) because groups are established normally through SOs, such as the VWU and VFU, and are certified by the Local People Committee (LPC), it ensures group sustainability and makes it more legal; (ii) because loan applications are certified by the LPC, it helps reduce the persistent risk resulting from the problem of asymmetric information, since the LPC has better information about borrowers than the MFIs; and (iii) because group members are required to provide collateral, such as a Land Use Certificate, in order to obtain the loans, it insures MFIs against default risks that may occur.

Table 4.9 - Comparison of group lending methods

Criteria for comparison	The recent group lending model of VBARD	The group lending models in the other countries
Establishers	Women Union, Farmers' Association, Voluntarily	Voluntarily
Administrative requirements	Allowed by the local People's Committee	No requirement
Requirements relating to loan application	Certified by Local People's Committee	No requirement
Collateral requirements	Required	Not required
Disbursement	Direct to each members	Through the group's leader
Savings	Not required	Required
Collection	Direct from each members	Through the group's leader
Combined activities	Not available	Available

Source: Dao (2002)

A comparison between group lending in VBARD and the popular Grameen's model is presented in Table 4.9. The disadvantages of the group lending as compared with the famous Grameen Bank's model are significant. Because of the requirements of group establishment through social organizations and allowed by the LPC, many borrowers are excluded from microfinance services. This also increases the problem of administrative procedures, which basically take time and result in high non-financial costs for borrowers. Moreover, the

requirement of collateral seems not to be relevant for microfinance borrowers while the role of joint liability, which can serve as collateral and is the key factor explaining success of group lending, is generally ignored. The credit officers in fact work directly with group members.

4.5.4 Microfinance institutions

Formal sector

Most formal MFIs in Vietnam such as VBARD and VBP are state owned organizations. The main strengths of this group as compared with other MFIs are that they have a wide national network with good relations to the Local People Committee, which is an important player in microfinance in Vietnam and a vehicle of local information, and are professional in banking. This explains why formal microfinance accounts for the largest portion of microfinance in Vietnam and also has a better performance. However, the network of formal MFIs in the case of VBARD or VBA just outreaches to the district level but not the village and commune level, which is seen better to serve the LIHs (see Chapter 5, 6, 7).

The importance of expanding branch network can be learnt from the case of the BRI in Indonesia which specifies micro banking division (known as the BRI Banking Unit System) and offers savings and credit products at the grassroots level. The extended network of BRI's Unit banking system is one of its greatest strengths with 3,703 units at the grassroots level. Each BRI Unit operates as a separate *profit centre* having its own balance sheet and profit and loss statements. This concept is at the heart of the BRI Unit system and it enables BRI to implement performance-based incentive programs and facilitates the implementation of monitoring tools. As a result, the Micro Banking division was the most profitable and even supports the other operations of the Bank (McGuire, Conroy and Thapa, 1998).

While the success of extended network from BRI is a critical lesson to learn, another weakness of formal MFIs in Vietnam is that they depend much on relations with other organizations, such as Social Organizations (SOs) and the Local People Committee (LPC), which increases the administrative costs to borrowers. Although this feature is also the strength because it reduces the cost of screening borrowers, it does reflect the consequence of the central planning economy. The complicated hierarchy in lending procedure obviously increases the non-financial costs and likely leads to negative behaviours by the responsible persons. A summary of strengths and weaknesses of individual formal MFIs is presented in Table 4.10.

Table 4.10 - Strengths and Weaknesses of Formal Financial Institutions

Organization	Strengths	Weaknesses
VBARD	• Largest network to provide credit service in rural area. • Willingness to improve outreach by following collateral free group lending up to a ceiling of VND5 million, inter-commune transactions offices and mobile banking operations.	• Unofficial fees raise the cost of borrowing for clients. • Willingness to improve outreach comes from Government rather than from VBARD's strategy. • Not targeting rural LIHs. • Many rural areas still not covered. • Mixed commercial credit with government subsidized programs.
VBP	• Focus lending to the rural poor. • Impressive outreach achieved in a short time. • Good relationship with local government.	• Subsidized credit. • No financial sustainability. • Deeply depend on VBARD (staff, offices).
PCFs	• Market approach credit service • Owned by its members • Focus on local savings mobilization. • Commune-based credit service.	• Most loans are short-term. • Initial growth is focused on richer areas and richer clients.

Source: Dao (2002)

Semi-formal and informal sector

Although they do not have the nation-wide network and they do not have professional skills on microfinance as compared with the formal group, semi and informal microfinance have the advantage of focusing on the poor as targeted customers. Furthermore, semi-formal such as International NGOs normally bring experiences from abroad and thus ensure the best

common practices from the world of microfinance. Most studies have shown that NGOs follow the best practices in microfinance, especially in group lending and social intermediation (Dao, 2002; McCarty, 2001). The very famous case of success in Vietnam is the CIDSE[9], which launched its microfinance schemes in cooperation with the VWU and provided financial services relevant to the group lending model known as TYM (TYM - Tao Yeu May- I Love You) and combined with regular trainings and meetings.

The main weakness of these groups, however, is that they are excluded from the legal framework to provide financial services. This is obvious, of course, for informal sector. For semi formal microfinance, financial services cannot be provided as the main activity but only combined with other activities. This is different from other countries, such as the Philippines or Indonesia, where competition is encouraged and entry barriers to financial markets are removed. In other words, semi formal microfinance institutions in Vietnam cannot perform as financial institutions in real terms.

The other weakness is the high associated costs. For the semi-formal microfinance, this is because they don't have their own networks. As a result, most semi-formal microfinance institutions are based on subsidised sources of funding. For informal microfinance lenders, they normally charge very high costs to borrowers as a solution to problems of asymmetric information (McCarty, 2001). The key strengths and weaknesses of semi formal and informal microfinance institutions are summarised in Table 4.11.

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9 International Cooperation for Development and Solidarity (CIDSE) is currently operating as an International NGO providing microfinance schemes in cooperation with the VWU. The author visited and worked with this credit program in 2001.

Table 4.11 - Strengths and Weaknesses of Semi- and Informal MFIs

Organization	Strengths	Weaknesses
National Programs	• National network. • Strong government backing and support from local government • Combine credit provision with technical assistance.	• Subsidized credit. • No financial sustainability. • No savings mobilization. • Inadequate skills, staffing for credit service. • Not focus on LIHs. • Political and social target over economic efficiency.
Social Organizations	• Large national networks reaching to the commune and village levels. • Have tried different micro finance schemes. • Willingness and eager to mass mobilization through credit service. • Loan repayment is higher than other formal credit schemes. • Focus on poor members.	• No function of credit provision. • No institutional sustainability in term of financial service. • Lack of skills and staff for large-scale intervention in savings and credit. • Insufficient understanding of financial sustainability of credit schemes; Depending on outside support.
International NGOs	• Effective in reaching the poor. • Target customers are clearly identified. • Market approach. • Have good experience and knowledge of micro finance schemes. • Appropriate technical assistance. • Focus on sustainability and self-management of grassroots poor.	• High operating cost. • Isolated and small coverage. • Low financial fund. Dependent on subsidised funds. • Due to small scope, cannot reach sustainability.
Informal Financial services	• Convenient, simple and local. • Market interest approach. • Lender and borrowers know each other well. • Good local savings mobilization. • Independent operating.	• High cost to the poor. • Very poor are excluded. • Loan in kind at high interest rate. • Most loans are small and short-term. • Isolated operation. • Are not encouraged to become formal credit organization.

Source: Dao (2002)

4.5.1 Capacity to outreach

The capacity to outreach depends on self-financial sufficiency while self-financial sufficiency depends on the ability to charge the *sustainable interest rates* that cover all necessary costs (see Chapter 3). In rural Vietnam, formal financial institutions that are providing financial services to the LIHs are regulated by one or more of the following laws: The Law on Cooperatives, The Law on the State Bank of Vietnam, and The Law on Credit

Institutions. Within the current context of legal framework and policy, the clearly seen constraint for formal MFIs to charge sustainable interest rate is the interest rate policy.

Although the government, through SBV, has changed its interest rate policy with the shift from lending rate ceiling (e.g. 1.2 per month in 1999) to a base interest rate policy, it still commits and requires the formal MFIs (such as the VBP-Policy Bank) to provide prior or cheap credit to the rural poor households and under governmental directions. As a result, this seriously limits the formal MFIs to attain profitability and financial self-sufficiency. The capacity to expand outreach and attain financial sustainability is therefore dependent on the ability to find innovative ways to provide financial services at lower costs.

The *semi-formal* schemes are on the other side. Except from the credit schemes under National Programs, semi-formal schemes such as those run by NGOs and SOs are not regulated by the banking laws and able to set interest rates that cover their operating costs. Of the various social organizations and government programs involved in microfinance activities, the Vietnam Women Unions (VWU) and the Vietnam Farmers Union (VFU) have been, so far, the most experienced. VWU has, through its own Saving & Credit (S&C) schemes, provided loans to 100,000 households and assisted around 641,307 members in accessing credit at VBARD or VBP. VFU is thought to have somewhat less in the way of numbers but still an appreciable loan outreach. A further 67,000 people have had the opportunity to borrow and/or save through the 60 or so NGO/INGO C&S schemes that have operated in Vietnam (Dao, 2001, 2002).

However, the major constraint for semi-formal MFIs to expand outreach and attain sustainability is that they are not considered to be financial institutions so that they are not allowed to participate in financial intermediation in real terms, such as savings mobilization. Furthermore, the banking law issued in late 1998 has made it obligatory that they must

comply with certain requirements (including capitalization) in order to conduct *banking activities*. As a result, they cannot expand their activities on a large scale and in most cases they are funded or subsidized from government or donor's funds. This indicates that semi-formal schemes are not sustainable are also cannot be able to increase their capacity to outreach significantly if there is no change in the banking laws.

4.6 Towards a sustainable microfinance

The above analysis reveals that the formal financial sector has been the leader in microfinance markets in Vietnam and that in general microfinance in Vietnam has been far from sustainability. In order to attain a sustainable microfinance and contribute to the poverty reduction and economic development, there are some major changes that should be made. These changes should focus on the issues of government policies, business strategies, lending methods and capacity of MFIs. The major constraint, which governs all the above issues, is the perception of microfinance (see Chapter 3). The main concern therefore should be what is the appropriate approach to microfinance in Vietnam and how can we realize that approach?

We suggest that the mixed approach, which is proposed in Chapter 3, could be more appropriate for Vietnam at this period. The foremost concern in following this approach is the balance between financial and social goal and it is obviously not easy to know where the balance should lie. However, we may have acknowledged that the current microfinance framework is not good for a sustainable microfinance and that subsidised microfinance has lowered the financial sustainability of MFIs on a permanent basis. Our recommendations below are therefore based on the view that changes should be made gradually to remove subsidy and, instead, the government should make more supports in terms of creating a sound financial infrastructure specified for microfinance and investing more in social and informational intermediation.

4.6.1 Changing approach to microfinance

Literature shows that microfinance under poverty reduction approach which concentrates on reducing poverty reduction through subsidized credit programs cannot reach the poor households on a sustainable basis (Gonzalez Vega, 2003; Robinson, 2001). The application of pure financial systems approach which emphasizes the financial sustainability may also result in the limited development of microfinance i.e. the exclusion of the very poor. We therefore suggest that a mixed approach to microfinance could be a good option and recommend that the Vietnamese government and participating MFIs should change their perception in order to attain a sustainable microfinance.   Following this approach, microfinance institutions are encouraged to follow the financial systems approach i.e. to become commercial microfinance institutions while the government and donor supports are used to create a sound financial infrastructure and informational intermediation and to promote social intermediation to the poor households.

However, we believe that changing perception of microfinance in general is not an easy thought and it is a time-consuming process. First, the general financial infrastructure should be enhanced and informational intermediation should be developed. The Asian Development Bank has been advising that MFIs can develop sustainable commercial services on a permanent basis and expand their scope of operations and outreach only if they operate within an appropriate financial infrastructure, such as information systems and training facilities (Ashok, 2001). The legal framework and supervision and regulation of MFIs, including self-regulation and performance standards for MFIs, therefore need to be set up to facilitate sound growth and improve the capacity of MFIs to leverage funds in the market and provide competition. Legal barriers preventing banks from establishing business relationships

with informal or semiformal bodies, such as community-based organizations or self-help groups, will need to be removed.

Second, commitment to providing cheap credit to poor households should be removed. The literature review has shown that the poor can pay high interest rates (Chapter 3). The case of BRI Indonesia is a very good example to learn about how MFI can be profitable while it improves its outreach. Hence, a change in interest rate policy in microfinance should be made. The current commitment to providing cheap credit to the poor households has not allowed formal MFIs to cover all costs including market cost of capital, operational costs, inflation, loan losses and a reasonable profit. The government should loosen this commitment by letting the formal MFIs to determine their own interest rates, as the normal commercial financial institutions do, in lending to poor households.

Third, a legal framework should be set up to recognise the role of various kinds of MFIs, especially the semi-formal MFIs. The lack of a specific legal framework has made it unattractive for MFIs to provide their services in effective and efficient ways. Most semi-MFIs long for a policy that specifies their allowed financial activities. Also, the legal status of "borrowing group" is not specified in legislation. MFIs are therefore not allowed to lend to households through groups as one legal entity. The government should promptly issue separate regulations dedicated solely to microfinance, creating a sound legal framework for the operation of microfinance institutions and, because the most used collateral in microfinance is the Land Use Certificate, the government should aggressively promote the process of land-use certificate (LUCs) issuance so that more LIHs can use LUCs to get access to MFIs.

Forth, as in normal markets, microfinance markets should be competitive. As shown in the above section, the Philippines has encouraged competition in the banking industry and

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has been seen to create a fair playing field for financial institutions. The government should therefore encourage competition in the provision of rural financial services to improve the quality of delivery. By simplifying registration and lowering capital requirements, more semi-formal S&C schemes could become credit cooperatives.

Fifth, viability is also critical for expanding outreach in order to achieve the primary objective of poverty reduction. The institutional development support from the government, to ensure viability, needs to encompass (i) ownership and governance, (ii) diversified products and services, (iii) management information systems and accounting policies and practices, (iv) management of portfolio quality and growth, (v) systems and procedures and financial technology for reducing transaction costs, and (vi) training facilities (Ashok, 2001). This is essential to Vietnam since the residual of the central planning economy remains imprinted on the economy.

Finally, microfinance services cannot become effective either as a tool for poverty reduction and hunger alleviation or as a financial intermediation, without social investment or intermediation. This is also regarded as a better solution to subsidised microfinance since it is seen as giving the poor "a row, not a fish". So, the government should find ways and means to strengthen the capacity of rural households in general and LIHs in particular. SOs and extension services of various government ministries are mandated to do this and more financial support from the government would enable them to intensify their efforts. Experience from many countries has suggested systemic and regular training for both MFIs staff and borrowers; the establishment of SME promoting organizations etc should be done in the first period.

4.6.2 Commercialization of microfinance institutions

Analysis in Chapter 3 shows that in order to provide financial services to the poor on a sustainable basis, microfinance institutions should develop towards commercial microfinance institutions. The progress of commercialization (see Chapter 3) requires each MFI, at first, to apply commercial finance principles in microfinance. Currently most formal MFIs provide financial services to the poor on subsidised basis which makes them unable to be self-sufficiency. Thus, the priory action for MFIs should be to provide financial services in a way that covers all operating costs. Lessons from the success of NGOs should be learnt (see Box 4.2 and 4.3). This however is highly dependent on the policy environment, especially financial infrastructure.

A wide national network of branches has been the strength of formal MFIs, but it covers only at district level and thus this should be further developed. The extension of branch network at commune and village level, in forms of village and commune banking networks with a wider scope, as learnt from the case of BRI Indonesia and initial success from the VBARD mobile banking model (see Box 4.1), is necessary to ensure sustainable outreach and development. Besides, the coordination or partnership with social organizations and Local People Committee should be maintained and strengthened, as they are necessary in a group lending setting and in mobile banking system.

As a result of the high transaction fixed costs persistent in microfinance, strategies towards specialisation in microfinance could be a solution to increase profitability. MFIs should also be aware of the necessity of intensification and innovation in providing microfinance services. Besides, the strategies that emphasise community development should be employed, as they are more appropriate to the poor, especially in rural areas. Social intermediation could also be conducted by MFIs via government and donor supports (but

should be separated from financial intermediation) to enable LIHs to benefit from financial

services.

Box 4.2 – The Mobile Banking Model at VBARD

VBARD's Mobile Banking Model

The concept of mobile banking implies an extension of branch network to commune and village level. However, mobile banking does not require an establishment of a physical branch but instead it requires each credit officer to travel and work on behalf of the bank at commune and village level. The mobile banking reduces the cost of access for rural poor households, especially who live in the far and remote areas. The mobile banking model at VBARD is integrated with group lending and with supports from the SOS and the LPCs.

After the first four month of use, the mobile banking system has shown some achievements. For example, the number of loans disbursed has been increased at the average rate of 551 loans per month; the number of loans collected has increased at the average rate of 512 loans per month; number of savings, on average, has increased at 206 savings per months. Overall, mobile banking system has made an important contribution to improve the outreach of VBARD to its clients. The use of mobile banking system also improves the financial results for the VBARD's branches. The net income that each mobile banking unit contributes to the branch is at VND 2.43 million per month.

Criteria	Unit	Averaged increase 01 mobile vehicle /month
I. Saving Mobilization		
1.1. Number of mobilised savings	savings	206
1.2. Total amount of savings	million VND	1,440
1.3. Total points of mobilising savings	point	3
II. Disbursement & loan collection		
2.1. Number of loans disbursed	loan	551
2.2. Total amount disbursed	million VND	4,234
2.3. Number of loans collected	loan	512
2.4. Total amount collected	million VND	2,925
2.5. Total points for disbursement/collection of loans	point	28
III. Financial results		
3.1. Total income/month	million VND	15.58
3.2. Total expenditure/month	million VND	13.15
Net income	million VND	2.43

Source: VBARD's report on Four Month Operation of Mobile Banking Vehicles, Dao (2001)

<u>Lending technology</u>

We recognise that currently there is no clear distinction between individual lending and group lending technology in Vietnam. However, in our ideas, the important thing should be to find an efficient and effective way to expand outreach to the poor. In this sense, the cooperation with LPC and SOs is a good way to exploit local information on the potential borrowers, but MFIs should ensure to reduce any unnecessary non-financial costs relating to this process. The cooperation with NGOs could be also a good option because it can exploit the wide network of formal financial sector and the experience of NGOs in dealing with poor households (see Box 4.2 and 4.3).

With respect to group lending technology, it is clear that the group lending method should be applied relevant to the best international practices in group lending around the world to enhance the role of joint-liability in order to benefit from the economies of scale and risk reduction. By doing so, it ensures that the group lending in Vietnam benefits MFIS in two ways: (i) it exploit information on potential borrowers at lower costs and (ii) it ensures peer selection, peer monitoring and peer pressure (see Chapter 2; Box 4.2 and 4.3).

MFIs should also learn from experience that the lending method of regular instalments with prior small savings or compensating balance (see Chapter 2; Box 4.2 and 4.3) could be of help. This method is especially useful when an integrated loan repayment incentive mechanism is initiated. Research in lending to the poor in regional countries, for example through NGO schemes, shows that the poor repay better in instalments rather than in a full lump-sum amount at the end. Repayment rates using an instalment schedule are usually very high at around 95%. However, it should be noted that the incentive of getting larger loans in the next periods may result in moral hazard problem if failed borrowers borrow "hot money",

repay and get higher loan which can pay for the "hot money" loan and make some profit. This may cause a serious problem of delinquency.

Coupled with the lending method is the innovation in methods of saving mobilization, which ensures the other side of sustainable microfinance. Incentives for savers such as lotteries and prizes have been very successful in increasing savings in other developing countries and should be considered. The lotteries could be structured in a way to promote demand deposits as well as longer-term deposits. Savings mobilization efforts must be supported by publicity with emphasis on the ease of access, simplicity, security of deposited sums, ease of withdrawal when needed and lotteries.

Other resources

Sustainable microfinance cannot be achieved without the strengthened capacity of MFIs. The most important feature of capacity is human resources, with professional skills and knowledge of microfinance borrowers. Credit officers and management should be sensitized to microfinance, best international practices in general, and more specifically to the fact that microfinance borrowers can save, borrow and repay well. Factual data and real life experience needs to be shared in order to change the lack of faith in dealing with LIH, a fact clearly demonstrated during the research.

MFIs also should have a priority in developing an information system which helps not only the MFIs to work more efficiently at the operational level, but would also gives more confidence and a much better understanding to donors and external consultants. With increased transparency, more practical and applicable recommendations can be made and the future development of MFIs could be enhanced. The subsidy of government and donors could be of help on these resources.

Box 4.3 – Joint Liability Lending through Partnership with Compulsory Savings

The project

The Forest Protection and Water Resource Management (FPWRM) project in Nghe An province, which is financially supported by the Demark Government has been successful in developing the Community Credit and Savings Fund (CCSF). The purpose of this project is to establish the sustainable CCSFs at the village level to help poor households and women enhance their living conditions. The project seeks partnership between the Policy Bank, the Local People Committee and the Women Union.

Establishment of CCSF

Groups of 10-15 women are established and certified by the Women Union and the Local People Committee. The Policy Bank uses funds from the project and lend to these self-managed groups but these funds are at first managed by the Fund Management Unit (FMU) at commune level. Each group then develops itself as a CCSF. Each member is required to save a small amount (VND5000 i.e. US$0.3) before the fund starts.

Group lending and saving technology

- Each group votes for a group leader who is responsible for collecting loan applications from the group and sending these applications to the FMU. The FMU then lends directly to the members of group. The group leader is also responsible to collect repayment and savings and send to the FMU.
- Each group member can borrow at a certain time either a short-term (6 month) loan of VND650,000 (US$40) or a medium-term (24 month) loan of 3,050,000 (US$180). The interest rate is charged on the basis of full-cost recovery and at 0.7% a month for both kinds of loans. However, this interest rate does not consider the market-rate of fund (i.e. subsidy).
- Short-loan repayment of interests and principal is at the end of the period. Medium loan payment of interests is paid monthly and the principal is at the end of the period.
- In case of defaults, all group members are required to lend to (rather than to pay for) the defaulted members to repay to the FMU.
- Each member is required to provide a monthly compulsory saving of VND5000 during the period of loan without interest rate. The voluntary savings are encouraged and the interest rate is paid at 0.4% a month. If the accumulated savings reach the amount of VND200,000, the excess amount will be considered as voluntary savings.
- Group members are required to attend monthly meeting and trainings.

Results

All the CCSFs are reported to have a 100% repayment rate. 100% members report that loans have helped them to enhance their lives in various ways such as investing in small businesses, education for children and smoothing consumption. Especially, all members are satisfy with the saving scheme which helps them to establish a saving habit and get a "lump-sum" money when they need it.

Source: Interviews with Ms. Dinh Thi Minh Thai – Project Coordinator and Credit Officers from Policy Bank during a Microfinance Training Course organized by the Bourne Griffith (Vietnam) in July 2004

Box 4.4 – Joint Liability Lending with Compulsory Savings

The project

The Integrated Child Nutrition Project (ICNP) aims at increasing family's income through credit activities; enhancing knowledge, working experience, managing capability and saving conscious in families; and enhancing managing capability of Women Union at all levels.

Group lending and saving technology

- Groups of 5 women are formed voluntarily and certified by the Women Union and Local People Committee. Group leader is voted by group members and is responsible for monitoring and supporting group members in repayment, group meeting and reporting to the project management board at commune level. All groups are required to attend the periodic group meetings.

- Loans and savings schemes are implemented through group and the whole group must acts as an identity. No further loans for the whole group if any of the group members fails to meet the project requirements.

- In first round, only 3 group members are provided with loan while the other 2 members wait for the next reimbursement (using collected loan repayment).

- Loans must be used for investment production activities and income generation.

- The loan size for the first borrowing period depends on the needs but at maximum of VND700,000 (US$42). From the second loan borrowing period, the loan size increases to VND 1,500,000 at maximum conditional on the previous success of repayment.

- Duration: Maximum 12 months

- The loan repayment is on instalment basis which includes payment of principal and interest. Interest must be paid monthly and principal is paid quarterly. The repayment is on flat basis of the initial loan capital

- The interest rate is charged at 1.5% per month and covers all the necessary costs including the market adjusted cost of funds.

- Compulsory savings of VND 5,000 a month are required before a member can start borrowing and this saving is required during the period of borrowing.

- Voluntary savings are encouraged and paid at the interest rate of 0.8% per month.

Results

The repayment rate is reported at 100% and all groups members benefit from the credit and savings services through income generation activities, business skills and income management.

Source: Interview with Mr. Nguyen Xuan Canh – Project Microfinance Expert

4.7 Conclusion

In this chapter, we have analysed the performance of microfinance in rural Vietnam. We emphasize that microfinance has been seen as important to the strategy of poverty reduction and economic growth by the Vietnamese Government. The performance review has shown that, although it has achieved major success in outreaching to the poor, microfinance

has not been sustainable. The lack of a legal framework which prevents formal MFIs from being financially self-sufficient and semi-formal MFIs from participating more in microfinance has been the main constraint to a sustainable microfinance. The other constraints include the lending technologies which are not relevant to the best practices in microfinance around the world and the limited institutional network which cannot reach the poor at the grassroots levels.

In order to attain a sustainable microfinance, we suggest that a perception towards a mixed approach in providing financial services to the poor should be targeted. The government and donors should remove any direct subsidy to financial services, but instead provide supports in creating a sound financial infrastructure and investing more in social and informational intermediation. Specifically, the government may establish supporting agencies such as the credit rating office, credit scoring, credit bureaus .etc which are currently absent. The government and donors may support to improve roads, deliver health care and education services, and so on, which help to increase the poor' ability to gain access and make use of financial services.

Another aspect of changing approach to microfinance requires a commercialization of microfinance institutions. By doing so, microfinance institutions in Vietnam should apply market principles in proving financial services to the poor in order to be self-sufficient at the first stage. In this context, innovations in financial technologies are necessary. More specifically, successful experiences from the village model banking in BRI and group lending model from NGOs in Vietnam should be learnt. Besides, cooperation or partnership with SOs and LPC is also a good option to reduce the costs of reaching the poor.

Our recommendation of changing towards a mixed approach is however constrained by the aim of reaching the very poor and the impact of credit on poverty reduction. If the

poverty reduction approach can effectively reach the very poor (i.e. the LIHs) and the impact is found significantly positive, one may think that the poverty reduction approach is acceptable at the cost of microfinance institutions which are not sustainable. Hence, further analyses of credit allocation and the impact of credit on poverty reduction are necessary to attain a sufficient condition for our recommendation.

In the next chapters, we will show that the better-off households, rather than the poorer households, are those who receive formal credit (Chapter 5). Also, the impact of credit on household poverty reduction is significantly positive but small (Chapter 6, 7). These results suggest that poverty reduction approach which aims at the poorest of the poor fails to realize its target in rural Vietnam. Furthermore, the small degree of impact implies that cheap credit cannot be the only solution if the government commits to improving the life of the rural poor. These findings strengthen our belief that the poverty reduction approach should be replaced.

CHAPTER 5

WHO GETS FORMAL CREDIT IN RURAL VIETNAM?

5.1 Introduction

Is the poverty reduction approach that the government has been following appropriate and successful in reaching the poor in rural Vietnam? The answer to this question is important because it reveals the effectiveness of the subsidy policy in the strategy of rural development and poverty reduction. The analysis in the previous chapter has shown that the current framework has not encouraged microfinance institutions to attain sustainability and thus if the answer to the above question is negative, it is more reliable to conclude that the poverty reduction approach should be removed. Our view is clear that if the target of reaching the very poor cannot be achieved, it is the time to reconsider the poverty reduction approach.

The main purpose of this chapter is therefore to investigate how credit is distributed to the poor households in rural areas by the formal sector. By doing so, we look at the determinants of household borrowing and the determinants of credit rationing by the formal sector. Briefly, we find that education, savings, the area devoted to farming and the availability of formal credit are important determinants of both household borrowing from the formal sector and credit rationing by the formal sector. All of these factors, to some extend, reveal that the better-off households in rural Vietnam are more likely to receive credit from the formal sector. Our findings therefore support the view that poverty reduction approach has failed to expand outreach to the poorest of the poor in rural Vietnam. Or at the least, the findings provide some suggestions in order to help the government and formal financial institutions improve their outreach to the poor.

The rest of this chapter is organised as follows. In the next section, we briefly review the literature that is relevant to this study. In section 5.3, we present the econometric model and the hypotheses. Section 5.4 discusses the characteristics of the household survey data that we use in this chapter. The results of the estimation and testing are presented in section 5.5, along with an analysis of the results. The final section concludes with a summary of findings and draws policy conclusion.

5.2 Review of relevant literature

A considerable amount of research has been devoted to understanding the functioning of credit markets, credit market imperfections and credit rationing (see Chapter 2 and also: Stiglitz and Weiss, 1981; de Meza and Webb, 1987; Bester, 1985, 1987; Swank, 1996; Amano, 1999; Hellmann and Stiglitz, 2000). Credit rationing is broadly regarded as an excess demand for bank loans caused by the asymmetry of information on investment projects between banks and borrowers. Credit rationing occurs if some borrowers have limited access to credit. It thus affects the number of borrowers who receive credit. The other form of rationing occurs when some borrowers are rationed in the amount of credit i.e. receive less than the amount of credit they demanded.

There has also been a focus on the analysis of rural credit markets (Meyer and Nagarajan, 1992, 2000) which are widely believed to be characterised by high lending transaction costs and lack of collateral when farmers do not own their own land; resulting in high interest rates being charged to borrowers. A combination of the above raises a very interesting research question: How do lenders in rural credit markets select borrowers and how much do they lend?

A number of recent papers have analysed such questions (Kochar, 1997; Zeller, 1994; Pham and Izumita, 2002, Ranjula, 2002). Their approaches and findings vary and differ,

largely due to inadequate data. Zeller (1994) sees credit rationing as a function of access to the market conditional on the demand function of borrowers and finds that both formal and informal lenders ration loan supply. They look at total household wealth and the leverage ratio of households. Pham and Izumita (2002) assume an excess demand for credit in the rural markets and thus see credit rationing as a function of access to the market or external credit rationing. They find that reputation, the dependence ratio and the amount of credit demanded are determinants of credit rationing. Their results imply that poorer households are more likely to be rationed.

Another question that one may also pose is: what determines the amount of credit that a representative household receives? Theoretically, the demand and supply of credit determines the amount of credit and thus the demand and supply functions need to be separately identified (Yadav et all., 1992; Pitt and Khandker, 1996). The problem of simultaneous functions leaves the construction of variables a critical issue for the consistent estimate of the household credit functions. Various approaches have been proposed to resolve this issue. For example, based on household and province attributes, Pham and Izumita (2002) construct variables that proxy for both demand and supply. They find that farming area and total value of livestock are decisive determinants of household borrowing from the formal sector. Others, such as Pitt and Khander (1996), Khandker (2003) and Khandker and Faraqee (2003), consider household characteristics (such as age and education), village fixed effects (such as prices of selected products) and the competition characteristics (such as characteristics of competitor villages) as the factors of household borrowing and find education and land owned are the core factors.

In the context of rural Vietnam, there has been a relatively little work (Pham and Izumita, 2002) on the issues above: determinants of household credit access and determinants

of household borrowing. This chapter therefore expects to contribute to the literature by providing an empirical analysis of the rural credit market in Vietnam. The chapter concentrates on formal credit[10], as this plays a dominant role in Vietnam (Dao, 2002). The purpose of this chapter is to analyse: (i) the determinants of formal credit access in rural Vietnam and (ii) why and how formal lenders ration credit.

5.3 The model

Consider three sets of agents in the rural credit market: households (potential borrowers), formal lenders (such as VBARD) and informal lenders (such as money lenders, relatives, friends and ROSCAs). Of the households, there are borrowing and non-borrowing households. Households may borrow from formal lenders, informal lenders or both in order to finance their economic activities[11]. Households have a demand for credit and apply for loans. The demand for credit depends on household attributes and the village characteristics in which households are living in. Lenders then screen the applications and decide to whom to offer loans and how much to offer (as interest rate is fixed). As credit rationing is typical in credit markets (Stiglitz and Weiss, 1981), especially under financial repression, some applicants receive loans, the others are rejected, and yet others receive smaller loans than they desire. There are thus two major questions that need to be answered: (i) What are the

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10 Typically, formal and semi-formal financial sectors in Vietnam provide credit to rural households for the specific purposes of rural development and/or poverty reduction at cheaper interest rates. Thus, these sectors basically employ their own criteria in selecting and screening borrowers who are eligible to receive loans from them. For this reason, we include the semi-formal sector into the formal sector in our study of credit exclusion. Thus the *so-called formal* sector in this chapter and in chapters 6, 7 includes banks, credit and savings institutions, microfinance programs by NGOs, national programs etc.

11 We imply both production and consumption. However, we assume that formal credit is mainly for the purpose of small business and farm production.

determinants of the credit supply to households?; and (ii) What are the determinants of credit rationing in the rural credit market?;

5.3.1 The determinants of credit

If we consider only households with loans as those who have a demand for credit, it may lead to sample selection bias because it is possible that households without loans may have a demand for credit but have been excluded. However, we ignore the problem that some households receive less credit than they demanded at the pre-set interest rate i.e. they were also rationed but not in the form of exclusion. In other words, to control for sample selection bias, we adopt the financial exclusion form of credit rationing. Furthermore, the amount of credit supplied to a household, which a researcher can observe, is the result of the interaction between demand and supply. The difficulty is that the factors, which are likely to affect household demand for credit, also are likely to affect supply of credit. For example, ownership of farming land may positively affect household demand for credit while it may also positively affect the supply of credit if the lenders regard it to be collateral in rural market (e.g. in the case of VBARD). This implies that credit supply and demand curves cannot be easily identified. Thus, the determinants of a credit model, rather than demand and supply separately, are estimated as follows using Tobit regression:

$$y = y_i^* = \begin{cases} f(x_i, z_i) & \textit{if } y_i^* > 0 \\ 0 & \textit{if } y_i^* \leq 0 \end{cases} \qquad (5.1)$$

where y_i represents the amount of credit that one household receives from source i which equals $f(x_i)$ if household has loans and 0 otherwise (i = source of credit such as formal, informal or total credit etc); x_i is a vector of explanatory variables which reflect household and local market characteristics; and z_i is a vector of additional explanatory variables proxied for supply side of credit. Household characteristics include natural attributes (e.g. gender and

age .etc) and capital assets (e.g. education years, land ownership and savings .etc). Location characteristics represent distance-comparative-effects and comprise of socio-economic factors such as prices of selected common goods and services (e.g. rice, pork and sewing .etc), the mean of local household characteristics (e.g. average of education years in commune).

One may question whether the household's income/expenditure may be good to proxy for household's wealth, which is very likely to affect the amount of credit that a household may receive. This question is reasonable but we do not have the data to analyze this. What we observe as the household's income or expenditure is actually at the end of the period i.e. after the borrowing/supplying decision has been made. Therefore, it may not be appropriate to proxy for the household's wealth at the time of borrowing.

The supply of credit depends on the terms of loan contracts, the availability of credit and competition for loans among borrowers. Given an excess demand for formal credit, as a result of financial repression, and the lack of liquid collateral, we propose that what could actually determine the supply of credit is the availability of credit. We consider the availability of credit at three levels: province, commune and village. Availability of credit from source i is proxied by the total credit from source i. How lenders allocate credit depends on the competition between households at commune and village levels (Khandker and Faruqee, 2003). Competition is dependent on household and local characteristics, which are included in x_i and on the number of potential borrowers (proxied by the number of households in commune). Moreover, as various sources of credit are substitutes (in terms of use) and demand for one source of credit (such as informal credit) may depend on the supply of another source (such as formal credit), we also include the variable proxy for the supply of credit from a substitute source in z_i. Thus, z_i includes variables that proxy for the availability of credit, number of competitors and the supply of credit from substitute source.

5.3.2 Determinants of credit rationing

Equation (5.1) shown above is used to explain factors that affect the amount of credit supplied to a household. It does not specify why some households receive loans while the others are excluded or receive less than the mount demanded. In other words, we may see credit rationing in rural market, but how do lenders ration credit? Clearly, borrowing is a function of demand for credit and access to the market. What a researcher can observe as the outcome of this process is the amount of credit supplied and the outcome of applications. As the decision to offer loans is conditional on the decision to apply for loans, it is necessary to separate these two stages: first households decide whether to apply for loans and then lenders decide whether to offer or reject the applications. We employ the Heckman approach (see Heckman, 1974, 1976, 1979 and 1980) in which the probability of a household receiving a loan depends first on that whether they have a demand for credit and then on that whether their application is accepted by the lender (see similar framework, for example: Zeller, 1994). The first-stage model takes the form below:

$$P(y_i) = f(x_i) \qquad (5.2)$$

where y_i equals 1 if household has demand for credit from source i and 0 otherwise; x_i is a vector of explanatory variables which are similar to x_i in (1), and then:

$$P(y_i) = f(x_i, z_i, \xi_i) \qquad (5.3)$$

where y_i equals 1 if a household receives loans from source i; x_i and z_i are vectors of explanatory variables. ξ_i is the Mill's ratio (see Greene, 2003; Wooldridge, 2003 for details) computed from (5.2), which controls for sample selection bias. Vector x_i in (5.3) represents the household and local characteristics that lender may use to screen applicants such as age, education, savings, land use etc. Vector z_i again represents the supply side of credit, which

include proxy variables for the availability of credit and competition between communes (e.g. poverty incidence in commune and province, and average education in commune).

