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THE IMPACTS OF MICROCREDIT ON RURAL VIETNAMESE HOUSEHOLDS

PhD thesis submitted by

Phan Thanh Chung

For the degree of Doctor of Philosophy, College of Business, Law and
Governance, James Cook University, Townville, Queensland, Australia.

Advisors

Assoc. Prof. Sizhong Sun

Dr. Rabiul Beg

Professor Zhang-Yue Zhou

28 August 2020



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Declaration of published research

The current thesis is formatted according to the James Cook University guidelines for a Doctor of Philosophy research thesis. I list below research outputs relevant to this thesis.

Publication title	Contribution	Status
Phan, C. T., Sun, S., Zhou, Z. Y., & Beg, R. (2019). Does microcredit increase household food consumption? A study of rural Vietnam. <i>Journal of Asian Economics</i> , 62(1), 39-51. https://doi.org/10.1016/j.asieco.2019.04.003	Joint, first author	Published
Phan, C. T., Sun, S., Zhou, Z. Y., & Beg, R. (2020). Does Microcredit Improve Rural Households' Social Network? Evidence from Vietnam. <i>Journal of Development Studies</i> , https://doi.org/10.1080/00220388.2020.1725485	Joint, first author	Published
Phan, C. T., Sun, S., Zhou, Z. Y., & Beg, R. Does productive microcredit improve rural children's education? Evidence from rural Vietnam. To be submitted to <i>World Development</i> .	Joint, first author	To be submitted

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Statement of contribution of others

The following is a statement of contribution of others to this thesis research as a whole.

Nature of assistance	Contribution	Names, titles, and affiliations of co-contributors
Intellectual support	Supervision	Assoc. Prof. Sizhong Sun (James Cook University – JCU) Dr. Rabiul Beg (JCU) Prof. Zhang-Yue Zhou (JCU)
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Abstract

Microcredit has rapidly become an important tool in fighting poverty and promoting small business development. As such, agencies involved in microcredit loans, especially donors, policymakers, and practitioners, are keen to assess the impacts of microcredit, in order to ensure that the supportive funds were spent efficiently. However, the evidence of what microcredit programs have achieved remains incomplete and inconclusive. Several existing studies find that microcredits have both economic and social impacts, while others find no evidence of socio-economic development from microcredits. Examining the impacts of microcredit, therefore, remains an open question for policymakers, development practitioners, donors, and researchers.

This thesis explores the effects of microcredit on rural households in Vietnam, focusing on three aspects, namely, the economic, social, and human capital aspects. To this end, this thesis aims to investigate three research questions, as follows:

1. Does microcredit increase a rural household's food consumption?
2. Does microcredit help rural households to enhance social network?
3. Does microcredit improve children's education in rural Vietnam?

To answer these questions, I first develop a theoretical framework, in which a representative household, after accessing microcredit to invest in its small family business, is involved in a multi-stage decision-making process to maximise its lifetime utility. Accounting for the probability of achieving success in the microcredit-funded family business, which increases the family income, the household first makes decisions on its children's education, then on social network and finally on food consumption. Solving the utility maximisation problem backwards, I derive the optimal consumption, social network, and children education as functions of microcredit and a set of control variables.

Then guided by the theoretical framework, I estimate these impacts using the household survey data from rural Vietnam. Regarding the impact on food consumption, microcredit appears to be an effective tool for smoothing food consumption. However, it is also found that previous borrowings become a burden for current-period consumption. That is, the borrowers need to squeeze their current consumption to repay the borrowing in previous periods. Hence, in this sense, despite that

rural Vietnamese households can benefit from borrowing microcredit, they are also faced with a risk of falling into “credit trap”. It is important to improve the microcredit policy to facilitate positive impacts and mitigate adverse effects.

Regarding the impact on social network, microcredit enhances borrowers’ social network in terms of both size and quality of the network. The social network can have a long-term impact on borrowers, especially the poor. A broader and better social network enables borrowers to access to external supports when facing adverse income shocks. It also helps them acquire new skills from peers within its social network to build a route out of poverty.

For the impact on children’s education, I find that microcredit borrowing significantly and negatively affects children’s education in rural Vietnam, which suggests a child labour effect. When a household receives external resources, such as microcredit, to expand its family business, its demand for labour increases, and using its children in the business is, not surprisingly, a cheap way to solve the problem. Moreover, this adverse effect is more profound for boys. Such negative impact requires attention from policymakers and practitioners, in that despite being an anti-poverty tool, the microcredit can also harm children’s education, which, in turn, exacerbates their poverty, particularly in the long run.

This research makes three contributions to existing literature. First, it provides a comprehensive analysis of the impacts of microcredit on rural households from three dimensions, namely food consumption, social network, and children’s education. Second, the theoretical framework developed in this thesis can be utilised in other similar impact assessment studies. Third, the policy implications from this study are likely to help improve the microcredit policy and reduce poverty, not only in Vietnam but also in other developing countries.

Table of Contents

Statement of access	ii
Electronic copy	iii
Declaration.....	iv
Declaration of published research.....	v
Statement of contribution of others.....	vi
Acknowledgements	vii
Abstract	viii
List of Tables	xiv
List of Figures.....	xv
List of Acronyms	xvi
Chapter 1 Introduction	1
1.1 Background.....	2
1.2 Motivations for this research	4
1.3 Research objectives and questions.....	5
1.4 Contributions of the research.....	5
1.5 Structure of this thesis.....	7
Chapter 2 Microcredit: An overview.....	9
2.1 Basics of microcredit	10
2.2 Microcredit in practice: A global perspective	13
2.2.1 Providers of microcredit.....	13
2.2.2 Clients of microcredit.....	15
2.2.3 Do the microcredit programs help the poor?.....	17
2.3 Microcredit in Vietnam.....	18
2.3.1 Providers.....	19

2.3.2	Clients	22
2.3.3	Remaining and emerging issues in Vietnam’s microcredit market	24
Chapter 3	Literature review	27
3.1	Microcredit impact assessment.....	28
3.1.1	Earlier models of microcredit impact assessment	28
3.1.2	Potential impacts of microcredit.....	30
3.1.3	The household economic portfolio model.....	32
3.2	Microcredit and household consumption	35
3.2.1	A positive effect on consumption	36
3.2.2	A negative or insignificant effect on consumption.....	38
3.2.3	Summary	39
3.3	Microcredit and social network	39
3.3.1	Microcredit generates social network	40
3.3.2	Social network is not an automatic outcome of accessing microcredit	43
3.3.3	Summary	43
3.4	Microcredit and children’s education	44
3.4.1	The mechanism through which microcredit affects education.....	44
3.4.2	Channels through which microcredit impacts education	45
3.4.3	A positive effect on children education	46
3.4.4	A negative or insignificant effect on children education	47
3.4.5	Summary	49
Chapter 4	Research methodology	51
4.1	An overview of the research methodology.....	52
4.2	Identifying the impacts of microcredit on rural households.....	52
4.3	The model.....	55
4.3.1	Household optimising framework	55

4.3.2	Factors affecting household capability	56
4.3.3	Optimal consumption	57
4.3.4	Optimal social network	59
4.3.5	Optimal children's education	60
4.4	The data	62
4.4.1	Introduction	62
4.4.2	Measurement of food consumption	66
4.4.3	Measurement of social network.....	66
4.4.4	Measurement of children's education.....	71
4.5	Summary	72
Chapter 5	Impacts of Microcredit on rural households' food consumption	74
5.1	Introduction	75
5.2	Estimation strategy.....	76
5.3	Variable definitions and summary statistics.....	78
5.4	Results	81
5.5	Robustness check.....	86
5.6	Concluding remarks	87
Chapter 6	Impacts of Microcredit on rural households' Social network.....	89
6.1	Introduction	90
6.2	Estimation strategy.....	91
6.3	Variable definitions and summary statistic	93
6.4	Results	97
6.4.1	Baseline results	97
6.4.2	Robustness check.....	100
6.5	Concluding remarks	101
Chapter 7	Impacts of Microcredit on children's Education	103

7.1	Introduction	104
7.2	Estimation strategy.....	105
7.3	Variable definitions and summary statistics.....	108
7.4	Results	111
7.5	Concluding remarks	116
Chapter 8	Conclusions	118
8.1	Findings and conclusions	119
8.2	Significance and contributions	121
8.2.1	Contribution to microcredit literature	121
8.2.2	Contributions to research methodology	122
8.2.3	Contributions to the policy debate.....	122
8.3	Policy implications.....	123
8.4	Limitations and future research	125
	References.....	126
	Appendix A: Difference Generalised Method of Moments estimation.	133
	Appendix B: Collinearity diagnostics.	134
	Appendix C: Impacts of microcredit on children’s education.....	135

List of Tables

Table 4-1: Sample size for the VARHS surveys.	64
Table 4-2: Distribution of loans.....	65
Table 4-3 Components of the two social network indexes	70
Table 5-1. Variable definitions and descriptive statistics	79
Table 5-2. Impacts of microcredit on household food consumption (System GMM).....	83
Table 5-3 Robustness check	86
Table 6-1 Variable definition and descriptive statistics	95
Table 6-2 Impacts of microcredit on household social network.....	98
Table 6-3 Robustness check	100
Table 7-1: Variable definition and descriptive statistics.....	110
Table 7-2 The effects of microcredit on children’s education.....	112
Table 7-3 Marginal effects of microcredit in sub-samples.....	115
Table A1. Impacts of microcredit on household food consumption (Difference GMM)	133
Table B1. Collinearity diagnostics.....	134
Table C1: Summary of school gap for children aged from 12 to 18	135
Table C2: Summary of completed grades for children aged from 12 to 18.....	135
Table C3: Marginal effects of microcredit, boys versus girls.	136
Table C4: Marginal effects of microcredit, poor versus non-poor children.....	137

List of Figures

Figure 1.1 Thesis structure	7
Figure 2-1: Microcredit loan portfolio.	12
Figure 2-2: Funding sources by providers.....	14
Figure 2-3: Microcredit clients by gender.....	16
Figure 2-4: Rural microcredit clients.....	17
Figure 2-5: Number of microcredit clients.....	18
Figure 2-6: Number of active clients.	23
Figure 2-7: Clients by borrowers' gender.	23
Figure 2-8: Clients by areas.....	24
Figure 3-1: Potential impacts of microcredit.....	31
Figure 3-2: The household economic portfolio model.....	34
Figure 4-1 Impacts of microcredit on rural household economy	53
Figure 4-2 An order in which a household makes optimal decisions.	54
Figure 4-3 VARHS provinces	63

List of Acronyms

AB	Arellano and Bond
ADB	Asian Development Bank
AIMS	Assessing the Impact of Microenterprise Services
ATT	Average Treatment Effect on The Treated
BRAC	Bangladesh Rural Advancement Committee
CDF	Cumulative Distribution Function
CES	Constant Elasticity of Substitution
GMM	Generalised Method of Moments
DID	Differences-in-Differences
GSO	General Statistics Office
HEP	Household Economic Portfolio Model
IMF	International Monetary Fund
IV	Instrumental Variables
MFI	Microfinance Institutions
MIX	Microfinance Information Exchange
MOLISA	Ministry of Labour, Invalids, and Social Affairs of Vietnam
MOs	Mass Organisations
NB	Negative Binomial Model
NBFI	Non-bank Financial Institutions
NGOs	Non-governmental Organisations
PCA	Principal Component Analysis
PCFs	People's Credit Funds
PPI	Producer Price Index
PSM	Propensity Score Matching
RCCs	Rural Credit Cooperatives
VARHS	Vietnam Access to Resources Household Survey
VBARD	Vietnam Bank for Agriculture and Rural Development
VBP	Vietnam Bank for the Poor
VBSP	Vietnam Bank for Social Policies
VHLSS	Vietnam Household Living Standards Survey
VIF	Variance Inflation Factors

CHAPTER 1 INTRODUCTION

CHAPTER OUTLINE

1.1	Background.....	2
1.2	Motivations for this research	4
1.3	Research objectives and questions.....	5
1.4	Contributions of the research.....	5
1.5	Structure of this thesis.....	7

Microcredit refers to small loans provided to the poor with an aim to lift them out of poverty. It is based on the idea that credits are given as financial assistance to low-income households, who otherwise have difficulty in accessing the traditional banking and monetary system due to lack of collateral. With the help of microcredit, the borrowers can shift to new livelihood strategies, which in turn allow them to pursue self-employment projects that generate additional earnings and promote their well-being. Eventually, it will help the poor borrowers to be out of poverty.

This argument is logically consistent. However, it is not clear whether microcredit achieves its intended outcomes. To this end, this thesis aims to investigate the effects of microcredit on rural households in Vietnam, focusing on three aspects, namely the economic, social, and human capital aspects. Based on the standard utility maximisation, this thesis develops a theoretical framework which allows us to empirically analyse the impacts of microcredit on rural households. This comprehensive study, hence, sheds light on the understanding of whether microcredit is an effective tool for poverty alleviation in developing countries.

The rest of this chapter is structured as follows: Section 1.1 provides a background of the research. Section 1.2 and Section 1.3 highlight objectives and research questions. Then, motivations and contributions are presented in Section 1.4. Section 1.5 presents the structure of this thesis.

1.1 Background

Even though the concept of combating poverty through microcredit is widely adopted and practised in both global and Vietnamese contexts, evidence of anti-poverty impacts is mixed and inconclusive. For instance, Pitt and Khandker (1998) investigated the effects of microcredit on borrowers' income and consumption in Bangladesh. They conclude that microcredit borrowings significantly enhance these outcomes of interest. However, even using the same dataset, Roodman and Morduch (2009) later found no evidence of the impacts in Bangladesh. Similarly, in the context of Vietnam, Duong and Thanh (2014) empirically analysed the Vietnam Household Living Standards Survey (VHLSS) and found that microcredit indeed helps borrowers to earn more income and consume more. In contrast, Nghiem et al. (2012), using a quasi-experimental approach, did not discover any significant effect of microcredit on household consumption in Vietnam. The contradictory findings of previous studies raise a need for a high-quality research on the impacts of microcredit, with better quality data and more appropriate research methods.

Given the needs for studies on the impacts of microcredit, three aspects are important, namely the economic, social, and human capital aspects. Knowledge of all these three aspects can provide comprehensive and essential information to any interested agencies, particularly the donors, policymakers, or practitioners, to ensure that funding is spent efficiently. For example, the positive impacts of microcredit on borrowers' economic aspect, such as food consumption, reflects the success of microcredit in fighting poverty in terms of economic improvement, which however is likely to be short-lived. Although this indicator directly affects the households' utility, it is insufficient to draw a completed picture of microcredit impacts. In addition, the microcredit providers also need to understand how their services change their clients' social capital, such as social network, and human capital, such as children's education. Compared with the economic effects, these impacts tend to be more long-lasting, and also significantly help lift poor rural households out of poverty. A better social network allows poor households to access non-financial supports from relative, neighbour, and friends in time of need to deal with any negative income shock. In addition, educated children are more likely to get decent jobs and significantly support their parents, as well as other siblings, to end their poverty circles. Nevertheless, the effects of microcredit programs on the three aspects of household welfare have not been thoroughly explored in the existing literature, as will be highlighted in the chapter of literature review, and there remain questions to be answered.

It is necessary to have a comprehensive study of rural microcredit assessment in order to draw appropriate and effective policies for rural development. Rural microcredit is given to the poor to improve their welfare and eventually pull them out of poverty. However, the microcredit-related policies might not work properly due to insufficient facilities and limited resources in the under-developed areas. Therefore, if there is no appropriate policy for rural microcredit services, it might result in problems rather than solutions for poverty alleviation. For instance, the poor borrowers might get deep into debt traps if they cannot pay back the loans; they can become even poorer.

Vietnam appears to be a good case for a rural microcredit assessment study. As a developing country in South East Asia, its population is about 96 million (World Bank, 2019). More than 70 per cent of those are living in rural areas, and most of them are low-income households. These attributes make Vietnam an ideal representative for analysing the impacts of microcredit on the poor. Furthermore, in Vietnam, poverty is widespread, and the government has made significant efforts to alleviate it. These efforts include implementation of a number of microcredit programs that function primarily through state-owned banks in coordination with

non-governmental organisations. As a result, Vietnam's achievement in fighting against poverty is substantial. For instance, the incidence of poverty, measured in terms of the international poverty line, has declined from 60 per cent in the early 1990s to 20.7 per cent in 2010, then 9.8 per cent in 2016 (World Bank, 2019). Thus, the contribution to poverty alleviation of microcredit and lessons from Vietnam policy implementation would be of importance to researchers and policymakers not only in Vietnam but also globally.

To overcome the shortcomings of previous studies outlined above, this thesis develops a theoretical framework to investigate the contribution of microcredit to rural development in terms of economic, social, and human capital aspects. Using a unique panel dataset, namely the Vietnam Access to Resources Household Survey (VARHS), the findings are expected to propose potential solutions to improve the effectiveness of rural microcredit, not only for Vietnam but also for other developing countries.

1.2 Motivations for this research

Microcredit has been recognised as a potentially effective tool to fight against poverty. The spread of microcredit appears to coincide with a sharp decrease in the poverty rate across countries. Vietnam is not an exception. For example, the poverty rate dropped sharply from 40.07 per cent in 2002 to 9.8 per cent in 2016 (World Bank, 2019), while the number of registered microcredit institutions increased from two to thirty-six in the same period. However, the role of microcredit in fighting poverty in rural Vietnam is still unclear. Most previous studies of microcredit in Vietnam utilised cross-section data or panel data with a short time frame, such as Quach et al. (2005) using data from 1992 to 1998. These studies could not account for the dynamic aspect of the household's welfare. This raises a need for a comprehensive study on whether microcredit contributes to poverty reduction in rural Vietnam.

A comprehensive investigation using a nationally representative dataset is necessary to capture a full picture of the impact of microcredit on poverty reduction. Findings of such a study will allow policymakers to refine their microcredit-related poverty reduction programs to improve the intended outcomes. Government can also use the results to support the growth of microcredit institutions by providing necessary financial assistance. Findings of the study will also facilitate microcredit institutions to better understand the perceptions of their clients on the financial services they are providing. That, in turn, helps the microcredit institutions improve their services to obtain desired outcomes.

1.3 Research objectives and questions

The major aim of this work is to construct an empirical analysis to investigate the research questions related to the impacts of microcredit on rural households. It is hoped that this study will lead to new insights of whether microcredit is an effective tool for poverty alleviation in Vietnam, and how to improve the services. To achieve these goals, there are two specific objectives as follows:

1. To investigate the impacts of microcredit on the consumption (economic impact), social network (social capital impact), and education (human capital impact) of rural household borrowers in Vietnam.
2. To draw policy implications that allow policymakers, government, microcredit institutions, and donors to improve their services and maximise the desired outcomes.

The overarching research question is how microcredit impacts rural households' welfare in Vietnam. To be more specific, this thesis answers explicitly the following three sub-questions:

1. Does microcredit increase rural households' food consumption?
2. Does microcredit help rural households to enhance their social network?
3. Does microcredit improve rural household children's education?

It is expected that answering these three questions will significantly boost our understanding of the impacts of microcredit on rural households in Vietnam.

1.4 Contributions of the research

This thesis contributes to the existing literature in several ways. First, it is expected to shed light on the impacts of microcredit on rural households in Vietnam by using a unique and nationally representative panel dataset of rural households. The previous studies used cross-sectional data or panel data that contain only two years. Thus, the research questions such as long-term impacts on consumption, education, and social network of rural households could not be answered. This thesis attempts to provide a reliable, comprehensive assessment of microcredit impacts in rural Vietnam.

Second, this thesis assesses the influence of microcredit on rural households from three aspects: economic, social, and human capital. Therefore, it allows policymakers, donors, and

microcredit institutions to understand their contributions to the fight against poverty more comprehensively. In particular, assessing household food consumption allows policymakers and microcredit providers to understand how their service impacts clients on the economic aspect. However, the increase in food consumption is only one dimension to assess how microcredit can improve its clients' wellbeing. In addition to that, human capital and social capital impacts also play a vital role in lifting poor rural households out of poverty. Therefore, to assess the impacts of financial interventions on rural households, researchers should investigate multi aspects.

Third, this study aims to contribute to the existing literature with a theoretical framework, which is based on the standard utility optimisation framework and can be replicated elsewhere to tackle similar problems. The theoretical framework provides a full picture of microcredit impacts on a household in economic, social, and human capital dimensions. In the framework, a representative household makes optimal decisions in a multi-stage manner. Solving for the set of optimal decision problems, I derive the optimal consumption, social network, and education as functions of microcredit and other control variables. Subsequently, by fitting these functions to data, the framework allows me to investigate the impacts of microcredit on rural household welfares.

Last but not least, the findings of this research are highly relevant to policymakers involved in microcredit not only in Vietnam but also in other developing countries. Once the roles of microcredit in poverty alleviation are better identified, it helps authorities draw appropriate policies for rural development strategies.

1.5 Structure of this thesis

This thesis consists of eight chapters. Three of those are empirical studies. The thesis structure and contents are briefly summarised as follows.

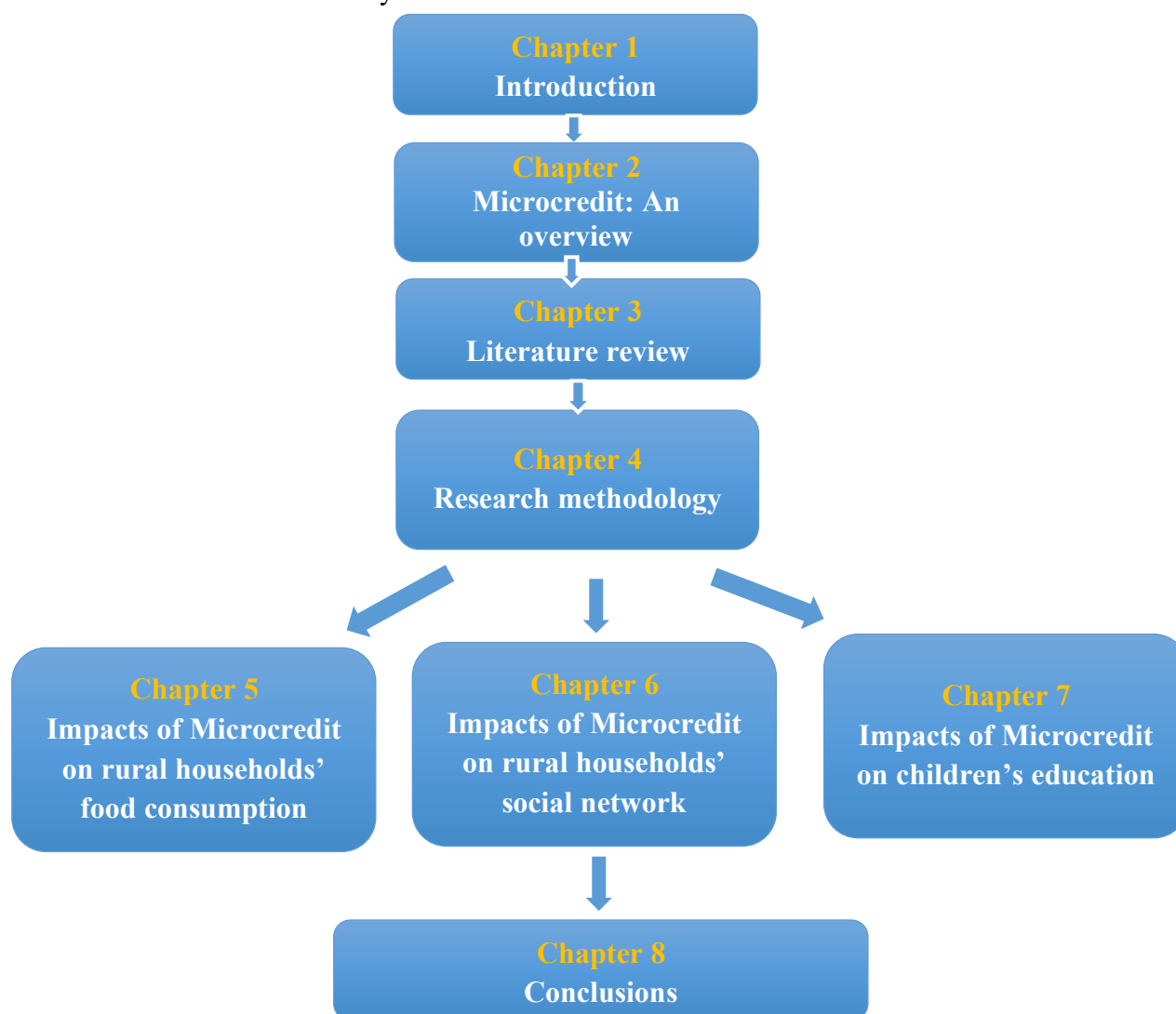


Figure 1.1 Thesis structure

Chapter 1: This chapter discusses the background in which microcredit is seen as an important tool for poverty alleviation. This chapter addresses the motivations and contributions of this thesis, then states the research questions to be answered and objectives to be achieved in the rest of the thesis.