5.4 Data and measurement

Our data are drawn from the Vietnam Living Standards Survey - VLSS 1997/1998. The survey was conducted in 1997/1998 by the General Statistical Office. The survey was funded by the UNDP and the Swedish International Development Authority (SIDA). The survey is a part of the Living Standards Measurement Study (LSMS) household surveys conducted in a number of developing countries with technical assistance from the World Bank. The survey covers a sample of 5,999 households, 194 communes and 388 villages. The proportion of rural households is 71.2% (4,269 households) and there are 38.9% of rural households borrowing from all sources. However, after adjusting for missing data, we select a sample of 4,101 rural households, of which there are 2,108 borrowing households. Of the borrowing households, 1,246 households borrow from formal sources; 1,213 households borrowing from informal sources, resulting in a number of 351 households having loans from both sources. The informal sources of credit include money lenders, relatives and friends; ROSCAs and other individuals. If we exclude all households with zero-interest rate loans from informal sources (most of them have loans from friends and relatives), the sample of borrowing households reduces to 1,645 households. Table 5.1 shows a brief description of the sample and Table 5.2 provides a statistical description of the key variables. Further analysis of variables is undertaken in the following sections.

Table 5.1 - Summary of borrowing households

	Households	Percentage	Average loan size (VND1,000)	Monthly interest rate
Borrowing households	2,108			
Formal source	1,246	100%	3,209	1.26%
▪ Private banks and cooperatives		4.4%	2,230	1.59%
▪ Government banks		82.2%	3,512	1.27%
▪ Government programs and others		13.4%	1,547	0.87%
Informal source	1,213	100%	1,752	3.95%
▪ Money lenders		19%	2,141	4.56%
▪ Relatives		48%	1,861	2.63%
▪ ROSCAs and other individuals		33%	1,366	3.69%
Non-borrowing households	1,993			
Total	4,101			

Table 5.2 – Descriptive Statistics of Variables

Variables	Explanation of variables	Non-borrowing HHs Mean	SD	All HHs Mean	SD	Borrowing HHs Mean	SD	Formal borrowing Mean	SD
AGE98	Age group of household head	4.543402	1.504427	4.284565	1.412567	4.039848	1.272664	4.084270	1.217065
AGE98*AGE98	Age squared	22.90467	14.51875	20.35235	13.19449	17.93928	11.29129	18.16132	10.80074
EDUCYR98	Education years of household head	6.150861	4.228838	6.492725	4.050438	6.815939	3.847384	6.857945	3.794083
FARM98	Dummy: Farm households =1	0.753638	0.431000	0.758839	0.427840	0.763757	0.424874	0.795345	0.403611
GENDER98	Dummy: Male =1	0.746613	0.435060	0.782004	0.412935	0.815465	0.388012	0.826645	0.378706
HHSIZE	Households size	4.511791	2.025933	4.849549	1.937950	5.168880	1.793819	5.344302	1.835241
LGLAND980	Log of farming area owned	6.435767	3.261838	6.683171	3.157325	6.917079	3.037519	7.064593	3.059102
LGFISA980	Log of financial savings (saving books, deposits .etc)	5.083349	2.323899	4.820754	2.385538	4.572486	2.416824	4.718702	2.456173
LGNFSA980	Log of non-financial savings (savings in kinds)	3.981200	3.834011	3.432162	3.758125	2.913075	3.609820	3.192871	3.668047
LGDETE98	Log of price of detergent in commune (VND 1,000/kg)	1.939069	0.328720	1.940150	0.327640	1.941172	0.326690	1.938566	0.327976
LGFSOU98	Log of price of fish source in commune (VND 1,000/bot)	1.542432	0.395370	1.509139	0.407122	1.477662	0.415575	1.444695	0.432034
LGNOO98	Log of price of noodle in commune (VND1,000/pack)	0.105278	0.119876	0.109959	0.125294	0.114385	0.130083	0.115257	0.137191
LGPORK98	Log of price of pork in commune (VND1,000/kg)	2.998697	0.167860	3.003199	0.168737	3.007455	0.169491	3.026338	0.171293
LGRICE98	Log of price of rice in commune (VND 1,000/kg)	1.235146	0.128080	1.234837	0.127256	1.234545	0.126501	1.233832	0.129430
LGSEW98	Log of price of sewing (VND 1,000/trouser)	2.675130	0.330479	2.694550	0.343081	2.712911	0.353682	2.759295	0.338541
EDUYR98C	Mean of education year in commune	6.442730	2.042569	6.493202	1.951857	6.540920	1.861263	6.412705	1.844661
LGLAN98C	Mean of log of farming area in commune	8.038560	0.583207	8.080288	0.598650	8.119739	0.610412	8.170626	0.608952
RCPIGS98	Price index by region	0.977015	0.045514	0.979988	0.046528	0.982798	0.047306	0.988350	0.045113
LGVIIN980	Log of total informal credit in village	8.218244	2.804840	8.556792	2.597069	8.876870	2.340075	8.414376	2.840987
NOHHS98	Number of households in commune	667.3593	427.3440	654.3011	424.3382	641.9554	421.2058	596.4518	393.1924
LGPRFO980	Log of total formal credit at province level	14.60518	1.758588	14.80475	1.664795	14.99344	1.547901	15.22616	0.959694
LOGCFO980	Log of total formal credit at commune level	9.414417	2.432611	9.728391	2.208659	10.02524	1.927795	10.56044	0.906908
LGVIFO980	Log of total formal credit at village level	8.258445	2.986495	8.756093	2.640434	9.226593	2.162982	9.907602	0.983726
Observations	Number of households	1993		4101		2108		1246	

5.5 Empirical results

5.5.1 Determinants of formal credit

We conduct two separate tests to estimate determinants of household formal credit allocation. The first test (Test 5.1.1) is based on the whole sample of rural households with 4101 observations, of which 1246 households have formal loans. The second (Test 5.1.2), which looks at those who receive formal credit, uses the sample of borrowing households with 2108 observations. The dependent variable is the log of household formal credit extended by time of interview12. The explanatory variables include household and location characteristics, the availability of credit and the variables that proxy for competition at commune and village levels. We also use the proxy variable for the availability of informal credit at village level for the reason that this source of credit may affect household demand for formal credit, as explained in the Model section. Table 5.3 presents the Tobit regression of the household borrowing equation (5.1).

At the 95% confidence level, we find that the age of the head of household (AGE98) is positively and significantly related to the amount of formal credit supplied to households. The significance of the squared age indicates that middle-aged households receive the largest amount of formal credit. The amount of credit is therefore a nonlinear function of the age of the head of household. Education of households (EDUCYR98) is significant, implying that more educated households receive more formal credit. Farm households (FARM98) are seen to receive more credit, indicating that in rural Vietnam, farm households are the preferred clients. Formal credit extension is also dependent on the size of household (HHSIZE),

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12 Including outstanding loans and loans already paid within 12 months.

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possibly implying that households with more members either demand more credit or formal lenders provide more credit to them because of their high earning capacity.

The total farming area of households (LGLAND980) is seen as an indicator of both collateral and the size of farm production and is positively and significantly related to the formal credit extended. This indicates that households owning more farming land demand more credit and formal lenders in fact offer more credit to those households.

Household financial and non-financial savings (LGFISA980 and LGNFSA980) are significantly related to formal credit, but with negative signs in the first test and positive sign in the second test. It is possible that households with high savings demand less credit and thus they receive less. But it is also possible that (in the second test) when we control for only households who are clearly revealed to be demanding credit, the positive sign of financial savings indicates that households with more financial savings are seen to be more creditworthy by formal lenders, and thus receive more credit.

We find that the availability of formal credit at commune level (LOGCFO980) and at village level (LGVIFO980) are positively and significantly related to the formal credit extended to households. However, at province level (LGPRFO980), the availability of credit is found negatively and significantly related in the second test. This implies that the availability of formal credit is an important determinant of the amount of formal credit that one household may receive, but either there is an inequality in allocation of formal credit between communes or there are two many communes within a province. Specifically, some communes may receive less credit than the others in the same province, and thus households living in these communes may receive less credit, compared to other households living in other provinces. The availability of informal credit at village level (LGVIIN980) is negatively and significantly related to household formal credit at the 90% confidence level in the first

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test and at the 95% level in second test implying that where there is an excess demand for formal credit i.e. formal sector does not meet the demand of credit by households, there exists a market for informal credit.

Of the proxy variables for location (fixed) effects, we find that the mean of education in the commune (EDUYR98C), the mean of farming area in commune (LGLAN98C) and the price index of the province (RCPIGS98) are negatively and significantly related to household formal credit, especially in the second test. A possible explanation of this result is that because households in "better" communes often demand more credit, the amount of formal credit that any one household receives is less (but the number of households receiving credit might be higher). This may imply the fact that there is rationing in the amount of credit as well as the financial exclusion.

In short, we have found that total farming area, financial and non-financial savings and availability of formal credit are significant determinants of household formal credit. Households owning more farming land demand more credit and formal lenders are more likely to offer larger amounts of credit since LUCs can be used as collateral in rural Vietnam. Households with higher savings may demand less credit. However, if they have higher financial savings and do have demand, they may receive more generous formal credit allocating. The availability of formal credit at village and commune levels is important to the amount of formal credit that one household receives. The results also show that there is an inequality in allocation of credit within a province or across communes within a province.

Table 5.3 - Results from Tobit regression: Determinants of formal credit

| | Test 5.1.1 | | Test 5.1.2 | |
	Coefficient	z-Statistic	Coefficient	z-Statistic
AGE98	3.758498	4.829326*	2.196420	3.872094*
AGE98*AGE98	-0.456323	-5.265458*	-0.214564	-3.333159*
EDUCYR98	0.185905	3.453552*	0.148874	3.690984*
FARM98	0.730163	1.612231	0.714636	2.130596*
GENDER98	0.476951	1.058321	0.314248	0.930317
HHSIZE	0.616284	6.420827*	0.222580	3.107933*
LGLAND980	0.465386	7.175849*	0.241026	5.013996*
LGFISA980	-0.165587	-2.211143*	0.135384	2.503009*
LGNFSA980	-0.261559	-5.118806*	0.042807	1.115107
LGDETE98	0.508889	0.954907	0.382457	0.969152
LGFSOU98	-1.488011	-3.492921*	-0.351738	-1.137395
LGNOO98	2.226429	1.672403**	0.622205	0.636572
LGPORK98	-0.996639	-0.658557	0.754390	0.667149
LGRICE98	-3.169625	-2.175630*	-2.563133	-2.367508*
LGSEW98	1.991168	2.920890*	0.618908	1.263769
EDUYR98C	-0.192808	-1.480780	-0.166986	-1.731353**
LGLAN98C	-0.747076	-2.058645*	-0.706285	-2.671740*
RCPIGS98	-2.380690	-0.505146	-5.937609	-1.725125**
LGVIIN980	-0.111652	-1.697568**	-0.420104	-8.006437*
NOHHS98	-0.000263	-0.552376	-0.000449	-1.278521
LGPRFO980	-0.052588	-0.231004	-0.388116	-2.359462*
LOGCFO980	0.728956	1.867763*	0.571618	1.984287*
LGVIFO980	2.872957	9.253923*	1.964455	8.633500*
C	-37.16056	-5.882620*	-10.25352	-2.220564*
Log likelihood	-5598.107		-4424.520	
Adjusted R-squared	0.196636		0.270345	
Total observations	4101		2108	
Positive observations	1246		1246	

* Significant at 5% level
** Significant at 10% level

5.5.2 Determinants of credit rationing by the formal sector

In this section, we test two forms of credit rationing: credit exclusion and rationing in amount of credit. In the first stage of testing, we use equation (5.2) and conduct tests on whether households have a demand for formal credit. We use the sample of 4101 households, of which 2108 households demand both formal and informal loans. Given that formal credit is a cheaper source and that it dominates rural credit market in rural Vietnam as discussed above, we assume that if households demand loans, they first seek formal loans and thus the dependent variable equals 1 for those who have either formal or informal loans. However, for a more reasonable assumption, we exclude households with zero-interest informal loans in the

second test for the reason that non-zero interest borrowers are most likely to demand for loans from the cheaper (than interest charging informal lenders) formal sector. There are 1645 households with non-zero interest loans. Thus, the two alternative tests are presented in Table 5.4a, namely (5.2.1) and (5.2.2) respectively.

In the second stage, we use equation (5.3) and conduct the tests on how formal lender decides to offer loans. The sample we use for these tests is those households who have loans, i.e. 2108 and 1645 households respectively. There are two possibilities: (i) credit exclusion if a household does not receive any formal loans and (ii) rationing in the amount of credit if a household have both formal and informal loans.

For the test of credit exclusion, if households have formal loans (1246 households), the dependent variable takes value of 1, and otherwise 0. The inverse Mill's ratios, which are computed from the first stage, are included as explanatory variable in second stage. Table 5.4b represents the second stage tests, (Test 5.3.1) and (Test 5.3.2). The significance of Mill's ratios and high percentage of correct prediction (71.96% and 78.12%) indicate that the two-stage regressions are more appropriate.

For the test of rationing in amount of credit, we conduct two types of tests: (i) if households have informal loans (1213 and 750 households for the first and second samples respectively), the dependent variable takes the value of 1, otherwise 0. The purpose of these tests is to see why households are being rationed either being excluded or rationed in amount of credit. Table 5.5a represents the test results (Test 5.3.3 and Test 5.3.4 for samples 1 and 2 respectively) and the significance of Mill's ratios indicates that the two stage regressions are appropriate; and (ii) if households have both formal and informal loans (351 households for both samples), the dependent variable takes the value of 1, and otherwise 0. The purpose of this test is to see why households are being rationed in amount of credit. Table 5.5b represents

the results (Test 5.3.5 and Test 5.3.6). The Mill's ratios are not significant in this test, and thus, the two stage regression is not necessary.

Table 5.4a - Results from Probit regression: Probability of applying for formal credit

	Test 5.2.1		Test 5.2.2	
Variable	Coefficient	z-Statistic	Coefficient	z-Statistic
AGE98	0.166910	1.847101**	0.404057	4.265932*
AGE98*AGE98	-0.031483	-3.183275*	-0.054266	-5.170551*
EDUCYR98	0.010287	1.553428	0.010036	1.491136
FARM98	-0.061831	-1.130932	0.067442	1.202834
GENDER98	0.035150	0.649202	0.020321	0.364873
HHSIZE	0.096402	8.065885*	0.091849	7.588738*
LGLAND980	0.024723	3.170051*	0.014459	1.818839**
LGFISA980	-0.049451	-5.241171*	-0.032069	-3.388112*
LGNFSA980	-0.052710	-8.623011*	-0.048846	-7.782064*
LGDETE98	0.056098	0.882392	0.037159	0.573068
LGFSOU98	-0.279683	-5.383893*	-0.312052	-5.939800*
LGNOO98	0.467778	2.768203*	0.308479	1.820298**
LGPORK98	0.241978	1.389808	0.503740	2.853129*
LGRICE98	-0.392533	-2.223284*	-0.750968	-4.203524*
LGSEW98	0.462954	5.742108*	0.526625	6.459547*
EDUYR98C	0.050313	3.379183*	0.051269	3.390795*
LGLAN98C	0.113579	2.501985*	0.194549	4.240019*
RCPIGS98	-0.075613	-0.133571	1.203721	2.119201*
C	-2.701407	-3.646798*	-5.985611	-7.964278*
Log likelihood	-2609.430		-2526.231	
R-squared	0.081505		0.085321	
LR statistic	463.1079		471.2892	
Probability(LR stat)	0.000000		0.000000	
Total observations	4101		4101	
Dependent variable =1	2108		1645	
Percentage correct prediction	63.35%		64.81%	

* Significant at 5% level
** Significant at 10% level

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Table 5.4b - Results from Probit regression: Probability of being granted credit

Variable	Test 5.3.1		Test 5.3.2	
	Coefficient	z-Statistic	Coefficient	z-Statistic
AGE98	0.407103	2.809102*	0.106084	3.322559*
AGE98*AGE98	-0.032640	-1.914274**		
EDUCYR98	0.030897	3.025259*	0.041918	3.416101*
FARM98	0.259537	3.145633*	0.144148	1.476160
GENDER98	0.005030	0.060198	0.032832	0.339170
LGFISA980	0.046000	3.105118*	0.029831	1.808339**
LGNFSA980	0.029256	2.663487*	0.050780	4.029634*
EDUYR98C	-0.052447	-2.231807*	-0.045546	-1.641288
LGLAN98C	-0.234607	-3.469965*	-0.393176	-4.731628*
PORU98	-0.000670	-0.267192	-0.000686	-0.233648
NOHHS98	-0.000263	-3.230685*	-0.000290	-3.033580*
NOFPOR98	-0.000159	-1.073828	-0.000515	-2.950293*
LGPRO980	0.055014	4.108307*	0.057827	3.756366*
LGPRFO980	-0.128837	-3.329671*	-0.180923	-3.506067*
LOGCFO980	0.160149	2.407301*	0.007671	0.095329
LGVIFO980	0.371513	6.937432*	0.347980	5.416588*
MILLS (1 and 2)	-0.822340	-3.867150*	-0.735897	-3.894671*
C	-1.958554	-2.049839*	3.075123	2.701524*
Log likelihood	-1155.080		-792.9777	
R-squared	0.189976		0.129876	
LR statistic	541.8052		236.7214	
Probability (LR stat)	0.000000		0.000000	
Total observations	2108		1645	
Dependent variable =1	1246		1246	
Percentage correct prediction	71.96%		78.12%	

* Significant at 5% level
** Significant at 10% level

Table 5.5a - Probability of being excluded from the formal sector

Variable	Test 5.3.3		Test 5.3.4	
	Coefficient	z-Statistic	Coefficient	z-Statistic
AGE98	-0.172633	-1.217220	-0.047822	-1.654851***
AGE98*AGE98	0.010842	0.651303		
EDUCYR98	-0.025805	-2.627402*	-0.025915	-2.392328**
FARM98	-0.223021	-2.764176*	-0.132880	-1.493275
GENDER98	0.011265	0.138057	-0.018445	-0.209019
LGFISA980	-0.066026	-4.600638*	-0.059837	-4.065854*
LGNFSA980	-0.036795	-3.501435*	-0.051019	-4.566935
EDUYR98C	0.022214	1.010183	0.010843	0.447920
LGLAN98C	0.136742	2.134553**	0.199247	2.720781*
PORU98	0.003735	1.582073	0.004931	1.909509***
NOHHS98	0.000436	5.354588*	0.000493	5.462981*
NOFPOR98	0.000135	0.938981	0.000374	2.364500**
LGPRO980	-0.033255	-2.593995*	-0.024726	-1.781610***
LGPRFO980	0.211338	5.691731*	0.301982	6.379988*
LOGCFO980	-0.228339	-3.597153*	-0.149362	-2.041934**
LGVIFO980	-0.219530	-4.569855*	-0.137358	-2.508216**
MILLS (1 and 2)	0.653818	3.248622*	0.554439	3.278574*
C	0.700191	0.816742	-3.538992	-3.387448*
Log likelihood	-1251.282		-1034.956	
R-squared	0.129286		0.087202	
LR statistic	371.5890		197.7450	
Probability (LR stat)	0.000000		0.000000	
Total observations	2108		1645	
Dependent variable =1	1213		750	

* Significant at 1% level
**Significant at 5% level
***Significant at 10% level

Table 5.5b - Probability of being rationed in amount of credit

Variable	Test 5.3.5		Test 5.3.6	
	Coefficient	z-Statistic	Coefficient	z-Statistic
AGE98	0.381049	2.386669**	0.049810	1.589881
AGE98*AGE98	-0.037446	-2.080031**		
EDUCYR98	0.007475	0.666501	0.009271	0.789857
FARM98	0.004259	0.046046	-0.026075	-0.266399
GENDER98	0.025261	0.277560	0.005615	0.058386
LGFISA980	-0.043559	-2.987450*	-0.051701	-3.337208*
LGNFSA980	-0.020256	-1.882536***	-0.017048	-1.492603
EDUYR98C	-0.006331	-0.249587	-0.014025	-0.528158
LGLAN98C	-0.076753	-1.116748	-0.129386	-1.801081**
PORU98	0.004244	1.567901	0.004838	1.712917
NOHHS98	0.000264	2.940412*	0.000332	3.457073*
NOFPOR98	9.84E-05	0.584729	-8.28E-07	-0.004688
LGPRO980	0.034881	2.372414**	0.033052	2.161167**
LGPRFO980	0.136843	3.011024*	0.181051	3.590752*
LOGCFO980	-0.088627	-1.179738	-0.197566	-2.461886**
LGVIFO980	0.254907	3.913084*	0.241596	3.472660*
C	-5.175718	-5.462623*	-3.274568	-3.466064*
Log likelihood	-894.8133		-822.5585	
R-squared	0.057343		0.035411	
LR statistic	108.8660		60.39470	
Probability (LR stat)	7.77E-16		2.16E-07	
Total observations	2108		1645	
Dependent variable =1	351		351	

* Significant at 1% level
**Significant at 5% level
***Significant at 10% level

Who receive formal credit or who are excluded?

As shown in Table 5.4b, of the household attributes, we find that the age of head of household (AGE98) is positively and significantly related to the probability of applying for formal loans and the probability of being offered. Education (EDUYR98) is not significantly related to the probability of applying, but is to the probability of being offered, implying that formal lenders screen applications by using education levels. More interestingly, household savings (LGFISA980, LGNFSA980) reduce the probability of applying for credit, but increase the probability of being offered credit it. This indicates that if households have savings, they are less likely to demand loans, but if they apply, they are more likely to be successful. In other words, banks are most willing to lend to those that least need to borrow. The productivity of

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farming land (LGPRO980), which is a proxy for the value of collateral, is also found to be positively and significantly related to the probability of being offered a loan.

As a proxy for competition among households within one location, the number of households in commune (NOHHS98) reduces the probability of receiving formal loans. This may be because there are more applicants for loans from large communes and thus the probability of success for each applicant is small. Similarly, the number of poor households in a commune (NOFPOR98) is negatively significant in the second sample (Test 5.3.2). This implies either that more applicants reduce the probability of success or that formal lenders may be discouraged from offering loans where there are more poor households. The mean of productivity of the farming area in a commune (LGPRO98C) reduces the probability of being offered. The possible reason is that in communes with high productivity, there are more households applying for loans and thus the probability of success for each household is low. This might imply a quota system of credit allocation by the formal lenders.

Availability of credit at province, commune and village level is found to be significantly related to the probability that one household is offered a loan. At province level (LGPR980) it is found to be negatively significant, but at commune level (LOGCFO980) and village level (LGVIFO980) it is positively related. The different signs at different levels are not surprising as they imply inequalities in distribution of formal credit between communes and villages within a province. However, the implication is that if formal credit is more available at village and commune levels, an applicant household has more probability of receiving loans.

The results thus show that age of the household head, education, savings, availability of credit and competition among households are the determinants of credit rationing in rural credit market. Household savings may increase the probability of being offered loans as

savings are seen either as collateral or an indicator of household wealth. The availability of credit at village and commune level also increases the probability of being offered as it narrows the gap between demand and supply. However, the number of households and number of poor households in the commune are variables which reduce the probability of being offered loans from formal lenders.

Who face credit rationing?

The above results have shown why some households receive loans from the formal sector while the others do not. As an attribute of the probit model, the results also indicate (with adverse signs of the coefficients) that households who do not receive any formal loans are those who are completely excluded from the formal sector. Looking further at those who are excluded from the formal sector, we conduct further tests to see why they are excluded and the difference, if any, between completely excluded and partly excluded households.

As shown in Table 5.5a, most of the key coefficients are with the adverse signs, compared to those resulted from the tests of households who have loans from the formal sector. This strengthens our above finding and once again indicates that the level of household education, the level of household savings and the availability of formal credit at commune and village reduces the probability of being excluded.

However, when we look at those who are being rationed in amount of credit i.e. who receive both loans from formal and informal sector, the results are interesting. As seen in Table 5.5b, we do not find clear evidence on the effect of age and education level of household head on the probability of being rationed in amount of credit. The number of households in a commune increases the probability of being rationed in amount of credit from formal sector at 1% level of significance in both samples, indicating that there may be a quota system in credit allocation.

The level of financial savings is found to be negatively and significantly related to the probability of being rationed in amount of credit at the 99% level of confidence, again indicating that household financial savings reduce the probability of being excluded and being rationed in amount of credit. The level of non-financial savings is negatively and significantly related to the probability of being partly excluded at 95% level of confidence and for the second sample only.

Surprisingly, at 99% level of confidence, the availability of formal credit at province and village level is positively and significantly related to the probability of being rationed in amount of credit from formal credit for both samples, while the availability of formal credit at commune level is negatively and significantly related to the probability of being partly excluded at 5% of significance and for the second sample. The positive effect of the availability of credit at village level indicates that demanding households may have high probability of getting formal loans in the village where formal credit is available, but the amount of loans is insufficient, and thus they have to borrow from the informal sector. This seems to prove the case of VBARD which usually grants 50% of the loan amount requested and meets only 14% of the effective demand13 for loans from the low income households in rural Vietnam (Dao, 2002).

The result thus suggests that the key reason explaining why households are being rationed in the amount of credit is the quota system in credit allocation by formal lenders (mainly VBARD). It also indicates that household savings are the important factors that influencing the amount of credit being granted in rural Vietnam.

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13 Calculated as a ratio of (total low-income households receiving loans * amount of loan granted) over (total low income households*amount of loan requested) (Dao, 2002).

5.6 Conclusion

In this chapter, we have attempted to analyse how credit is distributed by the formal sector in rural Vietnam. A study by Dao (2001) indicates that if households demand credit, they first apply for loans from the formal sector (e.g. government banks), largely because of interest rates are subsidized and thus lower than the informal sector. However, for many reasons, households choose to borrow from the informal sector at much higher interest rates. They are either who are completely excluded from the formal sector or being rationed in the amount of credit. A number of households borrow from their relatives and friends at zero-interest rates, but we exclude these households from our analysis of credit rationing by the formal lenders.

For those who receive loans from formal sources, the amount of credit that they may receive is affected by various factors, of which education, household savings, the availability of credit and the area devoted to farming are important. Apart from the availability of credit, education, household savings and farming area all represent the wealth of households. The results thus indicate that formal lenders tend to provide more credit to households who are better off. Similarly, we found that households with higher education, higher savings and higher productivity of land use are more likely to receive loans. This again strengthens our hypothesis that formal credit is for better off rural households and that formal lenders are most willing to grant loans to those who are better off (see also: Pham and Izumita, 2002). Interestingly, we have found that for households who are being rationed in amount of credit, the quota system in credit allocation is the key factor and this seems to prove the case of VBARD (see Chapter 4 for VBARD's lending technology).

Since the government of Vietnam is committed to providing credit to rural households as a key component of its strategy for rural development and poverty reduction (Dao, 2002),

the policy implications drawn from findings in this chapter are as follows: first, given the effect of farming area and its productivity on household formal credit, Land Reform should be accelerated. Many provinces have not yet finished the issuance of LUCs (Dao, 2002) and thus rural households may find it hard to gain access to formal credit as LUCs can be used as collateral. Second, the importance of the availability of credit at village and commune level indicates that the government should encourage the expansion of bank branch network. Although interest rates in the banking sector are gradually being liberalised, the requirement to charge prior or cheap interest rates (Dao, 2002)) remains a constraint on banks' ability to cover lending costs and develop lending at risk-premium based rates (Chapter 4). Thus, a further liberalisation of interest rates could create more incentives for banks (VBARD, VBP) and induce more efficient lending. Third, better-off households seem to benefit more from formal credit. In order to ensure poorer households gain access to formal credit, the applicant-screening process should not be based on criteria representing household's wealth. More emphasis should for example be placed on business plans and pre and post loan training and group borrowing. And the last but not least, employing local information obtained from NGOs and other social organizations through partnership strategy could be a good policy.

Overall, the findings suggest that the poverty reduction approach that the government followed has failed in achieving its goals: the poorer households are most likely to be excluded while the financial self-insufficiency (as analyzed in Chapter 4) has limited the capacity of formal financial sector to expand outreach at the commune and village level. In the next chapters, we will analyze the impact of credit on poverty reduction in order to conclude a comprehensive assessment of whether or not the poverty reduction approach should be replaced.

CHAPTER 6

THE IMPACT OF ACCESS TO CREDIT ON HOUSEHOLD POVERTY

REDUCTION IN RURAL VIETNAM: A CROSS-SECTIONAL STUDY

6.1 Introduction

As we have pointed out in the conclusion section of Chapter 4, an assessment of impact of access to credit on poverty reduction is important to conclude the recommendation on the approach to microfinance. This chapter and the next chapter focus on this purpose. Literature has shown that access to credit has ambiguous impact on poverty reduction and it depends on certain circumstances (Gonzalez Vega, 2003). However, many studies have revealed the positive but small impact (Morduch and Haley, 2002). Hence, our main interest is that whether the access to micro credit has any impact on poverty reduction and if yes, how much does it contribute to poverty reduction in rural Vietnam?

To answer this question, in this chapter, we develop an econometric framework to analyse the effect of household credit on the economic welfare of households and use cross-sectional data from the two households surveys undertaken in 1992/1993 and 1997/1998 to derive empirical evidence. Our findings confirm that household credit contributes positively and significantly to the economic welfare of households in terms of per capita expenditure, per capita food expenditure and per capita non-food expenditure. The positive effect of credit on household economic welfare is regardless of whether they are poor or better-off households. We also find that credit has a greater positive effect on the economic welfare of poorer households and find that the age of the household head, the household size, land ownership, savings and the availability of credit at village level are key factors that affect household borrowing.

The remainder of this chapter is organized as follows. Section 6.2 represents a brief review of the relevant literature. In section 6.3, we develop the econometric framework and discuss the characteristics of data we used in section 6.4. In the following section, we present and discuss our test results. The concluding section summarizes the main findings of the chapter and draws policy conclusions.

6.2 Review of relevant literature

Many researchers have postulated that the provision of financial services to the poor, or microfinance, is a powerful means of providing low income households with the chance to escape from poverty and to transform their lives. It is also evident that there is a strong demand for small-scale commercial financial services – both credit and savings – from low-income households (Robinson, 2001). The strong demand for financial services by low income households, together with the evidence that access to credit reduces household poverty, provides clear incentives for policy markers to develop a framework for providing financial services to low-income households (Chapter 3).

As many studies have shown, by providing low-income households with access to financial services, the service providers help them improve their productivity and management skills, create jobs, smooth income and consumption flows, enlarge and diversify their businesses, and increase their income and other benefits, such as health care and education. The various evidence supporting this assertion can be found from the papers by Morduch, 1995; Gulli, 1998; Khandker, 1998; Pitt and Khandker, 1998; Zeller, 2000; ADB, 2000a; Parker and Nagarajan, 2001; Robinson, 2001; Khandker, 2001; Khandker and Faruque, 2001; Coleman, 2002; Morduch and Haley, 2002; Pitt and Khandker, 2002; Khandker, 2003; .etc.

Recent empirical findings show that access to credit has a positive impact on household economic welfare (Khandker, 1998; Panjaitan, Drioadisuryo and Kathleen, 1999; Remenyi and Benjamin, 2000; Wright, 2000; Khandker, 2001a; Khandker and Faraque, 2001b; Coleman, 2002; Pitt and Khandker, 2002; Khandker, 2003; .etc). Moreover, the literature also shows that most microfinance programs do not serve the poorest, but when they do so, the poorest can benefit from microfinance through increased income and reduced vulnerability (Morduch and Haley, 2002). There is also some evidence that the degree of poverty may affect the response. Better-off poor households have a larger positive response than the very poor (Remenyi and Benjamin, 2000; Coleman, 2002).

Paramount among the limitations of the existing studies is the absence of a coherent econometric methodology that would make empirical findings easily comparable. Differences in research methodology seem to account for differences in research findings. Moreover, the empirical studies seem to focus on a subset of countries and tend to exclude some of the countries where the supply of microcredit has been actively developed – Vietnam, for example.

The most relevant studies that assess the impact of credit on rural households were conducted recently by the Microfinance Resource Centre of Vietnam (MFRC) (Dao, 2000, 2001b) and Pham and Izumita, 2002). Dao (2000) assessed the socio-economic impact of the rural credit funded by Asian Development Bank. One of the project objectives is to increase the living standards of poor rural households. This project is disbursed through the network of VBARD. Dao (2001b) also assessed the socio-economic impacts of the rural finance project funded by the World Bank. The only difference is that WB project is disbursed through the network of VBARD as well as PCFs. Some other research (McCarty, 2001; Dao, 2002)

focused on studying the outreach of rural financial system, rather than its role on household living standards.

Dao (2000, 2001b) concluded that the impacts of credit on household living standards in Vietnam were positive. According to Dao (2001b), of 1,883 interviewed borrowing households, 99.07% agreed that the project had positive impact on their living standard, of which 88.76% stated that borrowing from project increased individual benefit (having additional capital for business production investment), and 93.29% said that borrowing increased family economic benefit as a whole. With higher incomes, expenditures for family consumption increased as a result, especially expenditure for better schooling. The diversity of income activities remains limited: cultivation and animal husbandry remain two major sources of incomes. With loans obtained from the projects, households have the opportunities to expand and diversify their businesses, to change from traditionally single crop and small-scale production patterns to a larger scale and scope, but these changes are not very large.

The objectives of this chapter are two-fold. First, we propose and implement an econometric framework which seeks to overcome the shortcomings of the research methodology employed in previous studies. Second, we seek to obtain evidence on the impact of credit on household economic welfare in Vietnam. Specifically, the chapter addresses two questions: (i) What determine household borrowings in rural Vietnam?; and (ii) How much does household borrowing contribute to household economic welfare and to poverty reduction?

6.3 The model

We consider a simple two-period economy[14] in which there are two sets of actors, households and the lenders. We assume that households finance their economic activities by

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14 We, however, consider two separate points of time at the end of each period in this paper

borrowing from the lenders. The impact of borrowing during the period is expected to occur at the end of the period and to affect household economic welfare[15]. For simplicity, we look at household i in location j at time t. During the period from t-1 to t, this household would have a demand for credit C^d_{ijt}. However, household demand for credit is constrained by the supply of credit C^s_{ijt}. While the demand depends on household characteristics, the supply of credit depends on the availability of funds and the lender's characteristics[16]. The household borrowing function[17] is jointly determined by demand and supply functions, denoted as C_{ijk}. During the period from t-1 to t, the household generates its economic welfare, which is observed at time t and denoted as Y_{ijt}. The figure below illustrates our approach.

…	t-1	t
	At t-1:	At t:
Demand function C^d_{ijt-1}	Observed economic welfare Y_{ijt-1}	Economic welfare Y_{ijt}
Supply function C^s_{ijt-1}	Observed borrowing C_{ijt-1}	Observed borrowing C_{ijt}
Borrowing function C_{ijt-1}	From t-1 to t:	
	Demand function C^d_{ijt}	
	Supply function C^s_{ijt}	
	Borrowing function C_{ijt}	

For the purpose of assessing the impact of credit on household economic welfare, an output supply function is employed in which we introduce credit as a separate explanatory variable in the welfare function. Household welfare may be reflected in income and expenditure indicators, etc. At the household level, the welfare is most likely to be affected by the household characteristics such as the age of household head, the education of household head, total farming area, etc. At village and commune levels, household welfare is possibly

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15 The term "household welfare" is used generally here for the purpose of modelling. The selection of testing welfare variables such as income, expenditure and savings etc will be discussed in testing practice section.
16 We use the term characteristics to imply all the realised attributes of households and the lenders, which for the purpose of modelling we do not specify here in this section but in the testing practice section.
17 We imply the function of amount of credit that a household receives.

affected by the characteristics of the village and commune in which the households live. For example, the prices of selected goods and services in the village and commune may affect household expenditure or income. We recognise those characteristics as the local market characteristics. Household welfare is also affected by household and local market characteristics that we cannot observe or measure. For instance, households exerting more effort may generate higher income. The controlling variables therefore include household characteristics, local market characteristics and unobservable characteristics. The household welfare function takes the structural form, as follows

$$Y_{ijt} = \beta + X_1{'}_{ijt}\,\beta_1 + X_2{'}_{ijt}\,\beta_2 + C_{ijt}\beta_c + W'_{ij}\,\beta_w + \varepsilon_{ijt} \qquad\qquad (6.1)$$

where X_1, X_2 and W are vectors of household characteristics, local market characteristics and unobservable characteristics, respectively. Y and C represent household welfare and total household borrowing. The estimation of parameter β_c would show the effect of credit on the household welfare.

There are, however, some concerns about the equation (6.1). Firstly, is it appropriate to use the total household borrowing? If C represents borrowing from a specific source (e.g. controlled program[18] or borrowings from one type of lenders), the parameter β_c may not be consistent. Specifically, a household may borrow from a bank and from a moneylender or whatever. Then, if we consider the effect of bank loans on household welfare and find β_c, it is less convincing to conclude that β_c shows solely the effect of bank borrowings since it is possible that household welfare results from the borrowings from the moneylender. Therefore, the use of total household borrowings should be better than the use of borrowings from a specific source.

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18 i.e. one credit program or source of interest only; the others are ignored.

Second, is the total household borrowing an exogenous variable in equation (6.1)? To answer this question, we consider a function of household borrowing which results from the interaction between demand and supply functions. Note that the econometric literature on the identification problem (see Greene, 2003; Wooldridge, 2003; Manski, 1995; for examples) shows that identifying separate demand and supply functions of household credit from a sample of households is impossible without further information about either demand or supply. However, this is not our purpose in this chapter. We consider neither the demand nor the supply of household credit, but the function of household borrowing for a representative household. One may think of our approach as identifying the factors that determine the quantity of credit that a typical household may receive. Consequently, the understanding and interpretation of determinants of household borrowing should take into account both the demand and the supply side.

The household demand for credit depends on a number of observable factors, such as: household characteristics, local market characteristics, etc. Examples of household characteristics may include the gender of household head, the education of household head, the ownership of farm land, the initial endowment, etc. Local market characteristics may include the prices of selected goods and services, average education levels, farm landowning levels etc. It is also likely that the unobservable characteristics of household and local market affect household demand for credit. These types of variables may include the human effort and dedication etc. Hence, the demand function takes the general form:

$$C^d_{\,ijt} = \beta^d + X_1{'}_{ijt}\,\beta^d_1 + X_2{'}_{ijt}\,\beta^d_2 + W_d{'}_{ij}\,\beta^d_w + \varepsilon^d_{\,ijt} \qquad (6.2)$$

where X_1 is a vector of household characteristics; X_2 is a vector of local market characteristics; and W_d is a vector of unobservable characteristics of households and the local market.

Similarly, the supply of credit depends on the lenders' characteristics, local market characteristics and some unobservable characteristics. The lenders' characteristics may include the type of lender, such as formal or informal, the availability of funds, the allocation pattern of funds and the competition between lenders etc. Local market characteristics may be the same as in the credit demand function. The unobservable characteristics may include valuation of the lender based on, for example, the average effort and dedication to work by households in a specific market. The supply takes the form:

$$C^s_{\ ijt} = \beta^s + X_3{'}_{ijt}\ \beta^s_3 + X_2{'}_{ijt}\ \beta^s_2 + W_s{'}_{ij}\ \beta^s_w + \varepsilon^s_{\ ijt} \qquad (6.3)$$

where X_3 is a vector of lenders' characteristics; X_2 is a vector of local market characteristics; and W^s is a vector of unobservable characteristics of households and the local market which correlates with supply of credit.

In theory, the demand and supply of credit would determine the amount and price of credit granted to a representative household. However, the credit market is special. The existence of asymmetric information may lead lenders into the problems of adverse selection and moral hazard (Alkelof, 1970). One solution to these problems is for the lenders to tailor their loan contract covenants, which may act as a screening device to distinguish borrowers (Bester, 1985; Bester, 1987). Another solution is for the lenders to ration credit (Stiglitz, 1981). For these reasons, the function of household borrowing may result not only from pure demand and supply functions but also from variables controlling for asymmetric information problems, such as collateral, interest rates, availability of funds and competition amongst borrowers etc[19]. The reduced form of household borrowing function therefore should be estimated as follows:

$$C_{ijk} = \beta^c_0 + X_1{'}_{ijk}\ \beta^c_1 + X_2{'}_{ijk}\ \beta^c_2 + X_3{'}_{ijk}\ \beta^c_3 + W_c{'}_{ij}\ \beta^c_w + \varepsilon^c_{\ ijk} \qquad (6.4)$$

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19 Khandker (2001,2003) discusses this issue but our setup is slightly different.

where X_1 is a vector of household characteristics; X_2 is a vector of local market characteristics; X_3 is a vector of lender's characteristics and W^c is a vector of unobservable variables.

Now we look at the equations (6.1) and (6.4). We may see that with cross sectional data i.e. households are observed at only one point of time (i.e. at the end of the observed period), it is likely that the unobservable characteristics of household and local markets, W^c in equation (6.4) and W in equation (6.1), are correlated, so that the estimate of Y based on (6.1) could result in biased coefficients. More specifically, because of unobservable characteristics of households and the local market, such as a household's special effort and dedication, and the natural comparative advantages of the local market etc, it is possible that an increase in a household's welfare is not the result of household borrowings but because of that the household has invested more effort or they live in a better location for farming, for example. Alternatively, the lenders may screen households using their characteristics. As a result, better-off households receive loans but better-off households may also be able to generate higher welfare outcomes. Therefore, the estimation of β_c based simply on the welfare equation (6.1) may not be consistent.

Econometrically, the solution to the issue of endogeneity of credit is to employ instrumental variables and two-stage regression method (see details of this method: Greene, 2003; Wooldridge, 2003, for examples). We first estimate the determinants of household credit, which include instrumental variables that will not be included in Equation (6.1), but can be used to predict the amount of household credit that does not depend on household characteristics. Selecting appropriate instrumental variables is therefore a crucial task as the instruments must not be correlated with household welfare but must be closely correlated with the amount of credit borrowed. Given the existence of credit rationing in the market, the high

demand and limited supply of credit in rural areas, what actually matters is the supply of credit. The instrumental variables must therefore be those which well describe the characteristics of the lender.

From the Equation (6.4), there are two sets of observable variables, of which we can see that the lender's characteristics may serve as the instrumental variables. The lender characteristics influence the supply of credit and they do not directly affect household welfare. But which of these characteristics should be chosen? One may think the lending interest rate could be a good instrument as it describes the response of supply i.e. the amount of credit supplied. However, in rural Vietnam, because of the government restrictions on the lending interest rates, the "interest rate" can not serve as an instrument as it does not vary very much across the sample. The instrumental variables that we select include: the availability of funds; the credit allocation pattern; and the competition between lenders at commune and village levels.

Hence, in the first stage, the household borrowing is estimated based on Equation (6.4) where lenders' characteristics play the role of instrumental variables. The predicted values of household credit that are obtained from Equation (6.4) are then used, instead of actual values, in the second stage (i.e. Equation 6.1) to correct for the problem endogeneity of credit. The alternative option is to include both the actual values and the predicted residuals computed from the first stage (Equation 6.1) into the second stage regression (Equation 6.2). The coefficient of the predicted residuals in the second stage regression shows the Durbin- Wu – Hausman test (see more about this test in Greene, 2003), which indicates that whether or not the endogeneity of credit is significant and that the two-stage regression is appropriate.

Having solved the problem of the endogeneity of credit, our next concern is about the selection of the sample. From a household survey, we can observe that there are a number of

households who borrow and other households who do not. For a number of reasons, including credit rationing by the lenders, the non-borrowing households cannot get loans even they wish to do so. The allocation of credit therefore is not a random process. If we select only borrowing households and estimate the effect of credit on household welfare, the estimation may be biased. For example, the lenders select households because they are more credit-worthy, but credit-worthy households may achieve higher welfare outcomes. Hence, the effect of credit on household welfare is not consistent.

To control for sample selection bias, the whole sample, which includes both borrowing and non-borrowing households, should be used. The first stage regression using Equations (6.4) is then reconsidered as follows. For the purpose of convenience, we denote vector X = (X1, X2, X3) i.e. X includes household characteristics, local market characteristics and lender's characteristics. The structural form of household credit function (6.4) therefore becomes:

$$C_i^* = X_i^{'}\beta + \varepsilon_i \text{ with } \varepsilon_i \big| X_i \sim N(0, \sigma^2)$$

Econometrically, if we observe (Y_i, X_i) for a random sample, the estimation of the coefficients β using ordinary least squares (OLS) regression produces a consistent estimation of β, i.e.

$$\hat{\beta} = (X'X)^{-1}(X'C^*)$$

However, as we can observe only borrowing households, resulting in a random sample conditional on $C_i^* > 0$, the least squares regression may not be appropriate. The reason is as follows. Consider the following credit equation for every observation:

$$E[c_i \big| x_i, c_i > 0] = x_i^{'}\beta + E[\varepsilon_i \big| \varepsilon_i > -x_i^{'}\beta] = x_i^{'}\beta + \sigma E[\frac{\varepsilon}{\sigma} \big| \frac{\varepsilon}{\sigma} > -\frac{x_i^{'}\beta}{\sigma}]$$

We assumed $\varepsilon_i \big| X_i \sim N(0, \sigma^2)$, so we can arrange this equation for:

$$E[c_i \,|\, x_i, c_i > 0] = x_i^{'}\beta + \sigma \frac{\phi(-x_i^{'}\beta/\sigma)}{1 - \Phi(-x_i^{'}\beta/\sigma)} = x_i^{'}\beta + \sigma \frac{\phi(x_i^{'}\beta/\sigma)}{\Phi(x_i^{'}\beta/\sigma)}$$

where $u = \dfrac{e-0}{\sigma}$; $\phi(u) = \dfrac{1}{\sqrt{2\pi}} e^{\left(-\frac{1}{2}u^2\right)}$; and $\Phi(u) = \displaystyle\int_{-\infty}^{u} \phi(z)dz$

Set $\lambda(x_i^{'}\beta/\sigma) = \dfrac{\phi(x_i^{'}\beta/\sigma)}{\Phi(x_i^{'}\beta/\sigma)}$, we then have

$$E[c_i \,|\, x_i, c_i > 0] = x_i^{'}\beta + \sigma\lambda(x_i^{'}\beta/\sigma) \tag{6.5}$$

Equation (6.5) implies that a marginal effect of x'_i on c_i differs from β which results from the OLS regression, which is therefore not appropriate. A number of studies have proposed different methods to solve this problem using log likelihood function maximisation. We follow Tobin's (1958) approach, which is then called the Tobit model, as follows:

Consider the distribution of C given X conditional on C>0:

$$f_{C|X,C^*>0}(c|x) = \frac{f_{C^*|X}(c|x)}{1 - F_{C^*|X}(0|x)}$$

We then arrange for the distribution of the observed dependent variable:

$$f_{C|X}(c|x) = \frac{(1/\sigma)\phi((c - x'\beta)/\sigma)}{1 - \Phi(-x'\beta/\sigma)}$$

The log likelihood function is then constituted as a function of logarithm of sum of distribution function of all observed dependent variables with respect to β and σ.

$$L(\beta, \sigma^2) = \sum_{i=1}^{n} \left[-\frac{1}{2}\ln(2\pi\sigma^2) - \frac{1}{2\sigma^2}(c_i - x_i^{'}\beta)^2 - \ln(1 - \Phi(-x_i^{'}\beta/\sigma)) \right]$$

The Tobit model is used to estimate the consistent parameters β and σ by maximizing this log likelihood function by differentiating the above equation with respect to β and σ and setting the derivatives equal to zero.

6.4. Data and measurement

Our data are drawn from two surveys on living standards in Vietnam, namely Vietnam Living Standards Surveys - VLSS 1992/1993 and VLSS 1997/1998. The first survey was conducted in 1992/1993 by the State Planning Committee, known now as the Ministry of Planning and Investment and the General Statistical Office (GSO). The second was conducted by the GSO in 1997/1998. Both surveys were funded by UNDP and Swedish International Development Authority (SIDA). The surveys were parts of the Living Standards Measurement Study (LSMS) household surveys conducted in a number of developing countries with technical assistance from the World Bank.

VLSS 1992/1993 covers a sample of 4,799 households, 150 communes and 300 villages over the country. In which, there are 3,839 rural households, accounting for 80% of the overall sample. Of the rural households, there are 1,985 households (41.4%) being indebted from various sources. VLSS 1997/1998 was designed to provide an up-to-date source of data on households. It covers a sample of 5,999 households, 194 communes and 388 villages, including all households surveyed in 1992/1993. The proportion of rural households is 71.2% (4,269 households). There are 38.9% of rural households borrowing from all sources. The timing of this VLSS approximately five years after the first allows analysis of medium term trends in living standards.

The construction of variables plays an important part in our study. A descriptive statistics of variables and correlation matrices are presented in Table 6.1, 6.2 and 6.3. The dependent variables, which proxy for household welfares, include per capita expenditure, per capita food expenditure and per capita non-food expenditure. The variable of total household credit is constructed by summing all loans from the formal and informal sources such as bank loans and ROSCA loans. The household characteristics include variables measuring natural

attributes such as age, gender of household head; variables measuring household assets, such as savings and farm-land owning. Local market characteristic variables include: the prices of selected goods and services; the averaged household characteristics in a commune, such as averaged education, averaged farm-land owning. The construction of variables measuring local market characteristics is mainly for the purpose of controlling for the location fixed effects, rather than for comparison. The lender characteristics include proxy variables of the availability of funds at province, commune and village levels and the competition between lenders. Further discussion of variables is in Section 6.5.

6.5. Econometric procedures and results

In this section, we implement the tests and report the empirical evidence on the effect of household credit on household welfare. The first stage regression estimates the determinants of household borrowing. The question that we want to answer in this stage is: what are the determinants of household borrowing? In other words, we are interested in exploring: (i) whether or not the natural attributes of a household affect its amount of borrowing; (ii) how the household's endowment affects its borrowings?; and (iii) does the supply of loans by the lenders play any role on household borrowing?

In the second stage, the predicted residuals resulting from the first stage are included as an explanatory variable to control for the endogeneity of credit in the estimation of household welfare. The questions that we will answer in this stage, are as follows: (i) is the household credit endogenous and is the two-stage regression appropriate?; (ii) what is the effect of household credit on household welfare?; and, (iii) is there any difference in the degree of effects between 1992/1993 and 1997/1998?.

6.5.1 Determinants of household borrowing

In the first stage, we use the Equation (6.4) and implement tests using the Tobit model. We select and implement the tests *separately* for two samples of rural households in 1992/1993 and 1997/1998. After adjusting for missing data, the 1997/1998 sample includes 4101 rural household houses, of which 2108 households are borrowing households. The 1992/1993 sample includes 3264 rural households, of which 1733 households borrowed. The test results of are reported in Table 6.4.

(Insert Table 6.4 about here)

The 1997/1998 sample

Considering the test results for the 1997/1998 sample from Table 6.4, we find that, of the natural attributes of households, the age of household head and the size of household are significantly related to total household borrowing at 1% level of significance. In 1997/1998 survey, the middle-aged households tend to borrow more than the other households. The household size is positively and significantly related to household borrowing, indicating either that larger-size households demand more loans, or that the lenders allocate more credit to households with more labourers. The gender of the household head and the dummy variable of whether a household is a farm household are not significantly related to household borrowing. This result indicates that in rural areas there is no distinction between genders and type of households in demanding loans and the allocation of credit.

The proxy variables for household assets are found to be significantly related to household borrowing. At the 5% level of significance, the education of the household head is positively and significantly related to household borrowing, implying that more educated households tend to borrow more than others. At the 1% level of significance, we find that the ownership of farming land positively and significantly affects the amount of household

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borrowing. This indicates either that the ownership of land is very important for gaining access to loans since the formal lenders normally require land use certificates as collateral for loans, or that households owning more farming land borrow more i.e. bigger farm need more money. Financial savings and non-financial savings are negatively and significantly related to household borrowings, at the 1% level of significance. This shows that the households with smaller endowments tend to demand more and borrow more.

Our next concern is about whether or not the availability of funds (or the supply of credit) plays any role in household borrowings. To proxy for the availability of funds, we calculate the sum of all household borrowings by source at village, commune and province level. We then consider the availability of *formal funds* at village, commune and province level and the availability of *informal funds* at village level. At the 1% level of significance, we find that the availability of *informal* funds at village level, the availability of formal funds at village level and the availability of formal funds at province level are positively and significantly related to household borrowings. However, the availability of formal funds at commune level is negatively and significantly related to household borrowing at the 5% level of significance. The opposite signs of the effect of *formal sources* of credit at different levels may imply that in order to help rural households gain access to formal sources of credit, the network of formal lenders must be extended at the village level. The negative effect of the availability of formal credit at commune level possibly implies that where formal credit supply is restricted households may borrow more from informal lenders. The effect of the availability of informal sources of funds at village level on household borrowing indicates that informal sources of credit remain important in rural credit markets.

The 1992/1993 sample

The findings from the 1992/1993 sample, as shown in Table 6.4, are similar and confirm the main findings from 1997/1998 sample. We find the negative and significant effect of the age of household head on household borrowing at the 1% level of significance. This result also indicates older households tend to borrow less. Household size is again positively and significantly related to household borrowing at the 1% level of significance. The gender of the household head and farm household variable are not found to be significantly related to household borrowings.

Of the proxy variables for household assets, the ownership of farming land, the value of financial savings and non-financial savings are all significantly related to the total household borrowing, but we do not find evidence for the influence of the education of the household head. At the 5% level of significance, the positive effect of the ownership of farming land on the amount of household borrowings confirms the implication that we found in 1997/1998 sample that households owning more land demand more loans for their production or that the lenders use land owning as a priority criteria for offering loans. At the 1% level of significance, the negative effects of financial and non-financial savings are relevant to previous findings that better-off households borrow less.

Regarding the availability of funds and competition between lenders, at the 1% level of significance, we find similar results as in 1997/1998 sample that the availability of informal funds and the availability of formal funds at village level are positively and significantly related to household borrowings. However, the availability of funds at the commune level is not significantly related to household borrowings. The findings again strengthen the view that for rural households to gain access to credit, its supply at the village level must be improved.

6.5.2 Impact of credit on household welfare

In the second stage of regression, we use the Equation (6.1) and conduct tests using ordinary least squares method. The predicted residuals that are resulted from the first stage have included in the second stage to correct for sample selection bias and endogeneity of credit. We conduct separate tests for the 1997/1998 sample and the 1992/1993 sample. Table 6.5 shows the Durbin-Hausman-Wu test which indicates whether or not the credit is endogenous and should the two stage regression is appropriate. Table 6.6 shows a summary of the tests of effect of credit on household welfares for the 1997/1997 and 1992/1993 sample, respectively. The test results are reported in Table 6.7 and 6.8. The dependent variables include the logarithm forms of per capita expenditure, per capita food expenditure and per capita non-food expenditure.

(Insert tables 6.5 and 6.6 about here)

From Table 6.5, at the 1% level of significance, the Durbin-Wu-Hausman tests show that the household credit is indeed endogenous for all dependent variables. Therefore, using instruments and analysing the role of credit on household welfares based on the two stage regression are appropriate. Briefly, at the 1% level of significance, we find that household borrowing is positively and significantly related to household welfares, in terms of per capita expenditure, per capita food expenditures and per capita non-food expenditure for both the 1997/1998 and 1992/1993 samples, as shown in Table 6.6. We also find that in 1992/1993, household borrowing contributes more to household welfares than in 1997/1997[20]. The effect of borrowing on non-food expenditure is found to be higher than on food expenditure in both

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20 Specifically, if household borrowing increases by x %, the per capita expenditure increases by $(1+x)^{.058897}-1$ % in 1997/1998 and $(1+x)^{.069796}-1$ % in 1992/1993. The increases in per capita food expenditure and per capita non food expenditure are $(1+x)^{.03155}-1$ % and $(1+x)^{.114328}-1$ % in 1997/1998 and $(1+x)^{.051011}-1$ % and $(1+x)^{.124194}-1$ % in 1992/1993

1997/1998 and 1992/1993 samples. The effects on food and non food expenditures are lower in 1997/1998.

Although the findings show very small effects, they do reveal that household borrowing has a positive impact on household welfare. This result supports the view that providing credit to rural households may increase their welfares and reduce poverty. The greater effect of credit on non-food expenditure in both samples possibly implies that households need to borrow to finance other activities, such as production and trading business, rather than daily sustenance. However, further discussion and the correct policy assessment of the impact of credit needs to take into account cost and benefit analysis.

6.5.3 The main implications

In short, our findings reveal some important implications. First, a schematic picture of a typical household which borrows in the rural Vietnam is presented. A typical household owns an area of farming land and borrows to finance its production because it lacks an endowment (i.e savings). The middle-aged and larger sized households tend to borrow more. The gender of household head and the type of household (i.e. form or non-farm household) however do not affect the amount of household borrowing. This snapshot shows that the households who borrow are those who lack endowments, but have land and labour. They indeed need loans for production. However, the amount of household borrowing is influenced by the availability of funds at the village level. This implies an important policy conclusion: in order for rural households to gain access to credit, the formal/semiformal credit network must be extended to the village level.

Second, the positive impact of household borrowing on household economic welfare indicates that the provision of credit to rural households is an effective tool for improving their living standards. However, the very small values of the estimated coefficients raise the

question of whether it is efficient to provide financial services to the rural households. The traditional view (see Chapter 2, 3 and Robinson, 2001) on rural finance emphases that providing credit to rural households involves high risk and/or high transaction costs. If the costs are too high, one may question: (i) whether providing credit to rural households is good policy, and if it is; (ii) how should we provide financial services to them? This returns us to the debate of whether we should follow a subsidized poverty reduction approach or a market risk related approach aimed at achieving sustainability of financial services provision, which is well discussed in Robinson (2001).

6.6 Further considerations

In the proceeding section, using the whole sample of households in 1992/1993 and 1997/1998, we have shown that credit has a positive and significant impact on household welfare. How robust is this conclusion? Is there any difference in the results between points in time? Are the results consistent for the sub-samples of both poorer households and better-off households?

The conduction of tests for two separate samples has shown the test of robustness in terms of variance in results between points in time. The test results have confirmed the positive impact of credit on household welfare. In this section, we look in detail at the role of the better-off households. It is likely that household borrowing may have positive and significant impact on the better-off households, rather than the poorer households, for the reason that better-off households basically know better how to use credit to generate household welfare. If this is found to be so, the above findings are also robust. Therefore, we implement two further sets of tests. For each sample, we divide it into two sub-samples of households: better off households and poorer households. To construct the sub-samples, rural households are classified into five groups from 1 to 5, in which the household group of 1

indicates the poorest households and the household group of 5 indicates the richest households. The better-off households include households of group 3 to 5 and the poorer households belong to groups 1 and 2.

The sub-sample of better-off households in 1997/1998 includes 2377 households, of which 1163 households are borrowing households. These figures for the sub-sample of better-off households in 1992/1993 are 1901 and 949, respectively. The sub-sample of poorer households in 1997/1998 includes 1724 households, of which 945 are borrowing households. The figures for sub-sample of poorer households in 1992/1993 are 1363 and 784 households. We then repeat the tests in the above section for all sub-samples. Tables 6.9 shows the first stage regression results for the sub-sample of better-off households and Table 6.10 shows the results for the sub-sample of poorer households in 1997/1998 and 1992/1993, respectively.

(Insert Tables 6.9 and 6.10 about here)

From Tables 6.9 and 6.10 we see that the results of the first stage-regression for the sub-samples are not much different from the first stage regression for the whole sample as in previous section in terms of the significant factors and the direction of effect. However, there are some changes in the degree of significance. For example, in 1992/1993 whole sample, the availability of formal funds at village level is found positively and significantly related to household borrowing at 1% level of significance, but in the sub-sample of poorer households, the effect is found at 5% level of significance (see Table 6.10).

By comparing the results from the regressions on 6 samples: whole samples (2) and sub-samples (4), we find that the following variables have a significant effect on the household credit: age of household head, household size, financial savings, non-financial savings, the availability of informal funds and formal funds at village level. The owning of land is also found to be significant to household access to credit in most of the samples,

except for the sub-sample of better-off households in 1992/1993. The significance of these variables in all samples implies that these variables are indeed the key determinants of household borrowing.

Our main interest however is to test whether the results from the second stage regression alter our findings on the impact of credit from the previous section. Table 6.6 shows the Durbin-Wu-Hausman tests which indicate whether or not the instruments and the second stage are appropriate. The results reveal that the two-stage regression and the instruments are more appropriate for most of the dependent variables and the sub-samples, except for the per capita food expenditure in the sub-sample of better-off households in 1992/1993. Therefore, we do an extra test using least squares regression for this case and the two-stage regressions for the rest.

As before, the predicted residuals, which are calculated from the first-stage regression, are added as an explanatory variable in the regression. The extracts of the second stage test results are also reported in Table 6.6 for the sub-samples of better-off households and for the sub-samples of poorer households. The test results are reported in Tables 6.11 and 6.12 for the samples of better-off households and in Tables 6.13 and 6.14 for the samples of poorer households. The extra test of per capita food expenditure using least squares regression for the sample of better-off households in 1997/1998 is reported in Table 15.

For all sub-samples, the results indeed confirm the findings of the previous section. The household borrowing is positively and significantly related to household welfares at 1% level of significance, except to the per capita food expenditure in the sub-sample of better-off households in 1997/1998 at 10% level of significance. The coefficients however are slightly different. For example, the effect of the same increase of x% in the total household credit in 1997/1998 results in an increase of $(1+x)^{.058897} - 1$% in per capita expenditure for the whole

sample, higher than an increase of $(1+x)^{.0261606}$-1% for the sub sample of better-off households and $(1+x)^{.051041}$ for the sub-sample of poorer households.

This result is important for two reasons. First, it confirms that our findings in the section 5 pass the robustness tests and the conclusion that household borrowing is positively and significantly related to household welfare is consistent. Second, it indicates that household borrowing can contribute to household welfare regardless of whether the households are poorer or better off households. Moreover, we find that if the household borrowing increases by the same percentage, it contributes more to the welfares of poorer households, compared with better-off households. Specifically, an increase of x% in household borrowing increases $(1+x)^{.051041} - 1$ % in per capita expenditure for poorer households but $(1+x)^{.026106}$ -1 % for better-off households.

The final thing that we may be concerned with is about technical issues of econometrics. First, the coefficients that we report in this chapter are the un-standardized ones and they are not useful for comparison among variables. Second, the standard errors when using two *separate* stage regressions as discussed in Maddala (2001, pp. 360-363) need to be adjusted. As Maddala analyzes, although the two separate stages of regression may produce consistent coefficients, the standard errors may be incorrect since in the second stage, the predicted values are used instead of the actual values. If so, the interpretation of the test results may lead to different conclusions. Hence, we also conduct extra tests for these two purposes. The calculation of standardized coefficients which are useful for comparison among variables is presented in Appendix A1. The standard error problem is solved by using 2SLS estimator directly. The extra tests are reported in Appendix A2 and indeed they do not contradict our findings in this chapter.

6.7 Conclusions

Although there has been substantial research on the relation between microfinance and household economic welfare, the research approach and methodology has been flawed. The main problems in the study of credit impact assessment include: the endogeneity of credit; and sample selection bias. In this chapter, we have: (i) proposed an econometric framework that aims at minimising the above problems; and (ii) provided the empirical evidence on the role of household credit on household economic welfares with the case of rural Vietnam.

We have found that household borrowing is affected by various factors, of which the following are important: the age of the household head, the household size, the ownership of farming land, the value of financial savings, the value of non financial savings, the availability of informal funds and the availability of formal funds at village level. The positive effect of the ownership of farming land implies either that the households owning more farming land tend to borrow more or that the lenders lend more to those households. This possibly demonstrates that the formal/semiformal lenders require rural households to provide collateral in the form of land use certificates. The negative coefficient of the value of financial savings and the value of non financial savings on the amount of household borrowing indicates that households with insufficient endowments (i.e. low savings) tend to borrow more to finance their production. We also found that the availability of informal and formal/semiformal funds at village level increases the amount of household borrowing. This finding has a very important implication that in order to help rural households gain access to the formal sources of credit, the banking network must be extended to the villages.

The main purpose of this chapter is to assess the role of credit on household economic welfare. We have found that household borrowing is positively and significantly related to the household welfare in both 1992/1993 and 1997/1998 samples. The similarity of finding for

each of the two periods informally supports robustness tests. Although the effect is small, the finding implies that providing loans to rural households is a tool to help poor rural households escape from poverty. We also conducted other tests of robustness to control for the sample bias. These do not contradict our findings. Moreover, we found that household borrowing has a greater positive impact on poorer households, compared with better-off households. This strengthens the view that poorer households can potentially gain from access to formal/semiformal credit in particular, and financial services in general. The readers may also note that for the purpose of this chapter we have considered total household borrowing but it may be possible to follow the same approach and conduct further research on the role of formal and informal credit separately.

However, we may be concerned about the very low impact of credit on household welfare. Given the high transaction costs of providing credit to rural households, the benefit, or the impact, may be lower than the cost, and hence the question is raised: should we provide credit on a risk-related, or a subsidized basis? The main case for subsidizing credit is to reduce poverty by supplying cheap credit, but, as we and many others have found (e.g. Khandker, 2003; Khandker and Faruque, 2001), credit has a very low impact on poverty reduction. Moreover, credit is not the only tool in a poverty reduction strategy (Chapter 3), so why do we need to commit a cheap credit? The risk related approach (i.e. the financial system approach), which aims at assuring sustainability of the providers, results in the supply of much more expensive credit to rural households and we may expect exclusion of the very poor households to result. We thus return to the debate of which is better: the risk oriented or the subsidized poverty alleviation approach? We will come back to this question in the conclusion section of the next chapter which assesses the long-term impact of access to credit on poverty reduction.

CHAPTER 7

RURAL CREDIT AND HOUSEHOLD POVERTY REDUCTION IN VIETNAM:

EVEDENCE USING PANEL DATA FROM HOUSEHOLD SURVEYS

7.1 Introduction

This chapter continues the research question that has been proposed in the previous chapter. However, this chapter looks at the long-term impact of access to credit on household poverty reduction, using panel data from household surveys. We find that credit has a long-term positive and significant impact on household welfare (per capita expenditure, per capita food expenditure, per capita non-food expenditure and the household poverty status). This finding confirms our previous finding using cross-sectional data and indicates that providing credit in particular and financial services in general to the poor leads to household poverty reduction. However, the impact of credit on household welfare is found to be very low. We also find that in order to help rural households gain more access to credit, the credit network must be extended to the village level which further raises the possibility that costs exceed benefits under poverty reduction approach.

This chapter is organised as follows. In Section 7.2, we review the relevant literature relating to long-term impact of access to financial services and poverty reduction. An econometric framework for panel data based analysis is then developed and presented in Section 7.3. Data characteristics and construction of variables are discussed is in Section 7.4. Section 7.5 presents the empirical results and considers their implications. The concluding remarks summarises the key findings of this chapter and draws policy recommendation.

7.2 Review of relevant literature

There is considerable evidence that financial development is associated with economic growth in developing countries (see DFID, 2004; Levine, 1997; Gertler, 1988; Pagano, 1993; Beck, Levine, and Loayza, 1999; Evans, Green and Murinde, 2002). Levine (1997) finds that a growing body of empirical analyses demonstrate a strong positive link between the functioning of the financial system and long-run economic growth. One implication of these papers is that there is a positive relationship between finance and poverty reduction (see for example: Levince, 2005; Beck, Demirguc-Kunt and Levine, 2004; DFID, 2004). However, the papers do not address the specific relationship between *finance for the poor (mainly credit)* and poverty reduction. Studies at macro level may reveal some positive contribution of finance to poverty reduction through economic growth, but they say little about whether or not finance for the poor may increase their living standards in long-term perspective. This chapter focuses on the impact of long-term access to credit (to some extent it implies the financial development) on poverty reduction.

The relationship between access to credit and household poverty reduction has been explored in recent studies (see Chapter 3 and 6). However, most of the previous studies draw their findings from analysis of cross-section data obtained from household surveys. Such analysis does not tell us much about the long-term impact of access to credit on household welfare. It is possible that, if we consider a borrowing household at time t only, this household may generate higher economic welfare because at time t the economic condition is better, rather than because that access to credit has improved its welfare. In such a case, we are concerned that the perceived impact of access to credit on household welfare is temporary or spurious at time t and thus the conclusion of positive impact of access to credit on household welfare may not be persistent.

One of the few papers that look at the long-term impact of credit on household welfare is by Khandker (2003). It uses panel data obtained from household surveys in Bangladesh and finds that credit has a long-term positive impact on household welfare. Although the degree of impact is found to be small, it confirms the evidence from cross-section data and supports the widely held belief that credit can contribute positively to economic welfare of households.

Regarding Vietnam, there are several papers addressing the role of credit on household welfare. For examples, Quach, Mullineux and Murinde (2003) use cross-section data based analysis and find a positive impact of credit on household poverty reduction in rural Vietnam (see also Chapter 6). Their findings are consistent between the household surveys, of 1992/1993 and 1997/1998. Pham and Izumita (2002) also use a household survey and cross-section data based analysis and conclude the positive impact of credit on household income. Others, such as Dao (2000, 2001), use questionnaires and statistical comparison analysis and find that 99 percent of interviewed households agree that they benefit from borrowing and that their income increases.

Although the above mentioned studies suggest a positive impact of credit on household welfare in rural Vietnam, they do not look at the long-term relationship. Thus, in order to draw a comprehensive conclusion on how much credit contribute to household welfare, a long-term assessment is necessary and that is the purpose of this paper. This chapter provides empirical evidence on the long-term impact of credit on household welfare in Vietnam, using a panel data based analysis. If we can confirm that a household which borrows in two consecutive periods, we can see the difference (or change) in the amount of borrowing and household welfare. If the change in household welfare is correlated with a change in household borrowing, there is a long-term relationship. The main difference

between cross-section data and panel data analysis is that the first shows the comparison across households while the second shows changes within households over time.

7.3 The model

We consider a household i in village j who borrows at both times, t and $t+1$. At a certain time t, denote c_{ijt} as the accumulative amount of credit that this household has borrowed by time t and y_{ijt} as an economic welfare that the household obtains at time t. The reduced form of the household borrowing and household welfare function are as follows:

$$c_{ijt} = \beta_0^c + x_{1ijt}^{'}\beta_1^c + x_{2ijt}^{'}\beta_2^c + x_{3ijt}^{'}\beta_3^c + w_{cij}^{'}\beta_w^c + \varepsilon_{ijt}^c \qquad (7.1)$$

$$y_{ijt} = \beta_0 + x_{1ijt}^{'}\beta_1 + x_{2ijt}^{'}\beta_2 + w_{ij}^{'}\beta_w + \varepsilon_{ijt}^y \qquad (7.2)$$

where x_1 is a vector of household characteristics; x_2 is a vector of local market characteristics; and x_3 is a vector of lender characteristics; w is a vector of unobservable characteristics of the household and local market that may affect c_{ijt} and y_{ijt}.. ε_{ijt}^c and ε_{ijt} are mean-zero stochastic errors. The parameters of interest are β_i ($i = 0,1,2,3,c$).

The household characteristics include the natural attributes such as the age of household head, the gender of household head and the household endowment such as the education of the household head, the ownership of land and household savings. The local market characteristics include the proxy variables representing the local economy such as the prices of the selected goods and services or the competitive advantage of the local market such as the averaged-ownership of land, the averaged-education of household head. The lender characteristics include the type of lenders: formal and informal and the availability of formal and informal funds.

7.3.1 Model of endogenous credit

With cross-section data, the endogeneity of credit arises for a number of reasons. First, the non-random allocation of credit may lead to biased estimation of the impact of credit on

household welfare. The lenders may screen applicants based on their characteristics. It is likely that the credit is distributed to better-off households, but better-off households generally are considered to be able to generate higher welfare. Also, the lenders may allocate more credit to some targeted markets, for examples to poorer villages (e.g. lenders offer loans in compliance with a poverty reduction strategy or a regional development policy). It may be that borrowing households in poorer villages generate lower welfare than the non-borrowing households in better-off villages. Hence, the comparison of the credit impact on borrowing and non-borrowing households may be misleading.

Second, the unobservable characteristics of households and local markets affect both the household borrowing, c_{ijt}, and the household welfare, y_{ijt}. In other words, the error terms, ε^c_{ijk} and ε_{ijk}, are likely to be correlated. These unobservable characteristics may include preference heterogeneity, dedication and special effort exerted by households, or the competitive advantages of the local markets. It is possible that a household with greater preference, dedication or effort is more willing to borrow than the others, and then is more capable to generate higher welfare than the others. Now we may see that the generated economic welfare might not result from the increased borrowing, but from the fact that some households are more dedicated or hard-working than the others. The estimation of the impact of credit on household welfare is therefore inconsistent. The discussion of treatment for endogeneity of credit with cross-section data is well presented in Pitt and Khandker (1998) and Khandker and Faruque (2002).

With panel data, households are observed at some points in time, e.g. at *t* and *t+1*. As a result, the problem of endogeneity of credit is reduced to some extent. If we consider the welfare function (7.2) at two points in time and take the difference, the unobserved characteristics are likely to be eliminated. The underlying assumption for this argument to be

true and also for the estimation to be consistent is that the unobservable characteristics are hardly to change from t to $t+1$. More specifically, it is expected that the preference heterogeneity, dedication and effort exerted by a household are constant over time. The reduced forms of the household borrowing and household welfare equations using panel data are as follows:

$$\Delta c_{ijt} = \beta_0^{\Delta c} + \Delta x_{1ijt}' \beta_1^{\Delta c} + \Delta x_{2ijt}' \beta_2^{\Delta c} + \Delta x_{3ijt}' \beta_3^{\Delta c} + \varepsilon_{ijt}^{\Delta c} \tag{7.3}$$

$$\Delta y_{ijt} = \beta_0^{\Delta} + \Delta x_{1ijt}' \beta_1^{\Delta} + \Delta x_{2ijt}' \beta_2^{\Delta} + \Delta c_{ijt} \beta_c^{\Delta} + \varepsilon_{ijt}^{\Delta y} \tag{7.4}$$

where $\Delta x_{1ijt} = x_{1ijt} - x_{1ijt-1}$; $\Delta x_{2ijt} = x_{2ijt} - x_{2ijt-1}$; $\Delta x_{3ijt} = x_{3ijt} - x_{3ijt-1}$; $\Delta c_{ijt} = c_{itk} - c_{ijt-1}$

Although the panel data may reduce the possibility of endogeneity of credit resulting from the unobservable characteristics of household and of the local market, it does not control for the non-random allocation of credit. It is still possible that credit is available and allocated more to households in poorer villages in both time t and $t+1$. We may think of the fact that such strategies as poverty reduction and regional development target the same markets in both times, t and $t+1$. The non-random allocation of credit causes the possibility of endogeineity of credit as it does with cross-section data. Moreover, we have assumed that unobservable characteristics of households and local markets are time invariant, but it may not always be the case. Therefore, the estimation of (7.4) using panel data is possibly biased, and resulting in inconsistent coefficients.