Chapter 2: An overview of microcredit is provided in this chapter. The first section introduces the basic definition and purpose of microcredit. The second section discusses microcredit in practice: providers, clients, and characteristics. The third section goes into more details of

Vietnamese microcredit market: providers, clients and issues in the Vietnamese microcredit market.

Chapter 3: Existing literature on the impacts of microcredit is reviewed in this chapter. It consists of four sections. The first section overviews the approaches of microcredit impact assessment in the literature. The second section reviews the impact of microcredit on consumption. Empirical studies on the impact of microcredit on the household's social network are evaluated in Section 3. Finally, the fourth section reviews previous research on the impact of microcredit on children's education.

Chapter 4: The theoretical framework for this study, modelling issues, and data used are addressed in this chapter. The first section identifies the three impacts of microcredit on rural households: economic, social, and human capital. A household utility optimising framework, in which a household try to maximise its lifetime utility, is proposed. Based on the framework, models for empirical analysis are developed. The final section of the chapter provides details on data issues.

Chapters 5, 6, and 7: These three chapters detail the three empirical studies on food consumption, social network, and children's education, respectively. Each chapter contains five sections. The first section introduces the research problem and discusses the need to conduct the research. The second section discusses estimation strategies to overcome a number of estimation issues, such as selection bias and endogeneity. The third section shows data transformation, variable definition and summary statistics for the study. Estimation results are discussed in the fourth section. Finally, the last section draws a conclusion for the chapter.

Chapter 8: This final chapter summarises findings, implications, and future research directions. The first section is a summary of all the research findings dawn from the research. Based on the findings, the second section highlights the significance and contributions of this thesis. The third section suggests important policy implications for improving microcredit effectiveness in order to more effectively alleviate poverty in Vietnam. The last section points out the limitations of this study and offers directions for future research.

CHAPTER 2 MICROCREDIT: AN OVERVIEW

CHAPTER OUTLINE

2.1	Basics of microcredit	10
2.2	Microcredit in practice: A global perspective	13
2.2.1	Providers of microcredit.....	13
2.2.2	Clients of microcredit.....	15
2.2.3	Do the microcredit programs help the poor?.....	17
2.3	Microcredit in Vietnam	18
2.3.1	Providers.....	19
2.3.1.1	Formal providers.....	19
2.3.1.2	Semi-formal providers	20
2.3.1.3	Informal providers	21
2.3.2	Clients	22
2.3.3	Remaining and emerging issues in Vietnam's microcredit market.....	24

This chapter provides an overview of microcredit. In Section 2.1, some basics of microcredit are introduced. Section 2.2 discusses microcredit in practice that makes microcredit standing out from the conventional credit in the financial market. In Section 2.3, the Vietnamese microcredit market is presented.

2.1 Basics of microcredit

In the literature, the terms of microcredit and microfinance are often used interchangeably. They are, however, different. Microcredit refers to small loans, while microfinance includes microcredit and other financial services such as insurance, money transfers, payments, remittances, among others. Thus, microcredit is only a component of microfinance (Oikocredit, 2005). In this thesis, the focus is on microcredit.

Microcredit is a provision of lending services to poor households. Due to their lack of physical collateral, these low-income poor families often fail to get approval for loans in the formal financial sector. In order to obtain money to fund their essential production and consumption, the poor households seek credit from informal sources but often with higher interest rates. This informal credit has been seen as a burden on poor families as it erodes their income and, consequently, leads the poor borrowers into “credit trap”, a cycle of debt and poverty. To fight poverty, governments in developing countries have introduced microcredit programs. These programs aim to assist the poor’s access to a small amount of preferential interest rate loans through the formal financial system.

Microcredit services provide additional financial resources for poor households. With this assistant, the receivers can shift to new livelihood strategy owing to improved resources. Microfinance institutions also provide new knowledge, skills, and experiences to the receivers through social group meetings. Microcredit services target impoverished people living in both rural and urban areas. The main objective is to help them increase their labour productivity and then lead to an increase in household incomes.

Comparing to the conventional credit, microcredit has the following distinguishing characteristics.

- (1) Small loans. This is the most significant feature of the microcredit. The small loans can be issued to individuals or groups of people. The loan volume varies from time to time, place to place, and provider to provider.

- (2) Serving the poor. Microcredit programs chiefly serve the poor in developing countries, especially poor women. They focus on poverty alleviation.
- (3) Flexible with collateral requirements. Collateral requirements are the major obstacle for the poor who typically do not own valuable assets to secure their loans. Microcredit loans are usually collateral-free. Instead, microfinance institutions (MFIs) require their clients to have regular meetings to share their loan use experiences and to participate in training for new skills. It is through such innovative regular gatherings that MFIs help their clients to better use their loans for improved repayments.
- (4) Lower interest rates. The interest rates for microcredit loans vary across providers but are generally lower than the commercial interest rates. While this improves the poor's affordability to secure loans, it also helps them to avoid "credit traps" – a situation in which borrowers might get approved for microcredit loans, but they have to combat higher interest rate and less favourable terms to pay back that loan. As a result, they get deep in debt and stuck in the debt trap.
- (5) Group lending. This innovative lending strategy issues loans to an individual who is a member of a borrowing group. All members of this group have a responsibility for the repayment of this individual's loan. This joint liability mechanism creates a new kind of collateral, the so-called social collateral. Group lending is gaining popularity.

In 2018, globally, some 124 billion US dollars were lent to low-income households through the microcredit programs (Figure 2-1). Between 2012 and 2018, global microcredit increased at an annual rate of over seven per cent. At the regional level, Latin America and the Caribbean is most active in providing microcredit. South Asia has expanded its microcredit lending most impressively. The volume of microcredit in other regions is relatively low and with limited increase.

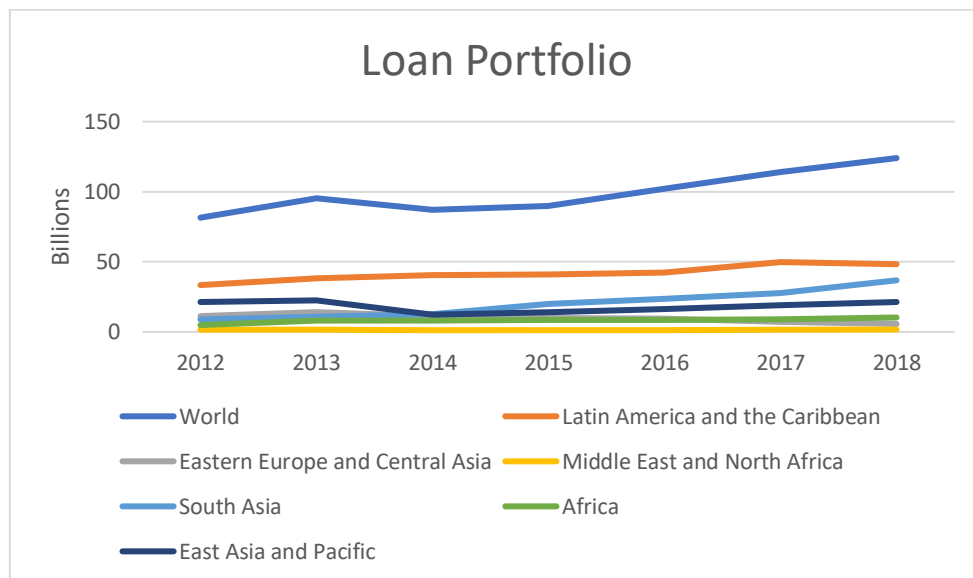


Figure 2-1: Microcredit loan portfolio.

Source: Microfinance Barometer (Convergences, 2019).

Generally, the provision of microcredit is in three forms: individual lending, group lending, and village banking. In individual lending, microcredit loans are directly offered to individual households. Bank officers take sole responsibility for leading decisions, risk assessment, and monitoring repayment. The individual lending is associated with several incentives such as collateral requirements, strict repayment terms in lending contracts. These requirements aim to promote sufficient social pressure on the borrowers to repay (Morduch & Aghion, 2000). Individual lending consumes less time for loan procedures, and it also protects borrowers' privacy better than other lending models (Lehner, 2009). This lending model has been recently widely practised by microcredit banks in Bangladesh, Bolivia, and Indonesia.

Group lending was first introduced by the Grameen Bank in Bangladesh. In this lending type, MFIs provide loans to groups of five, which usually are women groups. Each member of the groups has responsibility for other's liability. A member has to monitor others' loan use and repayments. If one of the members fails to repay loans in time, others take full responsibility to the debt. Otherwise, they are not able to receive the next credit due to this history of default. Members are required to attend regular group meetings. This lending mechanism, on the one hand, can mitigate the risk of bad debts by using joint liability, borrowers' reputation, and the level of creditworthiness of each member. On the other hand, it places much pressure on other members. As such, group leaders are more likely to select creditworthy members to facilitate reputation and increase credit ranking for their group. Subsequently, the default rate is low (Madajewicz, 2011). In addition, group meetings promote training and exchanging

information, sharing experience among members. However, the cost of group lending is relatively high (Savita, 2007). In terms of the default rate, it is similar between individual lending and group lending, according to Gine and Karlan (2008).

A village bank is a local informal self-help group which consists of 20-30 members from a village. Members are mostly female farmers. The first loan amount is \$50-\$100 for each member; very small compared to traditional loans. Village banks have regular meetings in which its members can update and discuss related loan uses and other financial matters. The frequency of participation in these meetings is an important indicator of getting a loan. While traditional loans require collateral that makes it almost impossible for low-income households to borrow, this village banks allows those who are with limited resources to borrow and invest in their microenterprises. Instead of collateral, this leading method employs social pressure to guarantee the repayment. The primary purpose of this mechanism is to help those extreme poor households by providing small financial assistance to allow them to engage in self-enterprises, which hopefully will eventually help them to be out of poverty.

2.2 Microcredit in practice: A global perspective

2.2.1 Providers of microcredit

Most of the microcredit loans are provided by formal financial institutions in forms of small loans. The providers of microloans can be divided into four groups.

1. Banks, either state or private banks. They can be specialised banks for rural development or agricultural development or other non-banking institutions. Many countries have promoted their local microcredit banks. For example, Grameen Bank is the biggest and leading bank for the poor in Bangladesh. In Indonesia, the Unit Desa of Bank Rakyat is a successful bank for rural development.
2. Non-profit, non-governmental organisations (NGOs). This group of providers has made significant impacts and has been recognised as a successful microcredit delivery system for poor people in rural areas (Mollah et al., 2019). The village, mobile, and solidarity banking are three innovative systems of this type of microloans provider and are common in most developing countries such as Bangladesh, India, or Vietnam.
3. Self-help groups and credit unions. They are local providers who understand credit status of borrowers well and have local knowledge. Therefore, their services tend

to be fast and low cost. The heads of groups typically are local reputable female heads of households. This group of credit providers is highly democratic and self-managed by poor people. For example, Bangladesh is a pioneer in encouraging this type of microcredit providers in rural areas.

4. Informal microfinancing, i.e., money lenders and saving collectors/brokers. They are also local credit providers and manage risk by understanding their customers' financial situations. In turn, the informal credit lenders tend to charge higher interest rates to compensate for the cost of collecting customer's information.

Figure 2-2 shows the structure of global funding sources by types of providers. Banks are the largest source of microcredit, followed by non-bank financial institutions (NBFI). Together they provide over 85 per cent of the microcredit. The credit unions/cooperative and NGOs contribute about six and eleven per cent, respectively.

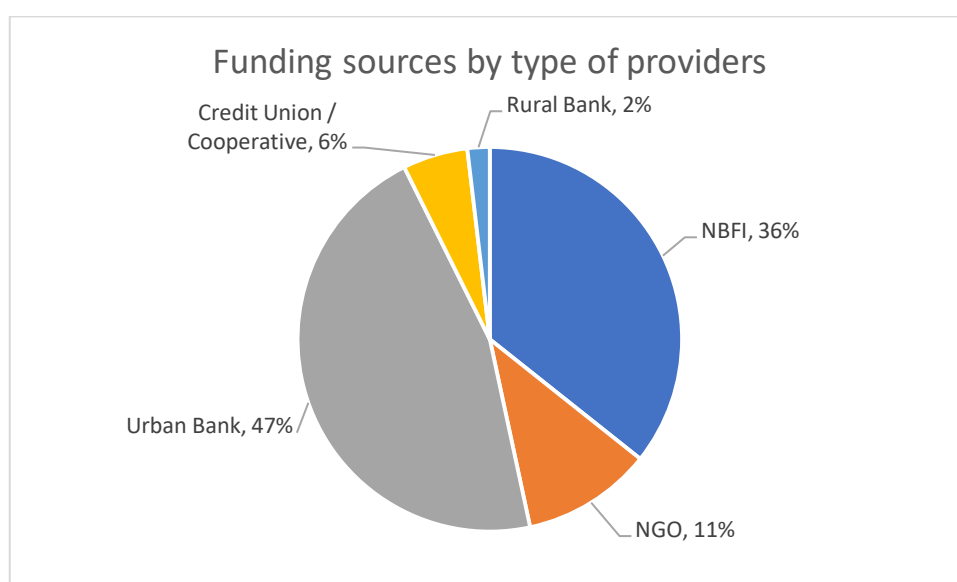


Figure 2-2: Funding sources by providers.

Source: Khamar (2019).

While the loan volume has increased in recent years, the number of microfinance institutions has declined. This could be due to MFIs' efficiency improvement in their loan services to the disadvantaged families, or business merging might have taken place.

At present, the five largest and most influential microcredit providers are the 51Give (China), the Bank Raykat Indonesia, the Bangladesh Rural Advancement Committee (BRAC), the Grameen Bank (Bangladesh), and the Kiva Microfunds (the United States). The 51Give was

established in 2007 in Beijing, China. It offers financial solutions for other MFIs, including e-commerce platform. The Bank Raykat Indonesia is a 70 per cent state-owned bank and the largest microfinance institution in Indonesia. The BRAC is one of the oldest microcredit providers and was founded in 1972 in Bangladesh. Its branches stretch mostly in developing countries, from Haiti to the Philippines. The Grameen Bank is a pioneer in using microcredit as a productive tool for poverty alleviation. The Kiva Microfunds is an American bank and serves the poor in over 80 countries worldwide. The bank's lending method allows their clients directly lend to others who lack access to traditional loans.

2.2.2 Clients of microcredit

The clients of microcredit are mostly those who are financially very poor such as female heads of households, pensioners, owners of small businesses, poor farmers, and unemployed workers (Gan et al., 2017). Collateral requirements are the main obstacle for them to obtain financial resources. Microcredit provides them with essential and accessible financial assistance. This kind of credit charges a lower interest rate and accepts varied forms of collateral (e.g., social form, or individual's reputation).

In many societies, women are identified as financially insecure and vulnerable. However, often they can better manage household finance and can help their families greatly in improving their livelihood if they are offered financial support (Garikipati, 2008). Microcredit has played a major role in assisting women in realising their capability potentials. It specifically targets this group of clients with loans. Figure 2-3 shows the proportion of microcredit clients by genders globally (Convergences, 2019). It is clear that female clients are dominant, with some 80 per cent of the clients being women during 2013-2018.

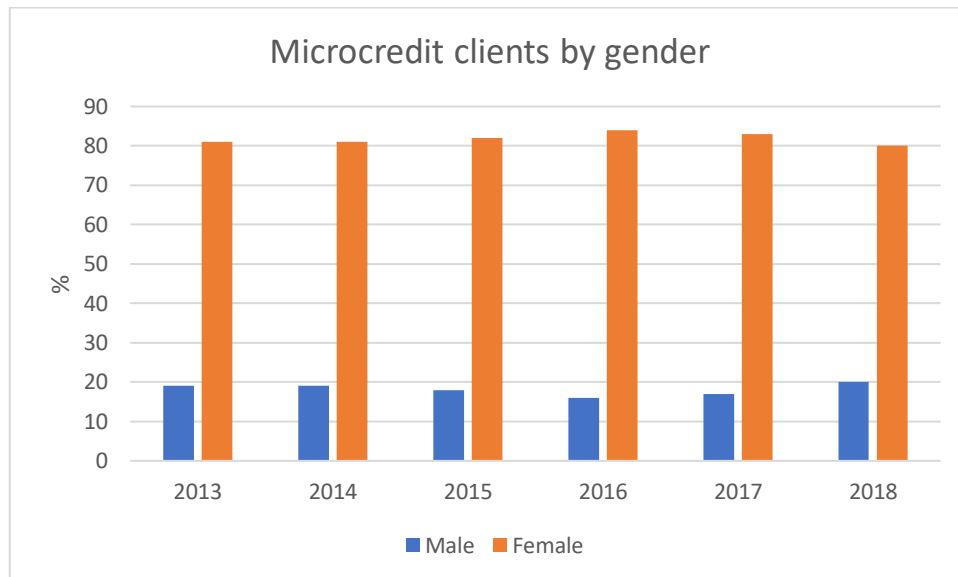


Figure 2-3: Microcredit clients by gender.

Source: Microfinance Barometer (Convergences, 2019).

Microcredit programs chiefly target clients in rural areas. Most of the rural clients are small poor farmers. Their businesses are related to unstable income and high risks. Therefore, microcredit has played a vital role in helping these poor farmers, alleviating poverty in rural areas. Figure 2-4 shows the proportion of microcredit rural clients in the world. Globally, over 60 per cent of microcredit clients are from rural areas. This proportion is even much higher in South Asia and East Asia and Pacific, being round 70 and 80 per cent, respectively. Microcredit is also made available to financially constrained urban residents. Typical urban microcredit clients include small retail shopkeepers, restaurants, service businesses, street vendors, and small-medium enterprises. Majority of microcredit clients in Latin America and the Caribbean are urban residents.

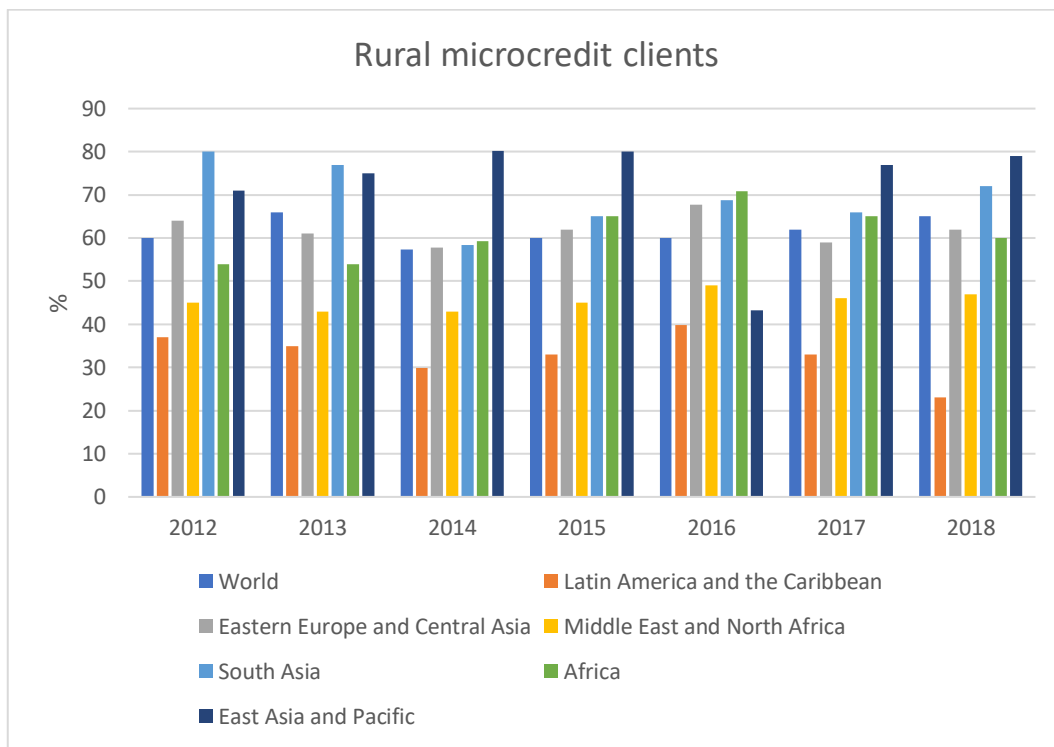


Figure 2-4: Rural microcredit clients.

Source: Microfinance Barometer (Convergences, 2019).

2.2.3 Do the microcredit programs help the poor?

Whether and how microcredit may help the poor has long been explored. Many empirical studies suggest that microlending services can positively affect the wellbeing of the poor, especially in developing countries. Islam (2016) believes microcredit promotes income growth which leads to improvements in household's consumption, then directly influence the household's utility. In the same vein, Hulme (2000) argues that microcredit plays a vital role in increasing clients' income and in leading to changes in their education and working skill levels. As a result, these changes positively impact households' wellbeing and social capital. Morduch and Haley (2001) show that microcredit helps to support the household in a time of facing negative shocks such as natural disasters or severe sickness. The availability of microcredit enables poor households to have minimal consumption without selling any assets in difficult times. As such, microcredit acts as insurance for poor people to better cope with crises. More evidence on microcredit's role in helping the poor is shown in the next chapter of literature review.

The large and increasing number of poor households participating in microcredit programs is another way to show that the programs render benefits to the needy in developing countries.

Otherwise, they would not have participated in such programs. During 2012-2018, the number of microcredit clients has been steadily increasing (Figure 2-5). Globally, the number reached 140 million. Microcredit client number increased most impressively in South Asia, East Asia and Pacific. South Asia, where a large number of the world’s poor live, accounts for the largest portion of the world total, is more than 50 per cent.

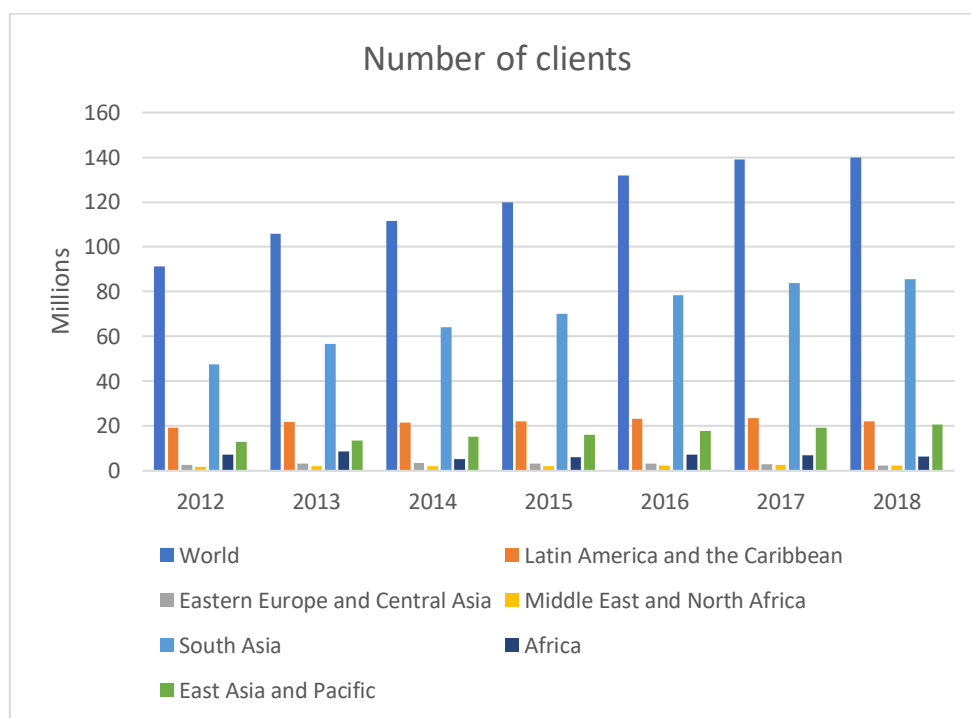


Figure 2-5: Number of microcredit clients

Source: Microfinance Barometer (Convergences, 2019).

2.3 Microcredit in Vietnam

The earliest version of Vietnam’s microcredit started in 1956, namely the Rural Credit Cooperatives (RCCs). The RCCs initially aimed to collect small savings then lend to poor households, farmers, small and medium enterprises, and agricultural cooperatives (Wolz, 1997). The RCCs collapsed in the late 1980s because of corruption, poor management, and restructure in the macroeconomic system. To keep supplying financial supports to the poor, especially for those related to agricultural sector, the Vietnam Bank for Agriculture was established in 1988. It is later renamed as Vietnam Bank for Agriculture and Rural Development (VBARD). The bank initially used a joint liability lending mechanism to serve its customers and reached 74 lending groups by 1995 (Duong, 2015). To meet an increasing credit demand in the growing economy, People’s Credit Funds (PCFs) were introduced in 1993.