The econometric solution to this problem is to use instrumental variables or instruments and the two-stage regression method (see Greene, 2003, Wooldridge, 2003). The idea of using instruments is that we find variables that are well-correlated with household borrowing c_{ijt}, but are not correlated with the household welfare y_{ijt}. In the first stage regression, the instruments are used to estimate the values of household borrowing that are not affected by the household characteristics. In the second stage, the estimated values are

used instead of household borrowing to correct for the endogeneity of credit. The equivalent is to use the estimated residuals together with household borrowing in the second stage. The significance of the estimated residuals indicates whether or not the instruments and the two-stage regression are appropriate. The Durbin-Wu-Hausman test can be used (see Greene, 2003, Wooldridge, 2003).

Selecting instrumental variables is not a trivial task. Pitt and Khandker (1998) use the exogenous loan eligibility criteria that a lender employs to select a borrower as the instrument. Such exogenous properties are appropriate for credit program assessment where they have specific selection criteria for the participants. Khandker (2003) uses the characteristics of the competitors as the instruments. His idea is that given a limited supply of funds, what matters is the allocation of funds by the lenders. The amount of credit that a household borrows depends not only on its own characteristics, but also on the characteristics of the competitors. The competitors may be at village level as well as district level where they influence the amount of credit that a particular household receives, but not the household welfare.

We follow Khandker's idea in the sense that the availability of funds is an important factor that affects the amount of credit that one household may receive, but not the household welfare. However, we consider the availability of funds and the competition between the informal and formal lenders in the village and commune which the households have access to, rather than in the village and commune of the competitors. The idea is that the amount of credit that one household can borrow is dependent on the amount of credit available in the village and commune. Moreover, if the households have access to both formal and informal sources of funds, the amount of household borrowing may be affected by the choice of where to borrow from since the households apparently choose between the two lenders.

Alternatively, the amount of credit that a lender allocates a borrower may depend on the availability of credit from its competitor.

7.3.2 Model of sample selection

In order to gauge the impact of consecutive borrowing on household welfare, we are interested in the sample of households who borrow at time t. At time $t+1$, there are two sub-samples: (i) households who borrow at both times, t and $t+1$; and (ii) households who borrow at t but not at $t+1$. For convenience, if a household borrows at both times t and $t+1$, they are called "*participant household*"; otherwise, they are called "*non-participant household*".

If we take the sample of participant households only and estimate the credit impact using the two-stage regression procedure, the results may suffer from sample selection bias. The reason is that the households who are non-participant households are possibly excluded for some reasons such as their self-selection or the exclusion by the lender, especially if the lender learns about a borrower's credit worthiness during the first period. If so, the results are inconsistent or at least less interesting since we do not know what would happen to the welfare of the non-participant households if they had chosen to borrow. The micro econometric analysis below will show how the selection bias matters and how we control for it. For convenience, we denote:

$y_i = \Delta y_{ijt}$;

$x_{1i} = (\Delta x_{1ijt}, \Delta x_{1ijt})$;

$x_{2i} = (\Delta x_{1ijt}, \Delta x_{2ijt}, \Delta x_{2ijt})$;

$s^{*}_i = \Delta c_{ijt}$ if a participant household; and $s^{*}_i = g$ (constant, $g < \Delta c_{ijt}$) otherwise.

The equations (7.3) and (7.4) now become the following:

$$y_i = x_{1i}\beta_1 + \varepsilon_{1i} \qquad\qquad (7.5)$$

$$s^{*}_i = x_{2i}\beta_2 + \varepsilon_{2i} \qquad\qquad (7.6)$$

Equation (7.5) represents the household welfare and equation (7.6) indicates the exclusion propensity. Thus, y_i is the observed welfare for household i if it is a participant household and s^*_i is a latent variable that indicates the propensity to be a participant household. Vectors x_{1i} and x_{2i} are vectors of observed explanatory variables; ε_{1i} and ε_{2i} are mean-zero stochastic errors representing the influence of unobserved variables affecting y_i and s^*_i. The parameters of interest are β_1 and β_2.

Since the latent variable s^*_i is unobserved, we define a dummy variable:

$s_i = 1$ if $s^*_i > g$

$s_i = 0$ if otherwise.

We thus observe the welfare of participant households only if $s_i = 1$, i.e., if the households borrow at both times, t and $t+1$. It is likely that the unobserved terms ε_{1i} and ε_{2i} are correlated: households with lower welfare, the poorer, given x_{1i} and x_{2i}, are more likely to want to be participant household. If so, the sample of participant households observed will not accurately represent the underlying population. Hence, inappropriate selection of sample of study generally produces inconsistent estimates of the parameters in the welfare equation.

To solve the above problem, we follow Heckman (1974, 1976, 1979 and 1980) approach, which suggested a simple method to deal with this selection problem. The conditional mean of ε_{1i} can be written as follows[21]:

$$E(\varepsilon_{1i}|s^*_i > 0) = E(\varepsilon_{1i}|\varepsilon_{2i} > -x_{2i}\beta_2) \tag{7.7}$$

and hence

$$E(y_{1i}|x_{1i}, s_i = 1) = x_{1i}\beta_1 + E(\varepsilon_{1i}|\varepsilon_{2i} > -x_{2i}\beta_2) \tag{7.8}$$

Equation (7.8) shows that the regression equation on the selected sample depends on both x_{1i} and x_{2i}. Omitting the conditional mean of ε_{1i} biases the estimates of β_1 unless ε_{1i} and

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21 For simplicity, we include an intercept in x_2 and hence we can normalize g to 0

ε_{2i} are uncorrelated. Selection bias can thus be regarded as a standard problem of omitted-variable bias. The solution is to find an empirical representation of the conditional mean of ε_{1i} and include this variable in the welfare equation.

Under the assumption that ε_{1i} and ε_{2i} are drawn from a bivariate normal distribution, we can derive the regression equation:

$$E(y_{1i}|x_{1i}, s_i = 1) = x_{1i}\beta_1 + \rho\sigma_1\lambda_i \qquad (7.9)$$

where ρ is the correlation coefficient between ε_{1i} and ε_{2i}, σ_1 is the standard deviation of ε_{1i}, and λ_i is the inverse of Mill's ratio (see Greene, 2003, Wooldridge, 2003), which is given by:

$$\lambda_i = \frac{\phi(x_{2i}\beta_2/\sigma_2)}{\Phi(x_{2i}\beta_2/\sigma_2)} \qquad (7.10)$$

where ϕ and Φ are the density and distribution functions of the standard normal distribution and σ_2 is the standard deviation of ε_{2i}.

The Heckman approach suggests estimation of (7.8) in a two-step procedure. The first step involves estimating the parameters in (7.6) by the Probit method (Greene, 2003, Wooldridge, 2003), using the entire sample. These estimates can then be used to compute λ_i for each household in the sample. Once λ_i is computed, we can estimate (7.5) over the sample of participant households by ordinary least squares regression, treating $\rho\sigma_1$ as the regression coefficient for λ_i.

7.3.3 The integrated model

Having paid attention to both the problem of endogenous credit and sample selection bias, the integrated model can be estimated as following. The first step involves estimating the parameters in (7.6) by the Probit method, using the entire sample. The inverse Mill's ratio λ_i is then calculated for each household. The second step involves estimating the parameters in

(7.3) by least squares method, using the sample of participant households. The predicted value of credit and the predicted residual are then calculated for each household. The last step involves estimating the parameters in (7.4) by least squares method, using the participant households and the predicted value of credit instead of the true value. The predicted residual and the inverse Mill's ratio are included as the explanatory variables to control for endogenous credit and sample selection bias.

7.4 Data and construction of variables

Our data are drawn from two surveys on living standards in Vietnam, the Vietnam Living Standards Surveys - VLSS 1992/1993 and VLSS 1997/1998, which have been discussed in Chapter 6. The construction of variables is an important and complicated part of our methodology. A descriptive statistics of variables and correlation matrix are presented in Table 7.1 and 7.2. As we have mentioned in the model section, we consider the change or time difference between values in 1997/1998 and 1992/1993. As a result, any variable should be understood as the difference estimator. For example, consider the simple equation:

$$Y_{t+1} = a + bX_{t+1} + c; \text{ where } Y_{t+1} \equiv (y_{t+1} - y_t) \text{ and } X_{t+1} \equiv (x_{t+1} - x_t)$$

Assuming $b > 0$, one may understand that if X_{t+1} increases, it leads to an increase in Y_{k+1}, and hence, an increase in the differenced variable of x (i.e. $x_{k+1} - x_k$) is associated with increase in the differenced variable of y (i.e. $y_{k+1} - y_k$). Note that higher differenced variable does not mean higher value of variable and that we cannot infer causality from such simple regression.

Following this construction, the groups of variables are considered as follows. The dependent variables, which proxy for household welfare, include per capita expenditure, per capita food expenditure, per capita non-food expenditure and household poverty status. These variables are considered in the form of difference estimators. The household poverty status is

a dummy variable where if the household improves its poverty status, the dependent variable takes the value of 1, and otherwise 0. The explanatory variable of interest, total household borrowing, is constructed by summing all loans from the formal and informal sources, such as bank loans and ROSCA loans. The differenced variables are then computed by calculating the difference in borrowing between 1997/1998 and 1992/1993.

The household characteristics include variables of natural attributes such as age, gender of household head, farm household; and variables of household assets such as savings and farm-land owning in differenced variable form. For the differenced variable of the age of the household head, we look at the age groups (i.e. the first digits of the actual age) and therefore we avoid the problem of the same differenced variables of age for every household head. The differenced variables of gender of the household head and the type of business are constructed as dummy variables. The dummy variable of gender takes the value of 1 if the household head is male in 1997/1998 but female in 1992/1993 (i.e. the household head died between two surveys), and 0 otherwise. The dummy variable of farm household takes the value of 1 if the household is a farm household in 1997/1998, but non-farm household in 1992/1993 i.e. new farm household, and 0 otherwise.

The local market characteristic variables include: the prices of selected goods and services; the averaged household characteristics in a commune, such as averaged education, and averaged farm-land owning. All are in the form of differenced variables. The construction of variables of local market characteristics is mainly for the purpose of controlling for the location fixed effects, rather than for comparison. The lender characteristics include proxy variables, in differenced variable form, of the availability of funds at commune and village levels and the competition between lenders. We consider the availability of both formal and

informal funds to control for the competition between these two sources of funds within the same location.

7.5 Econometric procedures and results

In this section we implement the tests and present the empirical evidence on the impact of household's borrowing on household welfare, using the panel data. The first stage regression estimates the probability of becoming a participant household. We are interested in the question why some households who borrow in 1992/1993 become the participant households in 1997/1998, whereas others do not.

Assuming asymmetric information is crucial in the market, the lender's lending decision depends not only on the household characteristics and the availability of funds, but also on the information on borrowers' credit worthiness that is gained by monitoring the use of loans in the first period and this, apparently, may affect their willingness to continue lending and how much they are willing to lend in the next period. Also, borrowers learn to manage and invest credit better as they gain experience (from training or advice, for examples) and become more credit worthiness.

For these reasons, it is possible and important to assume further that bad borrowers may be either self-excluded or rationed by the lenders while the good borrowers may either continue borrowing or have grown to the point when they become bankable and can thus be passed on to mainstream banks. If this assumption is reasonable, we may think that, in the next period, the pool of applicants includes both good and bad borrowers but only good borrowers receive loans. The question then becomes that what are the factors that affect the lender's decision to lend and the borrower's decision to self-exclude? In other words, we look at how the changes in household attributes, in household's endowment and in the availability of funds may affect the probability of a household being a participant household.

The second stage is to control for the endogenous credit by estimating the factors that affect the change in the amount of borrowing for the participant households. The questions that we want to answer in this stage include: (i) whether or not changes in the natural attributes of a household affect its change in amount of borrowing; (ii) how a change in household's endowment affects a change in the amount of household borrowing? and (iii) does the change in the supply of credit by the lenders play any role on the change in household borrowing?

In the third stage, the inverse Mill's ratios and the predicted residuals, which result from the first stage and the second stage, are included as explanatory variables to control for the sample selection bias and the endogeneity of credit in the estimation of household welfare. The questions that we will answer in this stage include: (i) is the sample selection biased and is the household credit endogenous, and thus, is the three-stage regression appropriate? And (ii) what is the effect of repeated borrowing on household welfare?

7.5.1 Probability of being a participant household

We select the sample of rural households who were borrowing in 1992/1993 and are observed to be borrowing again in 1997/1998. After adjusting for missing data, the sample consists of 1,516 households, of which, there are 970 households continuing to borrow in 1997/1998 i.e. they are the participant households. The regression takes the form of equation (7.6). The test results are reported in Table 7.3.

Insert Table 7.3 about here

Of the proxy variables for household characteristics, we find that an increase in age group of the household head reduces the probability of a household being a participant at the 5% level of significance. This indicates that when the household head becomes older, the household borrows less. This is consistent with our previous finding using cross-section data

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that young and middle-age households tend to borrow more (Quach, Mullineux and Murinde, 2003). At the 10% level of significance, the probability of being a participant household is also lower for those who shift their business towards farm activities. This possibly implies that in rural Vietnam, borrowing seems to be specific and consistent to traditional farm households to expand their business or that the new (farm) businesses are riskier and thus the lenders are more reluctant to lend to them.

Regarding the proxy variables of household endowments, we find that an increase in the value of financial savings and non-financial savings reduces the probability of being a participant household, at the 1% and 5% level of significance respectively. This indicates that if one household has a higher increase in savings within a period, it has lower probability of borrowing in the next period. This confirms our previous finding with cross-section data that households with higher endowment tend to borrow less (Quach, Mullineux, and Murinde, 2003). However, we do not find that the change in education of the household head or the ownership of farming land has significant influence on the probability of household participation.

The next concern is whether or not the change in the availability of funds (or the supply of credit) plays any role in household borrowing. As a proxy for the availability of funds, we calculate the sum of all household borrowings at village and commune level. Following that construction, we consider the availability of formal funds at village and commune levels and the availability of informal funds at the village level. At the 5% level of significance, we find that the increase in the availability of informal funds at village level is positively and significantly related to the probability of a household being a participant. This means that if household lives in a village where the increase of the availability of informal funds is greater, it has higher probability of being a participant household. However, we do

not find evidence on the role of the change in the availability of formal funds. This result suggests that the informal credit in the rural credit market is increasing its importance between the two periods.

7.5.2 Factors affecting change in household borrowing

In the second stage, we use the sample of participant households who borrow in both 1992/1993 and 1997/1998. After adjusting for missing data, this sample includes 970 households. The regression is based on the equation (7.3). The test results are reported in Table 7.4.

Insert Table (7.4) about here

Table 7.4 shows that, at the 5% level of significance, the shift towards farming business is negatively and significantly related to the change in the amount of household borrowing between 1997/1998 and 1992/1993. This means that if a household is a new farm household in 1997/1998, it has a smaller difference in the amount of borrowing, compared to other traditional farm households. We do not find evidence on the effect of age and gender of the household head on the change in household borrowing. However, at the 5% level of significance, we find the positive and significant effect of a change in household size on the change in household borrowing. This indicates that if a household has a greater change in household size, it has a greater change in its amount of borrowing.

Of the proxy variables of household endowments, we find that, at the 5% level of significance, the change in education of household head is negatively and significantly related to the change in household borrowing. This indicates that within a period, if the household head receives more education, the change in household borrowing seems to be smaller. Possibly, more education may result in perceiving more business skills and hence getting higher income and therefore reduces the demand for household borrowing. At the 1% level of

significance, the change in value of financial savings is positively and significantly related to the change in the household borrowing. This implies that if a household has a bigger increase in financial savings, it has a greater increase in the amount of borrowing. This does not contradict our previous finding that households with more financial savings tend to borrow less, but it <u>does</u> reveal the fact that: households who have more savings tend to borrow less, but if they borrow, they receive more because the lenders screen borrowers by their assets and indeed provide more credit to better-off households (Sergio, Schreiner, Meyer, Gonzalez-Vega and Rodriguez-Mega, 2000; Jennefer and Cohen, 2000; Anton, 2000; Wright, 2000; Hulme and Mosley, 1997; Rutherford, 1995; Khandker, 1998). We do not find the evidence that the change in the ownership of farming land and the value of non-financial savings affect borrowing.

At the 1% level of significance, the change in the availability of formal funds and informal funds at village level is positively and significantly related to the change in household borrowing. Specifically, if a village has a greater change in the availability of funds, the change in the amount of borrowing of households who live in that village is higher than that of other households. We however do not find an effect of the availability of funds at commune level. This once again supports the idea that the availability of funds at village level is an important influence on household borrowing.

7.5.3 Impact of household borrowing on household welfare

Next, we implement the tests of the impact of household borrowing on household welfare using the regression equation (7.4). The inverse Mill's ratios and the predicted residuals which are computed from the first and second stage are included as the explanatory variables. The test sample comprises of 970 participant households. The proxy variables for

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the household welfare include: per capita expenditure, per capita food expenditure, the per capita non food expenditure and the household poverty status.

Per capita expenditure

Table (7.5) presents the test result for the impact of household borrowing on per capita expenditure.

Insert Table 7.5 about here

As shown in Table 7.5, the significance of the inverse Mill ratio at the 10% level of significance and of the predicted residual at the 1% level of significance indicate the possibility of sample selection bias and the endogeneity of credit. Thus, the three stage regression is necessary and appropriate. At the 1% level of significance, we find that the change in household borrowing is positively and significantly related to the change in per capita expenditure. More specifically, if we consider two households which borrowed the same amount and had the same per capita expenditure in 1992/1993, then if one of them borrows more in 1997/1998, it has higher per capita expenditure in 1997/1998. For example, if two household borrow the same amount (m) and had the same per capita expenditure (p) in 1992/1993, then in 1997/1998 if the first household borrows m_1, its per capita expenditure will be $p_1 = p(m_1/m)^{.276427}$. But if the second borrows $m_2 > m_1$, its per capita expenditure will be $p_2 = p(m_2/m)^{.276427}$, which is higher than $p(m_1/m)^{.276427}$.

Per capita food expenditure

Table (7.6) shows the result of the third stage regression test. At the 5% level of significance, the predicted residual is significantly related to the per capita food expenditure. This implies the possibility of endogeneity of credit and indicates that the use of instruments is appropriate. However, the inverse Mill's ratio is not found to be significant. Thus, the

sample selection bias is not important for the test of per capita food expenditure. We therefore

exclude the inverse Mill's ratio and retest. The result of this test is reported in Table 7.6a.

Insert Tables 7.6 and 7.6a about here

As Table 7.6a shows, at the 1% level of significance, the change in household

borrowing is positively and significantly related to the change in per capita food expenditure.

This implies that if a household has a greater increase in household borrowing, it has a higher

increase in per capita food expenditure. For example, if two households borrow the same

amount (m) and had the same per food capita expenditure (p) in 1992/1993 then in 1997/1998

if the first household borrows m_1, its per food capita expenditure will be $p_1 = p(m_1/m)^{.180393}$.

But if the second borrows $m_2 > m_1$, its per capita expenditure will be $p_2 = p(m_2/m)^{.180393}$,

which is higher than $p(m_1/m)^{.180393}$.

Per capita non-food expenditure

The results of the test for credit impact on non food expenditure are represented in

Table 7.7.

Insert Table 7.7 about here

As shown in Table 7.7, the Mill ratio (at the 5% level of significance) and the

predicted residual (at the 1% level of significance) are both related to the dependent variable,

implying that the sample selection bias and the endogeneity of credit are serious. Hence, our

econometric procedure of three stage regression is necessary and appropriate. We find that the

change in household borrowing is significantly and positively related to the change in per-

capita non-food expenditure at the 1% level of significance. If a participant household has a

larger increase in household borrowing, it has a bigger increase in per capita non-food

expenditure. As in Table 7.7, if two households are assumed to borrow the same amount (m)

and have the same per non-food capita expenditure (p) in 1992/1993 then in 1997/1998, if the

first household borrows m_1, its per non-food capita expenditure will be $p_1 = p(m_1/m)^{.392661}$. But if the second borrows $m_2 > m_1$, its per capita expenditure will be $p_2 = p(m_2/m)^{.392661}$, which is higher than $p(m_1/m)^{.392661}$

Poverty status

The poverty status of a household indicates its poverty classification among all observed households including borrowing and non-borrowing households. All observed households are classified into five groups, in which group one indicates the poorest and group five indicates the richest. For an observed household, the poverty status may be different between 1992/1993 and 1997/1998. We define the change in poverty status (y_i) as following:

$y_i = 1$ if the poverty status in 1997/1998 is greater than that in 1992/1993

$y_i = 0$ if otherwise

Our first test follows the three-stage regression. The result of this test is reported in Table 7.8. We find that both the predicted residual and the inverse Mill ratio are not significantly related to the dependent variable. This implies that the sample selection bias and the endogeneity of credit are not serious. Therefore, we may exclude both these variables in our structural equation. However, for a rigorous test, we at first exclude the inverse Mill ratio but keep the predicted residual variable. The test result is in Table 7.8a. We again find that the predicted residual is insignificant. Hence, we exclude completely both inverse Mill ratio and predicted residual and conduct the final test. The result of the final test is reported in Table 7.8b.

Insert Tables 7.8, 7.8a, 7.8b about here

From Table 7.8b, at the 1% level of significance, we find that the change in household borrowing is positively and significantly related to the change in household poverty status. Specifically, if one household has a higher increase in the amount of borrowing, it has a

higher probability of being ranked higher i.e. improving poverty status. For example, if we consider two households who borrow the same amount and have the same poverty status in 1992/1993. If in 1997/1998, a household borrows more than another, it has a higher probability of getting a higher ranking compared with the other. This implies that credit has a positive and significant impact on household poverty status.

7.5.4 The implications

Why does a household become a participant household? Why does a household borrow at time t but not at time t+1? We have found that when the household head is getting older, the probability of repeated borrowing decreases. This indicates either that the younger households tend to borrow more, or that the lenders screen borrowers based on their age as age relates to the capacity of labour. The type of business is also relates to the probability of continuous borrowing. Farm households are also found to be more stable in their borrowing decision than those who are not. Hence, one may interpret this finding as showing that borrowing is consistent to farm households and that farm credit should be important in the rural areas.

The households who have greater increase in financial savings and non-financial savings tend to have a lower probability of being a participant household. This indicates that better-off households tend to borrow less frequently and that poorer households borrow more frequently, because of lacking endowment. However, the probability of repeated borrowing also depends on the availability of funds, especially the availability of informal funds. It indicates that the informal financial sector such as money lenders and ROSCAs still play an important role in the rural financial market.

If we look at participant households, what factors affect the amount of borrowing? It seems that more educated households borrow less compared with other participant

households. This is possibly because the more educated households often have a greater endowment and they demand less credit. The shift in type of business also affects the amount of borrowing. Households who shift from non-farm to farm households tend to have a smaller increase in the amount of borrowing, compared with farm households. The value of financial savings is possibly an important factor in screening applicants by the lenders. We have found that households with higher savings tend to borrow less, but if they borrow, they get larger amounts of credit. The availability of funds at village level again affects the amount of household borrowing. If the supply of formal and informal credit increases more in one village, the households who live in that village gets a greater increase in the amount of borrowing. This strengthens the view that in order to help rural households gaining access to credit, the credit network must be extended at village level.

The last but most important implication in our study is that our findings confirm the positive impact of credit on household welfare. We find that the change in the amount of household borrowing is positively and significantly related to the change in household welfare as measured by per capita expenditure, per capita food expenditure, per capita non food expenditure and household poverty status, at a sufficiently small level of significance. One may interpret this finding to mean that the growth in household borrowing relates to the growth in household welfare, and thus reflects the long-run impact of credit on household welfare. The readers may also find it useful to consult our supplementary tests in Appendix A1 and A2 for further information on this conclusion.

However, the coefficients of the relationship are found to be small. This again raises the issue of cost-benefit analysis. Taking into account the government strategy of providing cheap credit to rural households, one may wonder whether the benefit of gaining access to credit (i.e. the credit impact) is greater than the costs associated with the provision of it. The

traditional view (see: Robinson, 2001) of rural finance emphases that providing credit to rural households involves high risk and/or high transaction costs. If the cost is too high, one may question: (i) whether providing credit to rural households is good policy, and, if it is, (ii) how should we provide such services?

7.6 Conclusion

In this chapter, we have presented an econometric framework for estimating the long-term impact of credit on households, using panel data from household surveys. Our econometric procedure takes into account the problems of sample selection bias and endogenous credit. We employ a three stage regression: the first stage is to control for the sample selection bias; the second stage is to control for the endogeneity of credit; and the third stage is to estimate the credit impact on household welfare, where the inverse Mill's ratio and the predicted residual, which are computed from the first and second stage, are included as explanatory variables.

We find that credit has a long-term positive and significant impact on household welfare at the 1% level of significance, in terms of per capita expenditure, per capita food expenditure, per capita non-food expenditure and the household poverty status. This finding confirms our previous finding using cross-sectional data and indicates that providing credit in particular and financial services in general to the poor has a positive impact on household poverty reduction. We also conclude that in order to help rural households gain more access to credit, the credit network must be extended to the village level. However, as in previous chapter, further research may also be conducted to distinguish among different lenders i.e. the role of formal and informal credit separately.

However, it should be noted that the positive impact that we have found in this and previous chapter is too small. Given the high costs of providing financial services to the poor,

it obviously raises the question that whether or not we should continue to follow the subsidy approach in provision of financial services to the poor? We believe that the small impact of credit on poverty reduction indicates that a wide range of supporting services, such as improvements in physical infrastructure, health care, education and skill trainings, rather than the emphasis on credit and financial services is necessary to help the poor get out of poverty. Even if we agree that a small positive impact is worth considering, we believe it would be better to expand outreach to the poor at large scale.

Literature has shown that the poverty reduction approach has failed to expand its outreach on a sustainable basis (Chapter 2). The analysis in Chapter 4 has also suggested that the poverty reduction approach that the government followed has prevented formal financial institutions from attaining financial self-sufficiency and hence they are either reluctant or unable to expand their outreach at large scale. Moreover, findings from Chapter 5 indicate that even under the government supports, the very poor households are not those who are likely to receive cheap credit but the better off households are.

All of these findings suggest us that the poverty reduction approach cannot reach the very poor households and under this approach formal MFIs cannot operate on a sustainable basis while the positive impact is found to be small. We therefore strongly recommend that a new perception of providing financial services to the poor in rural Vietnam should be initiated. We propose that the mixed approach that we have proposed in Chapter 2 and the necessary changes that we have suggested in Chapter 4 should be implemented as soon as possible.

CHAPTER 8

CONCLUSIONS

8.1 Introduction

In this chapter, we summarise the main findings of our research. These findings are presented in the ways that show how they meet the objectives and hypotheses that we proposed at the beginning of the thesis. The policy conclusions are then proposed based on the findings. And finally, some proposals for further research are suggested.

8.2 Main findings

The superior aim of our research was to provide a deep analysis of how to attain a sustainable microfinance. Following this aim, the first objective was to explain why the poor and low-income are generally excluded from the financial sector. We have pursued this objective in Chapter 2 and found that it is important to aware that asymmetric information causes the problems of adverse selection and moral hazard, which result in credit rationing in credit markets. The requirement of collateral can be used as a screening device and to insure the banks against credit risks. However, the credit markets for the low-income households are characterised by high costs, high risks and insufficient collateral. Hence, generally, banks are reluctant to make loans to low-income borrowers.

Given the exclusion of the poor from financial sector, the second objective was to explore how financial institutions can use innovative financial technologies to enhance their outreach to the poor with a hypothesis that these innovative technologies can reduce the asymmetric information problems and associated costs. We indeed have proved this hypothesis, also in Chapter 2. Specifically, group lending may reduce the problem of adverse selection through peer-screening and joint liability while it may reduce moral hazard through

peer-monitoring and peer-pressure. By lending to a group, group lending also reduces the associated costs, as compared with traditional individual lending. However, group lending can also result in the thread of domino effect where one group member fails may lead the failure of the whole group and possible the whole group lending system.

In the context of constrained supply of financial services, the third objective of our research was to investigate whether or not the poor and low income households have demand for financial services. We have realized this objective in Chapter 3 and we have shown that the poor and low-income households do have demand for various financial services, especially they can save, and that there is an excess demand (Rutherford, 1998; Gibbson and Meehan, 2002; Morduch and Haley, 2002; ADB, 2000a). We have also found another reason for the low coverage that microfinance institutions are too small and unable to reach the poor on large scale and that they are not sustainable (Gibbson and Meehan, 2002).

With consideration of the constraints on supply and the excess demand, the analysis of approach to microfinance is important and it is the fourth objective of our thesis. We have shown in Chapter 3 that in attempts to meet the excessive demand for financial services from the poor, microfinance institutions and governments have followed two different approaches, namely poverty reduction approach and financial systems approach (Rhyne, 1998; Robinson, 1999, 2001). The poverty reduction approach commits to providing cheap financial services (mainly credit) to the poor, especially the poorest of the poor, on subsidy basis while the financial system approach aims at building a financial intermediation system among the poor, especially the economically active poor, on a sustainable basis with an application of market principles into microfinance.

We propose that a mixed approach could be more appropriate. To support this hypothesis, we have analyzed and pointed out that both above approaches have their own

disadvantages. The poverty reduction approach has failed in attaining sustainability. The main constrain is the problem of cost-effectiveness and self-sufficiency which result from a suspect and small impact of credit on poverty reduction (Morduch and Meehan, 2002; Gonzalez Vega, 2003). It is also suspected that the target at the poorest of the poor may not be a right policy as for the extremely poor they need basic needs and are not able to make use of financial services (Robinson, 2001; Charitonenko and Rahman, 2002).

The financial systems approach proposes an application of market principles into microfinance, of which charging full costs on financial services provided is essential (Charitonenko and Rahman, 2002; Christen and Drake, 2001). However, it is possible that the commercial costs are much higher than the maximum cost that the households can afford, and thus commercial MFIs decide not to operate in the market at all. It is also possible that the extremely poor are excluded. These two possibilities imply that there should be a balance between social and financial goal in developing a microfinance sector (Charitonenko and Rahman, 2002).

The assessment of microfinance in rural Vietnam is then the next objective of our research and presented in Chapter 4. Although microfinance in rural Vietnam has achieved major success in outreaching to the poor, it has not been sustainable. The main constraints include the lack of a legal framework which does not allow formal MFIs to be financially self-sufficient and semi-formal MFIs to participate more in microfinance. The other constraints include the lending technologies which are not relevant to the best practices in microfinance around the world and the limited network which cannot reach the poor at the grassroots levels. All of these findings draw some policy conclusions.

In order to draw a comprehensive policy conclusion towards the right approach to microfinance, in Chapter 5 we follow the objective of exploring the factors that affect the

access of rural households to formal financial services with a hypothesis that the poorer households are more likely to be excluded. Generally, we suggest that formal financial services in rural Vietnam are more preferable to the rural households largely because of subsidy policy (Dao, 2001). However, for many reasons, households are either completely excluded from the formal sector or being rationed in the amount of credit. The key factors that affect the possibility of receiving loans from formal sources and the amount received include education, household savings, the availability of credit and the area devoted to farming. Apart from the availability of credit, these factors represent the wealth of households and thus the results indicate that formal lenders tend to provide more credit to households who are better off. Interestingly, we have found that for households who are being rationed in amount of credit, the quota system in credit allocation is the key factor and this seems to prove the case of VBARD.

The objective of assessing the impact of access to financial services on poverty reduction is realized in Chapter 6 and 7. The hypothesis we made was that the impact is significantly positive and small. We found that access to credit is positively and significantly related to the household poverty reduction, both in short-term (Chapter 6) and long-term (Chapter 7). Although the effect is small, the finding implies that providing loans to rural households is a tool to help poor rural households escape from poverty. Moreover, we found that household borrowing has a greater positive impact on poorer households, compared with better-off households. This strengthens the view that poorer households can potentially gain from access to formal/semiformal credit in particular, and financial services in general.

8.3 Policy conclusions

Based on the findings in this thesis, we have drawn some policy conclusions, which can be divided, but closely related, into two main sections as follows:

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8.3.1 General policy conclusions

First, given the persistent existence of asymmetric information, a direct intervention of government into the provision of financial services is not an optimal solution because the government faces the same problems of asymmetric information as the financial institutions do. Hence, to make the microfinance markets work, government and financial institutions should focus on the solutions to reduce the problem of asymmetric information and the costs associated with microfinance. For the financial institutions, it is essential to develop and employ the innovations in financial technologies such as tailored lending contracts (e.g. group lending) or partnership based lending (e.g. with credit rating, credit scoring agencies). For the government, it is important to enhance the development of financial infrastructure and the informational intermediation.

Second, it is necessary to perceive that microfinance can be sustainable. To attain a sustainable microfinance, the balance between social and financial goal in microfinance should be recognized. We propose that a mixed approach in microfinance should be initiated. Under this approach, we suggest that financial institutions should follow their objective of being a commercial microfinance institution i.e. follow financial system approach and the governments and donors should provide supports to this approach in two ways: (i) create an enabling financial infrastructure and informational intermediation to assist (but not subsidize) microfinance institutions to reduce costs; and (ii) to provide social intermediation, such as physical infrastructure, education , health, job creation and business skills to the poor, extremely poor in order for them to be able to make use of financial services and gain access to financial system.

8.3.2 Policy conclusions for Vietnam

Given the positive impact of access to credit on poverty reduction and assuming that the government of Vietnam continues to commit to providing credit to rural households under the poverty reduction approach the policy implications drawn from findings in this thesis are as follows:

- First, given the effect of farming area and its productivity on household formal credit, Land Reform should be accelerated. Many provinces have not yet finished the issuance of LUCs (Dao, 2002) and thus rural households may find it hard to gain access to formal credit as LUCs can be used as collateral.

- Second, the importance of the availability of credit at village and commune level indicates that the government should encourage the expansion of bank branch network. Although interest rates in the banking sector are gradually being liberalised, the requirement to charge prior or cheap interest rates (Dao, 2002)) remains a constraint on banks' ability to cover lending costs and develop lending at risk-premium based rates. Thus, a further liberalisation of interest rates could create more incentives for banks (VBARD, VBP) and induce more efficient lending.

- Third, better-off households seem to benefit more from formal credit. In order to ensure poorer households gain access to formal credit, the applicant-screening process should not be based on criteria representing household's wealth. More emphasis should for example be placed on business plans and pre and post loan training and group borrowing. And the last but not least, employing local information obtained through partnership with NGOs and other social organizations could be a good policy.

However, it should be noted that the positive impact that we have found is too small. Taking into account the high costs of providing financial services to the poor, it obviously

raises the question that whether or not we should continue to follow the subsidy approach in provision of financial services to the poor? We believe that the small impact of credit on poverty reduction indicates that a wide range of supporting services, such as improvements in physical infrastructure, health care, education and skill trainings, rather than the emphasis on credit and financial services is necessary to help the poor get out of poverty. Even if we agree that a small positive impact is worth considering, we believe it would be better to expand outreach to the poor at large scale.

Literature has shown that the poverty reduction approach has failed to expand its outreach on a sustainable basis (Robinson, 2001, Gonzalez Vega, 2003). The analysis in Chapter 4 has also suggested that the poverty reduction approach that the government followed has prevented formal financial institutions from attaining financial self-sufficiency and hence they are either reluctant or unable to expand their outreach at large scale. Moreover, findings from Chapter 5 indicate that even under the government supports, the very poor households are not those who are likely to receive cheap credit but the better off households are.

All of these findings suggest us that the poverty reduction approach cannot reach the very poor households and under this approach formal MFIs cannot operate on a sustainable basis while the positive impact is found to be small. We suggest that a perception towards a mixed approach could be more appropriate. Following this approach, the government and donors should remove any direct subsidy to financial services, but instead provide supports in creating a sound financial infrastructure, developing informational intermediation and investing more in social intermediation. Specifically, the government may establish supporting agencies such as the credit rating office, credit bureaus .etc which are currently absent. The government and donors may support to improve roads, deliver health care and

education services, and so on, which help to increase the poor' ability to gain access and make use of financial services.

Another aspect of changing the approach to microfinance requires a commercialization of microfinance institutions. Microfinance institutions in Vietnam should apply market principles in proving financial services to the poor in order to achieve self-sufficiency at the outset. In this context, innovations in financial technologies are necessary. More specifically, successful experiences from the village model banking in BRI and group lending model from NGOs in Vietnam could be learnt. Besides, cooperation or partnership with SOs and LPC is also a good option to reduce the costs of reaching the poor.

8.4 Further research

We believe that further research based on findings from our research is necessary. For example, although we have proposed that the mixed approach to microfinance could be more appropriate, we have not yet shown in detail the ways through which this mixed approach increases the probability of sustainability. How, for example, informational intermediation, such as credit rating and credit bureaus, work and help to increase information and reduce costs relating to the provision of financial services. How a sound financial infrastructure which encourages the competition between various participants increases the performance of the microfinance markets. How the new financial technologies can be created. How social intermediation can be developed and how it contributes to financial intermediation. Moreover, the mixed approach implies a balance between the social and financial goal, but where the balance should lie?

For the case of rural Vietnam, among the above suggestions, the finding that the availability of credit at the village level is significantly related to household access to credit suggests that further research could focus on the creation of sufficient and effective

mechanisms to achieve outreach to the poor and low income households at village level. Following this idea, the expansion of research on successful examples is necessary. Can, for example, the mobile/village banking model can be developed and more widely applied? Can cooperation or partnership between financial institutions and social/informational institutions be made to work? Subsequent research might also replicate our research with the new data in order to verify the consistency of its policy conclusions overtime and/or explore the role of the different lenders on household poverty reduction.

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APPENDIX

Chapter 4

Appendix 4.1 – Concept of poverty by Vietnamese Government

| Criteria | Very LIHs 10% | Low Income Households 55% | | Higher Income Households 35% | |
	Hungry Poor (5%*)	Poor (20%*)	Average (40%*)	Better Off (25%*)	Rich (10%*)
Land (hectare)	<0.5	0.5-1	0.5- 1	1- 2	>2
Tractor (Unit)	No	No	No	One	Some
Cow, Buffalo (head)	No	1	1-3	3-5	>5
Pig (head)	No	1-2	2-4	2-5	>3
Chicken (head)	<5	5-10	5-20	10-30	>20
House	Bamboo Ground, Thatch	Brick, Wood, Thatch	Brick, Wood, Tile, Steel	Brick, Tile, flat roof	Brick, two floor
Bicycle	No	1	1-2	>2	>2
Motorbike	No	No	1 old	1 new	>1 new
Furniture (bed, chair, table, wardrobe, cupboard)	Poor (few, old, broken)	Reasonable (some, old, clean)	Adequate (many, tidy, clean)	good (new, tidy, clean)	luxury (big, carving, many)
Television	No	No	1 old	1 new, colour	>1 big, colour
Radio	No	1	1 with cassette player (small)	1 with cassette player (big)	1 with cassette player (big), louder speakers
Ability to send children to school	Primary	Secondary	High School, Technical	High, University	University
Main food (for 10 months per year)	Cassava, maize	Rice, maize	Rice, maize	Rice	Rice
Income Generating Non-farm Activities	No	Yes, but not stable, petty trade	Stable family business	Stable family business	With workshop
Employment	Under-employment, working as hired labourer	Working as part-time hired labourer	Not hiring external labour	Hiring external labour (seasonal)	Hiring full-time labour (more than 12 months)
Indebtedness	Yes, difficulty to repay	Yes, and able to repay	Yes, and able to repay	Not in debt or debts are low and highly payable	Not in debt or debts are low and highly payable

Appendix 4.2 – Comparison of poverty concepts

Organization(s)	Criteria	Advantages	Drawbacks
World Bank	• Rural areas: ≤ 99 USD per year • Urban areas: ≤ 120 USD per year • Currently, income of less than 1 USD / person/ day is used to define the poverty line.	• This perception, to some extent, serves as a benchmark to compare the poverty rate among nations and help policy-makers design long-term development policies.	• It does not identify accurately the actual level of poverty. • It is not applicable for lenders to identify target customers, for example low-income households as opposed to the poor.
UNDP	• No specific criterion is mentioned. • Instead, the poor are defined as those that *"lack opportunity to take part in the life of the nation, particularly in its economy"*		• It fails to be a useful tool for quantifying poverty degrees in rural areas. • It does not help lenders in identifying target customers or differentiating the better off from the poor at grassroots levels.
International NGOs	• *Wealth rating* technique i.e. the combination of food consumption, housing conditions, animal traction power, and valuable belongings is used by NGOs to identify poor and low-income households. • The poor are those suffering from food shortage 4-6 months per year, having no buffalo or cow, and whose houses are covered by thatch roofs.	• This *wealth rating* technique is meaningful and practical since: • Villagers know the wealth or poverty of their neighbours very well. Thus, they can identify target beneficiaries among themselves better than outsiders • It is visible • Complicated calculations are not needed. • Easy to put into practice.	• The identification of LIHs may be distorted if just a single factor in the combination is used. For example, a working poor may have a shabby house but able to improve it if he had access to a credit source. Besides, one may have to buy rice for consumption but this does not necessarily mean that he is poor since he may have other income sources available. • Poverty lines are based on relative personal value judgement and therefore are not comparable among NGO's S&C schemes.

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(to be continued…)

(…continued)

	• Rural areas: ≤15kg of rice (≤52500VND or ≤3.5 USD per month • Plain areas: ≤20 kg of rice (≤70000VND or ≤ 4.6 USD) per month. • Urban areas: ≤25 kg of rice (≤87500VND or ≤5.8 USD) per month. In November 2000, the Government introduced a new poverty line to replace the old one, now in effect since January 2001. Unlike the previous one, it is based only on cash equivalent income rather than paddy equivalent. The new poverty lines are as follows: • In mountainous areas: < VND 80,000/ person/ month; • In rural areas (plain) < VND 100,000/ person/ month; • In urban areas: < VND 150,000/ person/ month;	• These criteria are useful to measure poverty in terms of money value for the purpose of price comparison.	• It is not convenient to convert different sources of income into rice. For example, it fails to specify how many kilograms of maize or cassava are equal to 1 kg. of rice or how many bananas that a farmer has are equal to 1 kg. of rice • It does not accurately determine the poverty in monetary value. This can be due to the fact that there are different types of rice (broken rice, sticky rice, white rice and long grain rice...) and the price of rice fluctuates • It is not easy to calculate all income earned by an individual farmer per year and is time-consuming. Accordingly, lenders cannot use this method to classify their target customers as low-income households or hungry poor. • They are not well-defined methods to calculate monthly per-capita income earned by the household applying for credit. • No lender in Vietnam has used these poverty lines in approving loans. • These poverty lines have no practical use in rural credit schemes.
Vietnamese Government		

Source: Dao (2001)

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Chapter 6
Table 6.1 - Descriptive Statistics of Samples

	1997/1997 Sample					1992/1993 Sample				
	Mean	Median	Maximum	Minimum	Std. Dev.	Mean	Median	Maximum	Minimum	Std. Dev.
Total household credit (VND1000, Logarithm)	3.962311	5.298317	12.20607	0	3.943971	3.392644	4.60517	11.22524	0	3.319351
The age of household head	4.284565	4	9	1	1.412567	3.846814	4	7	1	1.405454
The age of household head squared	20.35235	16	81	1	13.19449					
Education of household head (years)	6.492725	6	18	0	4.050438	6.810968	6	18	0	3.463499
Dummy variable: farm household =1; otherwise =0	0.758839	1	1	0	0.42784	0.8269	1	1	0	0.378392
Dummy variable: gender of household head: male =1; female=0	0.782004	1	1	0	0.412935	0.819547	1	1	0	0.384624
Household size (persons)	4.849549	5	16	1	1.93795	5.028493	5	15	1	2.008895
Farm land owned (Hectare, Logarithm)	6.683171	7.832014	11.71178	0	3.157325	7.665103	8.598589	12.17716	0	2.989932
Financial savings (VND1000, Logarithm)	4.820754	5.192957	11.92636	0	2.385538	1.528746	0	11.51293	0	2.553675
Non-financial savings (VND1000, Logarithm)	3.432162	0	12.12811	0	3.758125	2.059595	0	13.03462	0	3.188475
Price of detergent in the village (VND1000/kg, Logarithm)	1.94015	2.079442	2.512035	1.360977	0.32764	2.003982	2.079442	2.397895	0.182322	0.335435
Price of fish source (VND1000/bottle, Logarithm)	1.509139	1.541159	2.285439	0.285179	0.407122	0.8173	0.788457	1.791759	-0.693147	0.407298
Price of noodle (VND1000/pack, Logarithm)	0.109959	0.122218	0.405465	-0.105361	0.125294	-0.195213	-0.223144	0.182322	-0.629234	0.167119
Price of pork (VND1000/kg, Logarithm)	3.003199	2.995732	3.332205	2.685805	0.168737	2.533995	2.484907	2.995732	2.178529	0.192701
Price of normal rice (VND1000/kg, Logarithm)	1.234837	1.258461	1.481605	0.756122	0.127256	0.549373	0.540404	0.916291	0.236415	0.135735
Price of sewing service (VND1000/trouser, Logarithm)	2.69455	2.751748	3.231989	1.609438	0.343081	1.869462	1.763583	2.995732	0.916291	0.573221
Averaged education in commune (years)	6.493202	6.37	10.44	1	1.951857	6.811036	6.87	10.45	3.32	1.576392
Averaged land owned in commune (Hectare, Logarithm)	8.080288	8	9.62	6.33	0.59865	8.75889	8.742515	10.64605	0	1.387952
Price index in the region	0.979988	0.974198	1.060165	0.916187	0.046528	0.964833	0.953379	1.085466	0.912119	0.043172
Availability of informal funds in village (VND1000, Logarithm)	8.556792	9.21034	12.2366	0	2.597069	8.281243	8.399535	11.31325	0	1.496115
Number of households in commune	654.3011	558	1868	102	424.3382	1730.379	1679	4487	213	879.3144
Availability of formal funds in province (VND1000, Logarithm)	14.80475	14.98484	16.54824	0	1.664795					
Availability of formal funds in commune (VND1000, Logarithm)	9.728391	10.14643	12.51723	0	2.208659	7.972152	8.268732	11.28978	0	1.913671
Availability of formal funds in village (VND1000, Logarithm)	8.756093	9.392662	12.29225	0	2.640434	6.59973	7.544332	11.28978	0	2.836976
Number of observations	4101					3264				

Table 6.2 – Correlation matrix – 1997/1997 sample

		1	2	3	4	5	6	7	8	9	10	11	12
1	Total household credit (VND1000, Logarithm)	1											
2	The age of household head	-0.166373	1										
3	The age of household head squared	-0.178752	0.985757	1									
4	Education of household head (years)	0.082223	-0.388763	-0.403231	1								
5	Dummy variable: farm household =1; otherwise =0	0.00026	0.037708	0.040288	-0.022476	1							
6	Dummy variable: gender of household head: male =1; female=0	0.091225	-0.188833	-0.185642	0.26737	0.055778	1						
7	Household size (persons)	0.195143	-0.155423	-0.191348	0.040767	-0.000823	0.293658	1					
8	Farm land owned (Hectare, Logarithm)	0.061502	-0.093628	-0.105579	0.062255	0.426227	0.126623	0.160447	1				
9	Financial savings (VND1000, Logarithm)	-0.056451	-0.013256	-0.023769	0.127372	-0.147391	0.051896	0.092969	-0.055129	1			
10	Non-financial savings (VND1000, Logarithm)	-0.103365	0.086071	0.072944	0.012561	-0.161255	-0.005601	0.097126	-0.060012	0.361597	1		
11	Price of detergent in the village (VND1000/kg, Logarithm)	0.0018	0.02918	0.030125	0.014363	-0.022485	-0.001149	0.007807	-0.019931	0.021375	0.000194	1	
12	Price of fish source (VND1000/bottle, Logarithm)	-0.078316	0.019443	0.019509	-0.014277	0.064143	0.018475	-0.00491	0.065401	-0.012543	-0.061967	0.012682	1
13	Price of noodle (VND1000/pack, Logarithm)	0.029969	-0.010454	-0.013607	0.056522	0.005999	-0.006683	-0.00679	-0.062481	-0.0705	-0.041856	-0.140282	0.100356
14	Price of pork (VND1000/kg, Logarithm)	0.073676	0.023675	0.017329	-0.265332	-0.196162	-0.031938	0.140056	-0.170641	0.146448	0.257692	-0.068865	-0.078342
15	Price of normal rice (VND1000/kg, Logarithm)	0.018924	0.012619	0.00857	-0.075022	-0.11729	-0.013664	0.078258	-0.120038	0.03015	0.117145	0.058547	-0.122171
16	Price of sewing service (VND1000/trouser, Logarithm)	0.093999	0.058344	0.05303	-0.209052	-0.198854	-0.015906	0.136037	-0.230618	0.094517	0.253278	0.070172	-0.059194
17	Averaged education in commune (years)	-0.003496	-0.075223	-0.075673	0.481854	0.098488	0.025317	-0.162453	0.03354	-0.017773	-0.171431	0.02983	-0.029824
18	Averaged land owned in commune (Hectare, Logarithm)	0.08314	-0.018452	-0.018903	-0.235734	-0.025926	0.015428	0.136441	0.150035	0.00378	0.154817	-0.08137	-0.082932
19	Price index in the region	0.083814	-0.056502	-0.055574	-0.208772	0.023857	0.031729	0.220848	-0.003062	0.063532	0.115593	-0.112915	-0.135352
20	Availability of informal funds in village (VND1000, Logarithm)	0.132319	-0.005372	-0.004727	0.058305	-0.084998	0.015989	0.021742	-0.039948	0.039109	0.01375	0.079525	0.081456
21	Number of households in commune	-0.016211	0.075462	0.075311	-0.043131	-0.144897	-0.049858	-0.072145	-0.051023	0.142686	0.153906	0.028438	-0.080305
22	Availability of formal funds in province (VND1000, Logarithm)	0.148216	-0.011406	-0.012949	0.033054	-0.122001	-0.033028	0.017988	-0.174533	0.056492	0.150406	0.098713	-0.143717
23	Availability of formal funds in commune (VND1000, Logarithm)	0.17063	-0.010929	-0.013764	-0.006531	-0.100167	-0.020038	0.042773	-0.151655	0.070658	0.134599	-0.005518	-0.150949
24	Availability of formal funds in village (VND1000, Logarithm)	0.215736	-0.018297	-0.021322	0.020921	-0.088231	-0.014052	0.046936	-0.148175	0.075682	0.106211	-0.023506	-0.166165

		13	14	15	16	17	18	19	20	21	22	23	24
13	Price of noodle (VND1000/pack, Logarithm)	1											
14	Price of pork (VND1000/kg, Logarithm)	-0.049611	1										
15	Price of normal rice (VND1000/kg, Logarithm)	0.048979	0.262984	1									
16	Price of sewing service (VND1000/trouser, Logarithm)	-0.101548	0.567673	0.353879	1								
17	Averaged education in commune (years)	0.117288	-0.550637	-0.155931	-0.434071	1							
18	Averaged land owned in commune (Hectare, Logarithm)	-0.03999	0.48245	0.004335	0.311449	-0.48913	1						
19	Price index in the region	-0.102583	0.464871	0.137498	0.416451	-0.433312	0.508151	1					
20	Availability of informal funds in village (VND1000, Logarithm)	-0.011076	-0.054413	0.034749	-0.024799	0.137504	-0.014516	-0.145502	1				
21	Number of households in commune	-0.098273	0.161247	-0.088192	-0.024402	-0.089317	-0.012375	-0.17992	0.203088	1			
22	Availability of formal funds in province (VND1000, Logarithm)	-0.038609	0.162218	0.016278	0.154241	0.068597	0.109976	0.028231	0.085474	0.078189	1		
23	Availability of formal funds in commune (VND1000, Logarithm)	0.016366	0.171111	-0.013776	0.239449	-0.013468	0.188647	0.178064	0.019605	-0.046051	0.612907	1	
24	Availability of formal funds in village (VND1000, Logarithm)	0.033941	0.182257	-0.019982	0.201365	0.001783	0.220546	0.149029	0.065115	-0.108539	0.523059	0.806215	1

Table 6.3 – Correlation Matrix – 1992/1993 sample

#	Variable	1	2	3	4	5	6	7	8	9	10	11
1	Total household credit (VND1000, Logarithm)	1										
2	The age of household head	-0.09996	1									
3	Education of household head (years)	-0.0024	-0.34712	1								
4	Dummy variable: farm household =1; otherwise =0	0.009375	0.035412	-0.124125	1							
5	Dummy variable: gender of household head: male =1; female=0	0.060256	-0.057956	0.130133	0.109591	1						
6	Household size (persons)	0.16595	0.057013	-0.084323	0.069787	0.24067	1					
7	Farm land owned (Hectare, Logarithm)	0.058287	0.024436	-0.085159	0.331713	0.093907	0.143766	1				
8	Financial savings (VND1000, Logarithm)	-0.105486	0.042093	0.070271	-0.159661	0.005141	-0.003791	-0.028587	1			
9	Non-financial savings (VND1000, Logarithm)	-0.098935	0.029496	0.060043	-0.130855	0.01173	0.071716	0.019792	0.305254	1		
10	Price of detergent in the village (VND1000/kg, Logarithm)	0.015292	-0.00531	0.05728	0.018227	0.030413	-0.020832	0.008516	0.038655	0.040591	1	
11	Price of fish source (VND1000/bottle, Logarithm)	-0.004641	-0.027828	0.087203	-0.028114	0.006235	-0.016885	0.013713	-0.051288	-0.060554	-0.077986	1
12	Price of noodle (VND1000/pack, Logarithm)	-0.025554	-0.088318	0.086382	0.029757	-0.02993	-0.012183	0.019027	0.035695	0.058083	-0.179695	-0.119995
13	Price of pork (VND1000/kg, Logarithm)	0.033481	0.066007	-0.216736	-0.15105	-0.008193	0.136239	-0.089644	0.136897	0.115799	-0.107549	-0.08281
14	Price of normal rice (VND1000/kg, Logarithm)	-0.000198	-0.047164	-0.051744	0.061628	0.003867	0.057722	0.01765	-0.055565	-0.13415	-0.178939	-0.004487
15	Price of sewing service (VND1000/trouser, Logarithm)	0.086213	0.071291	-0.276598	-0.143834	0.020676	0.207787	-0.081318	0.069966	0.12442	-0.133383	-0.103359
16	Averaged education in commune (years)	-0.069441	-0.072578	0.455195	-0.030608	-0.02272	-0.217609	-0.09219	-0.025852	-0.066887	0.125545	0.191793
17	Averaged land owned in commune (Hectare, Logarithm)	0.086574	0.001828	-0.145657	-0.028782	0.03589	0.081913	0.364034	0.058034	0.05747	-0.089874	-0.072534
18	Price index in the region	0.0272	-0.003594	-0.240036	-0.084718	0.023147	0.181988	-0.100002	0.070851	0.13172	-0.161913	-0.173901
19	Availability of informal funds in village (VND1000, Logarithm)	0.191731	0.08011	-0.023347	-0.130134	0.003646	0.053576	-0.090788	0.042139	0.108965	0.1141	-0.002791
20	Number of households in commune	0.013435	0.056195	-0.069657	-0.147542	0.006316	0.035875	-0.037349	0.120149	0.115407	-0.032514	0.048237
21	Availability of formal funds in commune (VND1000, Logarithm)	0.127343	0.007968	-0.076664	0.026433	0.010383	0.064596	0.008768	0.040924	0.005794	-0.008861	0.047647
22	Availability of formal funds in village (VND1000, Logarithm)	0.145892	0.02502	-0.044046	0.011128	0.0034	0.027407	0.052765	0.062799	-0.007285	0.051375	0.060024

#	Variable	12	13	14	15	16	17	18	19	20	21	22
12	Price of noodle (VND1000/pack, Logarithm)	1										
13	Price of pork (VND1000/kg, Logarithm)	-0.246573	1									
14	Price of normal rice (VND1000/kg, Logarithm)	0.244013	-0.045005	1								
15	Price of sewing service (VND1000/trouser, Logarithm)	-0.310763	0.678208	-0.002431	1							
16	Averaged education in commune (years)	0.189842	-0.476093	-0.113444	-0.607625	1						
17	Averaged land owned in commune (Hectare, Logarithm)	-0.037647	0.235602	0.016219	0.33826	-0.320147	1					
18	Price index in the region	-0.017732	0.567763	0.021989	0.633544	-0.527415	0.247659	1				
19	Availability of informal funds in village (VND1000, Logarithm)	-0.028534	0.116411	-0.091875	0.288871	-0.082206	0.056185	0.1411	1			
20	Number of households in commune	-0.106203	0.280165	-0.29553	0.320811	-0.152932	0.086992	0.269072	0.243809	1		
21	Availability of formal funds in commune (VND1000, Logarithm)	-0.17925	0.147772	-0.104193	0.148179	-0.168458	0.173121	0.152284	0.00494	-0.003222	1	
22	Availability of formal funds in village (VND1000, Logarithm)	-0.138998	0.095175	-0.089004	0.030199	-0.093103	0.13127	0.013688	-0.032044	-0.032784	0.68381	1

Table 6.4 - Determinants of household credit (97/98 and 92/93 - The whole samples)

First stage Tobit Regression

Dependent variable : Total household credit (VND1000, Logarithm)	1997/1998			1992/1993		
Explanatory variables	Coefficients	z-statistic	Prob.	Coefficients.	z-statistic	Prob.
The age of household head	1.349238	2.743424	0.0061	-0.534680	-6.649445	0.0000
The age of household head squared	-0.222313	-4.091714	0.0000			
Education of household head (years)	0.074426	2.079463	0.0376	-0.004059	-0.111232	0.9114
Dummy variable: farm household =1; otherwise =0	-0.218607	-0.737600	0.4608	-0.222741	-0.736479	0.4614
Dummy variable: gender of household head: male =1; female=0	0.308263	1.041345	0.2977	0.215318	0.764030	0.4448
Household size (persons)	0.523353	8.092091	0.0000	0.434557	7.904087	0.0000
Farm land owned (Hectare, Logarithm)	0.231562	5.406392	0.0000	0.092318	2.212809	0.0269
Financial savings (VND1000, Logarithm)	-0.216638	-4.325020	0.0000	-0.237987	-5.413677	0.0000
Non-financial savings (VND1000, Logarithm)	-0.313294	-9.322477	0.0000	-0.221818	-6.282292	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.110967	-0.319148	0.7496	-0.017907	-0.054083	0.9569
Price of fish source (VND1000/bottle, Logarithm)	-1.196459	-4.213158	0.0000	-0.382876	-1.445793	0.1482
Price of noodle (VND1000/pack, Logarithm)	2.887991	3.191280	0.0014	0.470643	0.639311	0.5226
Price of pork (VND1000/kg, Logarithm)	0.798256	0.815365	0.4149	0.081513	0.108388	0.9137
Price of normal rice (VND1000/kg, Logarithm)	-1.209699	-1.243912	0.2135	-0.226098	-0.264794	0.7912
Price of sewing service (VND1000/trouser, Logarithm)	2.166007	4.950512	0.0000	0.310168	0.966095	0.3340
Averaged education in commune (years)	0.017579	0.209168	0.8343	-0.032988	-0.350469	0.7260
Averaged land owned in commune (Hectare, Logarithm)	-0.248341	-1.000495	0.3171	0.151792	1.643362	0.1003
Price index in the region	5.121724	1.625574	0.1040	-9.186247	-2.677549	0.0074
Availability of informal funds in village (VND1000, Logarithm)	0.391335	8.247937	0.0000	0.881074	10.56694	0.0000
Number of households in commune	0.000433	1.435173	0.1512	-0.000145	-1.090582	0.2755
Availability of formal funds in province (VND1000, Logarithm)	0.292953	3.189332	0.0014			
Availability of formal funds in commune (VND1000, Logarithm)	-0.231167	-2.201784	0.0277	0.106379	1.369011	0.1710
Availability of formal funds in village (VND1000, Logarithm)	0.667861	7.758944	0.0000	0.272537	5.315236	0.0000
C	-22.05987	-5.381328	0.0000	-0.658902	-0.172808	0.8628
R-squared	0.145800			0.122646		
Adjusted R-squared	0.140771			0.116691		
Log likelihood	-8284.762			-6489.587		
Uncensored observations	2108			1733		
Total observations	4101			3264		

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Table 6.5 – Results of Durbin-Wu-Hausman Tests

Dependent variable (Logarithm)	The whole sample				Better-off households				Poorer households			
	1997/1998		1992/1993		1997/1998		1992/1993		1997/1998		1992/1993	
	t-sta.	Prob.	t-sta.	Prob.	t-sta.	Prob.	t-sta.	Prob.	t-sta.	Prob.	t-sta.	Prob.
Per capita expenditure	-9.149071	0.0000	-7.650737	0.0000	-3.596091	0.0003	-2.176149	0.0297	-8.444651	0.0000	-5.173894	0.0000
Per capita food expenditure	-6.002171	0.0000	-5.910136	0.0000	-2.780305	0.0055	-1.319384	0.1872	-3.107590	0.0019	-2.612428	0.0091
Per capita non food expenditure	-11.14564	0.0000	-9.021461	0.0000	-2.979476	0.0029	-3.031199	0.0025	-10.94111	0.0000	-6.905298	0.0000

Table 6.6 – Effect of credit on household welfares

Dependent variable (Logarithm)	The whole sample				Better-off households				Poorer households			
	1997/1998		1992/1993		1997/1998		1992/1993		1997/1998		1992/1993	
	Coeff.	t-sta.	Coeff.	t-sta.	Coeff.	t-sta.	Coeff.	t-sta.	Coeff.	t-sta.	Coeff.	t-sta.
Per capita expenditure	0.058897	10.76278	0.069796	8.594428	0.026106	4.016450	0.022210	2.993245	0.051041	9.501470	0.049039	5.273333
Per capita food expenditure	0.031550	6.596244	0.051011	6.560122	0.015926	2.590315	0.014053	1.768436*	0.018306	3.268044	0.027171	2.615912
Per capita non food expenditure	0.114328	13.29480	0.124194	9.877993	0.039319	3.753593	0.045279	3.783517	0.124351	12.49764	0.132783	7.017389

- Significant at 1% for all
- * Significant at 10%

Table 6.7 - Effect of credit on household welfares (97/98 – The whole sample)
Second stage Least Squares Regression

Dependent variable / Explanatory variables	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.177633	7.306821	0.0000	0.141211	6.645651	0.0000	0.236982	6.203212	0.0000
The age of household head squared	-0.011968	-4.495937	0.0000	-0.010793	-4.638587	0.0000	-0.013962	-3.337507	0.0009
Education of household head (years)	0.021521	11.73443	0.0000	0.011561	7.211788	0.0000	0.035329	12.25802	0.0000
Dummy variable: farm household =1; otherwise =0	-0.023968	-1.597689	0.1102	-0.024622	-1.877764	0.0605	-0.021334	-0.904948	0.3655
Dummy variable: gender of household head: male =1; female=0	0.001698	0.114598	0.9088	0.042384	3.272195	0.0011	-0.057059	-2.450155	0.0143
Household size (persons)	-0.102083	-27.05984	0.0000	-0.095099	-28.84122	0.0000	-0.115973	-19.56257	0.0000
Farm land owned (Hectare, Logarithm)	-0.011821	-5.475450	0.0000	-0.005308	-2.813256	0.0049	-0.019447	-5.732373	0.0000
Financial savings (VND1000, Logarithm)	0.058729	22.25537	0.0000	0.041436	17.96455	0.0000	0.086300	20.81076	0.0000
Non-financial savings (VND1000, Logarithm)	0.045339	23.76919	0.0000	0.025533	15.31461	0.0000	0.077134	25.73254	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	0.005053	0.288457	0.7730	0.025555	1.668933	0.0952	-0.032365	-1.175645	0.2398
Price of fish source (VND1000/bottle, Logarithm)	0.063933	4.294735	0.0000	0.048672	3.740697	0.0002	0.093392	3.992248	0.0001
Price of noodle (VND1000/pack, Logarithm)	0.081608	1.738382	0.0822	0.101111	2.464200	0.0138	-0.042754	-0.579544	0.5623
Price of pork (VND1000/kg, Logarithm)	0.406621	8.407764	0.0000	0.296651	7.017768	0.0000	0.520518	6.848926	0.0000
Price of normal rice (VND1000/kg, Logarithm)	0.210225	4.321962	0.0000	0.247643	5.824863	0.0000	0.204924	2.680927	0.0074
Price of sewing service (VND1000/trouser, Logarithm)	0.070426	2.987775	0.0028	0.007520	0.365022	0.7151	0.162953	4.399208	0.0000
Averaged education in commune (years)	0.011397	2.747349	0.0060	0.010979	3.027804	0.0025	0.020441	3.135507	0.0017
Averaged land owned in commune (Hectare, Logarithm)	0.058936	4.704746	0.0000	0.065031	5.939285	0.0000	0.063567	3.229086	0.0013
Price index in the region	-1.925638	-12.36355	0.0000	-1.486674	-10.92062	0.0000	-2.830734	-11.56548	0.0000
Total household credit (VND1000, Logarithm)	0.058897	10.76278	0.0000	0.031550	6.596244	0.0000	0.114328	13.29480	0.0000
Predicted residuals	-0.051599	-9.149071	0.0000	-0.029587	-6.002171	0.0000	-0.098780	-11.14564	0.0000
C	6.471063	31.34931	0.0000	6.224408	34.49953	0.0000	5.165934	15.92564	0.0000
R-squared	0.474517			0.385771			0.443598		
Adjusted R-squared	0.471941			0.382760			0.440870		
F-statistic	184.2145			128.1238			162.6414		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observations	4101			4101			4101		

Table 6.8 - Effect of credit on household welfares (92/93 – The whole sample)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.090527	15.87109	0.0000	0.068599	12.56038	0.0000	0.137327	15.55116	0.0000
Education of household head (years)	0.025197	10.58782	0.0000	0.016105	7.067884	0.0000	0.041430	11.24481	0.0000
Dummy variable: farm household =1; otherwise =0	-0.150273	-7.622210	0.0000	-0.098088	-5.196055	0.0000	-0.234073	-7.668874	0.0000
Dummy variable: gender of household head: male =1; female=0	-0.021696	-1.186900	0.2354	0.018206	1.040173	0.2983	-0.095532	-3.375689	0.0007
Household size (persons)	-0.078290	-18.48049	0.0000	-0.074983	-18.48536	0.0000	-0.088868	-13.54973	0.0000
Farm land owned (Hectare, Logarithm)	-0.001443	-0.533001	0.5941	1.65E-05	0.006351	0.9949	2.70E-05	0.006436	0.9949
Financial savings (VND1000, Logarithm)	0.040729	13.67241	0.0000	0.032491	11.39107	0.0000	0.058051	12.58704	0.0000
Non-financial savings (VND1000, Logarithm)	0.036854	14.84336	0.0000	0.021212	8.922329	0.0000	0.063629	16.55315	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.111503	-5.218410	0.0000	-0.096806	-4.731683	0.0000	-0.126994	-3.838965	0.0001
Price of fish source (VND1000/bottle, Logarithm)	-0.051007	-2.966216	0.0030	-0.059988	-3.643340	0.0003	-0.043821	-1.646044	0.0999
Price of noodle (VND1000/pack, Logarithm)	-0.238041	-4.992694	0.0000	-0.166472	-3.646553	0.0003	-0.426246	-5.774601	0.0000
Price of pork (VND1000/kg, Logarithm)	0.297911	6.016148	0.0000	0.270648	5.708156	0.0000	0.357521	4.663510	0.0000
Price of normal rice (VND1000/kg, Logarithm)	0.082461	1.551289	0.1209	0.222024	4.362158	0.0000	-0.119833	-1.456118	0.1455
Price of sewing service (VND1000/trouser, Logarithm)	0.134822	6.573578	0.0000	0.032058	1.632429	0.1027	0.309711	9.753856	0.0000
Averaged education in commune (years)	0.017738	2.853165	0.0044	0.016384	2.752460	0.0059	0.023928	2.486101	0.0130
Averaged land owned in commune (Hectare, Logarithm)	-0.005925	-1.014662	0.3103	-0.006104	-1.091577	0.2751	-0.011215	-1.240420	0.2149
Price index in the region	1.102585	4.867014	0.0000	0.700230	3.228127	0.0013	1.549224	4.417173	0.0000
Total household credit (VND1000, Logarithm)	0.069796	8.594428	0.0000	0.051011	6.560122	0.0000	0.124194	9.877993	0.0000
Predicted residuals	-0.064254	-7.650737	0.0000	-0.047526	-5.910136	0.0000	-0.117299	-9.021461	0.0000
C	4.658843	18.72168	0.0000	4.903242	20.57829	0.0000	2.398795	6.226434	0.0000
R-squared	0.375452			0.245630			0.387949		
Adjusted R-squared	0.371794			0.241211			0.384364		
F-statistic	102.6397			55.59346			108.2218		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observations	3264			3264			3264		

Table 6.9 - Determinants of household credit (97/98 and 92/93 - Better off households)
First stage Tobit Regression

	1997/1998			1992/1993		
	Coefficients	z-statistic	Probability	Coefficients	z-statistic	Probabiliy
The age of household head	1.482429	2.087290	0.0369	-0.579146	-4.996796	0.0000
The age of household head squared	-0.249041	-3.222121	0.0013			
Education of household head (years)	0.007877	0.158410	0.8741	-0.051062	-1.005726	0.3145
Dummy variable: farm household =1; otherwise =0	-0.414386	-1.074531	0.2826	-0.051352	-0.131594	0.8953
Dummy variable: gender of household head: male =1; female=0	0.432647	1.042593	0.2971	0.408491	1.019818	0.3078
Household size (persons)	0.716737	7.233349	0.0000	0.505222	6.342865	0.0000
Farm land owned (Hectare, Logarithm)	0.204441	3.725166	0.0002	-0.010655	-0.196161	0.8445
Financial savings (VND1000, Logarithm)	-0.262307	-3.519889	0.0004	-0.276602	-4.807256	0.0000
Non-financial savings (VND1000, Logarithm)	-0.375904	-8.139905	0.0000	-0.217089	-4.613575	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.051318	-0.103650	0.9174	-0.218519	-0.442688	0.6580
Price of fish source (VND1000/bottle, Logarithm)	-1.324972	-3.297068	0.0010	-0.613812	-1.567573	0.1170
Price of noodle (VND1000/pack, Logarithm)	2.329617	1.881117	0.0600	1.121625	1.041135	0.2978
Price of pork (VND1000/kg, Logarithm)	-0.957336	-0.658424	0.5103	0.454189	0.435486	0.6632
Price of normal rice (VND1000/kg, Logarithm)	-0.248053	-0.175695	0.8605	-0.332729	-0.260674	0.7943
Price of sewing service (VND1000/trouser, Logarithm)	1.584815	2.204726	0.0275	0.430463	0.936327	0.3491
Averaged education in commune (years)	-0.196099	-1.494119	0.1351	-0.022342	-0.170444	0.8647
Averaged land owned in commune (Hectare, Logarithm)	-0.386283	-1.111172	0.2665	0.297731	1.902234	0.0571
Price index in the region	6.269649	1.341001	0.1799	-10.62508	-2.218079	0.0265
Availability of informal funds in village (VND1000, Logarithm)	0.356408	5.142530	0.0000	1.120213	8.175622	0.0000
Number of households in commune	-4.12E-05	-0.096847	0.9228	-0.000161	-0.864821	0.3871
Availability of formal funds in province (VND1000, Logarithm)	1.129812	5.298885	0.0000			
Availability of formal funds in commune (VND1000, Logarithm)	-0.324574	-2.120559	0.0340	0.086610	0.765687	0.4439
Availability of formal funds in village (VND1000, Logarithm)	0.494974	3.956040	0.0001	0.351559	4.818852	0.0000
C	-23.94437	-3.679823	0.0002	-2.959063	-0.549737	0.5825
R-squared	0.158539			0.143696		
Adjusted R-squared	0.149953			0.133665		
Log likelihood	-4697.249			-3667.170		
Uncensored observations	1163			949		
Total observations	2377			1901		

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Table 6.10 - Determinants of household credit (97/98 and 92/93 - Poorer households)

First stage Tobit Regression:

	1997/1998			1992/1993		
	Coefficients	z-statistic	Probability	Coefficients	z-statistic	Probability
The age of household head	1.197938	1.779823	0.0751	-0.429008	-3.723920	0.0002
The age of household head squared	-0.193498	-2.561636	0.0104			
Education of household head (years)	0.128646	2.501598	0.0124	0.051385	0.968642	0.3327
Dummy variable: farm household =1; otherwise =0	-0.161231	-0.334436	0.7381	-0.513989	-1.002713	0.3160
Dummy variable: gender of household head: male =1; female=0	0.274598	0.666179	0.5053	0.024857	0.064292	0.9487
Household size (persons)	0.438137	4.840693	0.0000	0.332937	4.285694	0.0000
Farm land owned (Hectare, Logarithm)	0.316576	4.380443	0.0000	0.293848	4.231558	0.0000
Financial savings (VND1000, Logarithm)	-0.274773	-4.015568	0.0001	-0.192296	-2.641463	0.0083
Non-financial savings (VND1000, Logarithm)	-0.308241	-5.862193	0.0000	-0.285373	-4.997261	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.276965	-0.577673	0.5635	0.532688	1.208473	0.2269
Price of fish source (VND1000/bottle, Logarithm)	-1.350183	-3.383665	0.0007	0.068229	0.190339	0.8490
Price of noodle (VND1000/pack, Logarithm)	2.523247	1.842784	0.0654	0.248290	0.245684	0.8059
Price of pork (VND1000/kg, Logarithm)	0.650072	0.477229	0.6332	0.096512	0.087598	0.9302
Price of normal rice (VND1000/kg, Logarithm)	-2.762737	-2.071433	0.0383	-0.095574	-0.085894	0.9316
Price of sewing service (VND1000/trouser, Logarithm)	2.252245	4.230249	0.0000	-0.023061	-0.051457	0.9590
Averaged education in commune (years)	0.118262	1.084625	0.2781	-0.029207	-0.203117	0.8390
Averaged land owned in commune (Hectare, Logarithm)	-0.070447	-0.197140	0.8437	-0.073971	-0.642651	0.5205
Price index in the region	3.402068	0.762781	0.4456	-8.633828	-1.745767	0.0809
Availability of informal funds in village (VND1000, Logarithm)	0.314011	4.915044	0.0000	0.604826	5.988348	0.0000
Number of households in commune	0.001036	2.394920	0.0166	-8.67E-05	-0.451760	0.6514
Availability of formal funds in province (VND1000, Logarithm)	-0.060398	-0.593116	0.5531			
Availability of formal funds in commune (VND1000, Logarithm)	-0.130897	-0.921561	0.3568	0.147632	1.424559	0.1543
Availability of formal funds in village (VND1000, Logarithm)	0.722338	6.118278	0.0000	0.163339	2.317389	0.0205
C	-15.98472	-3.112358	0.0019	1.116361	0.195014	0.8454
R-squared	0.157419			0.111910		
Adjusted R-squared	0.145517			0.097329		
Log likelihood	-3538.583			-2785.511		
Uncensored observations	945			784		
Total observations	1724			1363		