The PCFs aims to form groups of donors to increase its capital and then provides savings, credit services to the poor. Most of the funds to MFIs come from Vietnamese government and donors. Several foreign donors that significantly contribute to the development of microcredit in Vietnam are the World Bank, Asian Development Bank (ADB), International Monetary Fund (IMF), and other aid programs from Australia, France, Belgium, and Canada. In what follows is a synopsis of the providers, clients and some major issues in the microcredit market in Vietnam.

2.3.1 Providers

There are three kinds of microcredit providers in rural areas in Vietnam: formal, semi-formal and informal. Over the years, the performance of these three forms of microcredit providers has been remarkable. They have been one of the major forces to help reduce the poverty incidence in rural Vietnam (Pimhidzai, 2018).

2.3.1.1 Formal providers

In the official channel, two state-owned banks, the VBARD and the Vietnam Bank for Social Policies (VBSP), are the major microcredit providers. In 1996, the VBARD changed its target customers to rural households and agricultural sectors. Since then, the bank has rapidly increased the number of customers from rural families. For instance, the number of households served by the VBARD was 3.5 million in 1996 (Creusot & Thanh, 2003); by 2019, it increased to 13.5 million (VBARD, 2019). The successful expansion of the microcredit services is partly due to connections with such organisations as the Women's Association, the Farmer's Association, and the Veteran's Association. These social groups play a significant role in disseminating information, seeking customers, performing transactions, and facilitating the loan procedure. With this network infrastructure, the VBARD aims to finance clients who meet the requirement of collateral for their loans. However, most of the poor people in rural areas fail to get loans from the VBARD because of lacking collateral.

The Vietnamese government started to provide microcredit to the poor in 1995 via the Fund for the Poor, which was later replaced by a Vietnam Bank for the Poor (VBP) under the VBARD management. The VBP aims to provide low-interest rate loan to the poor that requires less collateral. To be eligible, the clients must be classified as poor by the local commune's People's Committee and the Ministry of Labour, Invalids, and Social Affairs of Vietnam (MOLISA) and the loans are distributed to the poor households through the social groups to which they belong. As a result, the number of low-income families that had access to credit

increased rapidly. For example, the VBP provided microcredit to about 0.6 million poor people in 1998 (Conroy & MacGuire, 2000). In 2003, the VBP was restructured to establish the VBSP that was entirely independent of the VBARD. The VBSP since then has become a major non-profit bank. The VBSP takes part in implementing microcredit projects from the government or non-government organisations with low-interest rate to the high-risk group of clients. By contrast, VBARD is a commercial bank and mainly focuses on farmers who work in the agricultural sector. According to ADB (2014), the formal microcredit activities in Vietnam has expanded since 2005. In particular, the number of customers increased from 5.81 million in 2005 to 7.42 million in 2014. Of which, VBSP accounts for 66 per cent of the formal microcredit in terms of the loan value in 2014, while VBARD and other formal and semi-formal microfinance institutions share 14 and 20 per cent, respectively.

Although the public financial system has tried to offer suitable services to rural people, many households are still unable to access formal credit because of three primary reasons.

- (1) There is a long-distance from clients to VBARD/VBSP offices and long waiting time in the application process. Many potential customers, especially the poor, live in remote areas, while the banks' offices are usually set up in the centre of communes or provinces. Moreover, to be a client, the poor household must meet a set of criteria such as being certified as poor by local authorities, or must be nominated by their social groups, or must borrow for agricultural projects. All this results in high transaction costs to the poor.
- (2) The requirement to provide collateral becomes a significant barrier to the poor in accessing microcredit. The banks usually ask for collateral to ensure their borrowers pay back the principal and interest in the agreed time. The common collaterals are the land ownership certificates, land title, or permanent residence certificate which the borrowers, especially the poor households, do not necessarily have.
- (3) Formal credit providers only provide limited options for funding. The banks tend to offer loans for income-generating projects and exclude the loans for consumption, health, or education needs. As such, the public financial system does not serve the whole rural population to meet all their essential needs. The semi-formal and informal microcredit providers fill this gap.

2.3.1.2 Semi-formal providers

Semi-formal providers are microcredit institutions that are registered as banks with special characteristics or as NGOs that serve those who have been excluded from the formal banking

system. They provide loans that are repaid in small, frequent, and manageable instalments. Borrowers are encouraged to repay loans through group cooperation, norms, values, and a number of incentives. Microcredit institutions (whether formal, informal, or semi formal) have three distinguishing features: 1. the small size of products, both loans advanced and/or savings collected; 2. the absence of asset-based collateral; and 3. the simplicity of operations.

The semi-formal institutions are essential players in the microcredit market. These non-bank institutions provide savings and lending services to their members but are not allowed to mobilise savings from non-members. Mass organisations (MOs) and not-for-profit Non-government organisations (NGOs) are leading semi-formal microcredit providers in Vietnam.

The MOs play a role as social mediation to facilitate the lending processes. The five key MOs in Vietnam are social unions, the women union, youth union, farmers union, veterans association, and elderly association. These social groups have well-established networks from the central to village levels. With the system, the MOs assist microcredit programs in scanning potential clients' economic status, and distributing loans to targeted customers. Using social peer pressure, MOs appear to be useful in monitoring loan use and repayment. Also, these semi-formal groups act as brokers for VBSP in looking for and assessing customers.

Unlike MOs, NGOs may not purely provide financial services. More often, NGOs introduce programs which target poverty alleviation with other non-financial activities such as skill training or education. To do that, the aims of providing financial assistance, such as savings and loans, is just a component of the anti-poverty programs. NGOs tend to operate in remote areas where most disadvantaged people reside. Moreover, these organisations build up their capital by funding from international donors such as the World Bank, ADB, and IMF. They also mobilise savings among local communities and then lend small short-term loans to the poor with regular instalment repayments.

2.3.1.3 Informal providers

The informal microcredit providers, which include moneylenders, relatives, friends, and other financial groups, play an important role in providing credit to rural families. The interest rate charged by this type of providers varies. Loans come from relatives and friends are mostly free of charge. While moneylenders offer a wide range of services which even include loan for consumption with a simple procedure to meet urgent demand, they do charge high-interest rates to compensate for their taken risks.

The high demand for informal credit is mainly due to its simple application procedure, and the fact that the loan can be used for consumption purpose. The relationship between the creditors and debtors is based on trust. Given the information provided by the poor clients, the lenders make decisions on whether and how much to lend to them. To increase the prospect of getting the loans, the borrowers might provide the lenders with information on their skills or properties, how they utilised their previous credits and the level of their indebtedness. The repayment arrangement is flexible, which can be weekly/monthly or may not be specified at all.

Furthermore, informal lenders provide loans for consumption purposes. The consumption loans are much needed in rural areas where households are vulnerable to any shock. Most of these households are poor and do not have durable assets, which can be converted to cash when facing shocks such as natural disasters, sickness, or before harvest. In such hardship situations, the consumption loans protect them from these shocks.

The coverage of the informal microcredit service used to be very extensive but is now declining. The Vietnam Household Living Standards Survey (VHLSS) shows that the informal sectors accounted for more than 70 per cent of the rural credit volume in 1992. This proportion then dropped to 30 per cent in 1998 due to the expansion of formal financial institutions by the Vietnamese government (Barslund & Tarp, 2008).

2.3.2 Clients

In Vietnam, the poor, especially the rural poor, are the major clients of microcredit. Since the 1980s, the number of microcredit clients has increased impressively. By the 2010s, it has been over 7 million (see Figure 2-6). According to the data from the MIX market, World Bank, over the period from 2008 to 2017, on average, about 7.5 million poor clients received microcredit every year. The significant drop in the number of borrowers in 2010 is due to changes in financial policies that encourage more formal microcredit lenders to enter the market and to protect against risks of a “credit trap”. However, the formal institutions usually require collateral such as land title or other valuable assets, which many rural borrowers do not have. As a result, it became more difficult for rural households to access both formal and informal microcredit.

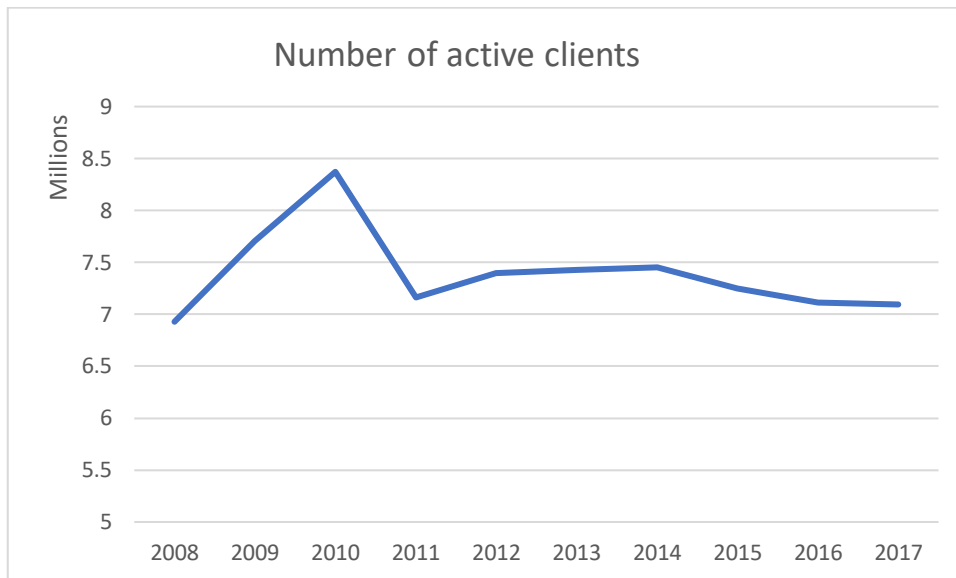


Figure 2-6: Number of active clients.

Source: Based on data from the MIX market.

In terms of clients' gender, most of the microcredit clients in Vietnam are female. Figure 2-7 shows that the proportion of female clients is above 60 per cent throughout the period between 2014 and 2018. In 2018, this proportion reached 73 per cent.



Figure 2-7: Clients by borrowers' gender.

Source: Based on data from the MIX market.

In Vietnam, “group-based lending” gains increasing popularity in providing loans to poor rural households. A potential client is required to form a group of 5-50 members residing in the same village. This group lending practice does not strictly follow the joint-liability principle. Group

leaders usually take responsibility in providing information of each member to credit providers, collecting loan applications and dispersing the loans, and monitoring repayments from the group members. In the case of a default, credit officers deal with default borrowers, while the group head helps convince the defaulters to repay.

In terms of clients' regions, Vietnam witnessed a significant percentage of rural clients over the period from 2012 to 2016 (see Figure 2-8). In particular, rural clients increased from 60 per cent in 2012 to nearly 80 per cent in 2016. This structure has remained relatively stable in recent years. This trend suggests that the Vietnamese authorities have significantly focused on rural development where the majority of the poor population reside.

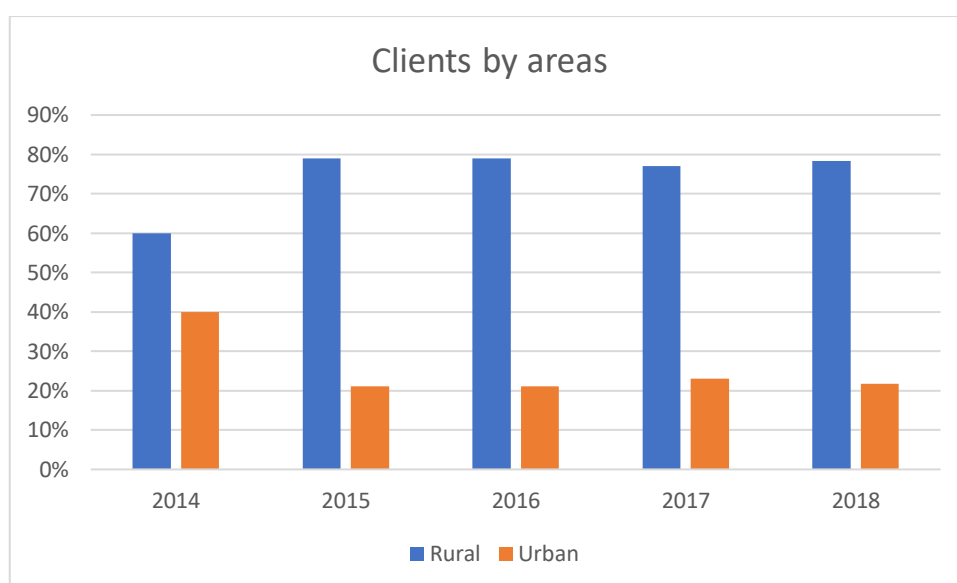


Figure 2-8: Clients by areas.

Source: Based on data from the MIX market.

2.3.3 Remaining and emerging issues in Vietnam's microcredit market

Access to credit remains one of the critical issues in Vietnam's effort to use microcredit to fight rural poverty. The lack of ability to access the microcredit by those remote and extremely poor rural households is most concerning. Further, the benefits of microcredit programs need to be shared and accepted by the public, especially those who are in the implementation of such programs.

In Vietnam, there are still challenges in defining and identifying real rural poor. Very often, the definition of poverty is different between GSO method and local authorities approaches. Even between communes, the criteria used may differ. Therefore, the distinction between poor

and non-poor households basically relies on the instinctive judgement of local officials who often have a varied understanding of the national poverty line. If a real poor is “defined” by a local official as a non-poor – even though the person is really extremely poor, this then makes it difficult for the real poor to access the microcredit.

Selection bias also denies the access of those really in need for microcredit loans. Generally, fund providers, such as policymakers, donors, and others, widely accept that their microcredit helps and encourage the poor develop new livelihood strategies, generate extra income from enterprising activities, and create more job opportunities. In reality, however, to approve a loan application, the providers still tend to focus more on one’s ability to repay. They are more likely to select households that have strong potential to repay.

The benefits of microcredit in fighting poverty and in helping Vietnam’s overall economic development needs to be better understood. As noted earlier, microcredit has been one of the major forces that have helped to bring down poverty from more than 60 per cent in the 1990s to less than 10 per cent today. The public needs to be made more aware of the contributions that microcredit has helped the country to advance. Especially, those microcredit providers who serve the rural applicants need to be well educated.

To better educate the public, the evidence of microcredit benefits needs to be adequately revealed, which calls for more empirical studies of the microcredit programs. In the case of Vietnam, many questions, such as the following, require answers:

- How have the extremely rural poor and those rural poor in remote areas been served by the microcredit programs? And how have they benefited from such programs?
- How have the microcredit programs contributed to Vietnam’s economic and social advancements?
- Are there notable differences in microcredit program benefits between regions and why?
- Why have poor rural households benefited differently from the programs? What are the common traits for households in using the loans more or less successfully?
- Does microcredit improve rural poor’s food consumption which may result in healthier bodies for improved labour productivity?
- Does microcredit help rural households to increase their social networking that subsequently may help them to make better use of resources for improved production and livelihood?

- Does microcredit improve school attendance of children of poor rural households that may better equip these children to step out the poverty trap in the future?

This research attempts to provide answers to some of the above questions. It is expected that the findings of this research will provide valuable insights to help microcredit policymakers, MFIs, donors, and loan officers to better implement their micro-financial services to the rural poor and make a greater contribution to reducing rural poverty in Vietnam, and as well in other developing countries.

Before diving into the inquiries, in the next chapter, existing literature that examines microcredit programs is first reviewed. Then, in Chapter 4, the research methodology to be used to derive answers for the research questions is presented.

CHAPTER 3 LITERATURE REVIEW

CHAPTER OUTLINE

3.1	Microcredit impact assessment.....	28
3.1.1	Earlier models of microcredit impact assessment	28
3.1.2	Potential impacts of microcredit.....	30
3.1.3	The household economic portfolio model.....	32
3.2	Microcredit and household consumption	35
3.2.1	A positive effect on consumption	36
3.2.2	A negative or insignificant effect on consumption.....	38
3.2.3	Summary	39
3.3	Microcredit and social network	39
3.3.1	Microcredit generates social network	40
3.3.2	Social network is not an automatic outcome of accessing microcredit	43
3.3.3	Summary	43
3.4	Microcredit and children's education	44
3.4.1	The mechanism through which microcredit affects education.....	44
3.4.2	Channels through which microcredit impacts education	45
3.4.3	A positive effect on children education	46
3.4.4	A negative or insignificant effect on children education	47
3.4.5	Summary	49

This chapter reviews what has been explored in the literature on microcredit impact assessment. It goes from an overview of earlier impact assessment to the three specific areas that this thesis is investigating. Section 3.1 first surveys the literature on microcredit impact assessment and the general approaches used. After setting a general picture of the impact assessment in Section 3.1, the remaining of the chapter, Sections 3.2 to 3.4 focus specifically on studies that address the impacts of microcredit on consumption, social network, and education, respectively.

3.1 Microcredit impact assessment

Earlier studies till about 2000, that deal with the assessment of the impacts of microcredit on individuals, households, enterprises, and communities are first reviewed in this section. The next part of this section discusses studies that argue that more aspects of microcredit impacts should be explored at various levels. Finally, a Household Economic Portfolio (HEP) model is evaluated; this model helps demonstrate how microcredit interventions contribute to a household's welfares, such as consumption, assets, savings, health, social network, education.

3.1.1 Earlier models of microcredit impact assessment

The earliest conceptual model was proposed by Sebstad et al. (1995). The primitive analytical model classifies the impacts of microcredit into three domains, namely individuals, households, and enterprises. At the individual level, the impacts of microcredit on interactions of intrahousehold relationships can be assessed by observing personal resources, households' decision-making process, and household members' community participation. At the household level, the impacts could logically be observed by household income, expenditure, and assets. At the enterprise level, the impact domains include production processes, resource bases, management, market and financial performance. These impacts depend on household allocations of labour, capital, and other resources. In short, Sebstad et al. (1995) map the significant components of the household economy by suggesting groups of expected impact domains at the household, enterprise, and individual levels. According to the authors' suggestion, any study on the impacts of microcredit should take into account the interaction of household resources and its activities.

Based on earlier works, Barnes (1996) develops a household-based microenterprise finance program assessment method. Barnes (1996) notices that assets are a crucial proxy for household's welfare due to reflecting household living condition and defining entrepreneurship abilities. Assets are a store of wealth that can be drawn, when households are faced with any

negative shock, to maintain well-being. Therefore, households tend to maximise the present value of assets in their livelihood strategies. Barnes (1996) classifies assets into three groups: physical, financial, and human capital at the individual, household, and enterprise level. Assets can be used by both enterprises and households, or passed among families, individuals, and enterprises over time.

The asset-based analysis suggests several ways that a loan can contribute to household welfare by directly purchasing assets or investing in income-generating assets which, in turn, increase household earnings afterwards. However, assets may have been accumulated over time. Thus, if assets are not treated appropriately, it may lead to a bias in measuring the impact of microfinance interventions (Nghiem, 2005).

Later, Dunn et al. (1996) and Sebstad and Cohen (2001) develop theoretical models for assessing the role of microcredit in household risk management. Dunn et al. (1996) argue that the desirable provisions of microcredit services are helping its clients reduce risk and loss of negative income shock by providing insurance for them. The authors suggest households should select low-risk activities, diversify income sources, and use insurance services offered by microfinance institutions. In the same vein, Sebstad and Cohen (2001) argue that most of the microcredit clients are poor, and they are vulnerable to risk because they see themselves have limited resources to cope with income shocks. The clients are risk-averse and tend to invest in low return projects which result in low productivity and low income. Therefore, the poor might not quickly escape from the poverty circle, but they might be safer if they do not invest in high-risk projects. Both studies suggest that access to financial services can help clients reduce vulnerable levels by facilitating assets accumulation, diversifying income sources, and providing a large number of financial products.

To contribute to the strand of the literature, Chen (1997) is concerned with the impacts at the individual level and argues that household members may receive different impacts from microcredit interventions. In this argument, any impact assessment at the individual level should be conducted with those at the household and enterprise levels as well. The author suggests four outcomes that researchers can trace changes at the household member level. They are perceptual (self-esteem, self-confidence), relational (role in the decision-making process, participation in household and community activities), cognitive (knowledge, skills, and awareness), and material (income, asset) impacts. However, this framework does not account for time effects. In particular, several economic impacts, such as income, are likely to occur sooner than social impacts, such as social network, which tends to follow afterwards.

In summary, analytical approaches in earlier studies focused only on the limited number of outcomes of interest, such as income, assets, and risk. Microcredit may have various other impacts on the livelihood of borrowing families. There is a strong need for models that can provide clear insights into such impacts as well. Before presenting discussions on such models, highlighted below are possible other major impacts of microcredit in addition to those that have been dealt within existing studies.

3.1.2 Potential impacts of microcredit

Possible impacts of microcredit are shown in Figure 3-1, which is based on previous studies. Figure 3-1 includes the levels, types of impacts, and common measures of the impacts. The impact levels can be divided into narrow and wide levels (McGregor et al., 2000). The narrow level includes the impacts at the individual, household, and micro-enterprise levels. The effects at the national, regional and community levels are in the wide level group.

Types of impacts can be classified into four domains, namely economic, social, cultural, and political domains (Zohir & Matin, 2004). It is more likely that the effects on economic domains occur sooner while others need longer time to take place. The economic effects and social effects are expected to be analysed in the narrow level, while cultural and political impacts tend to be assessed at the wide level.

At the narrow level, the specification of what impacts on individuals are different from those on households, and microenterprises. In particular, the effects on individuals might include material, cognitive, perceptual, and relational effects. The material effect, such as personal income or expenditure, can be achieved more quickly than others. The cognitive effects can be proxied by accumulated knowledge or experience. The perceptual effects might include the level of participation in community activities. The relational effects can be embedded by the degree of participation in social organisations.

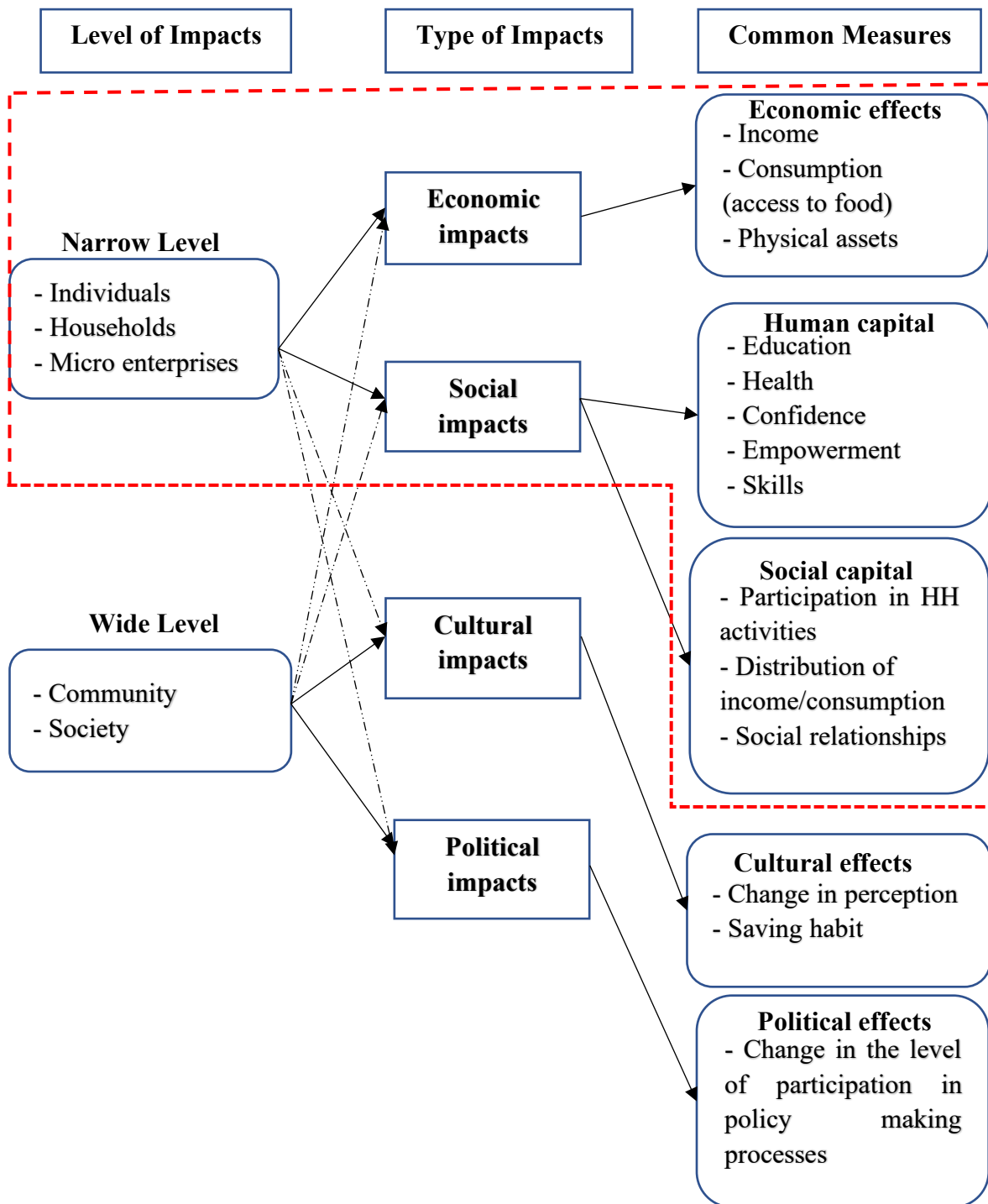


Figure 3-1: Potential impacts of microcredit.

However, these impacts need to be investigated in the interactions among household members. For example, farm works are likely to be shared among household members, while housework is mainly done by women. Household heads tend to play a crucial role in deciding resource mobilisation, such as investment or marriage of their children. Therefore, the intra-household effects of microcredit should be conducted by applying qualitative techniques. Nonetheless, in utilising quantitative methods, it needs to be assumed that all household's members are equal in all activities and consumption.

The effects on the household and microenterprise levels can be clustered into economic and social effect groups. The economic effect group includes variations in income, consumption, accumulation of physical assets, savings, and investment. The social effects are expected to bring more benefit to poor borrowers than that of the economic effects. This impact group includes education, health, confidence, level of participation of each individual in household activities, and how income or consumption is distributed among the members.

At the wide level, the microcredit impacts on society and community mainly include cultural and political impacts (Zohir & Matin, 2004). The cultural effects of microcredit can be captured by observing the changes in borrowers' attitudes or habits. For example, microcredit clients might shift their saving habit from traditional moneybox, or jewellery to safe savings in formal financial providers. The political effects are measured by changes in the level of participation of microcredit clients in policy-making processes.

In short, the variables of interest can be identified from the assessment level. For example, the economic indicators, such as income, expenditure, and accumulated assets, are commonly used in microcredit impact assessment studies. The social proxies, such as children's education, health care, nutritional consumption, have become popular. However, the choice of dependent variables for microcredit impact assessment studies depends on points of view the research stands for. This thesis stands on the viewpoints of microcredit-related donors, investors, and policymakers who are keen to understand the impacts of financial services at the household level.

3.1.3 The household economic portfolio model

When addressing household economic assessments, it is necessary to take into consideration of different expectations of microcredit stakeholders, such as donors, policymakers, researchers, practitioners, investors, or clients. Each major stakeholder in microcredit assessment studies has different goals, characteristics, and type of performance measurements

(Schreiner, 1997). In particular, donors are more likely to maximise the number of poor clients' access to microcredit, while society tries to maximise benefit from the financial interventions to all groups. Other stakeholders such as investors, the poor clients, and workers try to maximise their profit from using the services.

The goals of different stakeholders may contradict each other in the short run. For example, investors tend to prefer high-interest rates and fees in order to maximise their profit, while poor clients prefer to have low-interest rates and cost. In the long run, a trade-off among the goals of all groups could be achieved. For instance, a market equilibrium can be achieved when poor clients agree to an acceptable interest rate from investors.

Objectives, scale, scope, and methods of microcredit impact assessment studies are different depending on the kinds of stakeholders. For example, donors and academia require to understand where microcredit is allocated and whether the services are effective. To answer these questions, quantitative methods with large-scale datasets may be needed. On the other hand, practitioners need useful information on loan management tasks to avoid failure in repayments and provide better services to clients. This requirement may need to focus on detailed small-scale qualitative assessments. Hulme (2000) divides the objectives into two groups of performance assessments. Firstly, "proving" objective sets a goal of measuring as accurately as possible to all microcredit impacts. This goal tends to be pursued by academics, researchers, policymakers, evaluation departments, and program managers. Secondly, "improving" objective focuses on understanding the processes of interventions and its impacts to improve those processes. This objective is likely to be set by program managers, donor field staffs, NGO personnel, and intended beneficiaries.

This current thesis focuses on the impacts of microcredit at the household level. The underlying rationale for using households as units for analysis is that households are major targets of microcredit services. They play a crucial role in their production and investment strategies. Thus, any intervention examination which aims to provide impacts at the micro levels must look into household resource allocation and business activities (Team, 2001). The popular household economic portfolio (HEP) model is a household economy analysis framework with a focus on three components, namely resources, activities, and interaction between these two (see Figure 3-2). Households use their internal and external resources for three main groups of activities: consumption, production, and investment. In turn, these activities generate outcomes and contribute back to the household resource pool. These processes' outcomes depend on their livelihood strategies, such as socio-economic conditions, macro environment, and shocks.

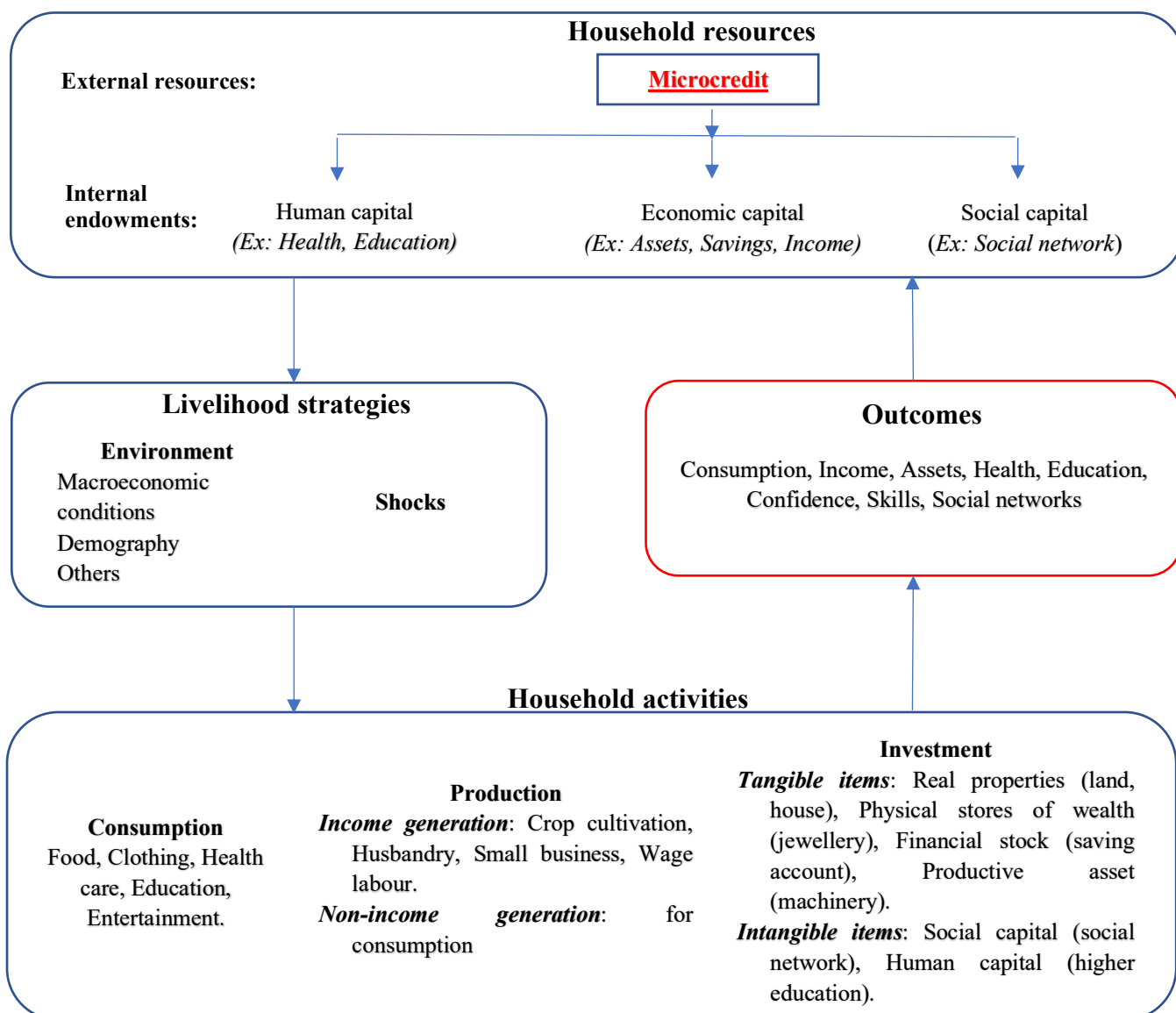


Figure 3-2: The household economic portfolio model.

Based on AIMS (2001), Scoones (1998), Cohen et al. (1996), and Nghiem (2005).

The household resource pool combines internal and external resources. Internal resources can be classified into three groups, namely human, economic, and social capital. Human capital includes the labour-power (from strong/weak health), and knowledge, skills (from education) of family members. Economic capital includes income, savings, land, equipment, machinery, and inventory. Social capital is stored in less tangible or even intangible forms such as social networks. The microcredit goes into the resource pool as an external resource. For example, one can borrow loans from available financial institutions to add to its resource pool.

The household activity component includes all activities of consumption, production, and investment. Consumption includes activities for food preparation, household cleaning, education, health care, and relaxing, which in turn contribute to human capital. The production activities can either generate income by producing marketable commodities such as agriculture cultivation, running small businesses, wage labour, or generate non-income products which are just used for family consumption. The households may invest in tangible items including real property, such as land and housing; physical stores of wealth, such as livestock or jewellery; financial stock, such as cash saving account; and productive assets, such as machinery. The households may also invest in intangible items to improve human capital through education.

The connections between household resources and activities include livelihood strategies and possible outcomes. The livelihood strategies are all factors which significantly influence household decision-making processes in allocating their endowments to various activities. The possible results are economic and social outcomes from those activities that contribute back to the family resource pool. The outcomes come from the activities are added up to the unused endowment for future use. The outcomes also reflect the effectiveness of household resource allocation strategies. Therefore, by examining the outcomes, one can observe the contribution of external resources to the household economy.

In summary, the HEP model shows how microcredit interventions go from the household endowments to their diverse activities and contribute back to the family endowments. The HEP model covers most of the household activities, including consumption, production, and investment. Therefore, the model can address where microcredit is used and avoids the fungibility problem.

3.2 Microcredit and household consumption

In the literature examining microcredit impacts on consumption, the problem of self-selection has been recognised as a major problem in estimation. This issue arises from the non-random

access of microcredit due to the unobservable characteristics such as entrepreneurial ability, and where financial institutions choose to locate. These features significantly influence the household decision on whether to borrow, while econometricians could not observe and control them in estimations. The self-selection results in an endogeneity problem in estimation that is not easy to be resolved. Although a large volume of the literature focuses on the wider contributions of microcredit services to customers, there is no consensus on the way to control for self-selection bias.

This section reviews earlier studies of the impact of microcredit on household food consumption,¹ with a focus on methods used to control for estimation problems such as selection bias. These studies are classified into two broad categories according to whether the findings are a significantly positive effect of microcredit on the consumption or a negative/insignificant effect.

3.2.1 A positive effect on consumption

A number of previous studies have found that microcredit generates a positive impact on household food consumption. Attanasio et al. (2015) examined the impacts of joint liability lending in rural Mongolia where group and individual lending programs were randomly implemented across rural areas. By utilising a randomised control survey, the study found a positive connection between borrowing and food consumption. Pitt and Khandker (1998) utilised instrumental variables to estimate the impact on household consumption from lending by three major microcredit institutions in Bangladesh. The study defined the eligible households for microcredit are those who own less than a half-acre of land as an instrument variable. With these criteria, control and treated groups are formed to estimate the average treatment effects on the consumption. By using a limited-information maximum likelihood estimation, they find a positive impact in the range between 0.018 and 0.043 from six research equations. Schroeder (2010) also suggest that microcredit has a positive impact on per-capita family consumption with an elasticity ranging from 0.177 to 0.212. To overcome the endogeneity problem, the authors impose an assumption that the conditional correlation of the errors is constant. This assumption allows using observational data to simulate instrument variables.

¹ Some studies investigate the impacts of microcredit on other types of consumption. However, due to data availability, this thesis only explores the household food consumption. Therefore, this section only reviews previous studies on the impact of microcredit on food consumption.

Khandker (2005) uses panel data and finds loans to women lead to an expansion in household consumption in Bangladesh. Quach et al. (2005) employed the Heckman two-step method to analysis the impact of borrowing on consumption per capita in Vietnam by using the VHLSS 1993 and 1998. They find a modest impact. Particularly, the elasticity of increasing consumption is just 0.07 and 0.06 in 1993 and 1998, respectively. Imai and Azam (2012) and Khandker and Samad (2014) utilise a panel data with fixed effects estimators to overcome the problem of self-selection bias. They find positive and significant benefits from borrowing to household consumption and income in Bangladesh. Similar impacts are also found by using repeated cross-sectional data in the study of Duong and Nghiem (2014). Moreover, Imai and Azam (2012) employed the difference-in-differences technique with propensity score matching (DID-PSM) and household fixed effects models in their study. This method provides a reliable and effective ways to control for the endogeneity bias in microfinance research.

Nghiem et al. (2012) utilise the quasi-experimental survey with village fixed effect to analyse the positive impacts of microfinance on income and consumption in Vietnam and control for heteroscedasticity. By this method, the control and treated groups are designed to have similar characteristics and offer three main advantages (Bhuiya et al., 2015). First, the endogeneity problem is controlled for, which is less time- and resources-consuming than the randomised control trials. Second, one can use the fixed effects and structural models to deal with endogeneity and clearly explain the effect of microcredit on livelihoods of customers. Third, the method can capture the spillover effects. Similarly, Boonperm et al. (2013) demonstrate the positive link between support from the Village and Urban Community Fund and spending level of durable goods. Doan et al. (2014) used the quasi-experimental approach with the propensity score matching and multiple treatment effects to evaluate the impacts of credit on health care and education spending of the poor in urban areas of Ho Chi Minh City of Vietnam. They suggest that although the formal credit increases expenditure in education and health care, the impacts of informal credit is insignificant. This is likely due to that the impacts on education and health care can only be observed in a longer time frame than that utilised in the study.

Islam (2015) used village fixed effects to address the non-random nature of program placement and instrumental variables to deal with self-selection and found that the effects of microcredit on food consumption in Bangladesh were heterogeneous among households. The author concluded that the poorest participants achieved the biggest impact in terms of food consumption, and female borrowers received greater benefits than males. Islam and Maitra

(2012) found that microcredit in Bangladesh played a role as insurance for rural households against health shocks. The authors pointed out that microcredit can help rural borrowers to maintain their consumption, and avoid selling their livestock, in response to health shocks.

Duong and Thanh (2014) evaluated the impacts of microcredit on the income and food consumption of rural households in Vietnam by using VHLSS data for 2006 and 2008. To deal with the selection bias, they applied propensity score matching (PSM) and difference-in-differences (DID) methods. Their results showed a significant improvement in rural household food consumption and income due to microcredit. However, they found no evidence to support an increase in income among the rural poor. The authors suggested that local authorities should provide training in skills or business management to mitigate the misuse of loans. Phan et al. (2014) also employed a PSM approach to analyse cross-sectional data for rural Vietnam in 2010. They found that VBSP loans affected food consumption, and further the effects were stronger among the “truly poor” as certified by local authorities. Using a DID approach, Li et al. (2011) analysed household data for rural China and found that microcredit to rural borrowers raised both consumption and income. However, they also found that the main beneficiaries were non-poor households.

3.2.2 A negative or insignificant effect on consumption

Some studies found adverse effects or no connection between microcredit and household consumption. Coleman (1999) uses the quasi-experimental survey for Thailand. The author finds an insignificant link in changing expenditure in consumption as well in physical assets and labour time for a borrower. This result, however, can be cautiously explained that Thailand is relatively wealthy. Hence, small loans may not make much change in household welfare. Crépon et al. (2015) assess the microcredit impacts on self-employment activities and consumption by using a quasi-experiment in remote areas in Morocco. The study applies the instrument variables estimation to overcome the self-selection problem. One of the key findings is that there is no evidence of a significant impact on consumption, although a significant impact on self-employment was found. The authors suggest it is due to that the increasing income from self-employment activities does not cover a decline of wage due to self-employment.

Utilising a credit scoring technique to randomly select a treatment group, Karlan and Zinman (2010) also found that microcredit did not affect food consumption in Manila. Banerjee et al. (2015) used randomised trials to examine the effect of microcredit loans in Hyderabad, India.

They randomly assigned groups of slums into control and treatment groups, where treatment groups benefited from access to new microcredit offices. They then analysed the impact of microcredit 15 to 18 months after opening the new offices and found no evidence of a change in average per capita food consumption. They did, however, find an increase in consumption of durable goods by those households who ran existing businesses. Augsburg et al. (2015) used a similar randomised controlled trial to analyse the impact of microcredit in Bosnia and Herzegovina. They found a negative effect of microcredit on food consumption and savings despite a positive impact on self-employment and labour supply.

Roodman and Morduch (2009) performed a regression discontinuity estimation, using data from the work of Pitt and Khandker (1998) for Bangladesh, and found that the consumption was not driven by microcredit borrowing, in contradiction to the original findings of Pitt and Khandker. They argued that the eligibility criterion of owning land at some threshold level was not enforced and therefore using it as an instrumental variable was not valid.

3.2.3 Summary

Previous studies of the effect of microcredit on food consumption have yielded inconclusive results. A complicating issue in the empirical estimation is that households self-select into microcredit borrowing, resulting in a selection bias that needs to be corrected. Researchers have generally relied on two approaches for this. One is to rely on quasi-experimental approaches or randomised control trials to determine access to microcredit and thus avoid household-based choice in borrowing. The other is to employ instrumental variables when observational data are used. Regardless of either approach, however, the findings in the existing literature are conflicting as to the effect of microcredit on consumption. Quasi-experimental and randomised control trial approaches are time-consuming and costly to implement. In contrast, with the availability of high-quality observational data with long time series, it is feasible and less costly to adopt an instrumental variable approach, which will be adopted in this research.

3.3 Microcredit and social network

A growing body of literature has investigated the success of microcredit interventions on poverty reduction. So far, the vast body of literature has focused on the economic gains of individuals and groups. Most of these studies support the link between the provision of microcredit and economic benefits. However, studies that examine the link between the provision of microcredit and changes in social capital are limited. Only a few have attempted

to address the links between microcredit and social network, which is a very important component of social capital. These studies are generally qualitative. There is a lack of studies that employ quantitative approaches to estimate the relationships between the provision of microcredit and social network. This section reviews existing studies related to microcredit and social network.

Social network is an important part of social capital. Although definitions of social capital vary, social network has always been directly or indirectly indicated in such definitions. For example, Coleman (1988) defines social capital as “a variety of different entities, with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors whether personal or corporate actors within the structure” (Coleman, 1988, p. 598). Later, Putnam (1995) suggests that social capital is features of social structure such as trust, norms, and networks that facilitate coordinated action to improve the efficiency of society. Dasgupta and Serageldin (1999) define social capital as "the norms and social relations embedded in the social structures of societies that enable people to coordinate actions to achieve desired goals". Various other versions of social capital can be found, for example, in Woolcock and Narayan (2000) and Krishna and Uphoff (2002).

Social capital plays an important role in community development and ultimately a whole nation’s development (see Ahmed et al., 2014; Claridge, 2004). Given that social network is an important part of social capital, logically the presence of strong and productive social networks promotes a country’s development. This is a major motivation for this current study to look into whether microcredit fosters social network in communities where microcredit is made available in Chapter 6. What follows in this section are some existing studies that have attempted to establish how social network is influenced by the provision of microcredit.

3.3.1 Microcredit generates social network

A limited number of studies have shown that the provision of microcredit does promote the growth of social network. For microcredit research, social network is classified into horizontal network and vertical network (Dasgupta, 1999). The horizontal social network is typically viewed as the relationships among borrowers who are assigned into groups or known to each other (such as relatives, from the same village or region), while the vertical network is the relationships between borrowers and those who are involved in making the loans available to them. It is believed that the horizontal flows of information are more reliable than vertical flows, and members of the horizontal network are more likely to share new economic

opportunities. Financial institutions try to employ local workers who grown up and married locally. Subsequently, they often have insider knowledge about clients' circumstances to build up their vertical social network.

Todd (1996) shows the evidence that the provision of microcredit by the Grameen Bank in Bangladesh helps its clients to grow their networks. The author reports a case where a female borrower was able to not only better maintain existing networks of her and husband's kin, but also grow new social networks and building reputation. The female borrower combined her kinship group and capital from the Grameen Bank to lease and purchase lands. She ran a money lending business and developed clients by giving free-interest loans. This kind of business assists the Grameen Bank staff when they were busy. In turn, she could develop her network by providing small loans to help others buy livestock and lease land.

Larance (2001) finds that being a member of the Grameen Bank can expand social network. The study concludes that the regular meetings enhance the network among its members, especially in family and kinship groups. Most of the respondents in the research reported that they could use social networks to facilitate economic and non-economic activities. For instance, with a new network, many respondents enrolled and learned in the public mass education program that allows them to learn how to read. A member could learn experience from others and use it in his/her projects invested by loans from the bank. The author also reports that the members could expand social exchange. As a member, s/he could borrow jewellery and clothes to wear in social events and meet local social obligations. Moreover, by joining in the microcredit program, women could build their social network and ease mobility restrictions which seclude them within neighbourhoods and seek for assistance by using the local network.

Dowla (2006) concludes that the services provided by the Grameen Bank in Bangladesh create a social network among society by promoting social trust, building new norms, and forming vertical and horizontal networks. In rural areas, the poor are more likely to trust only family and close friends because such trust is enforceable in cases of conflicts. Being a member of the Grameen Bank allowed people, who are not in the "radius of trust", to cooperate to reach common group goals. The author also suggests that participation in microcredit programs enhances self-confidence and expands social networks. In turn, indigent clients, particularly women, find it easier to nominate themselves to a political position. Claridge (2004) explains that the economic empowerment of women is changed by accessing financial services. When credit is used productively, resources are better allocated and generate better wellbeing for their

families. The return further allows them to renegotiate and significantly change gender relations within families and the community. These changes result in social and political empowerment.

Microcredit provided through group-based lending can improve women's collective social behaviour (Sanyal, 2009). The author proposes three mechanisms through which microcredit creates the social network in India. First, continuous economic ties can generate trust that enhances cooperation among group members to identify social problems. Second, working together in a group with membership criteria, such as monitoring and sanctioning mechanisms, gradually forms the external group activities. Third, the features of interaction among group members, such as the cognitive focus of attention (money), talking, interaction with leaders, peer pressure, and mutual identification, may foster social network.

In comparison with other development programs, microcredit is seen to be the most productive tool to create a social network. Basargekar (2010) makes it clear that the social network is generated through peer group pressure and monitoring. Social network improves creditworthiness of the poor clients, especially women. The social interactions also bring more benefits to the community such as greater trust, sharing of information, better decision making, and sharing power within households and in the community, and the generation of support system. Feigenberg et al. (2017) conducted an empirical experiment on the economic return to the social network. They randomly assign first-time borrower groups to meet either weekly or monthly. The study concludes that financial intervention increases the interaction among clients that, in turn, help to improve risk-sharing and reduce defaults. Further experimental evidence shows that high frequency of interaction fosters economic cooperation among clients. Individuals' social contact creation is significantly associated with the meeting frequency of the group. Around 90 per cent of clients are more likely to visit other group members after five months in the experiment. After their loans cycle ended, 40 per cent of them are more likely to participate in social events together for more than one year.

Microcredit also plays an essential role in building a social network in micro-entrepreneurship. Morris et al. (2006) compare the performance between individual lending and group lending to self-employed entrepreneurs in Bulgaria and the Philippines. They suggest that cooperative lending groups have better performance than individual self-employed entrepreneurs. The reason is that the networks help entrepreneurs access flexible interest payment, training skills, networking with suppliers, and responsibilities sharing, such as childcare.

3.3.2 Social network is not an automatic outcome of accessing microcredit

Research findings so far tend to suggest that the generation of social network by accessing microcredit is not an automatic outcome. This outcome depends on the political capability of borrowers, program structure, and social interaction. Moore and Putzel (1999) highlight that the political capability of the poor determines the level of empowerment. The most important role of external agencies is to create an environment in which the financial institutions facilitate the political participation of their poor customers. Seibel et al. (2000) examine the relationship in the Philippines. They assess the effectiveness of applying the Grameen Bank's experience, such as regular meetings, prompt repayment, on the Philippine financial system. The authors suggest that training, peer selection processes, and microcredit regulations play an important role in creating social network which then contributes to the success of the microcredit programs.