Table 6.11 - Effect of credit on household welfares (97/98 – Better off households)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.105239	3.846885	0.0001	0.080154	3.097539	0.0020	0.150628	3.416559	0.0006
The age of household head squared	-0.007210	-2.433567	0.0150	-0.006171	-2.201853	0.0278	-0.010496	-2.198155	0.0280
Education of household head (years)	0.015954	8.181388	0.0000	0.006913	3.747514	0.0002	0.027094	8.621462	0.0000
Dummy variable: farm household =1; otherwise =0	-0.024470	-1.604713	0.1087	-0.033422	-2.317186	0.0206	-0.011651	-0.474116	0.6355
Dummy variable: gender of household head: male =1; female=0	-0.028193	-1.747057	0.0808	0.031109	2.038015	0.0417	-0.100704	-3.872222	0.0001
Household size (persons)	-0.058316	-11.49840	0.0000	-0.071708	-14.94772	0.0000	-0.037955	-4.643786	0.0000
Farm land owned (Hectare, Logarithm)	-0.012373	-5.753556	0.0000	-0.007664	-3.767768	0.0002	-0.014441	-4.166934	0.0000
Financial savings (VND1000, Logarithm)	0.035423	11.23859	0.0000	0.023019	7.720933	0.0000	0.049985	9.840436	0.0000
Non-financial savings (VND1000, Logarithm)	0.024978	10.89509	0.0000	0.012115	5.586715	0.0000	0.041458	11.22114	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	0.023680	1.226756	0.2200	0.058599	3.209374	0.0013	-0.025966	-0.834678	0.4040
Price of fish source (VND1000/bottle, Logarithm)	0.031532	1.969558	0.0490	0.032220	2.127657	0.0335	0.025938	1.005330	0.3148
Price of noodle (VND1000/pack, Logarithm)	0.166974	3.306420	0.0010	0.139007	2.910065	0.0036	0.179743	2.208577	0.0273
Price of pork (VND1000/kg, Logarithm)	0.358520	6.668940	0.0000	0.299330	5.886400	0.0000	0.424301	4.897411	0.0000
Price of normal rice (VND1000/kg, Logarithm)	-0.018917	-0.348569	0.7274	0.096908	1.887775	0.0592	-0.111001	-1.269146	0.2045
Price of sewing service (VND1000/trouser, Logarithm)	0.059863	2.075867	0.0380	-0.021146	-0.775214	0.4383	0.161764	3.480762	0.0005
Averaged education in commune (years)	0.002321	0.458462	0.6467	0.008353	1.744110	0.0813	-0.001158	-0.141975	0.8871
Averaged land owned in commune (Hectare, Logarithm)	0.034388	2.540981	0.0111	0.061016	4.766437	0.0000	0.008081	0.370524	0.7110
Price index in the region	-1.263575	-6.942171	0.0000	-1.294024	-7.516126	0.0000	-1.327817	-4.526709	0.0000
Total household credit (VND1000, Logarithm)	0.026106	4.016450	0.0001	0.015926	2.590315	0.0096	0.039319	3.753593	0.0002
Predicted residuals	-0.023924	-3.596091	0.0003	-0.017496	-2.780305	0.0055	-0.031944	-2.979476	0.0029
C	7.120872	28.33292	0.0000	6.753054	28.40636	0.0000	5.885884	14.53181	0.0000
R-squared	0.262783			0.207108			0.226162		
Adjusted R-squared	0.256524			0.200378			0.219592		
F-statistic	41.99005			30.77011			34.42816		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observations	2377			2377			2377		

Table 6.12 - Effect of credit on household welfares (97/98 - Poorer Households)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.056421	2.375696	0.0176	0.071065	2.869664	0.0042	0.044997	1.022921	0.3065
The age of household head squared	-0.001746	-0.662550	0.5077	-0.005477	-1.992781	0.0464	0.003913	0.801493	0.4230
Education of household head (years)	0.007530	3.819046	0.0001	0.003411	1.658872	0.0973	0.015331	4.197849	0.0000
Dummy variable: farm household =1; otherwise =0	-0.030852	-1.759911	0.0786	-0.024258	-1.327044	0.1847	-0.044075	-1.357371	0.1748
Dummy variable: gender of household head: male =1; female=0	0.007381	0.496646	0.6195	0.031361	2.023623	0.0432	-0.035619	-1.293862	0.1959
Household size (persons)	-0.050471	-14.18605	0.0000	-0.053460	-14.41048	0.0000	-0.051043	-7.745743	0.0000
Farm land owned (Hectare, Logarithm)	-0.005088	-1.931651	0.0536	0.003123	1.137299	0.2556	-0.022155	-4.541323	0.0000
Financial savings (VND1000, Logarithm)	0.033740	12.87706	0.0000	0.027061	9.904767	0.0000	0.052782	10.87606	0.0000
Non-financial savings (VND1000, Logarithm)	0.025455	12.43450	0.0000	0.012910	6.047718	0.0000	0.054611	14.40236	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.037814	-2.169528	0.0302	-0.035464	-1.951326	0.0512	-0.055983	-1.734122	0.0831
Price of fish source (VND1000/bottle, Logarithm)	0.062700	3.967621	0.0001	0.033311	2.021521	0.0434	0.139590	4.768889	0.0000
Price of noodle (VND1000/pack, Logarithm)	-0.134074	-2.671820	0.0076	-0.038547	-0.736685	0.4614	-0.390420	-4.200484	0.0000
Price of pork (VND1000/kg, Logarithm)	-0.025062	-0.518647	0.6041	-0.072393	-1.436765	0.1510	-0.016379	-0.183004	0.8548
Price of normal rice (VND1000/kg, Logarithm)	0.262849	5.245271	0.0000	0.262120	5.016368	0.0000	0.338816	3.650309	0.0003
Price of sewing service (VND1000/trouser, Logarithm)	-0.001137	-0.053896	0.9570	-0.013539	-0.615417	0.5384	0.033399	0.854679	0.3928
Averaged education in commune (years)	0.009653	2.516500	0.0119	0.007000	1.750196	0.0803	0.021643	3.046293	0.0024
Averaged land owned in commune (Hectare, Logarithm)	0.022750	1.736243	0.0827	0.014338	1.049396	0.2941	0.046316	1.908402	0.0565
Price index in the region	-0.517644	-3.311883	0.0009	-0.076998	-0.472444	0.6367	-1.439054	-4.970789	0.0000
Total household credit (VND1000, Logarithm)	0.051041	9.501470	0.0000	0.018306	3.268044	0.0011	0.124351	12.49764	0.0000
Predicted residuals	-0.046597	-8.444651	0.0000	-0.017880	-3.107590	0.0019	-0.111824	-10.94111	0.0000
C	6.926433	37.77503	0.0000	6.504283	34.01904	0.0000	5.813469	17.11730	0.0000
R-squared	0.304514			0.199055			0.319078		
Adjusted R-squared	0.296347			0.189648			0.311081		
F-statistic	37.28245			21.16187			39.90105		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observations	1724			1724			1724		

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Table 6.13 - Effect of credit on household welfares (92/93 – Better off households)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.041344	7.036635	0.0000	0.029877	4.748102	0.0000	0.064350	6.790454	0.0000
Education of household head (years)	0.012416	5.247050	0.0000	0.004943	1.950727	0.0512	0.023584	6.179458	0.0000
Dummy variable: farm household =1; otherwise =0	-0.090185	-4.983810	0.0000	-0.055646	-2.871361	0.0041	-0.140524	-4.814774	0.0000
Dummy variable: gender of household head: male =1; female=0	-0.064586	-3.483095	0.0005	-0.014724	-0.741470	0.4585	-0.147289	-4.924863	0.0000
Household size (persons)	-0.046938	-10.62202	0.0000	-0.053527	-11.31064	0.0000	-0.036158	-5.073252	0.0000
Farm land owned (Hectare, Logarithm)	-0.006680	-2.621830	0.0088	-0.003217	-1.178899	0.2386	-0.006521	-1.586770	0.1127
Financial savings (VND1000, Logarithm)	0.019549	6.944836	0.0000	0.017005	5.640697	0.0000	0.026395	5.813831	0.0000
Non-financial savings (VND1000, Logarithm)	0.025267	10.86411	0.0000	0.010263	4.120372	0.0000	0.046210	12.31882	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.068484	-3.023574	0.0025	-0.063628	-2.623074	0.0088	-0.066988	-1.833685	0.0669
Price of fish source (VND1000/bottle, Logarithm)	-0.017290	-0.977541	0.3284	-0.030982	-1.635654	0.1021	-0.006957	-0.243891	0.8073
Price of noodle (VND1000/pack, Logarithm)	-0.129367	-2.602030	0.0093	-0.145947	-2.741044	0.0062	-0.168673	-2.103455	0.0356
Price of pork (VND1000/kg, Logarithm)	0.074835	1.520333	0.1286	0.127805	2.424435	0.0154	-0.001632	-0.020555	0.9836
Price of normal rice (VND1000/kg, Logarithm)	-0.106613	-1.919724	0.0550	0.107255	1.803345	0.0715	-0.393201	-4.389786	0.0000
Price of sewing service (VND1000/trouser, Logarithm)	0.107449	5.208157	0.0000	-0.001997	-0.090405	0.9280	0.277898	8.351556	0.0000
Averaged education in commune (years)	-0.002704	-0.442579	0.6581	-0.003935	-0.601355	0.5477	0.006353	0.644628	0.5192
Averaged land owned in commune (Hectare, Logarithm)	0.000914	0.132145	0.8949	-0.000205	-0.027684	0.9779	-0.003246	-0.290820	0.7712
Price index in the region	0.554354	2.460321	0.0140	0.309643	1.283203	0.1996	0.841229	2.314821	0.0207
Total household credit (VND1000, Logarithm)	0.022210	2.993245	0.0028	0.014053	1.768436	0.0772	0.045279	3.783517	0.0002
Predicted residuals	-0.016701	-2.176149	0.0297	-0.010844	-1.319384	0.1872	-0.037521	-3.031199	0.0025
C	6.484279	26.34712	0.0000	6.256163	23.73613	0.0000	4.962927	12.50283	0.0000
R-squared	0.299244			0.147856			0.313963		
Adjusted R-squared	0.292166			0.139249			0.307034		
F-statistic	42.27599			17.17758			45.30715		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observation	1901			1901			1901		

Table 6.14 - Effect of credit on household welfares (92/93 - Poorer Households)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.026701	4.780936	0.0000	0.011697	1.875111	0.0610	0.071063	6.253407	0.0000
Education of household head (years)	0.007150	2.966701	0.0031	0.003237	1.202542	0.2294	0.018259	3.723619	0.0002
Dummy variable: farm household =1; otherwise =0	-0.007879	-0.338412	0.7351	0.018823	0.723854	0.4693	-0.066460	-1.402895	0.1609
Dummy variable: gender of household head: male =1; female=0	0.024795	1.450950	0.1470	0.050790	2.661083	0.0079	-0.035783	-1.029111	0.3036
Household size (persons)	-0.030593	-7.441198	0.0000	-0.027767	-6.046751	0.0000	-0.046269	-5.530911	0.0000
Farm land owned (Hectare, Logarithm)	-0.003111	-0.958966	0.3377	-0.004170	-1.150952	0.2500	-0.008000	-1.212083	0.2257
Financial savings (VND1000, Logarithm)	0.019858	5.878008	0.0000	0.011793	3.125528	0.0018	0.039096	5.687614	0.0000
Non-financial savings (VND1000, Logarithm)	0.016887	5.588296	0.0000	0.005654	1.675170	0.0941	0.050253	8.173033	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.052944	-2.640912	0.0084	-0.045502	-2.032126	0.0423	-0.081626	-2.001075	0.0456
Price of fish source (VND1000/bottle, Logarithm)	-0.063558	-3.926671	0.0001	-0.069941	-3.868698	0.0001	-0.071027	-2.156590	0.0312
Price of noodle (VND1000/pack, Logarithm)	-0.084872	-1.890003	0.0590	0.035793	0.713632	0.4756	-0.377734	-4.134090	0.0000
Price of pork (VND1000/kg, Logarithm)	0.172069	3.529359	0.0004	0.086797	1.593979	0.1112	0.321720	3.243144	0.0012
Price of normal rice (VND1000/kg, Logarithm)	0.105205	2.181204	0.0293	0.197888	3.673340	0.0002	-0.056652	-0.577259	0.5639
Price of sewing service (VND1000/trouser, Logarithm)	0.009028	0.458984	0.6463	-0.043014	-1.957845	0.0505	0.126553	3.161953	0.0016
Averaged education in commune (years)	0.017448	2.688828	0.0073	0.023651	3.263192	0.0011	0.000578	0.043760	0.9651
Averaged land owned in commune (Hectare, Logarithm)	-0.006312	-1.299133	0.1941	-0.004198	-0.773571	0.4393	-0.008353	-0.844861	0.3983
Price index in the region	0.654225	2.894228	0.0039	0.114078	0.451845	0.6515	1.278659	2.780066	0.0055
Total household credit (VND1000, Logarithm)	0.049039	5.273333	0.0000	0.027171	2.615912	0.0090	0.132783	7.017389	0.0000
Predicted residuals	-0.049317	-5.173894	0.0000	-0.027813	-2.612428	0.0091	-0.133928	-6.905298	0.0000
C	5.308913	20.57519	0.0000	5.770885	20.02457	0.0000	2.779027	5.293293	0.0000
R-squared	0.102579			0.101323			0.162216		
Adjusted R-squared	0.089883			0.088609			0.150363		
F-statistic	8.079503			7.969395			13.68619		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observations	1363			1363			1363		

Table 6.15 - Effect of credit on per capita food expenditure (1992/1993 –Better off Households without predicted residuals)

Explanatory variables	Coefficient	Std. Error	t-Statistic	Prob.
The age of household head	0.026384	0.005710	4.621038	0.0000
Education of household head (years)	0.004525	0.002515	1.799338	0.0721
Dummy variable: farm household =1; otherwise =0	-0.055831	0.019383	-2.880435	0.0040
Dummy variable: gender of household head: male =1; female=0	-0.012332	0.019779	-0.623469	0.5331
Household size (persons)	-0.050274	0.004040	-12.44310	0.0000
Farm land owned (Hectare, Logarithm)	-0.003549	0.002718	-1.306063	0.1917
Financial savings (VND1000, Logarithm)	0.015525	0.002799	5.547022	0.0000
Non-financial savings (VND1000, Logarithm)	0.009068	0.002321	3.907405	0.0001
Price of detergent in the village (VND1000/kg, Logarithm)	-0.061161	0.024190	-2.528374	0.0115
Price of fish source (VND1000/bottle, Logarithm)	-0.031646	0.018939	-1.670963	0.0949
Price of noodle (VND1000/pack, Logarithm)	-0.133605	0.052427	-2.548387	0.0109
Price of pork (VND1000/kg, Logarithm)	0.130336	0.052691	2.473610	0.0135
Price of normal rice (VND1000/kg, Logarithm)	0.098917	0.059151	1.672285	0.0946
Price of sewing service (VND1000/trouser, Logarithm)	0.005578	0.021340	0.261382	0.7938
Averaged education in commune (years)	-0.004639	0.006523	-0.711212	0.4770
Averaged land owned in commune (Hectare, Logarithm)	0.002059	0.007211	0.285538	0.7753
Price index in the region	0.247368	0.236690	1.045113	0.2961
Total household credit (VND1000, Logarithm)	0.003979	0.002202	1.806958	0.0709
C	6.321087	0.258988	24.40685	0.0000
R-squared				0.147068
Adjusted R-squared				0.138910
F-statistic				18.02809
Probability (F-statistic)				0.000000
Observations				1901

Table 7.1 - Descriptive statistics – Panel data

		Mean	Median	Maximum	Minimum	Std. Dev.	Observations
1	Increase in total household borrowing	1.258727	1.337696	5.298317	-6.214608	1.311738	970
2	Increase in age group of household head	0.298969	0	5	-5	1.012461	970
3	Increase in education of household head (years)	0.564948	0	16	-11	2.330842	970
4	Dummy: if household becomes farm household	0.048454	0	1	0	0.214834	970
5	Dummy: if household head becomes male	0.021649	0	1	0	0.145611	970
6	Increase in household size (persons)	-0.178351	0	5	-11	1.613969	970
7	Increase in ownership of farming land (hectare)	-0.950949	-0.721573	9.10498	-11.0021	2.670397	970
8	Increase in financial savings (VND1000)	3.260722	4.068698	9.615805	-7.600902	3.192478	970
9	Increase in non-financial savings (VND1000)	1.066843	0	11.0021	-10.30895	4.025281	970
10	Increase in price of detergent (VND1000/kg)	-0.09198	-0.057113	2.169054	-0.874669	0.447066	970
11	Increase in price of fish source (VND1000/bottle)	0.633214	0.559616	2.197225	-0.809681	0.572161	970
12	Increase in price of noodle (VND1000/pack)	0.314333	0.287682	0.972861	-0.182322	0.193624	970
13	Increase in price of pork (VND1000/kg)	0.444679	0.446287	0.899758	0.162519	0.142338	970
14	Increase in price of ordinary rice (VND1000/kg)	0.66744	0.67634	1.052818	0.153492	0.170443	970
15	Increase in price of sewing service (VND1000/trouser)	0.777575	0.693147	1.734601	0	0.413172	970
16	Increase in averaged education of household head in commune (years)	0.039763	0.04	1.83	-2.72	0.781263	970
17	Increase in averaged ownership of farming land in commune (hectare)	-8.37E-01	-9.07E-01	7.80E+00	-2.58E+00	1.01E+00	970
18	Increase in number of households in commune (households)	-978.6474	-823	247	-4154	665.7434	970
19	Increase in price index of the region	0.012842	0.025835	0.099597	-0.08317	0.036564	970
20	Increase in the availability of informal fund in village (VND1000)	0.545066	0.793092	8.941153	-10.3156	2.297871	970
21	Increase in the availability of formal fund in village (VND1000)	1.813926	1.711221	11.12726	-9.169518	3.239065	970
22	Increase in availability of formal funds in commune (VND1000)	1.4932	1.691676	9.87817	-8.90463	2.484622	970

Table 7.2 – Correlation matrix – Panel data

	1	2	3	4	5	6	7	8	9	10	11
1 Increase in total household borrowing	1										
2 Increase in age group of household head	0.0154104	1									
3 Increase in education of household head (years)	-0.0709625	-0.3493352	1								
4 Dummy: if household becomes farm household	-0.055024	-0.0097337	0.0648106	1							
5 Dummy: if household head becomes male	-0.0128841	-0.2469513	0.2710328	-0.0005782	1						
6 Increase in household size (persons)	0.0556301	0.0061396	0.0188561	0.0785226	-0.0274655	1					
7 Increase in ownership of farming land (hectare)	-0.0352536	-0.0054298	0.0101823	0.0284285	0.0154255	0.0539713	1				
8 Increase in financial savings (VND1000)	0.0977171	0.0331567	0.0405137	0.0485037	-0.0621507	-0.0412501	-0.0200069	1			
9 Increase in non-financial savings (VND1000)	0.0097594	0.058501	0.0097044	-0.0288628	-0.0440149	0.0051049	-0.0814746	0.1723696	1		
10 Increase in price of detergent (VND1000/kg)	0.0658668	0.0059895	-0.0098621	-0.0289945	-0.0187297	-0.0442978	-0.0866776	0.0725908	0.0493284	1	
11 Increase in price of fish source (VND1000/bottle)	0.0328436	-0.0262687	0.0252014	0.0185407	0.0007316	-0.0106586	0.128044	-0.0627379	0.0130232	-0.1711903	1
12 Increase in price of noodle (VND1000/pack)	0.0718132	0.0108271	-0.0152534	-0.0865481	-0.0055478	0.0044386	-0.0130479	-0.0021807	0.095245	-0.086183	0.1782411
13 Increase in price of pork (VND1000/kg)	0.0288155	0.0120022	0.0159271	0.0222041	-0.0556727	-0.027774	-0.0269088	0.105201	-0.0138999	-0.028099	0.0029025
14 Increase in price of ordinary rice (VND1000/kg)	0.0092879	-0.0031678	-0.0298367	-0.037092	-0.001866	-0.0852669	-0.1113118	0.1033308	0.086584	-0.0093507	-0.0692096
15 Increase in price of sewing service (VND1000/trouser)	-0.0171853	0.0627605	0.0292377	0.050648	-0.0276416	-0.0358062	0.1540738	-0.0403137	-0.1158186	-0.0542147	0.1955628
16 Increase in averaged education of household head in commune (years)	-0.0592752	-0.0763118	0.1580119	0.0383129	0.0843203	0.0182093	0.16711	-0.0622095	-0.1041915	-0.0725489	-0.0614511
17 Increase in averaged ownership of farming land in commune (hectare)	-0.0267113	-0.0371926	-0.0019825	-0.0224864	-0.0092333	0.0353141	0.354804	0.0217825	-0.0538331	-0.1840208	0.1966829
18 Increase in number of households in commune (households)	0.0337699	0.050575	0.0277845	0.0139651	-0.0325589	-0.0001642	0.1109738	-0.0055774	-0.0638486	0.0548321	0.0799907
19 Increase in price index of the region	-0.0615527	-0.0442696	0.0386949	-0.0405392	0.0096989	-0.0330162	0.1761777	-0.0592065	-0.0964551	-0.0556774	-0.1058896
20 Increase in the availability of informal fund in village (VND1000)	0.095584	0.0444873	-0.0215736	0.0245266	-0.0044692	0.0020539	0.0148672	-0.0116435	-0.0224154	0.1825817	0.1264375
21 Increase in the availability of formal fund in village (VND1000)	0.1283155	0.0118076	-0.0046031	-0.0047092	-0.0058021	0.0275067	-0.087818	-0.0126615	-0.0492194	-0.1328096	0.0181575
22 Increase in availability of formal funds in commune (VND1000)	0.0722351	-0.0424435	0.0262839	-0.0033065	0.0214942	0.0280976	-0.0507822	0.0184717	-0.0172395	-0.1794004	-0.0032455

	12	13	14	15	16	17	18	19	20	21	22
12 Increase in price of noodle (VND1000/pack)	1										
13 Increase in price of pork (VND1000/kg)	-0.1259235	1									
14 Increase in price of ordinary rice (VND1000/kg)	0.2912366	-0.0993543	1								
15 Increase in price of sewing service (VND1000/trouser)	0.000325	0.0669856	-0.1402553	1							
16 Increase in averaged education of household head in commune (years)	-0.1298156	-0.0904834	-0.225145	0.2063731	1						
17 Increase in averaged ownership of farming land in commune (hectare)	0.0385641	0.0049791	-0.0558797	0.1481222	0.0697169	1					
18 Increase in number of households in commune (households)	0.0349759	-0.0311446	-0.1289659	0.2783318	0.1300861	0.0425378	1				
19 Increase in price index of the region	-0.1109723	-0.1513794	-0.1859293	0.0624507	0.29124	0.1150583	0.1167217	1			
20 Increase in the availability of informal fund in village (VND1000)	0.0574497	0.178632	0.1018887	0.1968286	-0.0559339	-0.1605781	-0.2424569		1		
21 Increase in the availability of formal fund in village (VND1000)	0.0858509	0.0004323	0.0563897	-0.1753652	-0.0499831	-0.0686487	-0.0456508		-0.0919507	1	
22 Increase in availability of formal funds in commune (VND1000)	0.0625615	-0.0465691	0.0415105	-0.1513535	-0.0689779	-0.0836042	0.0913505		-0.1052369	0.7787302	1

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Table 7.3 - Probability of being participant household
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Dummy: if household is a participant household

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Increase in age group of household head	-0.082077	0.038387	-2.138169	0.0325
Increase in education of household head (years)	-0.001082	0.015931	-0.067941	0.9458
Dummy: if household becomes farm household	-0.279612	0.143827	-1.944081	0.0519
Dummy: if household head becomes male	0.031765	0.265893	0.119464	0.9049
Increase in household size (persons)	0.016060	0.021635	0.742333	0.4579
Increase in ownership of farming land (hectare)	0.007632	0.014350	0.531862	0.5948
Increase in financial savings (VND1000)	-0.028600	0.011292	-2.532805	0.0113
Increase in non-financial savings (VND1000)	-0.031903	0.008629	-3.697330	0.0002
Increase in price of detergent (VND1000/kg)	0.067955	0.080345	0.845790	0.3977
Increase in price of fish source (VND1000/bottle)	-0.126614	0.067327	-1.880585	0.0600
Increase in price of noodle (VND1000/pack)	0.208178	0.188254	1.105832	0.2688
Increase in price of pork (VND1000/kg)	0.221996	0.257408	0.862429	0.3885
Increase in price of ordinary rice (VND1000/kg)	-0.489018	0.222030	-2.202483	0.0276
Increase in price of sewing service (VND1000/trouser)	0.007040	0.092018	0.076510	0.9390
Increase in averaged education of household head in commune (years)	-0.001858	0.048711	-0.038137	0.9696
Increase in averaged ownership of farming land in commune (hectare)	-0.051199	0.033293	-1.537817	0.1241
Increase in number of households in commune (households)	-2.55E-05	5.17E-05	-0.493214	0.6219
Increase in price index of the region	-2.407694	1.022689	-2.354277	0.0186
Increase in the availability of informal fund in village (VND1000)	0.039638	0.015938	2.487012	0.0129
Increase in the availability of formal fund in village (VND1000)	0.012355	0.015512	0.796476	0.4258
Increase in availability of formal funds in commune (VND1000)	0.012360	0.020653	0.598450	0.5495
C	0.735368	0.241938	3.039490	0.0024
Mean dependent var				0.639842
McFadden R-squared				0.034713
Log likelihood				-956.3288
LR statistic (21 df)				68.78238
Probability(LR stat)				5.50E-07
Total obs				1516
Obs with Dep=1				970

Table 7.4 - Determinants of change in amount of household borrowing
Method: Least Squares

Dependent Variable: Increase in total household borrowing

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	-0.035905	0.044620	-0.804680	0.4212
Increase in education of household head (years)	-0.044742	0.019603	-2.282449	0.0227
Dummy: if household becomes farm household	-0.353820	0.194683	-1.817413	0.0695
Dummy: if household head becomes male	0.170418	0.300307	0.567480	0.5705
Increase in household size (persons)	0.052008	0.025930	2.005694	0.0452
Increase in ownership of farming land (hectare)	-0.007746	0.017079	-0.453572	0.6502
Increase in financial savings (VND1000)	0.046507	0.013434	3.461918	0.0006
Increase in non-financial savings (VND1000)	-0.002149	0.010657	-0.201687	0.8402
Increase in price of detergent (VND1000/kg)	0.146300	0.100777	1.451724	0.1469
Increase in price of fish source (VND1000/bottle)	0.054203	0.079377	0.682861	0.4949
Increase in price of noodle (VND1000/pack)	0.360164	0.232904	1.546406	0.1223
Increase in price of pork (VND1000/kg)	0.034437	0.309020	0.111440	0.9113
Increase in price of ordinary rice (VND1000/kg)	-0.294298	0.270656	-1.087352	0.2772
Increase in price of sewing service (VND1000/trouser)	-0.041748	0.114689	-0.364011	0.7159
Increase in averaged education of household head in commune (years)	-0.056421	0.059475	-0.948658	0.3430
Increase in averaged ownership of farming land in commune (hectare)	-0.029904	0.045627	-0.655411	0.5124
Increase in number of households in commune (households)	0.000127	6.78E-05	1.877255	0.0608
Increase in price index of the region	-0.221518	1.263804	-0.175279	0.8609
Increase in the availability of informal fund in village (VND1000)	0.061332	0.020611	2.975752	0.0030
Increase in the availability of formal fund in village (VND1000)	0.073036	0.020792	3.512636	0.0005
Increase in availability of formal funds in commune (VND1000)	-0.026758	0.027173	-0.984729	0.3250
C	1.218917	0.290951	4.189421	0.0000
R-squared				0.066044
Adjusted R-squared				0.045355
F-statistic				3.192237
Prob(F-statistic)				0.000002
Log likelihood				-1605.945
Durbin-Watson stat				2.071620
Number of observations				970

Table 7.5 - Impact of credit on per capita expenditure
Method: Least Squares

Dependent Variable: Increase in per capita expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.013132	0.016979	0.773420	0.4395
Increase in education of household head (years)	0.013310	0.006671	1.995201	0.0463
Dummy: if household becomes farm household	-0.048351	0.065801	-0.734803	0.4626
Dummy: if household head becomes male	-0.010031	0.089769	-0.111742	0.9111
Increase in household size (persons)	-0.096559	0.008331	-11.59023	0.0000
Increase in ownership of farming land (hectare)	0.002394	0.005330	0.449165	0.6534
Increase in financial savings (VND1000)	-0.004234	0.008135	-0.520448	0.6029
Increase in non-financial savings (VND1000)	0.002929	0.005595	0.523526	0.6007
Increase in price of detergent (VND1000/kg)	0.097721	0.030669	3.186287	0.0015
Increase in price of fish source (VND1000/bottle)	0.011340	0.031949	0.354925	0.7227
Increase in price of noodle (VND1000/pack)	0.034844	0.074742	0.466191	0.6412
Increase in price of pork (VND1000/kg)	0.152356	0.099822	1.526267	0.1273
Increase in price of ordinary rice (VND1000/kg)	-0.008588	0.094111	-0.091258	0.9273
Increase in price of sewing service (VND1000/trouser)	0.184266	0.031990	5.760036	0.0000
Increase in averaged education of household head in commune (years)	0.039722	0.017833	2.227464	0.0262
Increase in averaged ownership of farming land in commune (hectare)	0.007608	0.015291	0.497559	0.6189
Increase in price index of the region	-3.029959	0.531015	-5.705976	0.0000
Increase in total household borrowing (VND1000)	0.276427	0.077050	3.587656	0.0004
Predicted residuals	-0.252881	0.077803	-3.250263	0.0012
Inverse Mill's ratios	0.539742	0.278686	1.936737	0.0531
C	-0.151590	0.196867	-0.770013	0.4415
R-squared				0.265618
Adjusted R-squared				0.250142
F-statistic				17.16219
Prob (F-statistic)				0.000000
Log likelihood				-431.1583
Durbin-Watson stat				1.957169
Number of observations				970

Table 7.6 - Impact of credit on per capita food expenditure
Method: Least Squares

Dependent Variable: Increase in per capita food expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.030828	0.017491	1.762488	0.0783
Increase in education of household head (years)	0.009037	0.006872	1.314932	0.1889
Dummy: if household becomes farm household	0.008746	0.067787	0.129021	0.8974
Dummy: if household head becomes male	0.130030	0.092479	1.406052	0.1600
Increase in household size (persons)	-0.091156	0.008583	-10.62107	0.0000
Increase in ownership of farming land (hectare)	0.006393	0.005490	1.164328	0.2446
Increase in financial savings (VND1000)	0.006948	0.008381	0.829041	0.4073
Increase in non-financial savings (VND1000)	0.008491	0.005764	1.473091	0.1411
Increase in price of detergent (VND1000/kg)	0.094242	0.031595	2.982836	0.0029
Increase in price of fish source (VND1000/bottle)	0.014740	0.032913	0.447841	0.6544
Increase in price of noodle (VND1000/pack)	-0.016339	0.076998	-0.212204	0.8320
Increase in price of pork (VND1000/kg)	-0.009012	0.102835	-0.087637	0.9302
Increase in price of ordinary rice (VND1000/kg)	0.114984	0.096951	1.185998	0.2359
Increase in price of sewing service (VND1000/trouser)	0.083859	0.032956	2.544583	0.0111
Increase in averaged education of household head in commune (years)	0.010347	0.018371	0.563235	0.5734
Increase in averaged ownership of farming land in commune (hectare)	0.022213	0.015753	1.410127	0.1588
Increase in price index of the region	-1.769505	0.547041	-3.234682	0.0013
Increase in total household borrowing (VND1000)	0.185761	0.079375	2.340301	0.0195
Predicted residuals	-0.178500	0.080151	-2.227034	0.0262
Inverse Mill's ratios	0.028143	0.287097	0.098025	0.9219
C	0.205516	0.202808	1.013348	0.3112
R-squared				0.195612
Adjusted R-squared				0.178659
F-statistic				11.53892
Prob(F-statistic)				0.000000
Log likelihood				-460.0005
Durbin-Watson stat				1.832067
Number of observations				970

Table 7.6.a - Impact of credit on per capita food expenditure (Mill's ratio excluded)
Method: Least Squares

Dependent Variable: Increase in per capita food expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.031899	0.013657	2.335731	0.0197
Increase in education of household head (years)	0.008825	0.006522	1.353187	0.1763
Dummy: if household becomes farm household	0.011242	0.062792	0.179030	0.8580
Dummy: if household head becomes male	0.130252	0.092403	1.409615	0.1590
Increase in household size (persons)	-0.091134	0.008575	-10.62772	0.0000
Increase in ownership of farming land (hectare)	0.006230	0.005232	1.190826	0.2340
Increase in financial savings (VND1000)	0.007619	0.004829	1.577831	0.1149
Increase in non-financial savings (VND1000)	0.008956	0.003281	2.729738	0.0065
Increase in price of detergent (VND1000/kg)	0.093898	0.031383	2.992032	0.0028
Increase in price of fish source (VND1000/bottle)	0.016869	0.024722	0.682342	0.4952
Increase in price of noodle (VND1000/pack)	-0.017340	0.076278	-0.227333	0.8202
Increase in price of pork (VND1000/kg)	-0.013164	0.093660	-0.140549	0.8883
Increase in price of ordinary rice (VND1000/kg)	0.119913	0.082850	1.447343	0.1481
Increase in price of sewing service (VND1000/trouser)	0.083558	0.032796	2.547847	0.0110
Increase in averaged education of household head in commune (years)	0.010043	0.018097	0.554936	0.5791
Increase in averaged ownership of farming land in commune (hectare)	0.022923	0.013982	1.639442	0.1015
Increase in price index of the region	-1.731223	0.382860	-4.521817	0.0000
Increase in total household borrowing (VND1000)	0.180393	0.057422	3.141537	0.0017
Predicted residuals	-0.173109	0.058278	-2.970382	0.0030
C	0.222798	0.100189	2.223768	0.0264
R-squared				0.195603
Adjusted R-squared				0.179516
F-statistic				12.15840
Prob(F-statistic)				0.000000
Log likelihood				-460.0054
Durbin-Watson stat				1.832193
Number of observations				970

Table 7.7 - Impact of credit on per capita non food expenditure
Method: Least Squares

Dependent Variable: Increase in per capita non food expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	-0.009119	0.027161	-0.335741	0.7371
Increase in education of household head (years)	0.019570	0.010672	1.833870	0.0670
Dummy: if household becomes farm household	-0.123646	0.105262	-1.174648	0.2404
Dummy: if household head becomes male	-0.182082	0.143604	-1.267947	0.2051
Increase in household size (persons)	-0.091656	0.013327	-6.877365	0.0000
Increase in ownership of farming land (hectare)	0.001317	0.008526	0.154432	0.8773
Increase in financial savings (VND1000)	-0.012961	0.013014	-0.995903	0.3196
Increase in non-financial savings (VND1000)	-0.001580	0.008951	-0.176544	0.8599
Increase in price of detergent (VND1000/kg)	0.100941	0.049062	2.057435	0.0399
Increase in price of fish source (VND1000/bottle)	0.025245	0.051109	0.493936	0.6215
Increase in price of noodle (VND1000/pack)	0.090590	0.119565	0.757665	0.4488
Increase in price of pork (VND1000/kg)	0.389087	0.159686	2.436580	0.0150
Increase in price of ordinary rice (VND1000/kg)	-0.068136	0.150549	-0.452584	0.6510
Increase in price of sewing service (VND1000/trouser)	0.334511	0.051175	6.536592	0.0000
Increase in averaged education of household head in commune (years)	0.099338	0.028527	3.482210	0.0005
Increase in averaged ownership of farming land in commune (hectare)	-0.008087	0.024461	-0.330596	0.7410
Increase in price index of the region	-4.666223	0.849465	-5.493135	0.0000
Increase in total household borrowing (VND1000)	0.392661	0.123256	3.185734	0.0015
Predicted residuals	-0.354573	0.124462	-2.848845	0.0045
Inverse Mill's ratios	1.021222	0.445814	2.290689	0.0222
C	-0.586386	0.314928	-1.861970	0.0629
R-squared	0.191949			
Adjusted R-squared	0.174920			
F-statistic	11.27154			
Prob(F-statistic)	0.000000			
Log likelihood	-886.8798			
Durbin-Watson stat	1.895583			
Number of observations	970			

Table 7.8 - Impact of credit on household poverty status
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Increase in age group of household head	0.039274	0.065796	0.596903	0.5506
Increase in education of household head (years)	0.052241	0.025342	2.061453	0.0393
Dummy: if household becomes farm household	0.025362	0.245891	0.103144	0.9178
Dummy: if household head becomes male	-0.032454	0.322896	-0.100509	0.9199
Increase in household size (persons)	-0.258864	0.032572	-7.947384	0.0000
Increase in ownership of farming land (hectare)	-0.002053	0.020394	-0.100661	0.9198
Increase in financial savings (VND1000)	0.010467	0.030521	0.342940	0.7316
Increase in non-financial savings (VND1000)	0.017568	0.021114	0.832055	0.4054
Increase in price of detergent (VND1000/kg)	0.352242	0.111197	3.167734	0.0015
Increase in price of fish source (VND1000/bottle)	0.044364	0.119564	0.371046	0.7106
Increase in price of noodle (VND1000/pack)	-0.254930	0.276635	-0.921540	0.3568
Increase in price of pork (VND1000/kg)	0.246562	0.379182	0.650248	0.5155
Increase in price of ordinary rice (VND1000/kg)	-0.263163	0.349867	-0.752181	0.4519
Increase in price of sewing service (VND1000/trouser)	0.569932	0.118278	4.818571	0.0000
Increase in averaged education of household head in commune (years)	0.067032	0.067013	1.000284	0.3172
Increase in averaged ownership of farming land in commune (hectare)	0.072463	0.055594	1.303435	0.1924
Increase in price index of the region	-8.921348	1.997443	-4.466385	0.0000
Increase in total household borrowing (VND1000)	0.568297	0.286950	1.980475	0.0477
Predicted residuals	-0.472964	0.288704	-1.638231	0.1014
Inverse Mill's ratios	0.836696	1.068854	0.782798	0.4337
C	-2.032957	0.755096	-2.692317	0.0071

Mean dependent var	0.310309
McFadden R-squared	0.160900
Log likelihood	-504.1041
LR statistic (20 df)	193.3267
Probability(LR stat)	0.000000
Total obs	970
Obs with Dep=1	301

Table 7.8.a - Impact of credit on household poverty status (Mill's ratio excluded)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Increase in age group of household head	0.071103	0.051675	1.375954	0.1688
Increase in education of household head (years)	0.045917	0.023981	1.914720	0.0555
Dummy: if household becomes farm household	0.099938	0.226876	0.440498	0.6596
Dummy: if household head becomes male	-0.027031	0.323079	-0.083667	0.9333
Increase in household size (persons)	-0.258019	0.032551	-7.926513	0.0000
Increase in ownership of farming land (hectare)	-0.007064	0.019402	-0.364073	0.7158
Increase in financial savings (VND1000)	0.030064	0.017407	1.727157	0.0841
Increase in non-financial savings (VND1000)	0.031369	0.011619	2.699737	0.0069
Increase in price of detergent (VND1000/kg)	0.342815	0.110430	3.104374	0.0019
Increase in price of fish source (VND1000/bottle)	0.105552	0.090346	1.168304	0.2427
Increase in price of noodle (VND1000/pack)	-0.288329	0.273721	-1.053370	0.2922
Increase in price of pork (VND1000/kg)	0.124645	0.344822	0.361476	0.7177
Increase in price of ordinary rice (VND1000/kg)	-0.119042	0.298271	-0.399106	0.6898
Increase in price of sewing service (VND1000/trouser)	0.560174	0.117469	4.768689	0.0000
Increase in averaged education of household head in commune (years)	0.059360	0.066344	0.894728	0.3709
Increase in averaged ownership of farming land in commune (hectare)	0.093704	0.048487	1.932553	0.0533
Increase in price index of the region	-7.784587	1.368994	-5.686357	0.0000
Increase in total household borrowing (VND1000)	0.411783	0.205122	2.007504	0.0447
Predicted residuals	-0.316372	0.207527	-1.524482	0.1274
C	-1.517460	0.364868	-4.158926	0.0000
Mean dependent var				0.310309
McFadden R-squared				0.160392
Log likelihood				-504.4090
LR statistic (19 df)				192.7169
Probability(LR stat)				0.000000
Total obs				970
Obs with Dep=1				301

Table 7.8.b - Impact of credit on household poverty status (Mill's ratio and Predicted Residuals excluded)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Increase in age group of household head	0.057815	0.051151	1.130271	0.2584
Increase in education of household head (years)	0.028134	0.021915	1.283794	0.1992
Dummy: if household becomes farm household	0.013247	0.212118	0.062451	0.9502
Dummy: if household head becomes male	0.033397	0.320978	0.104049	0.9171
Increase in household size (persons)	-0.233516	0.029983	-7.788203	0.0000
Increase in ownership of farming land (hectare)	-0.010628	0.019155	-0.554833	0.5790
Increase in financial savings (VND1000)	0.043800	0.014888	2.941996	0.0033
Increase in non-financial savings (VND1000)	0.030323	0.011387	2.662839	0.0077
Increase in price of detergent (VND1000/kg)	0.405510	0.103875	3.903818	0.0001
Increase in price of fish source (VND1000/bottle)	0.145633	0.087692	1.660740	0.0968
Increase in price of noodle (VND1000/pack)	-0.155319	0.252177	-0.615913	0.5380
Increase in price of pork (VND1000/kg)	0.221028	0.340922	0.648323	0.5168
Increase in price of ordinary rice (VND1000/kg)	-0.143502	0.294151	-0.487852	0.6257
Increase in price of sewing service (VND1000/trouser)	0.571055	0.116511	4.901279	0.0000
Increase in averaged education of household head in commune (years)	0.033749	0.064921	0.519851	0.6032
Increase in averaged ownership of farming land in commune (hectare)	0.080334	0.047736	1.682880	0.0924
Increase in price index of the region	-7.389553	1.292057	-5.719216	0.0000
Increase in total household borrowing (VND1000)	0.098881	0.034775	2.843432	0.0045
C	-1.249388	0.298914	-4.179761	0.0000
Mean dependent var				0.311475
McFadden R-squared				0.153379
Log likelihood				-512.5357
LR statistic (18 df)				185.7076
Probability(LR stat)				0.000000
Total obs				976
Obs with Dep=1				304

In a multiple regression, the relative size of the coefficients is not important because the variables of interest may be measured in different units. Sometimes however we may be interested in the question of that which independent variable is the most important to the dependent variable. We will then be interested in making the variables become comparable to each other. Technically, this process is called transforming *coefficients* into *standardized coefficients*. The standardized coefficients are measured in the same scale with a mean of 0 and a standard deviation of 1. They are then comparable and the largest standardized coefficient indicates which independent variable has the greatest effect on the dependent variable.

In Chapters 6 and 7, our priority is not to identify which independent variables have the larger effect on the dependent variables. However, in order to provide the readers with a more comparable analysis of impact of access to credit on poverty reduction, we present the comparison of coefficients and standardized coefficients in this section. The coefficients and standardized coefficients are presented in the Tables attached to this section. For ease of interpretation, readers may find the correspondent Tables by adding "A1" to the end of the table number in Chapters 6 and 7. For example, Table 6.10 in Chapter 6 is related to Table 6.10.A1 in this section.

The computation of standardized coefficients is simple. The following arrangements show how we get standardized coefficients from the un-standardized coefficients.

Consider the simple equation as follows:

$$y = \alpha + \alpha_1 x_1 + \alpha_2 x_2 + \varepsilon .$$

We then subtract both sides by the mean of the dependent variable y and get:

$$y - \mu_y = \alpha + \alpha_1 x_1 + \alpha_2 x_2 + \varepsilon - \mu_y .$$

The right hand side then be arranged as follows:

$$= \mu_y - \alpha_1\mu_{x_1} - \alpha_2\mu_{x_2} + \alpha_1 x_1 + \alpha_2 x_2 + \varepsilon - \mu_y$$

$$= \alpha_1(x_1 - \mu_{x_1}) + \alpha_2(x_2 - \mu_{x_2}) + \varepsilon$$

$$= \alpha_1\sigma_{x_1} \frac{x_1 - \mu_{x_1}}{\sigma_{x_1}} + \alpha_2\sigma_{x_2} \frac{x_2 - \mu_{x_1}}{\sigma_{x_1}} + \varepsilon$$

Now we divide both sides by the standard deviation of the dependent variable and get:

$$\frac{y - \mu_y}{\sigma_y} = \alpha_1 \frac{\sigma_{x_1}}{\sigma_y} \frac{(x_1 - \mu_{x_1})}{\sigma_{x_1}} + \alpha_1 \frac{\sigma_{x_1}}{\sigma_y} \frac{(x_1 - \mu_{x_1})}{\sigma_{x_1}} + \frac{\varepsilon}{\sigma_y}$$

The reduced form can be written as follows, in which y', x_1', x_2' are standardized.

$$y' = \alpha_1' x_1' + \alpha_1' x_1' + \varepsilon'$$

Hence, the formula used to transform coefficients that we get from the regressions into standardized coefficients therefore is as follows:

$$\alpha_i' = \alpha_i \frac{\sigma_{x_i}}{\sigma_y}$$

Where α' is standardized coefficient, α is the coefficient, σ_y is the standard deviation of the dependent variable and σ_x is the standard deviation of the independent variable.

Table 6.4.A1 - Determinants of household credit (97/98 and 92/93 - The whole samples - Extra)

First stage Tobit Regression

Dependent variable : Total household credit (VND1000, Logarithm)	1997/1998		1992/1993	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	1.349238	0.483241	-0.534680	-0.226390
The age of household head squared	-0.222313	-0.743744		
Education of household head (years)	0.074426	0.076435	-0.004059	-0.004235
Dummy variable: farm household =1; otherwise =0	-0.218607	-0.023714	-0.222741	-0.025392
Dummy variable: gender of household head: male =1; female=0	0.308263	0.032275	0.215318	0.024950
Household size (persons)	0.523353	0.257160	0.434557	0.262997
Farm land owned (Hectare, Logarithm)	0.231562	0.185376	0.092318	0.083156
Financial savings (VND1000, Logarithm)	-0.216638	-0.131035	-0.237987	-0.183090
Non-financial savings (VND1000, Logarithm)	-0.313294	-0.298531	-0.221818	-0.213072
Price of detergent in the village (VND1000/kg, Logarithm)	-0.110967	-0.009218	-0.017907	-0.001810
Price of fish source (VND1000/bottle, Logarithm)	-1.196459	-0.123506	-0.382876	-0.046980
Price of noodle (VND1000/pack, Logarithm)	2.887991	0.091747	0.470643	0.023695
Price of pork (VND1000/kg, Logarithm)	0.798256	0.034152	0.081513	0.004732
Price of normal rice (VND1000/kg, Logarithm)	-1.209699	-0.039032	-0.226098	-0.009246
Price of sewing service (VND1000/trouser, Logarithm)	2.166007	0.188418	0.310168	0.053563
Averaged education in commune (years)	0.017579	0.008700	-0.032988	-0.015666
Averaged land owned in commune (Hectare, Logarithm)	-0.248341	-0.037695	0.151792	0.063470
Price index in the region	5.121724	0.060422	-9.186247	-0.119478
Availability of informal funds in village (VND1000, Logarithm)	0.391335	0.257691	0.881074	0.397122
Number of households in commune	0.000433	0.046587	-0.000145	-0.038411
Availability of formal funds in province (VND1000, Logarithm)	0.292953	0.123659		
Availability of formal funds in commune (VND1000, Logarithm)	-0.231167	-0.129456	0.106379	0.061330
Availability of formal funds in village (VND1000, Logarithm)	0.667861	0.447124	0.272537	0.232931
C	-22.059870		-0.658902	

Table 6.7.A1 - Effect of credit on household welfares (97/98 – The whole sample - Extra)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure(VND1000, Logarithm)		Per capita food expenditure(VND1000, Logarithm)		Per capita non food expenditure(VND1000, Logarithm)	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.177633	0.512975	0.141211	0.504417	0.236982	0.448124
The age of household head squared	-0.011968	-0.322833	-0.010793	-0.360119	-0.013962	-0.246612
Education of household head (years)	0.021521	0.178208	0.011561	0.118416	0.035329	0.191561
Dummy variable: farm household =1; otherwise =0	-0.023968	-0.020964	-0.024622	-0.026639	-0.021334	-0.012219
Dummy variable: gender of household head: male =1; female=0	0.001698	0.001433	0.042384	0.044258	-0.057059	-0.031541
Household size (persons)	-0.102083	-0.404445	-0.095099	-0.466048	-0.115973	-0.300866
Farm land owned (Hectare, Logarithm)	-0.011821	-0.076302	-0.005308	-0.042380	-0.019447	-0.082195
Financial savings (VND1000, Logarithm)	0.058729	0.286419	0.041436	0.249963	0.086300	0.275595
Non-financial savings (VND1000, Logarithm)	0.045339	0.348342	0.025533	0.242653	0.077134	0.388053
Price of detergent in the village (VND1000/kg, Logarithm)	0.005053	0.003385	0.025555	0.021173	-0.032365	-0.014195
Price of fish source (VND1000/bottle, Logarithm)	0.063933	0.053212	0.048672	0.050109	0.093392	0.050899
Price of noodle (VND1000/pack, Logarithm)	0.081608	0.020904	0.101111	0.032036	-0.042754	-0.007171
Price of pork (VND1000/kg, Logarithm)	0.406621	0.140270	0.296651	0.126581	0.520518	0.117576
Price of normal rice (VND1000/kg, Logarithm)	0.210225	0.054692	0.247643	0.079692	0.204924	0.034910
Price of sewing service (VND1000/trouser, Logarithm)	0.070426	0.049396	0.007520	0.006524	0.162953	0.074840
Averaged education in commune (years)	0.011397	0.045478	0.010979	0.054190	0.020441	0.053410
Averaged land owned in commune (Hectare, Logarithm)	0.058936	0.072130	0.065031	0.098448	0.063567	0.050942
Price index in the region	-1.925638	-0.183169	-1.486674	-0.174921	-2.830734	-0.176314
Total household credit (VND1000, Logarithm)	0.058897	0.474887	0.031550	0.314662	0.114328	0.603616
Predicted residuals	-0.051599	-0.382765	-0.029587	-0.271481	-0.098780	-0.479811
C	6.471063		6.224408		5.165934	

Table 6.8.A1 - Effect of credit on household welfares (92/93 – The whole sample -Extra)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure(VND1000, Logarithm)		Per capita food expenditure(VND1000, Logarithm)		Per capita non food expenditure(VND1000, Logarithm)	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.090527	0.265177	0.068599	0.230645	0.137327	0.257219
Education of household head (years)	0.025197	0.181888	0.016105	0.133440	0.041430	0.191232
Dummy variable: farm household =1; otherwise =0	-0.150273	-0.118512	-0.098088	-0.088791	-0.234073	-0.118039
Dummy variable: gender of household head: male =1; female=0	-0.021696	-0.017392	0.018206	0.016752	-0.095532	-0.048968
Household size (persons)	-0.078290	-0.327796	-0.074983	-0.360354	-0.088868	-0.237921
Farm land owned (Hectare, Logarithm)	-0.001443	-0.008992	0.000017	0.000118	0.000027	0.000108
Financial savings (VND1000, Logarithm)	0.040729	0.216775	0.032491	0.198490	0.058051	0.197563
Non-financial savings (VND1000, Logarithm)	0.036854	0.244911	0.021212	0.161798	0.063629	0.270377
Price of detergent in the village (VND1000/kg, Logarithm)	-0.111503	-0.077953	-0.096806	-0.077682	-0.126994	-0.056770
Price of fish source (VND1000/bottle, Logarithm)	-0.051007	-0.043299	-0.059988	-0.058450	-0.043821	-0.023786
Price of noodle (VND1000/pack, Logarithm)	-0.238041	-0.082912	-0.166472	-0.066554	-0.426246	-0.094933
Price of pork (VND1000/kg, Logarithm)	0.297911	0.119650	0.270648	0.124766	0.357521	0.091816
Price of normal rice (VND1000/kg, Logarithm)	0.082461	0.023328	0.222024	0.072094	-0.119833	-0.021677
Price of sewing service (VND1000/trouser, Logarithm)	0.134822	0.161073	0.032058	0.043961	0.309711	0.236597
Averaged education in commune (years)	0.017738	0.058279	0.016384	0.061786	0.023928	0.050269
Averaged land owned in commune (Hectare, Logarithm)	-0.005925	-0.017140	-0.006104	-0.020267	-0.011215	-0.020745
Price index in the region	1.102585	0.099210	0.700230	0.072319	1.549224	0.089135
Total household credit (VND1000, Logarithm)	0.069796	0.482864	0.051011	0.405066	0.124194	0.549395
Predicted residuals	-0.064254	-0.414637	-0.047526	-0.352021	-0.117299	-0.484008
C	4.658843		4.903242		2.398795	

Table 6.9.A1 - Determinants of household credit (97/98 and 92/93 - Better off households - Extra)

First stage Tobit Regression

	1997/1998		1992/1993	
	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	1.482429	0.504547	-0.579146	-0.234245
The age of household head squared	-0.249041	-0.803147		
Education of household head (years)	0.007877	0.007819	-0.051062	-0.053324
Dummy variable: farm household =1; otherwise =0	-0.414386	-0.045757	-0.051352	-0.006275
Dummy variable: gender of household head: male =1; female=0	0.432647	0.044626	0.408491	0.045834
Household size (persons)	0.716737	0.321143	0.505222	0.288845
Farm land owned (Hectare, Logarithm)	0.204441	0.170156	-0.010655	-0.009897
Financial savings (VND1000, Logarithm)	-0.262307	-0.144864	-0.276602	-0.223155
Non-financial savings (VND1000, Logarithm)	-0.375904	-0.348893	-0.217089	-0.214985
Price of detergent in the village (VND1000/kg, Logarithm)	-0.051318	-0.004099	-0.218519	-0.019903
Price of fish source (VND1000/bottle, Logarithm)	-1.324972	-0.133191	-0.613812	-0.072318
Price of noodle (VND1000/pack, Logarithm)	2.329617	0.074618	1.121625	0.051765
Price of pork (VND1000/kg, Logarithm)	-0.957336	-0.038277	0.454189	0.025543
Price of normal rice (VND1000/kg, Logarithm)	-0.248053	-0.007689	-0.332729	-0.012633
Price of sewing service (VND1000/trouser, Logarithm)	1.584815	0.123404	0.430463	0.071591
Averaged education in commune (years)	-0.196099	-0.085840	-0.022342	-0.010716
Averaged land owned in commune (Hectare, Logarithm)	-0.386283	-0.058443	0.297731	0.103411
Price index in the region	6.269649	0.069344	-10.625080	-0.137906
Availability of informal funds in village (VND1000, Logarithm)	0.356408	0.217308	1.120213	0.446851
Number of households in commune	-0.000041	-0.004203	-0.000161	-0.041935
Availability of formal funds in province (VND1000, Logarithm)	1.129812	0.294677		
Availability of formal funds in commune (VND1000, Logarithm)	-0.324574	-0.160365	0.086610	0.046585
Availability of formal funds in village (VND1000, Logarithm)	0.494974	0.304537	0.351559	0.289798
C	-23.944370		-2.959063	

Table 6.10.A1 - Determinants of household credit (97/98 and 92/93 - Poorer households - Extra)

First stage Tobit Regression:

	1997/1998		1992/1993	
	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	1.197938	0.454091	-0.429008	-0.189222
The age of household head squared	-0.193498	-0.674154		
Education of household head (years)	0.128646	0.137281	0.051385	0.053247
Dummy variable: farm household =1; otherwise =0	-0.161231	-0.016572	-0.513989	-0.046601
Dummy variable: gender of household head: male =1; female=0	0.274598	0.029387	0.024857	0.003034
Household size (persons)	0.438137	0.229576	0.332937	0.215926
Farm land owned (Hectare, Logarithm)	0.316576	0.231736	0.293848	0.248518
Financial savings (VND1000, Logarithm)	-0.274773	-0.169666	-0.192296	-0.122841
Non-financial savings (VND1000, Logarithm)	-0.308241	-0.260425	-0.285373	-0.244999
Price of detergent in the village (VND1000/kg, Logarithm)	-0.276965	-0.024369	0.532688	0.061931
Price of fish source (VND1000/bottle, Logarithm)	-1.350183	-0.145263	0.068229	0.008922
Price of noodle (VND1000/pack, Logarithm)	2.523247	0.079049	0.248290	0.014006
Price of pork (VND1000/kg, Logarithm)	0.650072	0.029822	0.096512	0.005443
Price of normal rice (VND1000/kg, Logarithm)	-2.762737	-0.093697	-0.095574	-0.004350
Price of sewing service (VND1000/trouser, Logarithm)	2.252245	0.221522	-0.023061	-0.003932
Averaged education in commune (years)	0.118262	0.068318	-0.029207	-0.013559
Averaged land owned in commune (Hectare, Logarithm)	-0.070447	-0.010748	-0.073971	-0.038187
Price index in the region	3.402068	0.043410	-8.633828	-0.109156
Availability of informal funds in village (VND1000, Logarithm)	0.314011	0.227712	0.604826	0.312396
Number of households in commune	0.001036	0.116869	-0.000087	-0.022611
Availability of formal funds in province (VND1000, Logarithm)	-0.060398	-0.035855		
Availability of formal funds in commune (VND1000, Logarithm)	-0.130897	-0.084987	0.147632	0.093793
Availability of formal funds in village (VND1000, Logarithm)	0.722338	0.536869	0.163339	0.147458
C	-15.984720		1.116361	

Table 6.11.A1 - Effect of credit on household welfares (97/98 – Better off households - Extra)
Second stage Least Squares Regression

Dependent variable / Explanatory variables	Per capita expenditure(VND1000, Logarithm)		Per capita food expenditure(VND1000, Logarithm)		Per capita non food expenditure (VND1000, Logarithm)	
	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.105239	0.423881	0.080154	0.353964	0.150628	0.385701
The age of household head squared	-0.007210	-0.275169	-0.006171	-0.258218	-0.010496	-0.254663
Education of household head (years)	0.015954	0.187414	0.006913	0.089036	0.027094	0.202341
Dummy variable: farm household =1; otherwise =0	-0.024470	-0.031976	-0.033422	-0.047884	-0.011651	-0.009679
Dummy variable: gender of household head: male =1; female=0	-0.028193	-0.034414	0.031109	0.041634	-0.100704	-0.078148
Household size (persons)	-0.058316	-0.309219	-0.071708	-0.416881	-0.037955	-0.127945
Farm land owned (Hectare, Logarithm)	-0.012373	-0.121869	-0.007664	-0.082764	-0.014441	-0.090426
Financial savings (VND1000, Logarithm)	0.035423	0.231513	0.023019	0.164946	0.049985	0.207686
Non-financial savings (VND1000, Logarithm)	0.024978	0.274355	0.012115	0.145897	0.041458	0.289495
Price of detergent in the village (VND1000/kg, Logarithm)	0.023680	0.022382	0.058599	0.060725	-0.025966	-0.015602
Price of fish source (VND1000/bottle, Logarithm)	0.031532	0.037511	0.032220	0.042024	0.025938	0.019617
Price of noodle (VND1000/pack, Logarithm)	0.166974	0.063292	0.139007	0.057770	0.179743	0.043314
Price of pork (VND1000/kg, Logarithm)	0.358520	0.169639	0.299330	0.155285	0.424301	0.127634
Price of normal rice (VND1000/kg, Logarithm)	-0.018917	-0.006939	0.096908	0.038975	-0.111001	-0.025886
Price of sewing service (VND1000/trouser, Logarithm)	0.059863	0.055163	-0.021146	-0.021364	0.161764	0.094766
Averaged education in commune (years)	0.002321	0.012023	0.008353	0.047442	-0.001158	-0.003814
Averaged land owned in commune (Hectare, Logarithm)	0.034388	0.061571	0.061016	0.119778	0.008081	0.009198
Price index in the region	-1.263575	-0.165389	-1.294024	-0.185701	-1.327817	-0.110490
Total household credit (VND1000, Logarithm)	0.026106	0.308944	0.015926	0.206639	0.039319	0.295815
Predicted residuals	-0.023924	-0.258517	-0.017496	-0.207282	-0.031944	-0.219443
C	7.120872		6.753054	0.000000	5.885884	

Table 6.12.A1 - Effect of credit on household welfares (97/98 - Poorer Households - Extra)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)		Per capita food expenditure (VND1000, Logarithm)		Per capita non food expenditure (VND1000, Logarithm)	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.056421	0.297553	0.071065	0.385714	0.044997	0.126770
The age of household head squared	-0.001746	-0.084633	-0.005477	-0.273228	0.003913	0.101325
Education of household head (years)	0.007530	0.111796	0.003411	0.052119	0.015331	0.121594
Dummy variable: farm household =1; otherwise =0	-0.030852	-0.044119	-0.024258	-0.035701	-0.044075	-0.033670
Dummy variable: gender of household head: male =1; female=0	0.007381	0.010990	0.031361	0.048056	-0.035619	-0.028331
Household size (persons)	-0.050471	-0.367937	-0.053460	-0.401094	-0.051043	-0.198782
Farm land owned (Hectare, Logarithm)	-0.005088	-0.051818	0.003123	0.032733	-0.022155	-0.120534
Financial savings (VND1000, Logarithm)	0.033740	0.289855	0.027061	0.239257	0.052782	0.242232
Non-financial savings (VND1000, Logarithm)	0.025455	0.299213	0.012910	0.156178	0.054611	0.342923
Price of detergent in the village (VND1000/kg, Logarithm)	-0.037814	-0.046289	-0.035464	-0.044678	-0.055983	-0.036609
Price of fish source (VND1000/bottle, Logarithm)	0.062700	0.093852	0.033311	0.051316	0.139590	0.111620
Price of noodle (VND1000/pack, Logarithm)	-0.134074	-0.058438	-0.038547	-0.017291	-0.390420	-0.090906
Price of pork (VND1000/kg, Logarithm)	-0.025062	-0.015996	-0.072393	-0.047552	-0.016379	-0.005585
Price of normal rice (VND1000/kg, Logarithm)	0.262849	0.124025	0.262120	0.127288	0.338816	0.085404
Price of sewing service (VND1000/trouser, Logarithm)	-0.001137	-0.001556	-0.013539	-0.019067	0.033399	0.024415
Averaged education in commune (years)	0.009653	0.077583	0.007000	0.057901	0.021643	0.092924
Averaged land owned in commune (Hectare, Logarithm)	0.022750	0.048292	0.014338	0.031324	0.046316	0.052522
Price index in the region	-0.517644	-0.091894	-0.076998	-0.014068	-1.439054	-0.136472
Total household credit (VND1000, Logarithm)	0.051041	0.710124	0.018306	0.262116	0.124351	0.924217
Predicted residuals	-0.046597	-0.592303	-0.017880	-0.233905	-0.111824	-0.759330
C	6.926433		6.504283		5.813469	

Table 6.13.A1 - Effect of credit on household welfares (92/93 – Better off households - Extra)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)		Per capita food expenditure (VND1000, Logarithm)		Per capita non food expenditure (VND1000, Logarithm)	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.041344	0.164857	0.029877	0.122669	0.064350	0.157410
Education of household head (years)	0.012416	0.127826	0.004943	0.052400	0.023584	0.148951
Dummy variable: farm household =1; otherwise =0	-0.090185	-0.108644	-0.055646	-0.069025	-0.140524	-0.103851
Dummy variable: gender of household head: male =1; female=0	-0.064586	-0.071442	-0.014724	-0.016770	-0.147289	-0.099948
Household size (persons)	-0.046938	-0.264558	-0.053527	-0.310651	-0.036158	-0.125023
Farm land owned (Hectare, Logarithm)	-0.006680	-0.061169	-0.003217	-0.030332	-0.006521	-0.036632
Financial savings (VND1000, Logarithm)	0.019549	0.155485	0.017005	0.139266	0.026395	0.128788
Non-financial savings (VND1000, Logarithm)	0.025267	0.246681	0.010263	0.103172	0.046210	0.276763
Price of detergent in the village (VND1000/kg, Logarithm)	-0.068484	-0.061495	-0.063628	-0.058831	-0.066988	-0.036901
Price of fish source (VND1000/bottle, Logarithm)	-0.017290	-0.020083	-0.030982	-0.037054	-0.006957	-0.004957
Price of noodle (VND1000/pack, Logarithm)	-0.129367	-0.058861	-0.145947	-0.068376	-0.168673	-0.047080
Price of pork (VND1000/kg, Logarithm)	0.074835	0.041491	0.127805	0.072962	-0.001632	-0.000555
Price of normal rice (VND1000/kg, Logarithm)	-0.106613	-0.039907	0.107255	0.041339	-0.393201	-0.090292
Price of sewing service (VND1000/trouser, Logarithm)	0.107449	0.176172	-0.001997	-0.003371	0.277898	0.279517
Averaged education in commune (years)	-0.002704	-0.012785	-0.003935	-0.019158	0.006353	0.018428
Averaged land owned in commune (Hectare, Logarithm)	0.000914	0.003130	-0.000205	-0.000723	-0.003246	-0.006819
Price index in the region	0.554354	0.070934	0.309643	0.040797	0.841229	0.066034
Total household credit (VND1000, Logarithm)	0.022210	0.218958	0.014053	0.142655	0.045279	0.273841
Predicted residuals	-0.016701	-0.151715	-0.010844	-0.101433	-0.037521	-0.209097
C	6.484279		6.256163		4.962927	

Table 6.14.A1 - Effect of credit on household welfares (92/93 - Poorer Households - Extra)
Second stage Least Squares Regression

Dependent variable	Per capita expenditure (VND1000, Logarithm)		Per capita food expenditure (VND1000, Logarithm)		Per capita non food expenditure (VND1000, Logarithm)	
Explanatory variables	Coefficients	Std. Coef.	Coefficients	Std. Coef.	Coefficients	Std. Coef.
The age of household head	0.026701	0.154187	0.011697	0.060517	0.071063	0.194862
Education of household head (years)	0.007150	0.097001	0.003237	0.039346	0.018259	0.117628
Dummy variable: farm household =1; otherwise =0	-0.007879	-0.009352	0.018823	0.020018	-0.066460	-0.037461
Dummy variable: gender of household head: male =1; female=0	0.024795	0.039621	0.050790	0.072714	-0.035783	-0.027152
Household size (persons)	-0.030593	-0.259764	-0.027767	-0.211238	-0.046269	-0.186556
Farm land owned (Hectare, Logarithm)	-0.003111	-0.034447	-0.004170	-0.041369	-0.008000	-0.042063
Financial savings (VND1000, Logarithm)	0.019858	0.166083	0.011793	0.088369	0.039096	0.155269
Non-financial savings (VND1000, Logarithm)	0.016887	0.189810	0.005654	0.056939	0.050253	0.268220
Price of detergent in the village (VND1000/kg, Logarithm)	-0.052944	-0.080587	-0.045502	-0.062053	-0.081626	-0.058998
Price of fish source (VND1000/bottle, Logarithm)	-0.063558	-0.108809	-0.069941	-0.107278	-0.071027	-0.057741
Price of noodle (VND1000/pack, Logarithm)	-0.084872	-0.062682	0.035793	0.023684	-0.377734	-0.132473
Price of pork (VND1000/kg, Logarithm)	0.172069	0.127057	0.086797	0.057423	0.321720	0.112807
Price of normal rice (VND1000/kg, Logarithm)	0.105205	0.062692	0.197888	0.105653	-0.056652	-0.016031
Price of sewing service (VND1000/trouser, Logarithm)	0.009028	0.020155	-0.043014	-0.086036	0.126553	0.134160
Averaged education in commune (years)	0.017448	0.106052	0.023651	0.128797	0.000578	0.001668
Averaged land owned in commune (Hectare, Logarithm)	-0.006312	-0.042662	-0.004198	-0.025421	-0.008353	-0.026809
Price index in the region	0.654225	0.108289	0.114078	0.016918	1.278659	0.100502
Total household credit (VND1000, Logarithm)	0.049039	0.642032	0.027171	0.318718	0.132783	0.825507
Predicted residuals	-0.049317	-0.605872	-0.027813	-0.306138	-0.133928	-0.781302
C	5.308913		5.770885		2.779027	

Table 6.15.A1 - Effect of credit on per capita food expenditure (1992/1993 –Better off Households without predicted residuals - Extra)

Explanatory variables	Coefficients	Std. Coef.
The age of household head	0.026384	0.108328
Education of household head (years)	0.004525	0.047969
Dummy variable: farm household =1; otherwise =0	-0.055831	-0.069255
Dummy variable: gender of household head: male =1; female=0	-0.012332	-0.014046
Household size (persons)	-0.050274	-0.291772
Farm land owned (Hectare, Logarithm)	-0.003549	-0.033463
Financial savings (VND1000, Logarithm)	0.015525	0.127145
Non-financial savings (VND1000, Logarithm)	0.009068	0.091159
Price of detergent in the village (VND1000/kg, Logarithm)	-0.061161	-0.056550
Price of fish source (VND1000/bottle, Logarithm)	-0.031646	-0.037848
Price of noodle (VND1000/pack, Logarithm)	-0.133605	-0.062594
Price of pork (VND1000/kg, Logarithm)	0.130336	0.074407
Price of normal rice (VND1000/kg, Logarithm)	0.098917	0.038126
Price of sewing service (VND1000/trouser, Logarithm)	0.005578	0.009417
Averaged education in commune (years)	-0.004639	-0.022586
Averaged land owned in commune (Hectare, Logarithm)	0.002059	0.007260
Price index in the region	0.247368	0.032592
Total household credit (VND1000, Logarithm)	0.003979	0.040392
C	6.321087	

Chapter 7 – A1

Table 7.3.A1 - Probability of being participant household (Extra)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Dummy: if household is a participant household

Variable	Coefficients	Std. Coef.
Increase in age group of household head	-0.082077	-0.166962
Increase in education of household head (years)	-0.001082	-0.005256
Dummy: if household becomes farm household	-0.279612	-0.133999
Dummy: if household head becomes male	0.031765	0.009064
Increase in household size (persons)	0.016060	0.052512
Increase in ownership of farming land (hectare)	0.007632	0.041866
Increase in financial savings (VND1000)	-0.028600	-0.185696
Increase in non-financial savings (VND1000)	-0.031903	-0.269477
Increase in price of detergent (VND1000/kg)	0.067955	0.064326
Increase in price of fish source (VND1000/bottle)	-0.126614	-0.144451
Increase in price of noodle (VND1000/pack)	0.208178	0.083101
Increase in price of pork (VND1000/kg)	0.221996	0.064368
Increase in price of ordinary rice (VND1000/kg)	-0.489018	-0.173131
Increase in price of sewing service (VND1000/trouser)	0.007040	0.006050
Increase in averaged education of household head in commune (years)	-0.001858	-0.003036
Increase in averaged ownership of farming land in commune (hectare)	-0.051199	-0.119132
Increase in number of households in commune (households)	-0.000026	-0.036857
Increase in price index of the region	-2.407694	-0.180876
Increase in the availability of informal fund in village (VND1000)	0.039638	0.195333
Increase in the availability of formal fund in village (VND1000)	0.012355	0.086595
Increase in availability of formal funds in commune (VND1000)	0.012360	0.065368
C	0.735368	

Table 7.4.A1 - Determinants of change in amount of household borrowing (Extra)
Method: Least Squares

Dependent Variable: Increase in total household borrowing

Variable	Coefficients	Std. Coef.
Increase in age group of household head	-0.035905	-0.027713
Increase in education of household head (years)	-0.044742	-0.079503
Dummy: if household becomes farm household	-0.353820	-0.057948
Dummy: if household head becomes male	0.170418	0.018917
Increase in household size (persons)	0.052008	0.063991
Increase in ownership of farming land (hectare)	-0.007746	-0.015769
Increase in financial savings (VND1000)	0.046507	0.113188
Increase in non-financial savings (VND1000)	-0.002149	-0.006595
Increase in price of detergent (VND1000/kg)	0.146300	0.049862
Increase in price of fish source (VND1000/bottle)	0.054203	0.023643
Increase in price of noodle (VND1000/pack)	0.360164	0.053163
Increase in price of pork (VND1000/kg)	0.034437	0.003737
Increase in price of ordinary rice (VND1000/kg)	-0.294298	-0.038240
Increase in price of sewing service (VND1000/trouser)	-0.041748	-0.013150
Increase in averaged education of household head in commune (years)	-0.056421	-0.033604
Increase in averaged ownership of farming land in commune (hectare)	-0.029904	-0.022931
Increase in number of households in commune (households)	0.000127	0.064456
Increase in price index of the region	-0.221518	-0.006175
Increase in the availability of informal fund in village (VND1000)	0.061332	0.107440
Increase in the availability of formal fund in village (VND1000)	0.073036	0.180347
Increase in availability of formal funds in commune (VND1000)	-0.026758	-0.050684
C	1.218917	

Table 7.5.A1 - Impact of credit on per capita expenditure (Extra)
Method: Least Squares

Dependent Variable: Increase in per capita expenditure

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.013132	0.030175
Increase in education of household head (years)	0.013310	0.070408
Dummy: if household becomes farm household	-0.048351	-0.023574
Dummy: if household head becomes male	-0.010031	-0.003315
Increase in household size (persons)	-0.096559	-0.353688
Increase in ownership of farming land (hectare)	0.002394	0.014509
Increase in financial savings (VND1000)	-0.004234	-0.030677
Increase in non-financial savings (VND1000)	0.002929	0.026758
Increase in price of detergent (VND1000/kg)	0.097721	0.099150
Increase in price of fish source (VND1000/bottle)	0.011340	0.014725
Increase in price of noodle (VND1000/pack)	0.034844	0.015312
Increase in price of pork (VND1000/kg)	0.152356	0.049217
Increase in price of ordinary rice (VND1000/kg)	-0.008588	-0.003322
Increase in price of sewing service (VND1000/trouser)	0.184266	0.172786
Increase in averaged education of household head in commune (years)	0.039722	0.070431
Increase in averaged ownership of farming land in commune (hectare)	0.007608	0.017368
Increase in price index of the region	-3.029959	-0.251434
Increase in total household borrowing (VND1000)	0.276427	0.822925
Predicted residuals	-0.252881	-0.727544
Inverse Mill's ratios	0.539742	0.182759
C	-0.151590	