Basargekar (2010) examines the effectiveness of social network in urban microcredit programmes in India by using a random sampling method to survey 217 women in the Self-Help Group. The research points out that the urban financial programmes have positive correlations with awareness, capacity building, active and collective attendance in social and political events. However, the paper does not agree that the creation of the social network is an automatic achievement. The financial organisations should implement specific policies such as developing decision-making ability, capacity building programmes.

Other studies have examined how social networks may influence the performance of microcredit. Van (1999) studies how social network help decreases transaction costs of microcredit programs. Ronchi (2004) finds that social network and microcredit support each other. Microcredit interventions use the existing social network to reduce transaction costs and improve repayments.

3.3.3 Summary

Overall, most existing studies on microcredit and social network have been qualitative and emphasised the success of microcredit provision in enhancing and creating the social network. A possible reason for the lack of quantitative research is that it is difficult to measure the social network due to the nature of multi-dimension of the social networks, such as the level and density of the social network. Moreover, some studies also suggest that the positive impacts on the social network are not an automatic outcome of microcredit. Other studies explore bi-directional causalities between microcredit and social network. Studies that use quantitative

approaches with large-scale datasets to address the relationships between microcredit and social networks will be a valuable addition to the literature.

3.4 Microcredit and children's education

3.4.1 The mechanism through which microcredit affects education

It is reasonable to expect that microcredit positively increases children's education because the lack of credit is considered as a major determinant for inadequate education for children in underdeveloped countries (Edmonds, 2006). Particularly, there are two reasons in rural areas of developing countries that human capital formation, especially education, is not a major focus in the household decision-making process. First, the lack of resources and infrastructure, such as schools, teachers, and academic materials, leads to the limitation in education provision. Second, budget constraints and parents' preferences could lead to less demand for schooling achievements. These obstacles can be overcome by accessing microcredit.

A growing body of literature has pointed out the determinants of children's schooling. These factors can be grouped into supply-side factors and demand-side factors. The supply-side factors are related to infrastructure, a supply of teachers, schooling resources, which can be facilitated by social and political impacts of microcredit programs on the community. Demand factors, however, can be affected by credit interventions mostly at the household level.

Demand-side factors are individual's demand for education. This demand is a result of cost-benefit analysis within the household. The cost includes financial costs and opportunity costs. The benefits are future return to the family from current education expenditure (Hill & King, 1993). The outcome of the analysis depends on the perception of individual parents who may have different preferences for their children's human capital. There is evidence in the literature that shows mothers tend to allocate a higher proportion of household income to children's education as compared to fathers (Kennedy & Peters, 1992; Mencher, 1988; Philips & Burton, 1998; Thomas, 1997). This information is valuable from policymakers' point of view as it points out to whom in a household the loans should be given, in order to achieve the desirable outcomes.

There are other important questions for policymakers as well in their efforts to promoting children's schooling. First, does it matter if loans are taken out by the mother or father? What channels could maximise the program benefits? What is the optimal credit size? What is the better type of credit? Do consumptive credit and credit for production produce the same effect?

What are the roles of financial and social intermediary in the improvement of demand for education? Are boys and girls affected by microcredit to the same extent? The answers to these questions might differ due to the channels in which households achieve education through access to microcredit. Microcredit can generate positive or negative impacts on schooling demand. Sign of the effects depends on which channels the service influences education. Microcredit may improve demand for education through income, risk management, gender, and information effects. The negative effect, however, occurs when households invest in land that demands child labour for farming or housework.

3.4.2 Channels through which microcredit impacts education

There are five channels through which microcredit influences clients' children's schooling. The first channel is the income effect. When households access loans and invest in their projects, it may generate extra income. Subsequently, it should result in higher education expenditure (Behrman & Knowles, 1999). If the return from using their loans is larger than the borrowing cost, the borrowers' income increases and subsequently improves their children's education under the assumption of parental altruism (Basu & Van, 1998). The increasing income may allow parents to overcome the financial threshold to send their next generation to school. However, this mechanism may not work in case of a decrease in income due to failure of risky projects or a burden of loan repayments. In addition, researchers argue that the parents' preferences are different and they may behave strategically and not spend on children's schooling (Basu & Ray, 2002; Moehling, 2006). Islam (2008) finds that microcredit supports households to smooth their consumption; thereby, they do not need to pull their children out of school. However, this channel works only in the formal credit sector in which women are more likely to gain power within the family owing to the support of policies.

The second channel is a risk-management effect. Maldonado and González-Vega (2008) suggest that faced with negative exogenous shocks, poor rural households tend to pull their children out of school. Households facing negative income shocks are likely to reduce the spending on education, and their children are demanded to work on farms to earn extra money. In these cases, accessing microcredit helps households to smooth consumption without selling assets, using financial savings, and taking children out of school. That, in turn, increases the household's ability to cope with unexpected shocks and increase demand for children's schooling. Islam and Choe (2013) find that in time of negative shocks, the vulnerable households may suspend sending their children to school. Accessing loans can help them to

deal with the shocks and smooth consumption, thereby minimising the likelihood of withdrawing children from school.

The third channel is the gender effect. It is believed that women's preference for nutrients and education of children is stronger than that of men (Behrman & Rosenzweig, 2002; Thomas, 1990), and microcredit institutions prefer giving loans to women. Thereby, microcredit can promote women empowerment by changing their power in the family's decision-making process. Subsequently, the demand for education might be positively affected.

The fourth channel is the information effect. Given the uncertainty about the future, the poor may be short-sighted in terms of evaluating the return on education investment. Accessing microcredit allows the poor to acquire new knowledge from additional microcredit services, such as training and regular meetings. That might modify intertemporal perceptions about education return and influence schooling choices (Maldonado & González-Vega, 2008). In the same vein, Islam and Choe (2013) also report that financial institutions may provide additional training courses to their clients to help the poor understand the benefit of knowledge in the efficient utilisation of loans, and encourage them to send children to school for their future.

The fifth channel is the child-labour demand effect. There is a possibility that the self-employed household might increase demand for child labour if it is funded by microcredit. Using loans for household enterprise often requires extra labour to work. For instance, borrowers might use the loans to purchase livestock, such as cows or chickens. Subsequently, children might be asked to take care of the animals, which affects negatively children's schooling time. If access to microcredit leads to an increase in productive activities, the opportunity cost to send children to school may increase, and the parents need to work more due to the extra activities. In both cases, microcredit access fosters the demand for child labour, and thereby limits children's schooling (Trigueros, 2002).

3.4.3 A positive effect on children education

Pitt and Khandker (1998) find that financial services enhance children's schooling in Bangladesh, and in addition, girls receive more education if their families are Grameen Bank's clients. Karlan and Zinman (2008) suggest that only male micro-entrepreneurial clients pay more attention to sending their children to school.

Holvoet (2004) highlights how microcredit impacts children's schooling by using a household survey dataset from southern India. Utilising a quasi-experimental design, Holvoet shows that

compared with non-borrowers, the education of borrowers' children exhibits no significant difference when they borrow directly from local banks. However, a significant difference emerges when loans are taken up through social intermediations, such as women's groups. Moreover, mothers who borrow microcredit through the social groups are more likely to bring more educational benefits to girls than boys.

Doan et al. (2014) contribute to the debate on whether microcredit brings benefit to education and health in developing countries. They employ the propensity score matching technique to match non-borrowers with borrowers and find that only loans from formal credit sources statistically impact education and healthcare spending in Vietnam, while there is no evidence for impacts of informal credit.

You and Annim (2014) analyse the impact of formal credit in China, using a dataset of two surveys in 2000 and 2004. After controlling for the selection bias by using static and dynamic regression-discontinuity designs, they find that the formal microcredit helps borrower's children gain longer schooling years and achieve a higher average grade. However, it is noted that their study mainly focuses on the short-term impacts, given that their data only cover two years.

Only a few researchers focus on the medium- or long-term effects of microcredit financial services. Islam (2011) argues that time length is a significant factor for return from microcredit to realise. Households need time to build up their reputation to access larger loans, which enable them to fund more productive projects and achieve higher profit. In addition, long-term clients are more likely to receive more supports from financial institutions than non-clients or short-term clients. Owing to such supports, households may not need to pull their children out of school for business expansion. Osborne (2006) uses a dynamic model to assess the impacts of microcredit on rural households in developing countries. He concludes that credit borrowing only has short-run benefits for productivity, consumption, and lifetime utility. In the long run, in contrast, the benefits are not sustained and even become negative.

3.4.4 A negative or insignificant effect on children education

Not all studies have discovered that microcredit borrowing benefits education. Some studies find that access to credit leads to an increase in income-generation activities, which tends to result in an increase in demand for child labour. Consequently, children may be taken out of school to take care of younger siblings or to work in new projects funded by microcredit.

In rural India, Jacoby and Skoufias (1997), one of the early studies, reported an increase in child labour, and thereby a decrease of school attendance, due to accessing microcredit. They conclude that poor financial infrastructure incurs risk to rural households, who usually are vulnerable to idiosyncratic shocks. As a result, the rural households use their children's school attendance as self-insurance against such risk. When an unexpected adverse shock occurs, they will pull their children out of school to cope with it.

Recently, a randomised evaluation of a group-lending program in India, conducted by Banerjee et al. (2015), finds no evidence for any difference in health, education, or women's empowerment between the borrowers and non-borrowers. Notably, there is no change in enrollment of children or teenagers, despite a decrease in teenage girls' labour supply. Furthermore, there is no difference in expenditure for schooling between private and public enrolment for boys and girls aged from five to fifteen.

In Guatemala, Wydick (1999) points out that the linkage between microcredit and child schooling is not unequivocally positive. Microcredit borrowers tend to invest in labour-intensive equipment/assets, and if the potential for moral hazard exists within family businesses, the households may still prefer to use their children rather than hiring workers. Furthermore, the demand for child labour even steps up if the success of the household enterprises boosts the return to child labour and thus increases the opportunity cost of schooling. As a consequence, microcredit, which is frequently assumed to ease credit constraints, does not guarantee an increase in children education.

Hazarika and Sarangi (2008) also find a similar result in rural Malawi. Their study reveals that children in borrowing households are more likely to work in the season of peak labour demand. Adults in the borrowing households are frequently busy with the increased workload due to improved access to microcredit, particularly in the peak season, and subsequently, their children have to take up more domestic work. Moreover, data from Malawi show a significantly lower rate of primary school enrolment among children in the borrowing households, compared with those in the non-borrowing households. In addition, a stronger adverse effect is observed among young boys.

Despite findings of significant impacts on business activity and self-employment in Bosnia, Augsburg et al. (2012) show that microcredit dramatically decreases school participation and fosters labour supply of children aged from 16 to 19. However, there is no significant effect on children under 16. The decrease in children's schooling occurs when loans are not sufficient to

overcome the liquidity constraint. As such, the households might muster resources from elsewhere and reduce costs as much as possible. Internal labour, especially child labour, is a cheaper and more flexible input for household businesses, in comparison with those in the market. These advantages promote demand for child labour and reduce school enrollment of children. Moreover, the adverse effect is magnified if parents care more about their benefit than their children's future utility. In such cases, access to microcredit leads to transferring resources to parents and worsening children's schooling.

Using a large dataset from rural Bangladesh, Islam and Choe (2013) find that microcredit participation adversely affects children's education and increases child labour abuse rate. Notably, the authors point out that girls and younger children of borrowers are less likely to enrol in school and more likely to be forced to work than boys and older siblings. Moreover, mothers tend to bring more benefits to girls in terms of education than fathers. They also suggest that self-employment activities are a significant determinant for a reduction in children's education.

3.4.5 Summary

This section reviewed studies on the mechanism that microcredit may influence the decision of borrowers on their children's education, the channels in which microcredit influences education, and those that have discovered varying impacts of microcredit on education. Findings of the literature on the linkage between microcredit and children's schooling are inconclusive. This is due to different perspectives, methodologies used, and aims of the impact assessment.

Further, in estimating the impact of microcredit on children's education, previous studies do not distinguish between microcredit loans for production purpose and those for consumption purpose. Conceptually, microcredit borrowing for the purpose of consumption, which includes expenditure on children's education, can promote children's school attendance in the current period, which however becomes a burden in later periods when it needs to be repaid. In contrast, the productive microcredit borrowing tends to expand the borrowing household's family business and increase its demand for workers, which is most likely to be satisfied by employing its children, at the expense of their education. Therefore, it appears necessary to separate these two types of microcredit in empirical studies in order to achieve a more accurate result.

In light of this gap, this thesis focuses on the productive microcredit and analyses its impact on rural children's education in Vietnam by using the Vietnam Access to Resources Household Survey (VARHS), a nationally representative panel dataset. This large-scale dataset allows the tracking of stated and actual uses of microcredit loans in rural Vietnam. Hence, it is possible for this study to separate different types of microcredit loans and focus on those that are actually used for the production purpose. In the next chapter, the methodologies to be used to examine the impacts of productive microcredit on education, as well as consumption and social network, are presented.

CHAPTER 4 RESEARCH METHODOLOGY

CHAPTER OUTLINE

4.1	An overview of the research methodology.....	52
4.2	Identifying the impacts of microcredit on rural households.....	52
4.3	The model.....	55
4.3.1	Household optimising framework	55
4.3.2	Factors affecting household capability	56
4.3.3	Optimal consumption.....	57
4.3.4	Optimal social network	59
4.3.5	Optimal children's education	60
4.4	The data	62
4.4.1	Introduction	62
4.4.2	Measurement of food consumption	66
4.4.3	Measurement of social network.....	66
4.4.4	Measurement of children's education.....	71
4.5	Summary	72

This chapter presents the methodology to be used in this thesis to assess the impacts of microcredit on the three variables of interest, namely the consumption, social network, and children's education. Section 4.1 provides an overview of the research methodology. Theoretic considerations are given in Section 4.2 on how the three aspects of interest may be affected by the provision of microcredit. Section 4.3 discusses the theoretical model, in which a representative household maximises its lifetime utility and makes optimal decisions on education, social network, and consumption sequentially. The last section, Section 4.4 will discuss the VARHS dataset, which I utilise in this thesis.

4.1 An overview of the research methodology

This thesis investigates the effects of microcredit on rural households in Vietnam, focusing on three aspects, namely the economic, social, and human capital aspects. The investigation is based on a conceptual framework, in which a representative household, after accessing microcredit and investing in its small business, is involved in a multi-stage decision-making process to maximise its lifetime utility. Based on the probability of being successful in doing businesses funded by microcredit, the household makes optimal decisions on its children's education, social network, and food consumption sequentially. This multi-stage decision process is to be solved backwards, to obtain the optimal consumption, social network, education as functions of a set of explanatory variables which include microcredit. Data from the Vietnam Access to Resources Household Survey from 2008 to 2016 are used for empirical verifications in this thesis. These surveys were conducted every two years in 12 provinces in Vietnam and mainly focus on rural areas.

4.2 Identifying the impacts of microcredit on rural households

Figure 4-1 demonstrates the impact flow, in which microcredit affects the household from three aspects. A household's consumption is examined to assess the impact on the economic dimension. The social aspect is proxied by a household's social network. Lastly, the children's education is employed to proxy for the human capital impact.

Consumption is the best outcome for the economic assessment, in comparison to income and assets, which are also frequently used in microcredit impact assessment. One may argue that income is the main economic outcome in microcredit intervention. However, income is an aggregated variable which comes from multi-sources, such as micro business, remittances, and

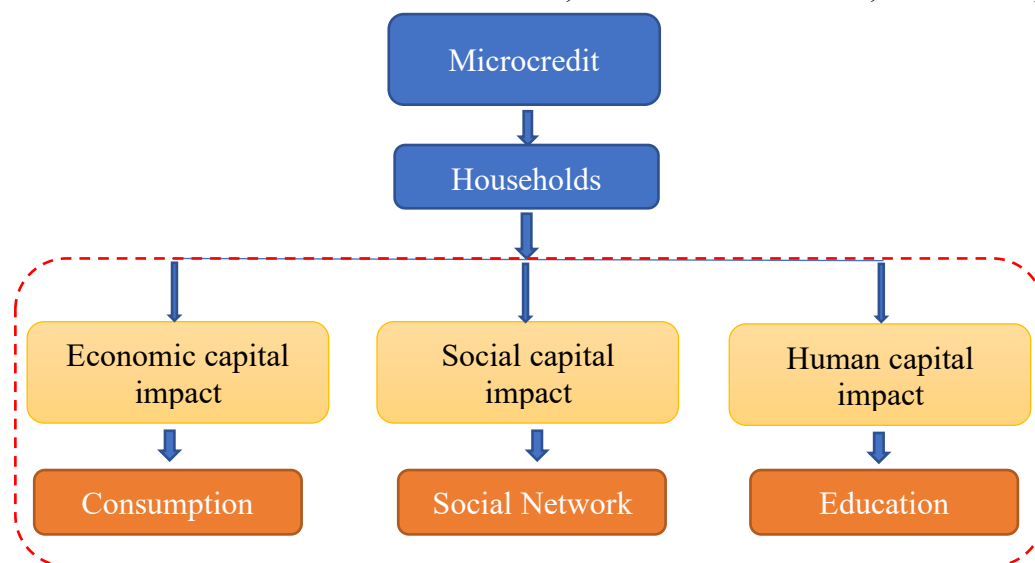


Figure 4-1 Impacts of microcredit on rural household economy

seasonal incomes. Moreover, income exhibit seasonality, for example, rural households may have more income in crop harvesting seasons and less earning at other times. As a result, it is harder to identify the income effects of the interventions. Assets also appear not to be the best indicator for impact assessment because the asset level does not change quickly as other economic indicators in responding to the interventions. Assets need more time to be accumulated. For example, a poor household may need a significant amount of time to save enough money to buy harvesting equipment. Therefore, it is hard to attribute the change in assets to the financial intervention. Meanwhile, families tend to smooth food consumption, subject to their budget constraints. Food consumption represents the household's living standard level and is more responsive to the shock caused by the financial intervention.

The social impacts can be measured by either the level of participation in community decision making processes or social networks. Arguably, the impact on social network is easier to be identified than that on the level of involvement in the social decision-making process, for which data are usually not available. Several proxies can be used to measure the social network, such as the number of social groups to which a household is a member, number of close friends, and the level of participation in social events such as weddings and birthday parties. Fortunately, these data are available for rural Vietnam and can be utilised in this study.

Human capital impacts can be captured by changes in children's education or health care expenditure. Education achievement can be measured by the number of school years that all household members obtain. In rural areas, it is not difficult to collect data about the education achievement of household members. Although most rural households have low income, they highly value the future return of children's education. As such, the rural households tend to spend a significant proportion of their resources to invest in their children's education as a long-term investment, which, in turn, is expected to bring more income in future.

In contrast, accurate data on health care expenditure are hard to obtain because rural people tend to use traditional medicine to treat sicknesses such as flu or cold. They rarely see doctors or go to hospitals unless they have serious health problems. Hence, this thesis employs the children's education of rural households as a variable of interest for the assessment of human capital impact.

After identifying the crucial indicators for economic impacts, social capital impacts, and human capital impacts, it is important to discuss a sequence that a household makes its optimal decisions. This research posits that after taking up microcredit loans, the borrower invests the borrowing in its small businesses. With the additional income, if the business achieves success, the households decide optimal education, social activities, and consumption levels sequentially (see Figure 4-2).

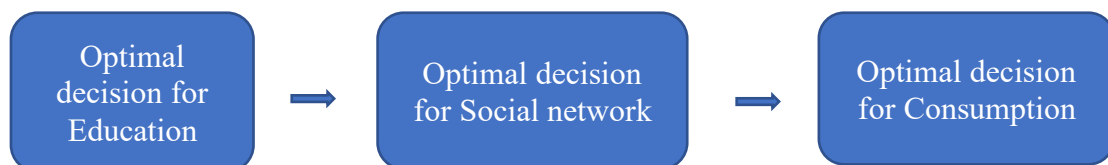


Figure 4-2 An order in which a household makes optimal decisions.

Education, which increases human capital, is the first concern in the household's utility maximisation problem. Arguably, households tend to allocate a significant proportion of their resources to invest in children's education. They expect that the more education achieved, the more return they can receive in the future. Therefore, the optimal decision on the number of their children's school years, or how much they should spend on education, is made before making any other decisions on social activities and consumption. Next, the household decides its social capital level through involving in social activities. The social activities could be the number of close friends they have, how much they spend on weddings, birthday, or other social events. Finally, the household makes the optimal decision for their consumption after deciding education and social network in the process.

4.3 The model

A representative household is engaged in a multi-stage decision-making process. At stage one, the household decides on its children's education. Then, at stage two, it makes an optimal decision on its social network, and at stage three, choose its optimal consumption path. The model can be solved backwards by deriving the optimal consumption first, then for social network and education.

4.3.1 Household optimising framework

A representative household chooses a consumption path to maximise the present value of lifetime utility, U :

$$\max_{\{C_t\}} U = \sum_{t=0}^{\infty} \rho^t \frac{C_t^{1-\sigma} - 1}{1-\sigma} \quad (4.1)$$

where utility in year t is given by a constant elasticity of substitution (CES) utility function; C_t is consumption in year t ; ρ is a discount factor; and σ is the elasticity of substitution between consumption and saving.

In each year, the household receives income, inherits wealth from the previous year, consumes goods and services, and makes interest and principal payments on microcredit loans. Accordingly, the household faces the following budget constraint:

$$W_{t+1} = (1+r)[\tilde{Y}_t + W_t - (1+r)M_{t-1} - C_t] \quad (4.2)$$

where W is household wealth; \tilde{Y} is household income; r is the rate of interest. For simplicity, r is assumed to be constant for all periods and the loan interest rate is the same as the interest rate of savings;² M_t is the total amount of microcredit loans borrowed at time t , and note the household might borrow more than once at time t .

² Allowing for different interest rates does not affect the estimations later.

The household receives income (\tilde{Y}) from two sources. One is earnings from small businesses that are owned by the household (including farming) and financed with microcredit borrowing, Y_B , and the other is all else (e.g., wage labour and remittances), Y :

$$\tilde{Y}_t = Y_{B_t} + Y_t. \quad (4.3)$$

Running a small business requires household capability (entrepreneurship), which is only partly observable. Let z denote household capability such that $z = \check{z}\tilde{z}$, where \check{z} is the observed component, which depends on a set of factors to be specified shortly, and \tilde{z} is the unobserved component, which is distributed over the range $[0, \bar{z}]$ with an upper bound \bar{z} and cumulative distribution function (CDF) $1 - G(\tilde{z})$. To achieve business success, a threshold level of capability (entrepreneurship) is needed, which is denoted as \underline{z} . Given the CDF of \tilde{z} , the probability of achieving success in business can be written as follows:

$$p = \text{Prob}(z > \underline{z}) = \text{Prob}(\tilde{z} > \underline{z}\check{z}^{-1}) = G(\underline{z}\check{z}^{-1}) = G(C, E, S, H). \quad (4.4)$$

where the observed component of capability (\check{z}) is a function of household consumption, C ; education, E ; social networks, S ; and other household characteristics, H .

4.3.2 *Factors affecting household capability*

Conceptually, food consumption, social networks, education all affect household capability. For example, the more food one consumes, the better the nutrition one receives and thus the higher is one's productivity and the chance of achieving success in business. Education is a measure of human capital where with greater human capital, the probability of success in business increases. One's social network also contributes to the probability of success in business by enhancing access to external resources and to opportunities for exchange of knowledge and experiences.

The vector of other household characteristics (H) includes household experience (age of household head, whether the household is local), resources (household size, area of land owned, number of dependent members, involvement in non-farming business activities, income from sources other than the household business), and economic status (whether the household is classified as poor, whether it experiences any income shock), and finally a year indicator. These household characteristics are expected to signal the underlying household capability for

business success. For example, an older household head with more experience is better able to deal with unforeseen situations. Moreover, local households have better understanding of the local business environment than households that migrated from other communes.

Labour (household size) and land are two important inputs for a household business, a farming business. Accordingly, I expect these characteristics to enhance a household's probability of success in business. The number of dependent members of the household reflects a burden as it requires the allocation of limited resources toward looking after them with a consequent negative effect on the probability of success in business.

A household's involvement in non-farming activities can affect its likelihood to succeed in business. However, the direction of such effect is not a clear cut. On the one hand, the involvement is likely to equip the household with relevant experience, for example, to help perform better in risk management, which will increase the probability of success. On the other hand, as farming is the major livelihood strategy in rural areas, a household might pursue non-farming activities only because of the lack of agricultural inputs, such as land and/or labour. For example, a household may be forced to engage in fertiliser trading or handicraft production because it does not have farmland. In such cases, resorting to non-farming activities suggests a lower probability of success in business.