Table 7.6.A1 - Impact of credit on per capita food expenditure (Extra)
Method: Least Squares

Dependent Variable: Increase in per capita food expenditure

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.030828	0.071964
Increase in education of household head (years)	0.009037	0.048566
Dummy: if household becomes farm household	0.008746	0.004332
Dummy: if household head becomes male	0.130030	0.043655
Increase in household size (persons)	-0.091156	-0.339213
Increase in ownership of farming land (hectare)	0.006393	0.039362
Increase in financial savings (VND1000)	0.006948	0.051142
Increase in non-financial savings (VND1000)	0.008491	0.078804
Increase in price of detergent (VND1000/kg)	0.094242	0.097142
Increase in price of fish source (VND1000/bottle)	0.014740	0.019445
Increase in price of noodle (VND1000/pack)	-0.016339	-0.007294
Increase in price of pork (VND1000/kg)	-0.009012	-0.002958
Increase in price of ordinary rice (VND1000/kg)	0.114984	0.045186
Increase in price of sewing service (VND1000/trouser)	0.083859	0.079886
Increase in averaged education of household head in commune (years)	0.010347	0.018638
Increase in averaged ownership of farming land in commune (hectare)	0.022213	0.051516
Increase in price index of the region	-1.769505	-0.149175
Increase in total household borrowing (VND1000)	0.185761	0.561815
Predicted residuals	-0.178500	-0.521723
Inverse Mill's ratios	0.028143	0.009681
C	0.205516	

Table 7.6.a.A1 - Impact of credit on per capita food expenditure (Mill's ratio excluded-Extra)
Method: Least Squares

Dependent Variable: Increase in per capita food expenditure

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.031899	0.074464
Increase in education of household head (years)	0.008825	0.047426
Dummy: if household becomes farm household	0.011242	0.005568
Dummy: if household head becomes male	0.130252	0.043729
Increase in household size (persons)	-0.091134	-0.339131
Increase in ownership of farming land (hectare)	0.006230	0.038358
Increase in financial savings (VND1000)	0.007619	0.056081
Increase in non-financial savings (VND1000)	0.008956	0.083119
Increase in price of detergent (VND1000/kg)	0.093898	0.096788
Increase in price of fish source (VND1000/bottle)	0.016869	0.022254
Increase in price of noodle (VND1000/pack)	-0.017340	-0.007741
Increase in price of pork (VND1000/kg)	-0.013164	-0.004320
Increase in price of ordinary rice (VND1000/kg)	0.119913	0.047123
Increase in price of sewing service (VND1000/trouser)	0.083558	0.079600
Increase in averaged education of household head in commune (years)	0.010043	0.018091
Increase in averaged ownership of farming land in commune (hectare)	0.022923	0.053162
Increase in price index of the region	-1.731223	-0.145948
Increase in total household borrowing (VND1000)	0.180393	0.545580
Predicted residuals	-0.173109	-0.505966
C	0.222798	

Table 7.7.A1 - Impact of credit on per capita non food expenditure (Extra)
Method: Least Squares

Dependent Variable: Increase in per capita non food expenditure

Variable	Coefficients	Std. Coef.
Increase in age group of household head	-0.009119	-0.013740
Increase in education of household head (years)	0.019570	0.067882
Dummy: if household becomes farm household	-0.123646	-0.039531
Dummy: if household head becomes male	-0.182082	-0.039456
Increase in household size (persons)	-0.091656	-0.220145
Increase in ownership of farming land (hectare)	0.001317	0.005234
Increase in financial savings (VND1000)	-0.012961	-0.061577
Increase in non-financial savings (VND1000)	-0.001580	-0.009465
Increase in price of detergent (VND1000/kg)	0.100941	0.067157
Increase in price of fish source (VND1000/bottle)	0.025245	0.021495
Increase in price of noodle (VND1000/pack)	0.090590	0.026103
Increase in price of pork (VND1000/kg)	0.389087	0.082418
Increase in price of ordinary rice (VND1000/kg)	-0.068136	-0.017283
Increase in price of sewing service (VND1000/trouser)	0.334511	0.205681
Increase in averaged education of household head in commune (years)	0.099338	0.115496
Increase in averaged ownership of farming land in commune (hectare)	-0.008087	-0.012105
Increase in price index of the region	-4.666223	-0.253906
Increase in total household borrowing (VND1000)	0.392661	0.766511
Predicted residuals	-0.354573	-0.668913
Inverse Mill's ratios	1.021222	0.226743
C	-0.586386	

Table 7.8.A1 - Impact of credit on household poverty status (Extra)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.039274	0.085908
Increase in education of household head (years)	0.052241	0.263073
Dummy: if household becomes farm household	0.025362	0.011772
Dummy: if household head becomes male	-0.032454	-0.010210
Increase in household size (persons)	-0.258864	-0.902647
Increase in ownership of farming land (hectare)	-0.002053	-0.011844
Increase in financial savings (VND1000)	0.010467	0.072194
Increase in non-financial savings (VND1000)	0.017568	0.152781
Increase in price of detergent (VND1000/kg)	0.352242	0.340223
Increase in price of fish source (VND1000/bottle)	0.044364	0.054840
Increase in price of noodle (VND1000/pack)	-0.254930	-0.106643
Increase in price of pork (VND1000/kg)	0.246562	0.075823
Increase in price of ordinary rice (VND1000/kg)	-0.263163	-0.096907
Increase in price of sewing service (VND1000/trouser)	0.569932	0.508751
Increase in averaged education of household head in commune (years)	0.067032	0.113144
Increase in averaged ownership of farming land in commune (hectare)	0.072463	0.157474
Increase in price index of the region	-8.921348	-0.704751
Increase in total household borrowing (VND1000)	0.568297	1.610548
Predicted residuals	-0.472964	-1.295358
Inverse Mill's ratios	0.836696	0.269699
C	-2.032957	

Table 7.8.a.A1 - Impact of credit on household poverty status (Mill's ratio excluded-Extra)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.071103	0.155531
Increase in education of household head (years)	0.045917	0.231227
Dummy: if household becomes farm household	0.099938	0.046386
Dummy: if household head becomes male	-0.027031	-0.008504
Increase in household size (persons)	-0.258019	-0.899701
Increase in ownership of farming land (hectare)	-0.007064	-0.040755
Increase in financial savings (VND1000)	0.030064	0.207360
Increase in non-financial savings (VND1000)	0.031369	0.272802
Increase in price of detergent (VND1000/kg)	0.342815	0.331118
Increase in price of fish source (VND1000/bottle)	0.105552	0.130478
Increase in price of noodle (VND1000/pack)	-0.288329	-0.120614
Increase in price of pork (VND1000/kg)	0.124645	0.038331
Increase in price of ordinary rice (VND1000/kg)	-0.119042	-0.043836
Increase in price of sewing service (VND1000/trouser)	0.560174	0.500040
Increase in averaged education of household head in commune (years)	0.059360	0.100194
Increase in averaged ownership of farming land in commune (hectare)	0.093704	0.203634
Increase in price index of the region	-7.784587	-0.614951
Increase in total household borrowing (VND1000)	0.411783	1.166989
Predicted residuals	-0.316372	-0.866482
C	-1.517460	

Table 7.8.b.A1 - Impact of credit on household poverty status (Mill's ratio and Predicted Residuals excluded -Extra)
Method: ML - Binary Probit (Quadratic hill climbing)

Dependent Variable: Increase in household poverty status

Variable	Coefficients	Std. Coef.
Increase in age group of household head	0.057815	0.126465
Increase in education of household head (years)	0.028134	0.141676
Dummy: if household becomes farm household	0.013247	0.006149
Dummy: if household head becomes male	0.033397	0.010506
Increase in household size (persons)	-0.233516	-0.814260
Increase in ownership of farming land (hectare)	-0.010628	-0.061317
Increase in financial savings (VND1000)	0.043800	0.302102
Increase in non-financial savings (VND1000)	0.030323	0.263706
Increase in price of detergent (VND1000/kg)	0.405510	0.391674
Increase in price of fish source (VND1000/bottle)	0.145633	0.180024
Increase in price of noodle (VND1000/pack)	-0.155319	-0.064973
Increase in price of pork (VND1000/kg)	0.221028	0.067970
Increase in price of ordinary rice (VND1000/kg)	-0.143502	-0.052843
Increase in price of sewing service (VND1000/trouser)	0.571055	0.509753
Increase in averaged education of household head in commune (years)	0.033749	0.056965
Increase in averaged ownership of farming land in commune (hectare)	0.080334	0.174579
Increase in price index of the region	-7.389553	-0.583745
Increase in total household borrowing (VND1000)	0.098881	0.280228
C	-1.249388	

Appendix A2- The standard error problem in 2SLS

Maddala (2001) shows that in a two stage least square regression (2SLS), although the method is correct to produce consistent coefficients, the standard errors may not be correct (p.p. 360-363), and hence the interpretation of the results may be biased. The reason lies at the fact that in the second stage of the 2SLS the predicted values of explanatory variables, which are estimated from the first stage, are used instead of the actual ones. Specifically, the second stage ignores the fact that the explanatory variables of interests have been estimated in the first stage but the standard errors have not been taken into account in the second stage.

It is also noted that the in the second stage of the 2SLS, we may use either: (i) the predicted values; or (ii) the predicted residuals and the actual values. These alternatives however are identical and they do not correct the problem. Therefore, the 2SLS, if estimated by two *separate* LS stages, might result in incorrect interpretation of the results. Fortunately, the 2SLS estimator (in E-Views) is programmed to correct this problem and hence, we do the extra tests to check the conclusions that we have proposed in Chapter 6 and 7 regarding the impact of access to finance on poverty reduction.

Although this problem seems to be important, many papers have failed to recognise it. For examples, Khandker (2001, 2003), Khandker and Faruqee (2001), Pham and Izumita (2002) .etc also run the two separate stage regressions to find the effect of access to credit on poverty reduction, but they do not take into account of the standard error problem. However, it may be that, because they run two stage regressions with different methods at each stage (Pham and Izumita use probit model in the first stage and LS in the second, while Khandker uses Tobit in the first stage and LS in the second), so the interpretations of the standard errors become precarious.

Having recognised the possibility of incorrect standard errors and because we follow the approach similar to Khandker's, we find it better to do some extra tests to check for the robustness of our findings in the chapters 6 and 7 with the 2SLS estimator. One may also interpret this appendix as an alternative method for assessing the impact of access to credit on household poverty reduction. The test results are reported in the Tables attached to this section. The readers may find it easier to compare if they follow the original Tables in Chapters 6 and 7 and find the corresponding ones which are added with "A2" at after the number. For example, Table 6.10 in Chapter 6 will be related to Table 6.10.A2 in this section.

As we can see, the results from the extra tests with 2SLS estimator do not contradict the findings reported in chapters 6 and 7. The slight changes of the coefficients are the results of using the Tobit regressions for the first stage, rather than the LS as in the 2SLS estimator. However, most importantly, the conclusion that access to credit has a significant positive impact on household poverty reduction holds. This implies that the findings in chapters 6 and 7 are consistent with those in this appendix.

Table 6.7.A2 - Effect of credit on household welfare (97/98- The whole sample -Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=9)

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coefficient	t-Statistic	Prob.						
The age of household head	0.169891	5.638115	0.0000	0.134479	5.302789	0.0000	0.224715	4.657123	0.0000
The age of household head squared	-0.011102	-3.251819	0.0012	-0.009902	-3.485478	0.0005	-0.012743	-2.317423	0.0205
Education of household head (years)	0.021129	9.741863	0.0000	0.011137	6.097692	0.0000	0.034799	10.09588	0.0000
Dummy variable: farm household =1; otherwise =0	-0.027263	-1.413413	0.1576	-0.026123	-1.675082	0.0940	-0.028073	-0.894477	0.3711
Dummy variable: gender of household head: male =1; female=0	0.000614	0.032493	0.9741	0.041197	2.674580	0.0075	-0.058504	-1.912467	0.0559
Household size (persons)	-0.102342	-19.14515	0.0000	-0.096631	-21.06038	0.0000	-0.114928	-13.68697	0.0000
Farm land owned (Hectare, Logarithm)	-0.011448	-3.712802	0.0002	-0.005352	-2.096692	0.0361	-0.018448	-3.679367	0.0002
Financial savings (VND1000, Logarithm)	0.057511	14.05248	0.0000	0.041090	11.51841	0.0000	0.083576	13.72659	0.0000
Non-financial savings (VND1000, Logarithm)	0.045134	15.27237	0.0000	0.026056	10.68099	0.0000	0.076028	16.29211	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	0.005156	0.181634	0.8559	0.025059	0.988501	0.3230	-0.031551	-0.717152	0.4733
Price of fish source (VND1000/bottle, Logarithm)	0.063704	2.627205	0.0086	0.051863	2.477556	0.0133	0.089251	2.427783	0.0152
Price of noodle (VND1000/pack, Logarithm)	0.084972	1.116269	0.2644	0.097361	1.469091	0.1419	-0.029986	-0.255739	0.7982
Price of pork (VND1000/kg, Logarithm)	0.395891	5.011417	0.0000	0.284019	4.110328	0.0000	0.507197	4.103760	0.0000
Price of normal rice (VND1000/kg, Logarithm)	0.204489	2.727994	0.0064	0.248445	3.642282	0.0003	0.189383	1.687958	0.0915
Price of sewing service (VND1000/trouser, Logarithm)	0.068643	1.787888	0.0739	0.000113	0.003761	0.9970	0.166656	2.582980	0.0098
Averaged education in commune (years)	0.011391	1.486889	0.1371	0.010424	1.596632	0.1104	0.021042	1.824756	0.0681
Averaged land owned in commune (Hectare, Logarithm)	0.055852	2.855160	0.0043	0.061942	3.670961	0.0002	0.059134	1.904625	0.0569
Price index in the region	-1.922732	-7.520948	0.0000	-1.482711	-6.712120	0.0000	-2.827731	-7.171467	0.0000
Total household credit (VND1000, Logarithm)	0.065800	5.251191	0.0000	0.039946	3.909322	0.0001	0.122598	6.304222	0.0000
C	6.518551	19.93758	0.0000	6.282107	22.97122	0.0000	5.222892	10.06580	0.0000
R-squared	0.286795			0.264564			0.174075		
Adjusted R-squared	0.283474			0.261140			0.170230		
S.E. of regression	0.414050			0.339914			0.680463		
F-statistic	142.2326			113.1921			113.6829		
Prob(F-statistic)	0.000000			0.000000			0.000000		
Observations	4101			4101			4101		

Table 6.8.A2 - Effect of credit on household welfare (92/93- All Households - Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=8)

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.086835	12.62785	0.0000	0.065624	10.26887	0.0000	0.132454	10.92915	0.0000
Education of household head (years)	0.024438	9.011035	0.0000	0.015551	6.498170	0.0000	0.039992	8.616417	0.0000
Dummy variable: farm household =1; otherwise =0	-0.150288	-5.796235	0.0000	-0.098293	-4.092517	0.0000	-0.232616	-5.752826	0.0000
Dummy variable: gender of household head: male =1; female=0	-0.020304	-0.899541	0.3684	0.019346	0.936615	0.3490	-0.093835	-2.742471	0.0061
Household size (persons)	-0.076738	-14.06822	0.0000	-0.073581	-13.95760	0.0000	-0.087976	-9.311577	0.0000
Farm land owned (Hectare, Logarithm)	-0.000962	-0.256957	0.7972	0.000398	0.103233	0.9178	0.000703	0.130976	0.8958
Financial savings (VND1000, Logarithm)	0.039267	9.584123	0.0000	0.031306	8.606916	0.0000	0.056173	8.302737	0.0000
Non-financial savings (VND1000, Logarithm)	0.035500	11.26330	0.0000	0.020107	6.809012	0.0000	0.061943	12.08833	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.107790	-4.171094	0.0000	-0.093740	-3.528314	0.0004	-0.122670	-2.819948	0.0048
Price of fish source (VND1000/bottle, Logarithm)	-0.051940	-1.967324	0.0492	-0.060712	-2.462487	0.0138	-0.045268	-1.086996	0.2771
Price of noodle (VND1000/pack, Logarithm)	-0.232440	-3.209414	0.0013	-0.161855	-2.376671	0.0175	-0.419643	-3.721696	0.0002
Price of pork (VND1000/kg, Logarithm)	0.298027	3.835560	0.0001	0.270582	3.557882	0.0004	0.358890	3.027476	0.0025
Price of normal rice (VND1000/kg, Logarithm)	0.079233	0.921313	0.3570	0.218848	2.706094	0.0068	-0.119696	-0.925510	0.3548
Price of sewing service (VND1000/trouser, Logarithm)	0.135960	4.170023	0.0000	0.033489	1.207092	0.2275	0.307274	5.711783	0.0000
Averaged education in commune (years)	0.017283	1.897507	0.0578	0.016008	1.954412	0.0507	0.023403	1.610770	0.1073
Averaged land owned in commune (Hectare, Logarithm)	-0.005651	-0.675359	0.4995	-0.005775	-0.753860	0.4510	-0.011683	-0.768163	0.4424
Price index in the region	1.031577	3.323173	0.0009	0.643217	2.160648	0.0308	1.453978	3.085027	0.0021
Total household credit (VND1000, Logarithm)	0.067699	5.175478	0.0000	0.048495	3.673339	0.0002	0.127757	5.636649	0.0000
C	4.722496	12.84026	0.0000	4.956141	14.88355	0.0000	2.470468	4.303794	0.0000
R-squared	0.214814			0.134638			0.139642		
Adjusted R-squared	0.210458			0.129838			0.134869		
S.E. of regression	0.426331			0.389934			0.697927		
F-statistic	85.39654			50.63534			80.91817		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observation	3264			3264			3264		

Table 6.11.A2 - Effect of credit on household welfare (97/98- Better-off Households - Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=8)

Dependent variable / Explanatory variables	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
The age of household head	0.104874	3.755667	0.0002	0.077711	2.630279	0.0086	0.151242	3.263800	0.0011
The age of household head squared	-0.007515	-2.375791	0.0176	-0.005958	-1.823194	0.0684	-0.011123	-2.105993	0.0353
Education of household head (years)	0.015781	7.356321	0.0000	0.006820	3.372518	0.0008	0.026846	7.975283	0.0000
Dummy variable: farm household =1; otherwise =0	-0.027008	-1.567335	0.1172	-0.034759	-2.190047	0.0286	-0.015304	-0.577402	0.5637
Dummy variable: gender of household head: male =1; female=0	-0.027234	-1.475062	0.1403	0.031056	1.768375	0.0771	-0.099041	-3.451175	0.0006
Household size (persons)	-0.054469	-8.978704	0.0000	-0.071104	-11.82678	0.0000	-0.031701	-3.234326	0.0012
Farm land owned (Hectare, Logarithm)	-0.011873	-4.433408	0.0000	-0.007517	-3.018386	0.0026	-0.013663	-3.318911	0.0009
Financial savings (VND1000, Logarithm)	0.033772	8.736461	0.0000	0.022423	6.235666	0.0000	0.047470	7.607007	0.0000
Non-financial savings (VND1000, Logarithm)	0.023248	8.603815	0.0000	0.011801	4.472848	0.0000	0.038668	8.771792	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	0.026114	1.140514	0.2542	0.059019	2.400253	0.0165	-0.022028	-0.621948	0.5340
Price of fish source (VND1000/bottle, Logarithm)	0.026901	1.318359	0.1875	0.031035	1.523928	0.1277	0.018641	0.606919	0.5440
Price of noodle (VND1000/pack, Logarithm)	0.182112	2.690215	0.0072	0.142487	2.095192	0.0363	0.203797	2.089656	0.0368
Price of pork (VND1000/kg, Logarithm)	0.360289	5.206417	0.0000	0.295708	4.304824	0.0000	0.429148	3.849063	0.0001
Price of normal rice (VND1000/kg, Logarithm)	-0.021810	-0.339220	0.7345	0.094412	1.397485	0.1624	-0.114672	-1.207184	0.2275
Price of sewing service (VND1000/trouser, Logarithm)	0.071082	1.936385	0.0529	-0.018461	-0.537922	0.5907	0.179537	3.016518	0.0026
Averaged education in commune (years)	0.001928	0.336774	0.7363	0.008269	1.409664	0.1588	-0.001786	-0.185052	0.8532
Averaged land owned in commune (Hectare, Logarithm)	0.034422	2.142831	0.0322	0.060666	3.790351	0.0002	0.008316	0.308034	0.7581
Price index in the region	-1.258712	-5.454145	0.0000	-1.306644	-5.400247	0.0000	-1.313142	-3.753415	0.0002
Total household credit (VND1000, Logarithm)	0.020151	2.191199	0.0285	0.016420	1.782334	0.0748	0.028914	1.896365	0.0580
C	7.108179	24.18510	0.0000	6.776687	23.48659	0.0000	5.852285	11.98565	0.0000
R-squared	0.224699			0.161796			0.203820		
Adjusted R-squared	0.218450			0.155039			0.197402		
S.E. of regression	0.306072			0.290267			0.487885		
F-statistic	41.53344			30.52859			34.44882		
Prob(F-statistic)	0.000000			0.000000			0.000000		
Observations	2377			2377			2377		

Table 6.12.A2 - Effect of credit on household welfare (97/98- Poorer Households - Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coefficient	t-Statistic	Prob.						
The age of household head	0.050899	1.711071	0.0872	0.065788	2.446208	0.0145	0.037136	0.601723	0.5474
The age of household head squared	-0.000939	-0.279896	0.7796	-0.004668	-1.508087	0.1317	0.004999	0.731671	0.4645
Education of household head (years)	0.006644	2.405668	0.0162	0.002532	1.054864	0.2916	0.014125	2.642751	0.0083
Dummy variable: farm household =1; otherwise =0	-0.032543	-1.325208	0.1853	-0.024292	-1.146875	0.2516	-0.049183	-0.979000	0.3277
Dummy variable: gender of household head: male =1; female=0	0.006592	0.323528	0.7463	0.030636	1.752993	0.0798	-0.036793	-0.887420	0.3750
Household size (persons)	-0.052593	-9.563238	0.0000	-0.055726	-11.90689	0.0000	-0.053659	-4.849370	0.0000
Farm land owned (Hectare, Logarithm)	-0.005265	-1.474147	0.1406	0.002507	0.746952	0.4552	-0.021644	-2.982825	0.0029
Financial savings (VND1000, Logarithm)	0.033630	7.670416	0.0000	0.027659	6.683473	0.0000	0.051427	6.685254	0.0000
Non-financial savings (VND1000, Logarithm)	0.026273	8.253848	0.0000	0.014009	5.145586	0.0000	0.055232	8.859649	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.036675	-1.294032	0.1958	-0.034572	-1.376567	0.1688	-0.054026	-1.006656	0.3142
Price of fish source (VND1000/bottle, Logarithm)	0.070405	2.945080	0.0033	0.043014	2.070085	0.0386	0.146562	3.098805	0.0020
Price of noodle (VND1000/pack, Logarithm)	-0.133777	-1.742805	0.0815	-0.044584	-0.623058	0.5333	-0.379207	-2.540805	0.0111
Price of pork (VND1000/kg, Logarithm)	-0.039933	-0.553383	0.5801	-0.087113	-1.352227	0.1765	-0.036682	-0.251987	0.8011
Price of normal rice (VND1000/kg, Logarithm)	0.282860	3.864053	0.0001	0.286285	4.453809	0.0000	0.358696	2.420442	0.0156
Price of sewing service (VND1000/trouser, Logarithm)	-0.012427	-0.348282	0.7277	-0.026275	-0.852791	0.3939	0.020653	0.295576	0.7676
Averaged education in commune (years)	0.007972	1.213609	0.2251	0.005158	0.919746	0.3578	0.019655	1.619801	0.1055
Averaged land owned in commune (Hectare, Logarithm)	0.017558	0.953110	0.3407	0.010317	0.604873	0.5453	0.037319	0.990079	0.3223
Price index in the region	-0.490970	-2.087970	0.0369	-0.055083	-0.269492	0.7876	-1.394979	-2.944175	0.0033
Total household credit (VND1000, Logarithm)	0.063505	4.948275	0.0000	0.028811	2.533635	0.0114	0.144494	6.785589	0.0000
C	6.949587	24.67599	0.0000	6.535498	26.63243	0.0000	5.830917	10.42673	0.0000
R-squared	-0.256176			0.061479			-0.479817		
Adjusted R-squared	-0.270183			0.051015			-0.496317		
S.E. of regression	0.301602			0.253306			0.612778		
F-statistic	22.03324			19.43827			19.10212		
Prob(F-statistic)	0.000000			0.000000			0.000000		
Observations	1724			1724			1724		

Table 6.13.A2 - Effect of credit on household welfare (92/93- Better-off Households - Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.038620	6.344209	0.0000	0.027017	3.894477	0.0001	0.062235	6.214399	0.0000
Education of household head (years)	0.011995	4.964613	0.0000	0.004578	1.804225	0.0714	0.022977	5.740696	0.0000
Dummy variable: farm household =1; otherwise =0	-0.090137	-4.337216	0.0000	-0.055751	-2.530593	0.0115	-0.139911	-4.230287	0.0000
Dummy variable: gender of household head: male =1; female=0	-0.062653	-3.030402	0.0025	-0.012749	-0.580587	0.5616	-0.145590	-4.661454	0.0000
Household size (persons)	-0.044650	-8.943850	0.0000	-0.050923	-9.460502	0.0000	-0.035124	-4.358739	0.0000
Farm land owned (Hectare, Logarithm)	-0.006915	-2.209451	0.0273	-0.003483	-0.976967	0.3287	-0.006630	-1.405038	0.1602
Financial savings (VND1000, Logarithm)	0.018392	5.603793	0.0000	0.015792	4.545818	0.0000	0.025487	4.819732	0.0000
Non-financial savings (VND1000, Logarithm)	0.024336	9.137173	0.0000	0.009284	3.255659	0.0012	0.045491	10.87943	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.066475	-3.091003	0.0020	-0.061587	-2.503453	0.0124	-0.065175	-1.625380	0.1042
Price of fish source (VND1000/bottle, Logarithm)	-0.017745	-0.898344	0.3691	-0.031511	-1.405704	0.1600	-0.007125	-0.220811	0.8253
Price of noodle (VND1000/pack, Logarithm)	-0.118354	-2.117909	0.0343	-0.135509	-2.195240	0.0283	-0.155994	-1.753881	0.0796
Price of pork (VND1000/kg, Logarithm)	0.077867	1.238563	0.2157	0.130130	1.857541	0.0634	0.003871	0.039150	0.9688
Price of normal rice (VND1000/kg, Logarithm)	-0.113060	-1.880106	0.0602	0.100439	1.556251	0.1198	-0.398041	-3.718927	0.0002
Price of sewing service (VND1000/trouser, Logarithm)	0.112672	4.240640	0.0000	0.004043	0.159619	0.8732	0.279912	6.094422	0.0000
Averaged education in commune (years)	-0.003217	-0.467510	0.6402	-0.004503	-0.617623	0.5369	0.006063	0.544986	0.5858
Averaged land owned in commune (Hectare, Logarithm)	0.002428	0.328113	0.7429	0.001589	0.227500	0.8201	-0.002821	-0.174710	0.8613
Price index in the region	0.505662	1.897985	0.0579	0.258162	0.930998	0.3520	0.803062	2.008155	0.0448
Total household credit (VND1000, Logarithm)	0.015530	1.461982	0.1439	0.006083	0.491860	0.6229	0.043599	2.819054	0.0049
C	6.530798	21.95589	0.0000	6.308353	21.12301	0.0000	4.986777	10.57650	0.0000
R-squared	0.290598			0.146654			0.274093		
Adjusted R-squared	0.283813			0.138492			0.267150		
S.E. of regression	0.298227			0.317659			0.491760		
F-statistic	43.45463			17.86411			44.77864		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observation	1901			1901			1901		

Table 6.14.A2 - Effect of access to credit on household welfare (92/93- Poorer Households)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=7)

Dependent variable	Per capita expenditure (VND1000, Logarithm)			Per capita food expenditure (VND1000, Logarithm)			Per capita non food expenditure (VND1000, Logarithm)		
Explanatory variables	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.	Coeff.	t-statistic	Prob.
The age of household head	0.024990	3.657603	0.0003	0.010660	1.612257	0.1071	0.068290	3.541672	0.0004
Education of household head (years)	0.007025	2.252789	0.0244	0.003177	1.097968	0.2724	0.017641	2.405371	0.0163
Dummy variable: farm household =1; otherwise =0	-0.010622	-0.385350	0.7000	0.017149	0.609958	0.5420	-0.070587	-1.079817	0.2804
Dummy variable: gender of household head: male =1; female=0	0.024109	1.195324	0.2322	0.050411	2.503586	0.0124	-0.037853	-0.825343	0.4093
Household size (persons)	-0.030260	-5.592479	0.0000	-0.027502	-5.091421	0.0000	-0.047369	-3.201230	0.0014
Farm land owned (Hectare, Logarithm)	-0.002276	-0.513999	0.6073	-0.003657	-0.773645	0.4393	-0.006839	-0.592231	0.5538
Financial savings (VND1000, Logarithm)	0.019037	4.462022	0.0000	0.011298	2.501685	0.0125	0.037724	3.787242	0.0002
Non-financial savings (VND1000, Logarithm)	0.016004	4.633977	0.0000	0.005103	1.480405	0.1390	0.049237	4.987081	0.0000
Price of detergent in the village (VND1000/kg, Logarithm)	-0.050222	-1.941033	0.0525	-0.043758	-1.471621	0.1414	-0.079677	-1.386608	0.1658
Price of fish source (VND1000/bottle, Logarithm)	-0.064264	-2.859673	0.0043	-0.070279	-2.633199	0.0086	-0.074484	-1.499452	0.1340
Price of noodle (VND1000/pack, Logarithm)	-0.090154	-1.427454	0.1537	0.032919	0.505890	0.6130	-0.394820	-2.784785	0.0054
Price of pork (VND1000/kg, Logarithm)	0.171104	2.717908	0.0067	0.086131	1.141249	0.2540	0.322287	2.339376	0.0195
Price of normal rice (VND1000/kg, Logarithm)	0.105789	1.715285	0.0865	0.197937	2.982215	0.0029	-0.047742	-0.348287	0.7277
Price of sewing service (VND1000/trouser, Logarithm)	0.008475	0.341572	0.7327	-0.043255	-1.772850	0.0765	0.123199	2.015630	0.0440
Averaged education in commune (years)	0.017034	2.003885	0.0453	0.023414	2.647224	0.0082	-0.000453	-0.021613	0.9828
Averaged land owned in commune (Hectare, Logarithm)	-0.006529	-0.983669	0.3255	-0.004317	-0.674850	0.4999	-0.009028	-0.583237	0.5598
Price index in the region	0.594457	1.942659	0.0523	0.078695	0.237757	0.8121	1.160120	1.556759	0.1198
Total household credit (VND1000, Logarithm)	0.049605	3.547798	0.0004	0.027165	1.835108	0.0667	0.142798	3.391308	0.0007
C	5.356416	15.55229	0.0000	5.799936	15.05956	0.0000	2.848976	3.362439	0.0008
R-squared	-0.272416			0.007782			-0.542011		
Adjusted R-squared	-0.289458			-0.005507			-0.562663		
S.E. of regression	0.268081			0.264222			0.621488		
F-statistic	5.950985			7.592050			7.941876		
Probability (F-statistic)	0.000000			0.000000			0.000000		
Observation	1363			1363			1363		

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Table 7.5.A2 – Impact of credit on per capita expenditure (Panel data - Extra)
Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=6)

Dependent Variable: Increase in per capita expenditure				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.033661	0.014345	2.346497	0.0192
Increase in education of household head (years)	0.009256	0.007504	1.233538	0.2177
Dummy: if household becomes farm household	-0.000487	0.071882	-0.006780	0.9946
Dummy: if household head becomes male	-0.005767	0.122630	-0.047026	0.9625
Increase in household size (persons)	-0.096134	0.009493	-10.12717	0.0000
Increase in ownership of farming land (hectare)	-0.000720	0.005840	-0.123272	0.9019
Increase in financial savings (VND1000)	0.008640	0.005396	1.601326	0.1096
Increase in non-financial savings (VND1000)	0.011837	0.003547	3.337111	0.0009
Increase in price of detergent (VND1000/kg)	0.091119	0.034260	2.659642	0.0080
Increase in price of fish source (VND1000/bottle)	0.052162	0.037012	1.409313	0.1591
Increase in price of noodle (VND1000/pack)	0.015643	0.096414	0.162245	0.8711
Increase in price of pork (VND1000/kg)	0.072732	0.132964	0.547009	0.5845
Increase in price of ordinary rice (VND1000/kg)	0.085941	0.107908	0.796422	0.4260
Increase in price of sewing service (VND1000/trouser)	0.178497	0.039507	4.518134	0.0000
Increase in averaged education of household head in commune (years)	0.033885	0.019433	1.743687	0.0815
Increase in averaged ownership of farming land in commune (hectare)	0.021222	0.013155	1.613259	0.1070
Increase in price index of the region	-2.295749	0.435659	-5.269601	0.0000
Increase in total household borrowing (VND1000)	0.173461	0.065202	2.660377	0.0079
C	0.179860	0.134832	1.333954	0.1825
R-squared				0.077735
Adjusted R-squared				0.060279
S.E. of regression				0.427136
F-statistic				14.77766
Prob (F-statistic)				0.000000
Number of observations				970

Table 7.6.A2 – Impact of credit on per capita food expenditure (Panel data -Extra)
Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=6)

Dependent Variable: Increase in per capita food expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.031899	0.015272	2.088776	0.0370
Increase in education of household head (years)	0.008825	0.007896	1.117692	0.2640
Dummy: if household becomes farm household	0.011242	0.079332	0.141704	0.8873
Dummy: if household head becomes male	0.130252	0.145249	0.896749	0.3701
Increase in household size (persons)	-0.091134	0.009913	-9.193113	0.0000
Increase in ownership of farming land (hectare)	0.006230	0.006819	0.913725	0.3611
Increase in financial savings (VND1000)	0.007619	0.005913	1.288505	0.1979
Increase in non-financial savings (VND1000)	0.008956	0.003796	2.359340	0.0185
Increase in price of detergent (VND1000/kg)	0.093898	0.039630	2.369390	0.0180
Increase in price of fish source (VND1000/bottle)	0.016869	0.037801	0.446252	0.6555
Increase in price of noodle (VND1000/pack)	-0.017340	0.105443	-0.164452	0.8694
Increase in price of pork (VND1000/kg)	-0.013164	0.134106	-0.098160	0.9218
Increase in price of ordinary rice (VND1000/kg)	0.119913	0.113873	1.053041	0.2926
Increase in price of sewing service (VND1000/trouser)	0.083558	0.040087	2.084431	0.0374
Increase in averaged education of household head in commune (years)	0.010043	0.020966	0.478996	0.6321
Increase in averaged ownership of farming land in commune (hectare)	0.022923	0.014502	1.580641	0.1143
Increase in price index of the region	-1.731223	0.478473	-3.618223	0.0003
Increase in total household borrowing (VND1000)	0.180393	0.075347	2.394154	0.0169
C	0.222798	0.134602	1.655235	0.0982
R-squared				-0.060399
Adjusted R-squared				-0.080470
S.E. of regression				0.450832
F-statistic				9.723167
Prob (F-statistic)				0.000000
Number of observations				970

Table 7.7.A2 – Impact of credit on per capita non-food expenditure (Panel data - Extra)

Method: 2SLS - Newey-West HAC Standard Errors & Covariance (lag truncation=6)

Dependent Variable: Increase in per capita non-food expenditure

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Increase in age group of household head	0.029724	0.021812	1.362735	0.1733
Increase in education of household head (years)	0.011900	0.010790	1.102874	0.2704
Dummy: if household becomes farm household	-0.033085	0.093943	-0.352185	0.7248
Dummy: if household head becomes male	-0.174014	0.176212	-0.987526	0.3236
Increase in household size (persons)	-0.090851	0.014907	-6.094617	0.0000
Increase in ownership of farming land (hectare)	-0.004575	0.009370	-0.488233	0.6255
Increase in financial savings (VND1000)	0.011398	0.008253	1.381088	0.1676
Increase in non-financial savings (VND1000)	0.015274	0.005319	2.871463	0.0042
Increase in price of detergent (VND1000/kg)	0.088449	0.051140	1.729556	0.0840
Increase in price of fish source (VND1000/bottle)	0.102483	0.053377	1.920002	0.0552
Increase in price of noodle (VND1000/pack)	0.054260	0.142700	0.380238	0.7039
Increase in price of pork (VND1000/kg)	0.238436	0.195477	1.219763	0.2229
Increase in price of ordinary rice (VND1000/kg)	0.110718	0.152859	0.724312	0.4691
Increase in price of sewing service (VND1000/trouser)	0.323596	0.059479	5.440509	0.0000
Increase in averaged education of household head in commune (years)	0.088293	0.031510	2.802098	0.0052
Increase in averaged ownership of farming land in commune (hectare)	0.017671	0.018135	0.974418	0.3301
Increase in price index of the region	-3.277058	0.660742	-4.959660	0.0000
Increase in total household borrowing (VND1000)	0.197843	0.094683	2.089528	0.0369
C	0.040736	0.202621	0.201045	0.8407
R-squared				0.097556
Adjusted R-squared				0.080475
S.E. of regression				0.644360
F-statistic				10.66094
Prob (F-statistic)				0.000000
Number of observations				970