Household status variables, such as whether a household is classified as poor and whether it experiences an income shock, are also determinants of capability.³ If a household is classified as poor, it will be targeted in economic development programs and may receive public support, which can help it achieve success in business. On the other hand, being classified as poor might be due to low capacity, which in the absence of outside support may reduce the probability of achieving success.

4.3.3 Optimal consumption

Taking into account the array of factors that influence the probability of achieving success in business, the expected income from the business can be written as:

³ Local authorities classify a household as poor if its income is below the official poverty line (for example, \$1.25/person/day for rural Vietnam in 2016). Once a household is classified as poor, the local authorities issue a certificate to confirm this status, which is reviewed every year.

$$Y_{B_t} = Prob(z_t > \underline{z}) \times AK_t^\alpha = G(C_t, E_t, S_t, H_t) \times AK_t^\alpha \quad (4.5)$$

where A denotes the productivity of business capital stock in year t , K_t ; and α is the elasticity of business income with respect to capital; K_t is derived as the depreciated capital stock of the previous year plus investment from microcredit borrowing in the current year, M_t , such that $K_t = (1 - \delta)K_{t-1} + M_t$ where δ is the depreciation rate.

Utilizing the dynamic programming technique (Bellman & Dreyfus, 2015), the Bellman equation corresponding to Equation (4.1) can be written as:

$$V(W_t) \equiv \max_{\{C_t\}} \{u(C_t) + \rho V(W_{t+1})\}. \quad (4.6)$$

where $V(\cdot)$ denotes the optimal value of the household utility which can be obtained by maximising the objective function, subjects to the budget constraint.

The first-order condition yields the following Euler equation:

$$C_t = \left(\frac{\rho \frac{\partial W_t}{\partial C_{t-1}} \frac{\partial W_{t+1}}{\partial W_t}}{\frac{\partial W_{t+1}}{\partial C_t}} \right)^{\frac{1}{\sigma}} C_{t-1}. \quad (4.7)$$

Taking the derivative of the budget constraint (4.2) with respect to C_t and C_{t-1} , Equation (4.7) can be rewritten as:

$$C_t = \left(\frac{\rho \left(\frac{\partial G(C_{t-1}, E_{t-1}, S_{t-1}, H_{t-1})}{\partial C_{t-1}} AK_{t-1}^\alpha - 1 \right) (1+r)}{\frac{\partial G(C_t, E_t, S_t, H_t)}{\partial C_t} AK_t^\alpha - 1} \right)^{\frac{1}{\sigma}} C_{t-1} \quad (4.8)$$

Taking natural logarithms at both sides of Equation (4.8), and linearizing $\frac{1}{\sigma} \ln \left(\frac{\partial G}{\partial C_{t-1}} AK_{t-1}^\alpha - 1 \right)$ and $\frac{1}{\sigma} \ln \left(\frac{\partial G}{\partial C_t} AK_t^\alpha - 1 \right)$, an estimable equation of consumption can be rewritten as follows:

$$\begin{aligned} \ln C_t = & \beta_1 + \beta_2 \ln C_{t-1} + \beta_3 \ln E_t + \beta_4 \ln E_{t-1} + \beta_5 \ln S_t + \beta_6 \ln S_{t-1} + \beta_7 \ln K_t \\ & + \beta_8 \ln K_{t-1} + \beta_9 \ln H_{t-1} + \beta_{10} \ln H_t + \epsilon_t \end{aligned} \quad (4.9)$$

where the β coefficients are to be estimated from the data, and ϵ_t is an error term.

4.3.4 Optimal social network

After solving for the optimal consumption, the optimal social network is solved. The expression for the optimal social network can be derived by substituting consumption (C) back into the utility Equation (4.1) and the budget constraint Equation (4.2). Moreover, to examine the long-run causality between social network and microcredit, I focus on the steady state, where all variables are stable over time, t . The consumption Equation (4.9), can be rewritten at the steady state as follows:⁴

$$\ln C = f(E, S, M, H) = \beta_{c1} + \beta_{c2} \ln E + \beta_{c3} \ln S + \beta_{c4} \ln M + \beta_{c5} \ln H \quad (4.10)$$

where β_{ci} , $i = 1...5$, are parameters. At the steady state, the household utility maximisation problem, Equation (4.1), becomes

$$\max_{\{S\}} \frac{1}{1-\rho} \frac{C^{1-\sigma} - 1}{1-\sigma} \quad (4.11)$$

Equation (4.11) admits the same solution as $\max_{\{S\}} \ln C = \max_{\{S\}} f(E, S, M, H)$, subjects to the budget constraint as follows:

$$\begin{aligned} W = & -\frac{(1+r)}{r} [G(e^{f(E,S,M,H)}, E, S, H) A(\sigma M)^\alpha + Y - (1+r)M \\ & - e^{f(E,S,M,H)}] \end{aligned} \quad (4.12)$$

The household's utility maximisation yields an optimal social network as follows:

⁴ At the steady state, I assume $C_t = C_{t-1} = C, E_t = E_{t-1} = E, S_t = S_{t-1} = S, H_t = H_{t-1} = H, K_t = K_{t-1} = K = \sigma M$ (Derive from $K_t = (1-\sigma)K_{t-1} + M_t$ and $M_t = M_{t-1} = M$)

$$S = \left(\beta_{c3} + \frac{(1+r)}{r} \beta_{c3} e^{f(E,S,M,H)} \right) \left(W - \left(\frac{(1+r)}{r} \left[\left(\frac{\lambda \partial G(e^{f(E,S,M,H)}, E, S, H)}{\partial S} - G(e^{f(E,S,M,H)}, E, S, H) \right) A(\sigma M)^\alpha - (\lambda + 1)e^{f(E,S,M,H)} - Y + (1+r)M \right] \right) \right)^{-1} \quad (4.13)$$

where λ stands for the Lagrange multiplier.

Equation (4.13) shows that the optimal social network is a function of children's education, microcredit borrowing, income from sources other than household business, and other household's characteristics. Taking natural logarithms of Equation (4.13), and linearizing

$$\left(\beta_{c3} + \frac{(1+r)}{r} \beta_{c3} e^{f(E,S,M,H)} \right) \quad \text{and} \quad \left(W - \left(\frac{(1+r)}{r} \left[\left(\frac{\lambda \partial G(e^{f(E,S,M,H)}, E, S, H)}{\partial S} - G(e^{f(E,S,M,H)}, E, S, H) \right) A(\sigma M)^\alpha - (\lambda + 1)e^{f(E,S,M,H)} - Y + (1+r)M \right] \right) \right), \quad \text{I obtain the}$$

following estimable equation:

$$\ln S = \beta_{s1} + \beta_{s2} \ln E + \beta_{s3} \ln M + \beta_{s4} \ln Y + \beta_{s5} \ln W + \beta_{s6} \ln H + \mathcal{E} \quad (4.14)$$

where β_{si} ($i = 1 \dots 6$) are coefficients to be estimated from the data; the error term, \mathcal{E} , captures the measurement error and is assumed to be i.i.d.

4.3.5 Optimal children's education

In stage one, the representative household makes a decision on children's education, E . Given the optimal consumption and social network, the household's utility optimisation problem can be rewritten as follows:

$$\max_{\{E\}} \ln C = \max_{\{E\}} f(E, S, M, H) = \max_{\{E\}} h(E, M, Y, W, H) \quad (4.15)$$

subject to

$$W = -\frac{(1+r)}{r} \left[G(e^{h(E,M,Y,W,H)}, E, e^{s(E,M,Y,W,H)}, H) A(\sigma M)^\alpha + Y - (1+r)M - e^{h(E,M,Y,W,H)} \right] \quad (4.16)$$

where

$$h(E, M, Y, W, H) = (\beta_{c1} + \beta_{c3}\beta_{s1}) + (\beta_{c2} + \beta_{c3}\beta_{s2}) \ln E + (\beta_{c4} + \beta_{c3}\beta_{s3}) \ln M + \beta_{c3}\beta_{s4} \ln Y + \beta_{c3}\beta_{s5} \ln W + (\beta_{c5} + \beta_{c3}\beta_{s6}) \ln H$$

The optimisation yields an optimal solution as follows:

$$E = \left((\beta_{c2} + \beta_{c3}\beta_{s2}) \left(1 + \lambda \frac{(1+r)}{r} e^{h(E,M,Y,W,H)} \right) \right) \left(W - \left(\frac{(1+r)}{r} \left[\left(\frac{\lambda \partial G(e^{h(E,M,Y,W,H)}, E, e^{s(E,M,Y,W,H)}, H)}{\partial E} - G(e^{h(E,M,Y,W,H)}, E, e^{s(E,M,Y,W,H)}, H) \right) A(\sigma M)^\alpha + e^{h(E,M,Y,W,H)} - Y + (1+r)M \right] \right)^{-1} \right) \quad (4.17)$$

where λ stands for the Lagrange multiplier.

Taking natural logarithms both side of Equation (4.17), then linearizing $W - \left(\frac{(1+r)}{r} \left[\left(\frac{\lambda \partial G(e^{h(E,M,Y,W,H)}, E, e^{s(E,M,Y,W,H)}, H)}{\partial E} - G(e^{h(E,M,Y,W,H)}, E, e^{s(E,M,Y,W,H)}, H) \right) A(\sigma M)^\alpha + e^{h(E,M,Y,W,H)} - Y + (1+r)M \right] \right)^{-1}$, an estimable equation for children's education can be obtained as follows:

$$\ln E = \beta_{e1} + \beta_{e2} \ln M + \beta_{e3} \ln Y + \beta_{e4} \ln W + \beta_{e5} \ln H + \epsilon \quad (4.18)$$

where β_{ei} , $i = 1 \dots 5$, are coefficients to be estimated from the data; and the error term, ϵ , captures the measurement error in the model and is assumed to be i.i.d.

In summary, the microcredit borrowing can play an important role as an external source of funding, which helps households to finance their small projects. To achieve success, households need to have a certain level of capability (entrepreneurship). The probability of achieving success depends on such factors as household consumption, children's education, social network, and household characteristics. With the additional income from the small business, a representative household makes optimal decisions on how much to consume, how much resource allocates for the social network, and their children's education. The decision process can be solved backwards to obtain the optimal consumption, social network, and education as a function of a set of explanatory variables. Hence, guided by this framework, I can assess the impact of microcredit borrowing on the household economic, social capital, and human capital aspects, as will be reported in Chapters 5-7 in this thesis.

4.4 The data

4.4.1 Introduction

This study employs the data from the Vietnam Access to Resources Household Survey (VARHS), which has been conducted every two years since 2002 for a selected group of 12 provinces (see Figure 4-3). The surveys are conducted under a collaboration involving the Central Institute for Economic Management of Vietnam, the Institute of Labour Science and Social Affairs of Vietnam, the Institute of Policy and Strategy for Agriculture and Rural Development of Vietnam, and the University of Copenhagen in Denmark. The 12 provinces covered are Ha Tay, Lao Cai, Phu Tho, Lai Chau, Dien Bien, Nghe An, Quang Nam, Khanh Hoa, Dak Lak, Dak Nong, Lam Dong, and Long An.

Red River Delta: Ha Tay

North East: Lao Cai and Phu Tho

North West: Lai Chau and Dien Bien

North Central Coast: Nghe An

South Central Coast: Quang Nam and Khanh Hoa

Central Highlands: Dak Lak, Dak Nong, and Lam Dong

Mekong River Delta: Long An.

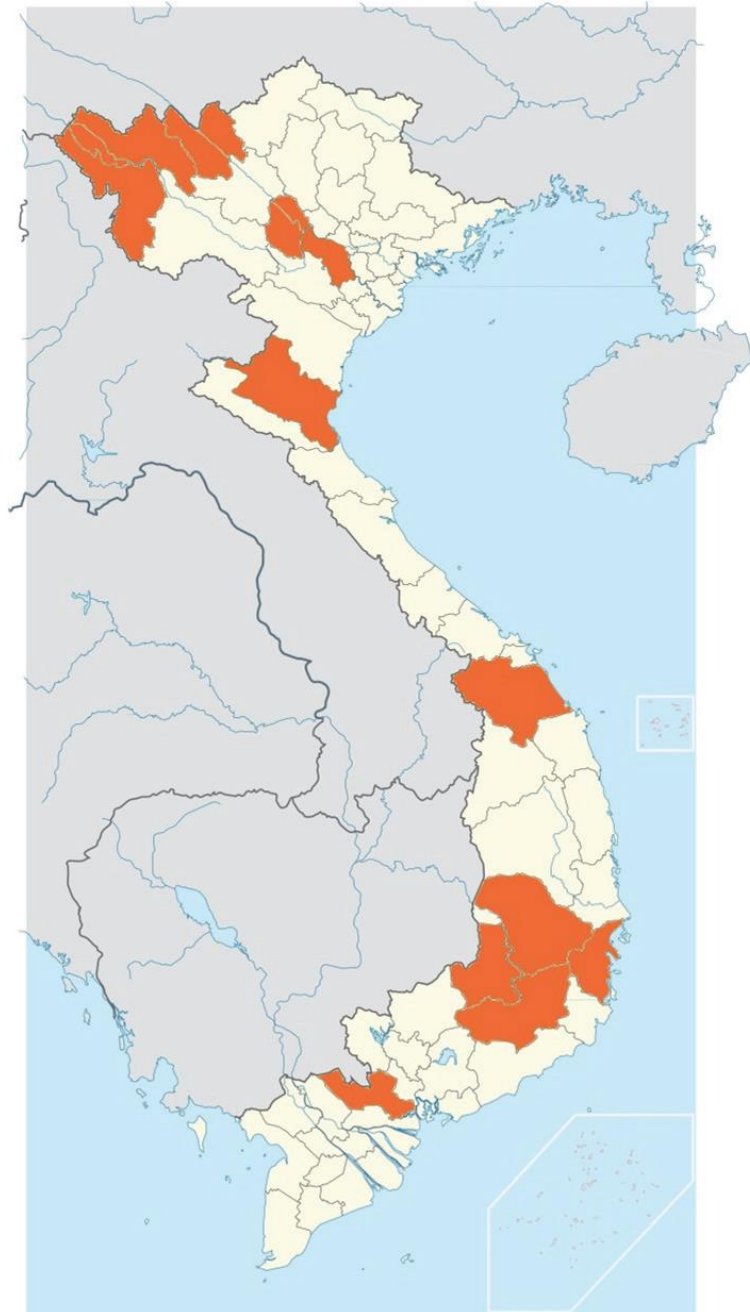


Figure 4-3 VARHS provinces

To obtain a nationally representative panel dataset of rural households, a three-level stratified sampling design is employed. First, the primary commune units were randomly chosen. Second, from each commune, three census enumeration locations were selected randomly. Third, from each census enumeration location, sample households were chosen randomly.

The sample size for the five survey rounds from 2008 to 2016 is shown in Table 4-1. Following expansion through earlier rounds, the number of households stabilised at around 3,500 and the information collected was standardised. To compensate for attrition, new households are added in each round.

Table 4-1: Sample size for the VARHS surveys.

Year	2008	2010	2012	2014	2016
Households	3,269	3,208	3,704	3,648	3,582
Individuals	15,844	14,904	16,585	16,206	15,665
New households	1,184	106	598	136	77
Attrition households	239	45	103	191	143

Source: VARHS, 2008 - 2016.

A rural household might use microcredit borrowing for different purposes, including consumption. Therefore, by following the theoretic considerations presented earlier in this chapter, which assume that a typical household borrows microcredit and invests in its small business (namely income-generating activities), careful data formation was carried out. Households who use microcredit only for consumption purposes are excluded from the data.⁵ Moreover, I account for such possible errors as missing or outlier data in the data cleaning process. The data cleaning process results in a reduction in the sample size from 14,185 to 12,202 observations.

To avoid any potential bias caused by commune's characteristics, I exclude those communes that contain only borrowers or only non-borrowing households. This filter decreases the sample size to 11,647 observations, which spreads over 2,699 households, 406 communes, 131 districts, and 12 provinces, for final analysis.

The information concerning households' access to microcredit is the primary focus of this study. I measure the total amount of microcredit borrowing of a household from loans that the household takes up in each survey round. In addition, I only focus on the households who have at least one loan for the income-generation purpose, based on self-reported actual use of loans.

⁵ Base on the information of main use of loan which reported in the surveys, I excluded all households who borrowed for consumption purpose. There are 14 main use of loan from the survey: (1) for rice production; (2) for other crop production; (3) for animal husbandry; (4) for forestry; (5) for fishery; (6) for non-farm activity; (7) build/buy house ; (8) buy land; (9) buy another asset; (10) pay for wedding/funeral; (11) for education expenses; (12) for health expenses; (13) for general consumption; (14) for other consumption. I excluded all households who borrowed for wedding/funeral; education expenses; health expenses; general consumption; and other consumption.

Table 4-2 shows, by year, the number and share of households that took out at least one microcredit loan. The number of households that accessed microcredit increased from 1,242 (43.8 per cent) in 2008 to 1,457 (51.4 per cent) in 2010, and then declined to 834 (29.4 per cent) in 2016. This is because since 2010 the government has implemented policies to encourage more formal microcredit lenders to enter the market and to protect against risks of a “credit trap”. However, the formal institutions usually require collateral such as land title or other valuable assets, which many rural borrowers do not have. As a result, it became more difficult for rural households to access both formal and informal microcredit.

Table 4-2: Distribution of loans

Year	2008	2010	2012	2014	2016
By number of loans					
Total (number of households)	1,242	1,457	1,113	997	834
One loan	953	972	830	755	692
Two loans	224	370	220	187	112
Three loans	65	115	63	55	30
% of households with loans	43.78	51.36	39.23	35.14	29.40
By gender (%)					
Female	66.90	66.30	69.54	68.60	70.98
Male	33.10	33.70	30.46	31.40	29.02
By income levels (%)					
Poor households	22.78	22.78	26.24	18.05	5.51
Non-poor households	77.22	77.21	73.76	81.95	94.49

Source: VARHS, 2008-2016.

It can be observed from Table 4-2 that the proportion of female borrowers is high with over 66 per cent during the study period. This is not surprising because microcredit loans are mainly distributed through the major mass organisations such as Woman Union. Moreover, microcredit also aims to support disadvantaged borrowers such as women in rural areas. Therefore, the number of female borrowers in rural Vietnam outweighs that of male counterparts. Regarding borrowers’ income (whether a borrower is classified as being poor), Table 4-2 suggests that the number of poor households accessing microcredit loans are relatively small, comparing to the number of non-poor borrowers. Hence, it appears that the Vietnamese authorities should pay more attention to the poor households’ access to microcredit, in order to help the poor end their poverty cycle.

4.4.2 Measurement of food consumption

Consumption (C) is measured specifically in terms of household food consumption. The food consumption value is calculated from the expenditures on food at and away from home yearly. For example, a household was asked about the quantity of main food items that they consume in last four weeks, such as pork, beef, chicken, any kind of fish, shrimp, fruit, milk, beer, rice, wine, coffee, and eating outside the home. Then these quantities are multiplied by its contemporaneous price for measuring the monthly food expenditure. Eventually, the yearly food consumption is roughly calculated by multiplying by 12 (months).⁶ The consumption, then, is converted to a real term, using the producer price index (PPI) with the base year of 2008.⁷

4.4.3 Measurement of social network

Measuring social network is a challenge due to its multi-dimensionality and intangible nature. In the literature, the social network is measured in different ways by different studies. Dowla (2006) captures social network through trust, norm, vertical and horizontal relationships among households. Those dimensions are found to be difficult to quantify. Recently, Akram and Kumar (2013) measure social network by aggregating scores on questionnaire items broadly related to trust, membership density, frequency of participation in social groups, and the level of democratic decision making in the community.

In the context of Vietnamese rural households, this study concerns how the households interact with its community. The social network of a household can be captured by a range of dimensions, such as the number of times that the household attends social events (such as weddings, parties, festivals), the frequency of participation in the social groups' meetings. I measure the social network from two dimensions, namely the size and quality. The standard principal component analysis (PCA) is employed to construct these two indexes that measure both the size and quality of a household's social network.

Size and quality dimensions are the two important aspects to measure social network of a household. For example, a household with high index in social network size might have many

⁶ In the survey, the participants were asked how much food items they consumed in the last 4 weeks (approximately one month). Therefore, I multiply it by 12 to approximate the annual food consumption.

⁷ The theoretical framework in this thesis is based on the production function, in which the representative household is treated as a producer. Therefore, PPI is used rather than CPI.

friends, is a member of many social groups such as farmers' union, women's union, but it does not mean the household interacts actively with its social network. The household might not participate in any of the group's meetings and does not gain any advantages from its social network. On the other hand, the quality index reflects the level of interaction of the household with its community. For instance, a household might have few friends or being a member of few social groups. However, the friendships are close, and s/he frequently attends the social meetings which are more likely to enhance the quality of its social network. It is expected that accessing microcredit improves both size and quality of social network.

The social network size index, denoted by *SIS*, is an indicator of how extensive a household's social network is, also known as the density of the social network. The index is constructed from four aspects, including (1) the number of participation in social events such as weddings, festivals, or birthday parties (*SIS1*); (2) the number of social associations that a household joined (*SIS2*); (3) the membership duration (years) of those social associations (*SIS3*);⁸ and (4) the diversity of those social groups (*SIS4*).⁹ If a household communicates with others who are different in terms of occupation and family relationship (namely the social groups that a household joined are more diverse), they are more likely to exchange information and gain experience from different perspectives. Arguably, participating in more social events, being a senior member in more social groups, and enjoying more diversity of those social groups, are more likely to extend the household's current social network size, which, in turn, enables the household to access more external supports in time of need.

Unlike the social network size, the quality of social network measures how deep a household interacts with its social network. The deeper a household interacts, the more benefits the household is expected to receive. If a household needs to ask for help, it is more likely that it will first request help from family or close friends, rather than from ordinary friends. In response, family members or close friends are more likely to support the household.

⁸ This is calculated by summing up the number of years that the household is a member of the associations.

⁹ In the survey, households were asked two questions for each participated social group: (1) Are members of this group mostly of the same extended family/family network/blood? and (2) Do members of this group mostly have the same occupation? The answers are coded as 2 if it is yes, 1 otherwise. Then, the household social network diversity score is measured by summing up the score from two questions for all social groups to which the households are members.

In order to measure the depth dimension of the social network, denoted by *SIQ*, I consider five aspects. They are (1) the frequency of participation in social group meetings (*SIQ1*);¹⁰ (2) democratic level of the decision making process in those social groups (*SIQ2*);¹¹ (3) expenditure for social activities (*SIQ3*);¹² (4) whether there is any household member holding official or other positions of public responsibility in their commune (*SIQ4*); and (5) the number of friends who are willing to support the household in case of need (*SIQ5*).

Being an active member by frequently participating in social group meetings enables the household to not only build up better relationships with their colleagues but also update new useful knowledge from these group meetings. If a household joins a social group with a higher level of democracy in terms of the decision-making process, the household is more likely to have a voice in the group's decisions. That way makes them more confident and increases the quality of their social network. Spending on social activities is another indicator of a household's social network quality. A household tends to spend more of its income on social activities which can bring in benefits. As such, a higher level of spending signals effectiveness of a household's social network.¹³

The quality of a household's social network is also determined by the official position of any household members in their communes. In rural Vietnam, political connections play an important role in building up the reputation of a family among the community (Markussen &

¹⁰ The score of how often the household participates in meetings is coded as 1 for rarely/never; 2 for sometimes; 3 for almost always. This component is obtained by summing up the score from each social group that the household is a member.

¹¹ For each participated social group, a household was asked: How does this group usually make decisions? the answers are coded as 1 for leader decides and informs the other group members; 2 for leader asks the group members what they think and then decides; 3 for all group members discuss and decide together. This component is obtained by summing up the scores related to all the social associations of the household.

¹² Measured by summing up the total value spent on New Year's Eve, social events, and gifts.

¹³ This variable might also be considered as a component of the social network size. Arguably, a household could spend more on social activities, if it has a broader social network. However, the household appears to be more concerned with the effectiveness of its spending on those activities, as an investment for future return. Hence, I only include this dimension in constructing the quality index.

Tarp, 2014). If any household member holds official public responsibilities in their commune, they are likely to have more influence on others because these members tend to have valuable and trusted information from the government. The number of close friends who are willing to support the household in difficult times is the last aspect of constructing the quality index. The more close friends who are willing to help in difficult times a household has, the higher quality of its social network is. Given the multidimensional nature of the social network, the PCA is an appropriate approach to construct the two social network indexes. An advantage of the PCA is that it can reduce the dimensionality to calculate the desired overall measures of the social network.

As the first step, PCA calculates the factor or component scores based on the eigenvectors of the correlation matrix of the initial variables. Each initial variable is optimally weighted and then summed to compute the factor scores. PCA creates uncorrelated factors, where each is a linear weighted combination of the initial inputs. These linear combinations account for more variations in the data than any other linear combination of variables. The factors are sorted so that the first factor is the one that explains the largest variations in the data. The subsequent factors are uncorrelated with the previous factors, and explain additional, but to a smaller extent, variation. Therefore, each factor represents an additional dimension of the original data. The details of PCA can be found in Vyas and Kumaranayake (2006).

For the second step, this study uses the first two factors, with their shares of explained variation as weights, to linearly calculate the indexes. These indexes are subsequently transformed to a 0-100 scale to avoid the difficulty in interpretation due to the negative values (see Akram & Kumar, 2013).

The results of the PCA are reported in Table 4-3. For the social network size index, the two extracted factors together account for 82.82 per cent of the total variations in the original data. The first factor can explain 59.12 per cent of the variations of the original data. The number of social associations that a household joined (*SIS2*), membership duration of those social associations (*SIS3*), and the diversity of those social groups (*SIS4*) showed high positive loadings. However, the number of participation in social events such as weddings, festivals, or birthday parties (*SIS1*) shows high positive loading in the second factor, which accounts for 23.70 per cent of the variations.

Table 4-3 Components of the two social network indexes

No.	Indexes	Components	Scoring coefficients	
			Factor 1	Factor 2
1	SIS	SIS1	0.19	0.98
2		SIS2	0.59	-0.09
3		SIS3	0.50	-0.12
4		SIS4	0.59	-0.11
		Per cent of variance (%)	59.12	23.70
		Cumulative (%)	59.12	82.82
5	SIQ	SIQ1	0.64	-0.14
6		SIQ2	0.63	-0.16
7		SIQ3	0.18	0.64
8		SIQ4	0.35	-0.13
9		SIQ5	0.16	0.72
		Per cent of variance (%)	38.99	20.30
		Cumulative (%)	38.99	59.27

N=9,260.

For the social network quality index, the overall explanation of variations in the data by the first two factors is 59.27 per cent. Respectively, factor 1 and factor 2 account for 38.99 and 20.30 per cent of the total variations. The frequency of participation in social group meetings (*SIQ1*) and democratic level of the decision-making process in those social groups (*SIQ2*) appear to be highly correlated with the first factor, while the expenditure for social activities (*SIQ3*) and the number of friends who are willing to support the household in case of need (*SIQ5*) showed high positive loading in the second factor. The data of these indexes are graphed in Figure 4-4.

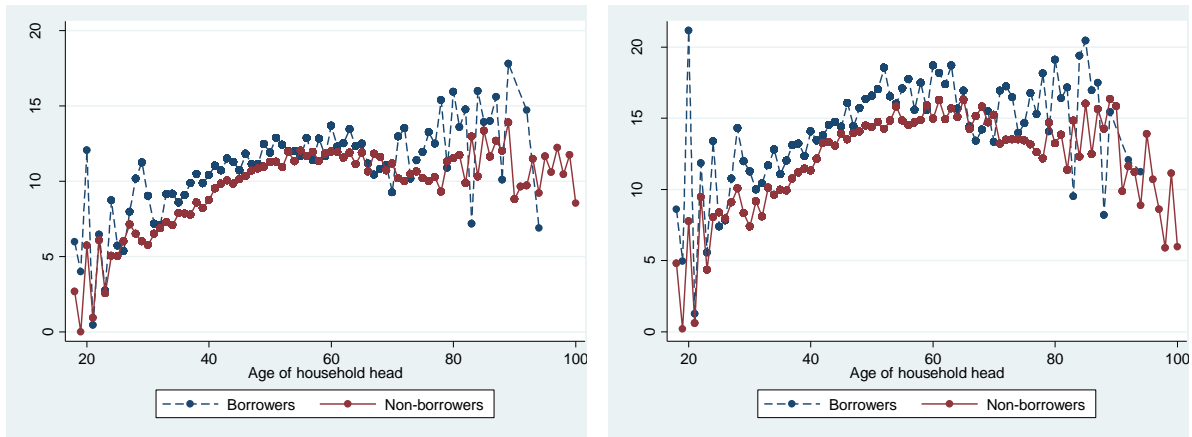


Figure 4-4 Average social network indexes by age of household head

Figure 4-4 plots the average of the two indexes against the ages of the household head. Overall, the group of households who take up microcredit loans achieves a higher average level of the social network than the group of non-borrowing household in both cases. However, the difference is more evident for social network quality. A household in rural Vietnam generally enjoys its highest level of the social network at the age of 60 to 90.

4.4.4 Measurement of children's education

In this study, children's education is proxied by two variables, namely completed grades (*Grades*) and school gap (*Schgap*). The completed grades are measured by grades children completed in school. The school gap is the difference between the expected schooling and the actual schooling years, according to the child's age (see Islam & Choe, 2013). For example, in Vietnam, a child should start school at age six, and continue to finish high school at age 18. A child, thus, at the age of seven to eighteen, is expected to complete school years, which equals to his/her age minus six. If a child's age is less than six, then the expected schooling year is zero, and if the child is older than 18, then the expected schooling is 12. The actual schooling is the number of years that the child completed and self-reported at the time of the survey conducted. Subsequently, the schooling gap is defined as

$$E = \max\{0, es - as\}$$

where E represents the school gap; as denotes the actual schooling years; and es denotes the expected schooling years and $es = \begin{cases} 0 & \text{if } age \leq 6, \\ age - 6 & \text{if } 7 \leq age \leq 18. \end{cases}$

Later in Chapters 5 and 6, the variable E is measured as the sum of schooling gaps relative to expected schooling for household children (years) as these two chapters focus on the household level. In Chapter 7, in contrast, the analysis is at the individual child level, and therefore, the measure of children’s education is proxied by school gap and completed grades of each child in households.

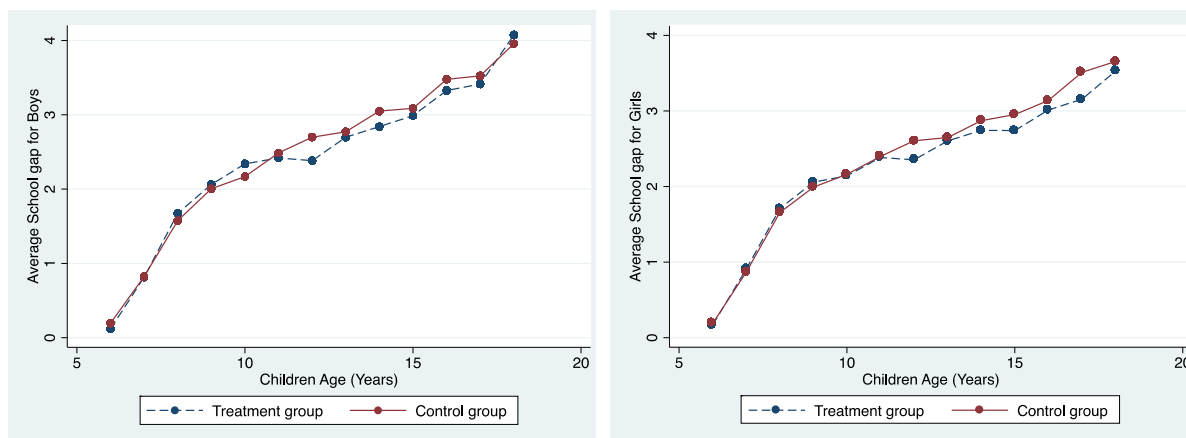


Figure 4-5: Average school gap by children’s gender and age

Figure 4-5 demonstrates the average school gap among boys (left panel) and girls (right panel) by age. Overall, the significant gap between the treatment (borrowers’ children) and control (non-borrowers’ children) groups occurs after age 11, when the children start their secondary school. It is not surprising because attendance in the primary school is compulsory and widespread in Vietnam. Moreover, the demand for children’s education is stronger among the treatment group.

4.5 Summary

The theoretical framework proposed in this chapter has provided some insights into the causal relationships between microcredit interventions and its effects on the household. The outcomes from businesses funded by microcredit can be classified into three groups, such as economic capital, social capital, and human capital. By observing these outcomes of interest, assessors can trace the impacts of microcredit at the household level.

The underlying assumption of this theoretical framework is that a representative household accesses microcredit and invests into its small businesses. These businesses might or might not be successful. Whether the household can achieve success depends on a set of household characteristics. Based on the business outcomes, the household makes its decision on education

first as it is the most important concern for the household. Second, the household chooses its social network level to optimise its utility. Lastly, consumption is determined after having optimal decisions for education and social network. The household's utility maximisation problem is solved backwards to derive the three models for consumption, social network, and education for the empirical analyses.

The VARHS is a unique panel database of rural living conditions in Vietnam. Each round of the VARHS survey is repeated across the same households to form a rich panel dataset. The technique of collecting data and rich information contained in the VARHS survey is sufficient to conduct comprehensive research on the impacts of microcredit on rural households in Vietnam. For my purposes, this thesis utilises a panel dataset of five survey rounds from 2008 to 2016.

CHAPTER 5 IMPACTS OF MICROCREDIT ON RURAL HOUSEHOLDS' FOOD CONSUMPTION

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CHAPTER OUTLINE

5.1	Introduction	75
5.2	Estimation strategy.....	76
5.3	Variable definitions and summary statistics.....	78
5.4	Results	81
5.4.1	Baseline results	81
5.4.2	Robustness check.....	86
5.5	Concluding remarks	87

This chapter presents the first empirical study of this thesis, focusing on the impact of microcredit on rural households' food consumption. The decision on food consumption is made in stage three of the multi-stage decision-making process. This chapter consists of five sections as follows: The introduction section highlights the importance and contribution of the study to the literature. The second section discusses the estimation strategy to overcome the selection bias problem. The next section focuses on defining variables and summary statistics. The results are discussed in the fourth section, and the last section concludes the chapter.

5.1 Introduction

Microcredit is considered a vital tool for economic development and poverty alleviation. The additional resources households gain from microcredit, combined with the new knowledge, skills, and experiences they glean from microcredit institutions and peer associations, can permanently transform livelihoods. More stable household food consumption paths can support better nutrition and human capital formation and thus lead to long-term productivity benefits.

As reviewed in Chapter 3, much research has been done to test the impact of microcredit on household welfare, looking at food consumption expenditure in particular. However, the findings are mixed. For example, Pitt and Khandker (1998) found that microcredit significantly improves annual household consumption expenditure in Bangladesh, whilst Roodman and Morduch (2009), using the same dataset, found an insignificant effect. Similarly, Quach et al. (2005) confirmed that microcredit in Vietnam benefits borrowers in terms of food and non-food expenditure, while Nghiem et al. (2012), using a quasi-experimental approach, found no significant effect of microcredit on household food consumption. The mixed findings suggest that more research, with better quality data and more appropriate methodology, is needed, in order to provide solid evidence on the impact of microcredit. Contributing to this strand of research, this chapter explores how microcredit affects rural household food consumption in Vietnam.

In Vietnam, poverty is widespread, and the government has made significant efforts to alleviate it. These efforts include implementation of a number of microcredit programs that function primarily through state-owned banks in coordination with non-governmental organisations. However, despite the fact that these microcredit programs date back more than two decades, it is unclear whether and to what extent the programs have been effective in improving the welfare of rural households.

This chapter sheds light on this issue. Chapter 4 proposes a theoretical model in which microcredit supports a representative household by financing its family business. The household is assumed to maximise its lifetime utility, which yields an optimal consumption path as a function of the household's microcredit borrowing. With reference to this theoretical consumption path, I then estimate the impact of microcredit empirically in this chapter. For this purpose, this chapter makes use of a household dataset for the period 2008-2016 from the Vietnam Access to Resources Household Survey (VARHS). The results suggest that microcredit programs in rural Vietnam appear to have been effective in raising household food consumption in both the short and long terms.

Most previous studies of microcredit in Vietnam utilised cross-section data or panel data with only short time frames, such as Quach et al. (2005) using data from 1992 to 1998. Accordingly, these studies did not account for the dynamic aspect of household food consumption. By contrast, this study uses a dataset that covers a longer period of time and allows for analysis of the dynamics of household food consumption. As such, it is able to more comprehensively assess the impact of microcredit on the consumption of rural Vietnamese households. Further, some previous studies, such as Nghiem et al. (2012) and Swain et al. (2008), focused on household income and assets in examining the impact of microcredit. However, food consumption is the more relevant indicator in the sense that it directly affects household welfare, whereas the effects of income and assets are indirect.

5.2 Estimation strategy

Equation (4.9) links optimal household food consumption to microcredit borrowing (via the capital variable) and other explanatory variables. To evaluate the impact of microcredit on food consumption, Equation (4.9) is estimated using the survey data from Vietnam. The equation is presented as follows:

$$\begin{aligned} \ln C_t = & \beta_1 + \beta_2 \ln C_{t-1} + \beta_3 \ln E_t + \beta_4 \ln E_{t-1} + \beta_5 \ln S_t + \beta_6 \ln S_{t-1} + \beta_7 \ln K_t + \beta_8 \ln K_{t-1} \\ & + \beta_9 \ln H_{t-1} + \beta_{10} \ln H_t + \epsilon_t \end{aligned}$$

where C is household food consumption; E stands for children's education; S denotes social network; K is accumulated microcredit borrowings; and H is a set of household characteristics; ϵ is the error term; and β s are coefficients to be estimated from the data.

Estimating Equation (4.9) is faced with two challenges, namely the presence of the lagged dependent variable and the non-random nature of the household borrowing decision. The

lagged dependent variable (C_{t-1}) results in a correlation between household characteristics and time-invariant unobserved household heterogeneity. In other words, the assumption that $E[X_t\epsilon_t] = 0$, where X is a vector of all explanatory variables in Equation (4.9), does not hold. Therefore, using the ordinary least squares estimator or standard panel estimators, such as fixed effects or random effects estimators, will lead to inconsistent estimates of the coefficients (Hsiao, 2014). A widely-used approach to dealing with this problem is to adopt the Difference Generalised Method of Moments (GMM) estimation (Arellano & Bond, 1991), which involves removing the fixed effects by first differencing, and then using lagged levels of the dependent variable as instruments for the endogenous and predetermined variables. However, this approach has been found to be weak in two situations: (1) when the dependent variable is close to a random walk, so that past levels are weak instruments as they convey little information about current changes, and (2) when the time series in the panel is short such that cross-sectional variation overwhelms the time variation (Bond et al., 2001).

To address these weaknesses, Blundell and Bond (1998) consider additional moment conditions to form a System GMM (GMM) estimation technique. The System GMM estimator includes a simultaneous system of the level equations and the first-differenced transformed equations. In the first-differenced equations, the lagged levels of predetermined and endogenous variables are employed as instrumental variables (similar to those in the Difference GMM estimator), and in the level equations, the instruments used are differences of these variables to make them exogenous to the fixed effects. Given the short panel of only five time periods, combined with a cross-section of 2,699 households, the System GMM estimation is more appropriate than Difference GMM (see Blundell & Bond, 1998). Nevertheless, I also report Difference GMM results for comparison.¹⁴

The second challenge is the selection bias in household borrowing, which also renders $E[X_t\epsilon_t] = 0$ invalid. The selection bias can occur from both demand and supply sides. On the demand side, households may be more likely to borrow when they possess superior knowledge or skills (entrepreneurship) that enable them to better exploit business opportunities. Similarly, on the supply side, microcredit lenders may regard knowledge and skills as indicators of likely success in business and loan repayment.

¹⁴ In comparison to matching techniques, the difference GMM and system GMM appear to be appropriate estimation methods for a dynamic equation such as equation 4.9.

To address the problem of selection bias, the microcredit borrowing variable (K) is instrumented. Note that although the System GMM estimator employs lags and differences as internal instruments, this may not be sufficient to eliminate the selection-bias problem. Therefore, this chapter employs the loan interest rate as an excluded instrument for microcredit. The interest rate is largely determined on the supply side in the micro-finance market with borrowers being in a very weak bargaining position. Therefore, the given interest rate directly affects a household's decision to borrow, but not its food consumption (other than indirectly through the effect on borrowing). Education (E) and social network (S), too, may not be strictly exogenous but may rather reflect choices made in conjunction with food consumption and borrowing decisions. Accordingly, this study also employs excluded instruments, namely the average interest rate of loans obtained within a prefecture (%), the highest level of education of a member in the household (number of school years), and distance to the nearest all-weather road (km), for these variables.

5.3 Variable definitions and summary statistics

Table 5-1 reports variable definitions and summary statistics. Household food consumption (C) is taken as expenditures on food, both at home and away from home. Table 5-1 reports that on average, a rural household in Vietnam expends over 10 million VND (478 USD) annually for food. There are few households in the surveys that have food expenditure at the minimum level of only around 0.5 million VND (22 USD), while in contrast, another small number of households enjoy their food expenditure at the maximum level of over 207 million VND (9,559 USD).

Table 5-1. Variable definitions and descriptive statistics

Variables	Description	Min.	Max.	Mean	Std. Dev.
C	Household food consumption (million VND)	0.49	207	10.37	9.03
K	Accumulated microcredit borrowing (million VND)	0	3,238	25.00	104.00
SIS	Social network size index (score)	0	100	10.20	6.30
E	Education measured as the sum of schooling gaps relative to expected schooling for household children (years)	0	47	2.00	4.30
Y	Income from sources other than the household business (million VND)	0	1,576	30.73	47.80
EduH	Schooling of household head (years)	0	12	6.00	3.90
HSize	Household members (number)	1	17	4.60	2.00
AgeH	Age of household head (years)	18	100	51.50	13.70
Plot	Land holding (ha)	0	84	1.06	1.75
Dep	Dependent members (number)	0	10	1.80	1.40
Nfarming	Whether a household is involved in non-farming business activities (1-yes; 0-otherwise)	0	1	0.25	0.43
Shock	Whether a household experienced an income shock (1-yes; 0-otherwise)	0	1	0.51	0.50
Poor	Whether a household is classified as poor by authority (1-yes; 0-otherwise)	0	1	0.19	0.39
Local	Whether a household is local (1-yes; 0-otherwise)	0	1	0.78	0.42
Irate	Average interest rate of loans obtained within a prefecture (% yearly)	0	76	3.82	36.30
HiE	Highest level of education of a member in the household (number of school years)	0	12	9.27	3.07
DiR	Distance to the nearest all-weather road (km)	0	80	3.50	7.66

N= 11,647, VARHS 2008-2016.

Accumulated microcredit borrowing (K), the variable of interest, is measured by depreciated capital stock that a household accumulates over the study periods. The accumulated microcredit borrowing capital (K_t) is measured by $K_t = (1 - \delta)K_{t-1} + M_t$, where δ is economic depreciation rate (5% per annum). M_t is the microcredit borrowing in the current year. The capital stock, K , allows for the microcredit borrowing of previous years to play a role in the business in the current year, subject, however, to depreciation. The capital stock in the initial

year, K_0 , is set as microcredit borrowing in 2008, namely $K_0 = M_0$. The average accumulated capital for sample households is 25.3 million VND (1,150 USD). At the high end, some households accumulated capital of more than 3 billion VND (150,000 USD), while others had no accumulated capital.

The interest rate, used as an instrument for K , is calculated as the average interest rate on loans at the prefecture level. The average interest rate for the sample is 3.82 per cent, which is lower than interest rates normally observed in Vietnamese credit markets of over 10 per cent. This is a sign that the Vietnamese government has supported rural residents by lowering interest rates in rural areas.

The social network index (SIS) is calculated from four elements using principal components analysis. The four elements are: number of social events attended (weddings, festivals, or birthday parties); the number of memberships in social associations; total duration of memberships in these social associations; and diversity of these social associations.¹⁵ The index is subsequently transformed to a 0-100 scale to avoid the difficulty in interpretation due to the negative values of the indices (see Akram & Kumar, 2013). The mean value of the social network index is 10.2.

To instrument the social network variable (S), I use distance to the nearest all-weather road since households who live closer to all-weather roads are likely to have better opportunities to make contacts and access information than those who live in more remote areas. Moreover, it is unlikely that this distance will affect household food consumption directly. The average distance from sample homes to an all-weather road is 3.5 km while the longest distance recorded is 80 km.

Education (E) is measured as the sum of school gaps of all children in a household. The school gap is the difference between actual years of schooling and expected years of schooling given the child's age (see Islam & Choe, 2013). Children are expected to be in school from age six to age 18 such that 18-year-olds should have received 12 years of schooling. The average school gap per household is found to be two years, indicating that rural households in Vietnam face difficulties in sending their children to school. Many poor households find they must

¹⁵ Households were asked two questions regarding diversity of social associations: (1) Are members of this association mostly of the same extended family/family network/blood? (2) Do members of this group mostly have the same occupation? Answers are coded 2 for yes, 1 otherwise. The score is taken as the sum of these values.

forego education for their children so that they can work to make a contribution to the household.

To instrument education, I make use of the highest level of education of a household member (number of school years). The most educated household member can serve as a role model to inspire others to pursue education. Conceptually, the highest level of education in the household should not directly affect the household's food consumption.

Income, Y , from sources other than the household business, include (1) net income from wages/salaries; (2) net income from common property resources such as earnings from collecting forest products or hunting in forest areas not owned or rented by the household; (3) net income from private transfers, such as remittances from relatives; (4) net income from public transfers, such as remittances from government support programs; and (5) income from other sources not related to the household business financed by microcredit. On average, a sample household earned almost 31 million VND (1,428 USD) from these five sources of income.

The average age of the household head is almost 52 years. Households own an average of 1.06 ha of land. Around 19 per cent of households are classified as poor. Local residents (non-migrants) comprise 78 per cent of the population. More than half of households (51 per cent) experienced at least one income shock in the past two years.

In the empirical estimation, some variables are log-transformed, which requires non-zero values. Therefore, a value of one is added to variables that contain zero before the logarithm transformation. Such a strategy is also used by Mark and Shahidur (1998) and Roodman and Morduch (2014). All nominal monetary variables are converted to real terms using the producer price index with the base year 2008 (General Statistics Office of Vietnam, 2017).

5.4 Results

5.4.1 Baseline results

Each endogenous variable, namely accumulated microcredit (K), school gap (E), and social network size (SIS), is estimated on all exogenous variables, and then test whether the three external instruments are jointly significant. The associated F statistics are 5.29, 49.91, and 41.72, respectively, all of which are all significant at the one per cent level.

Table 5-2 reports the System GMM estimation results.¹⁶ Column 1 presents the results without external instruments, and Column 2 results with external instruments. While there exist variations in the magnitude of point estimates, the signs remain consistent. The parameter of focus is the coefficient of accumulated microcredit borrowing (K), which measures the elasticity of food consumption with respect to K . The results show that a one per cent increase in the contemporaneous value of accumulated microcredit borrowing leads to a 0.177 per cent increase in household food consumption with the external instruments, or a 0.461 per cent increase without the external instruments, both statistically significant at the one per cent level. This finding supports the hypothesis that microcredit borrowing helps rural households improve their living standards through financing business activities and confirms the important role of microcredit in economic development in rural Vietnam. The finding is consistent with those of Islam (2015), Kaboski and Townsend (2012), Li et al. (2011), and Li et al. (2011) who report a positive impact of microcredit on food consumption in Bangladesh, Thailand and China, respectively.

¹⁶ One might wonder whether the inclusion of the external instruments in the System GMM estimation improves efficiency since the number of internal instruments is already large. For comparison, I present the results of Difference GMM estimation (external instruments omitted) in Appendix Table A1. I note substantial differences in the point estimates relative to the System GMM estimates of Table 5-2. However, as discussed in Section 5.3 in Chapter 5, the Difference GMM estimator is not well suited to the study data given the short time series of five periods. This study discussion therefore focuses on the System GMM results.

Table 5-2. Impacts of microcredit on household food consumption (System GMM)

Household food consumption	System GMM		System GMM with external IVs	
	Coefficients	Robust SE	Coefficients	Robust SE
$\log C_{t-1}$	-0.037	0.110	0.119***	0.045
$\log K_t$	0.461***	0.178	0.177***	0.056
$\log K_{t-1}$	-0.438***	0.154	-0.150***	0.048
E_t	-0.035	0.164	-0.116***	0.041
E_{t-1}	0.104	0.100	0.089***	0.032
SIS_t	0.704***	0.134	0.190***	0.053
SIS_{t-1}	-0.401***	0.100	-0.098**	0.039
$\log Y_t$	-0.053*	0.029	0.010	0.010
$\log Y_{t-1}$	0.052**	0.026	0.018**	0.009
$EduH_t$	-0.088**	0.037	-0.0005	0.012
$EduH_{t-1}$	0.011	0.032	0.0043	0.010
$HSize_t$	-0.302**	0.132	0.038	0.048
$HSize_{t-1}$	0.154	0.096	-0.024	0.034
$AgeH_t$	-0.011	0.013	0.006	0.005
$AgeH_{t-1}$	-0.002	0.013	-0.009**	0.005
$\log Plot_t$	-0.171*	0.104	0.153***	0.051
$\log Plot_{t-1}$	0.163*	0.087	-0.127***	0.042
Dep_t	0.152	0.111	0.018	0.038
Dep_{t-1}	-0.108	0.169	0.025	0.046
$Nfarming_t$	-0.796***	0.231	-0.152**	0.073
$Nfarming_{t-1}$	0.621***	0.155	0.238***	0.051
$Shock_t$	-0.367***	0.116	-0.154***	0.037
$Shock_{t-1}$	0.341**	0.133	0.061	0.045
$Local_t$	0.120	0.168	0.057	0.055
$Local_{t-1}$	0.032	0.177	0.019	0.057
$Poor_t$	0.078	0.185	-0.104	0.065
$Poor_{t-1}$	-0.069	0.144	-0.139***	0.048
Year dummies	YES		YES	
AR(1)	-4.58***		-4.59***	
AR(2)	0.72		1.03	
Hansen test	20.61		18.70	
Number of instruments	42		45	
Observations	9,220		9,220	
Number of households	2,699		2,699	

Note: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively. AR(1) and AR(2) are autocorrelation of order one and two testing for error term.

The coefficient of one-period lagged accumulated microcredit borrowing is estimated at -0.150, which is significant at the one per cent level (or 0.438 without the external instruments, also

significant at the one per cent level).¹⁷ Thus, the previous period's accumulated microcredit borrowing negatively affects a household's current-period food consumption. An increase in the previous period's accumulated borrowing indicates an increase in the repayment burden, which may be the reason for a decrease in current period food consumption, *ceteris paribus*.

The long-run elasticity of food consumption with respect to accumulated microcredit borrowing can be calculated by imposing the steady-state conditions, namely $\ln C_t = \ln C_{t-1}$ and $\ln K_t = \ln K_{t-1}$. The result shows that a one per cent increase in steady-state accumulated borrowing leads to a 0.031 per cent increase in steady-state consumption (a 0.022 increase without the external instruments). Thus in either the short run or the long run, microcredit borrowing appears to promote household food consumption in rural Vietnam through the financing of business activities.

The findings of a positive impact of microcredit borrowing on rural household food consumption indicate that Vietnam's approach to microcredit programs has been effective. Two features of Vietnam's microcredit market are likely to contribute to the positive impact of microcredit. First, Vietnam's microcredit providers focus more on group lending, rather than individual lending, where group members are familiar with each other, and the leader is a reputable person in the community and takes responsibility for the group. Borrowers in the same group can easily communicate with each other, and so when one member achieves success in utilising microcredit, his/her experience can be quickly shared with other members of the group. There also exists peer pressure within the group, such that each member has an incentive to perform well in utilising microcredit. Second, in addition to the loan, the microcredit providers frequently provide short training workshops to their customers, which helps to improve the use of microcredit and increase the probability of business success.

Despite the significant and positive impact of microcredit on food consumption in both the short and long run, the negative coefficient on one-period lagged accumulated microcredit borrowing (K_{t-1}) suggests that microcredit can be a burden to rural Vietnamese. The more a household has borrowed in the past, the bigger the repayment burden, which in turn negatively affects consumption, *ceteris paribus*. On average, a household has accumulated capital from microcredit borrowing of approximately 1,150 USD, which amounts to around 40 per cent of household income. The repayment burden is thus substantial. Besides, the relatively small size of microcredit borrowing limits the scope of investment options for households. On this scale

¹⁷ Note that since the data are bi-annual, a one-period lag corresponds to two years.

of borrowing, households can only afford to invest in small projects which may not be profitable enough to service their loans and support higher standards of living unless borrowing continues.

In considering the impact of other explanatory variables on household food consumption, this chapter focuses on the model with external IVs. The gap in children's education (*E*) shows a contemporaneous negative effect on food consumption. A gap of one year in children's education is associated with a 0.12 per cent decrease in current food consumption with statistical significance at one per cent. This may be due to a household with lower academic achievement being less likely to succeed in business and thus suffering a lower living standard. However, a one-period lag in the education gap is positively associated with food consumption, which may be a reflection of the economic contribution made by children when not attending school.

One unit increase in the contemporaneous social network index (*SIS*) is associated with a 0.19 per cent increase in current food consumption. This suggests that an expansion in a household's social network can provide an immediate boost to its food consumption. However, the effect becomes negative after a one-period lag, perhaps due to the demands of maintaining an existing social network as households must allocate limited resources to social activities to the detriment of generating income for food consumption.

As expected, income from sources other than the family business (*Y*) positively affects household food consumption, although this effect registers as statistically significant only with a lag.

Household land holdings (*Plot*) affect consumption positively contemporaneously but negatively with a lag. Land is an essential input of household farming businesses. A household, with more land, is thus more likely to achieve success in such business, and as a result, increase its consumption. However, land requires capital investment to be productive. Faced with a credit constraint, household investment in the previous period may constrain consumption in the current period.

Non-farming activities have a negative effect on consumption contemporaneously but a positive effect with a lag. In theory, the direction of the effect is ambiguous depending on whether non-farming activities are complementary to business success or whether it reflects a lack of farming resources. As expected, negative income shocks (*Shock*) and poverty (*Poor*) both show adverse effects on food consumption.

Several tests are conducted to check the model specification. The Arellano and Bond (AB) test for autocorrelation obtains a significant test statistic for AR(1) and an insignificant test statistic for AR(2), suggesting that the estimation with one-period lag is appropriate. The Wald test rejects the null hypothesis that the coefficients are insignificant overall. Finally, the Hansen test of overidentifying restrictions fails to reject the null hypothesis that the instrumental variables are valid.

5.4.2 Robustness check

The baseline estimations suggest that microcredit borrowing has a positive impact on rural household food consumption in Vietnam. To check for the robustness of the findings, I employ the System GMM (with instrumental variables) to re-estimate Equation (4.9) on different subsamples by household size, household head gender, and poverty status. Table 5-3 reports the estimation results.

Table 5-3 Robustness check

Subsamples	System GMM with external IVs			
	$\log K_t$		$\log K_{t-1}$	
	Coefficients	Robust SE	Coefficients	Robust SE
By household size				
Less than average (4.6)	0.0392*	0.056	-0.0376*	0.052
Greater than average (4.6)	0.0882*	0.054	-0.0871**	0.046
By household head gender				
Female household head	-0.0319	0.090	0.0137	0.076
Male household head	0.0663**	0.033	-0.0567*	0.039
By poverty status				
Non-poor households	0.0944*	0.047	-0.0706***	0.042
Poor households	0.0277*	0.041	-0.0190*	0.035

Note: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively.

Overall, Table 5-3 further confirms the positive impact of microcredit borrowing on household food consumption in most of the subsample estimations. Particularly, microcredit appears to have greater impact on households who have more than 4 members. This is possible because the more member a household has, the more labour the household can supply for its business, and hence increases the possibility of success in doing its business. As a result, food consumption increases. For the estimation on those households whose heads are female, I do not find any evidence of significant impact of microcredit on these households. It is not surprising because the sample of female household heads is small, compared to male counterparts. In the sample, households with female heads only account for 17 per cent of total

households. In contrast, the estimation with subsample of male household heads is similar to that of the baseline case. Moreover, Table 5-3 suggests that microcredit use is more effective among non-poor households than poor households. Non-poor households usually have more resources that can be used in their business projects than poor households. This advantage helps non-poor household invest microcredit more effectively.

5.5 Concluding remarks

This chapter assesses the impact of microcredit borrowing on rural households' food consumption in Vietnam. Specifically, this analysis starts with a theoretical model as developed in Chapter 4, where microcredit helps a representative household through financing its family business. The household maximises its lifetime utility, which yields a dynamic optimal consumption path. The theoretical framework shows that optimal consumption is a function of microcredit borrowing, and then use the optimal consumption function to guide the empirical estimation. To estimate the impact of microcredit on household food consumption, this study implements the System Generalised Method of Moments estimation using a panel dataset from the Vietnam Access to Resources Household Survey for the period 2008–2016. The estimations use excluded instrumental variables to address the endogeneity problem of explanatory variables and the sample selection bias due to households' non-random access to microcredit borrowing.

The estimation results in this chapter indicate that the microcredit programs in rural Vietnam are effective in improving household food consumption in both the short and long terms. The chapter thus contributes to the debate over whether microcredit borrowing is a tool for poverty alleviation in Vietnam, and developing countries more generally, by confirming that it positively affects household welfare. However, it is worth noting that accumulated microcredit borrowing of the previous period can negatively affect a household's current-period food consumption, suggesting that repayment may be a burden to the household. Although rural Vietnamese households can benefit from microcredit borrowing, they are also facing the risk of falling into a "credit trap". Therefore, this finding also points to the need for careful management of microcredit loan policy.

Despite the positive impact found for food consumption, there exist a number of factors that limit the effectiveness of microcredit in Vietnam. First, the loan size is relatively small, which limits the scope of investment options for households. Second, despite the provision of training workshops by some microcredit providers, there is still a lack of business skills which could

decrease the probability of achieving success in small business. Third, the survey data show a decrease in the number of households accessing microcredit in later years in both the formal and informal credit sectors. This decrease occurred because the government implemented policies to improve the formal microcredit sector and mitigate risk from informal microcredit. However, formal microcredit providers tend to require collateral which many rural households do not have. This constraint prevents microcredit lending from achieving its aim to the full extent.

To further promote the positive impacts of microcredit, microcredit lenders can increase their loan size to encourage borrowers to invest in larger and more profitable projects. They can also provide additional support services, such as business skill training and information on investment options that can help households to more effectively use their borrowings. For their part, regulators can revise loan requirements to allow not only physical collateral, but also social collateral, such as a household's social reputation, which will increase access to microcredit. Local authorities can encourage residents to participate in more social groups, such as the Women's Association, the Farmer's Association, and the Veteran's Association, which help them to access microcredit in the formal sector in rural Vietnam. Poor households can build their social networks and use these networks as collateral for their loan applications. These steps will facilitate greater use of microcredit to more fully achieve the aim of poverty alleviation in rural Vietnam.

CHAPTER 6 IMPACTS OF MICROCREDIT ON RURAL HOUSEHOLDS' SOCIAL NETWORK

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CHAPTER OUTLINE

6.1	Introduction	90
6.2	Estimation strategy.....	91
6.3	Variable definitions and summary statistic	93
6.4	Results	97
6.4.1	Baseline results	97
6.4.2	Robustness check.....	100
6.5	Concluding remarks	101

This chapter examines the impact of microcredit on rural households' social network, which is determined in stage two of the multi-stage decision-making process. The chapter consists of five sections. After an introduction in Section 6.1, Section 6.2 specifies the empirical model and discuss the estimation strategy. Section 6.3 describes the variables and summary statistics. Section 6.4 reports the results. Finally, Section 6.5 concludes the chapter.

6.1 Introduction

Social network plays an important role in helping the poor escape poverty in low-income countries, where formal insurance and crisis supporting systems are generally unavailable. Social network generates trust among the poor communities. It fosters exchange of common values and knowledge, resolves social conflicts, connects individuals within groups, and bridges gaps among different participants. That, in turn, enables the poor to access social supports when facing adverse income shocks. In addition, the less fortunate households can learn new skills to build a route out of poverty by learning from peers within its social network.

Given the vital role of social network in poverty alleviation, it is important to have a more comprehensive understanding of the impact of any anti-poverty programs, including microcredit, on social network. Microcredit is a popular policy tool to combat poverty. Not only does microcredit provide additional resources, but it also encourages social interaction among its borrowers. By participating in a microcredit program, intuitively, the poor are more likely to interact with other borrowers to exchange their experiences, learn new skills, and support each other in time of need. However, despite its importance, the evidence of whether participating in microcredit programs fosters a borrower's social network is not well documented.

In particular, there is a lack of quantitative examinations on the impact of microcredit on social network. As discussed in Chapter 3, Only a few studies have focused on the social impacts of microcredit. They have only used qualitative approaches to demonstrate the linkage between social network and microcredit interventions (Basargekar, 2010; Van, 2000).

Filling this gap, this chapter contributes to the existing literature by a quantitative evaluation of the impacts of microcredit on social network of rural households in Vietnam. The analysis will shed light on a better understanding of whether microcredit helps rural households in Vietnam build up their social network, which is an important external resource to lift them out of poverty. Moreover, findings from the chapter are useful for microcredit providers and policy

makers in term of improving effectiveness of microcredit services. Particularly, a positive impact of microcredit borrowing on social network suggests that their microcredit provision can benefit rural borrowers and help them end poverty. In turn, the poor can use their social network as social collaterals for their next loans. The microcredit providers can also accept social network as a form of collaterals in allocating loans. By doing so, the poor are able to access microcredit loans without physical collateral such as land ownership which they do not always have. As a result, more poor households can access microcredit and get out of poverty.

In Chapter 4, I have shown that a household's optimal level of the social network is a function of microcredit borrowing. Briefly, a representative household borrows microcredit in order to invest in its small business projects, where it requires the household to have a certain level of capability to achieve success. If the business is successful, the household derives an income, which, together with the income from other sources, can be used for building the social network. By choosing a level of social network, the household maximises its utility subject to its budget constraint, which yields an equation that links social network to the microcredit borrowing.

Empirically, in this chapter, the impact of microcredit on social network is quantitatively estimated, using the panel dataset from the VARHS (2008-16). As detailed in Chapter 4, due to the multi-dimensional nature of the social network, the principal component analysis (PCA) is employed to construct two indexes to be used in the regressions, namely the social network size and social network quality indexes. The results suggest that microcredit significantly improves both rural household's social network size and quality.

6.2 Estimation strategy

The microcredit variable ($\ln M$) in Equation (4.14) is likely to be endogenous due to the potential selection bias in accessing microcredit and possible bi-directional causality between microcredit and social network. The selection bias arises primarily from two sources. The first is non-random placement of microcredit providers. The microcredit providers tend to locate their businesses in more developed areas to utilise their better infrastructure and/or central location. Consequently, households, who live in remote areas, are less likely to access microcredit services due to higher travel cost. Second, among those who are short of financial resources, borrowers are more likely to have better knowledge or entrepreneurship than non-borrowers. The borrowers might be able to see more economic opportunities of having a loan. Subsequently, they decide to borrow and tend to perform better in the microcredit projects.

The bi-directional causality between microcredit and social network can also occur. On the one hand, participating in microcredit encourages social interaction among borrowers, which creates or enhances the social network. On the other hand, the social network plays a role as non-physical collateral for microcredit borrowers. The non-physical collateral is widely accepted in rural areas, where most of its residents are poor and do not have any physical assets to secure loans. Thus, the better social network a household has, the better chance it has to receive a microcredit loan.

In addition, children's education (E) can also be endogenous. Conceptually, a household also makes decisions on education, in addition to the consumption and social network, resulting in the optimal level of education being a function of microcredit borrowing and a set of other relevant factors. Therefore, E is likely to be correlated with the error term in Equation (4.10).

To address the endogeneity problem, this study employs the feasible two-step generalised method of moments estimator with excluded instrumental variables (IV-GMM). For microcredit (M), This study employs the indicator of whether a household borrows previously (IV1) to correct for the endogenous selection for receiving microcredit. I employ the availability of funds at the village level (IV2) to correct for the endogenous amount of credit to be received.

If a household has previously had a microcredit loan and successfully used it, it will have a better understanding of the borrowing process, and it might be identified as a creditworthy customer by current credit providers. As such, the household will have more chance to access microcredit. Khandker and Faruquee (2003) point out that the availability of funds is a valid predictor for how much a borrower could receive. I proxy the availability of funds by the sum of all households' borrowing amount in its village. Conditional on a household borrowing microcredit, how its social network is affected does not depend on whether the household has borrowed previously and the availability of fund in the village. Therefore, these two instruments are both relevant (correlated with the microcredit borrowing) and valid (uncorrelated with the error term).

Besides, I employ the highest number of school years of a member in the household (IV3) as an instrument for children's education. Arguably, the member with the highest level of education can serve as a good role model that inspires other members to achieve the same or higher levels of education. Hence, it is correlated with the children's education. Conceptually,

the highest level of education in the household shall not directly affect a household's social network, other than through children's education.

Later in the estimations, to check the relevance and validity of the three instruments, the under-identification, weak identification, and over-identification tests are conducted and reported in Section 6.4. The under-identification test checks whether the instruments are correlated with the endogenous variables. The weak identification test verifies whether the correlation between instruments and endogenous regressors are weak or not. The over-identification test (Sargan-Hansen test) tests the null hypothesis that the instruments are uncorrelated with the error term.

In estimating Equation (4.14), it is possible that the explanatory variables are collinear with each other. To address such potential multicollinearity problem, the correlation among the explanatory variables is first checked. It is generally low. For example, the correlation of log microcredit and school gap is as low as 0.0337. In addition, the variance inflation factors (VIF) of all explanatory variables are reported in Table B1 (see appendix B). The VIFs fall in a range from 1.06 to 2.33, suggesting no serious multi-collinearity issues among the explanatory variables. Besides, to mitigate any possible bias caused by other unobserved time-invariant factors, household fixed effects are utilised in the estimations.

6.3 Variable definitions and summary statistic

Guided by the theoretical framework in Chapter 4, This study focuses on the households that use microcredit only for non-consumption purposes.¹⁸ In addition, communes that contain only borrowers or only non-borrowing households are excluded to avoid any potential bias caused by communes' characteristics. Besides, I also delete the outliers in the sample. The final sample consists of 9,260 observations, covering over 2,637 households, 395 communes, 132 districts, and 12 provinces.

Table 6-1 reports variable definitions and summary statistics. The social network is measured by social network size (*SIS*) and social network quality (*SIQ*) indexes, as detailed in Chapter 4.

¹⁸ Base on the information of main use of loan which reported in the surveys, I excluded all households who borrowed for consumption purpose. For example, there are 14 main use of loan from the survey: (1) for rice production; (2) for other crop production; (3) for animal husbandry; (4) for forestry; (5) for fishery; (6) for non-farm activity; (7) build/buy house ; (8) buy land; (9) buy another asset; (10) pay for wedding/funeral; (11) for education expenses; (12) for health expenses; (13) for general consumption; (14) for other consumption. I excluded all households who borrowed for wedding/funeral; education expenses; health expenses; general consumption; and other consumption.

Both indexes are ranged from 0 to 100, with a mean of 10.18 and 14.09, respectively. The standard deviation is modest (6.38 and 9.36 for *SIS* and *SIQ*, respectively). This occurs because people living in rural areas tend to have broad connections with their neighbours and community. Therefore, their social network index distributions are not widely spread.

Table 6-1 Variable definition and descriptive statistics

Variables	Description	Min.	Max.	Mean	Std. Dev.
SIS	Social network size index (score)	0	100	10.18	6.38
SIQ	Social network quality index (score)	0	100	14.09	9.36
M	Total microcredit borrowing (million VND)	0	37	3.42	7.26
E	Children's education (School gaps of children (years))	0	47	2.15	4.43
Y	Income from sources other than the family business (million VND)	0	1,576	29.28	44.10
W	Household wealth (million VND)	0	7,295	31.04	105.14
EduH	Number of school years of the household head	0	12	5.48	3.03
HSize	The number of household members	1	17	4.66	2.00
AgeH	The age of household head (years)	18	100	51.25	14.02
Plot	Total land holding (ha)	0	84	1.01	1.67
Dep	The number of dependent members	0	10	1.81	1.44
Nfarming	Whether a household is involved in non-farming business activities (1=yes; 0=otherwise)	0	1	0.23	0.42
Shock	Whether a household experienced any income shock (1=yes; 0=otherwise)	0	1	0.52	0.50
Poor	Whether a household is classified as poor by authority (1=yes; 0=otherwise)	0	1	0.21	0.41
Local	Whether a household is local (1=yes; 0=otherwise)	0	1	0.79	0.41
IV1	Whether household previously borrow (1=yes; 0=otherwise)	0	1	0.55	0.50
IV2	Availability of funds at the commune (million VND)	2	7,885	313.51	556.36
IV3	Highest level of education of a member in the household (number of school years)	0	12	9.08	3.15

N= 9,260, VARHS 2008-2016.

Total microcredit borrowing (M), the variable of interest, is measured by summing up current productive loans. Table 6-1 indicates that a typical household takes up an average loan of 3.42 million VND (150 USD) in each survey round. Two instrumental variables are used to account for the endogenous selection for receiving microcredit and endogenous amount of credit to be received. The availability of funds in commune level is proxied by a sum of all amount of microcredit borrowing in each commune. On average, 313 million VND (13,695 USD) are available for each commune. More than half of the households in the sample have borrowing experience.

Children's education (E) is measured as the sum of school gaps of all children in a household. The school gap is the difference between actual years of schooling and expected years of schooling given the child's age (Islam & Choe, 2013). Children are expected to be in school from age six to age eighteen, such that an eighteen-year-old should have received 12 years of schooling. The average school gap per household is found to be two years, indicating that rural households in Vietnam have some difficulties in sending their children to school. Many poor households forego their children's education so that the children can work to help the household. To instrument the children's education, this chapter makes use of the highest level of education of a household member (number of school years). The average highest education level recorded in the sample is 9.08 years.

Income, Y , from sources other than the household business includes (1) net income from wage/salary; (2) net income from common property resources, such as earnings from collecting forest products or go hunting in forest areas not owned or rented by the household; (3) net income from private transfers, such as remittances from their relatives; (4) net income from public transfers, such as remittances from governmental support programs; (5) other income from other sources that are not related to the household business which is financed by microcredit. On average, a household in the sample can earn almost 29 million VND (1,318 USD) per year from these five sources.

Household wealth, W , is measured by the total value of its assets plus savings. The average wealth in the sample is 31 million VND (1,409 USD). The average number of years of education for the household head is 5.48 years. The average age of the household head is almost 51. Households in the sample own 1.01 hectare of land on average. There are more than four people in a typical household, while the average number of independent members is 1.81. About 23 per cent of household involves in non-farming activities. Around 21 per cent of

households are classified as poor, and 79 per cent of them are non-migrant residents. More than half of the households experienced at least one income shock in the past two years.

In the empirical estimation, some variables are log-transformed, which requires non-zero values. Therefore, a value of one is added to variables that contain zero before the logarithm transformation. Such a strategy is also used by Mark and Shahidur (1998) and Roodman and Morduch (2014). All nominal monetary variables are converted to real terms using the producer price index with the base year 2008 (General Statistics Office of Vietnam (2017)).

6.4 Results

6.4.1 Baseline results

Tests are implemented to check the relevance and validity of the instrumental variables. First, the Kleibergen-Paap rk LM statistic in the under-identification test is 94.964 with a p-value of 0.000. The null hypothesis that the three instruments are not correlated with the endogenous variables (microcredit borrowing and children's education) is rejected at the one per cent level. Second, whether the excluded instruments are weakly correlated with the endogenous regressors is checked. The weak identification test obtains the Cragg-Donald Wald F statistic of 35.208, which is greater than the Stock and Yogo critical value of 11.04 at the five per cent level, suggesting that excluded instruments are not weak. Finally, the over-identification tests in both estimations obtain Hansen J statistics of 2.673 and 1.396 respectively, both of which have a p-value greater than 0.1, failing to reject the null hypothesis that the instruments are valid at the 10 per cent level.

Estimated coefficients of Equation (4.14) are reported in Table 6-2, where the first column presents results of the social network size estimation, and the second column reports those of the social network quality estimation. Overall, most of variables are statistically significant and consistent in the sign of the impacts across both estimations. The consistency across both estimations is not surprising in that both indexes measure the two dimensions of the same social network. It is also noted that the impact of microcredit is statistically significant in both size and quality indexes estimations.

Table 6-2 Impacts of microcredit on household social network

VARIABLES	Social network size index (<i>SIS</i>)		Social network quality index (<i>SIQ</i>)	
	Coefficients	Robust S.E.	Coefficients	Robust S.E.
log Microcredit (<i>M</i>)	0.237***	0.044	0.413***	0.069
School gap (<i>E</i>)	-0.414***	0.114	-0.650***	0.168
log non-business income (<i>Y</i>)	0.003	0.034	0.121**	0.057
log Wealth (<i>W</i>)	0.148***	0.027	0.346***	0.044
Education of head (<i>EduH</i>)	0.587***	0.137	0.937***	0.208
Household size (<i>HSize</i>)	0.727***	0.087	1.061***	0.136
Age of head (<i>AgeH</i>)	0.094***	0.016	0.108***	0.021
log Land size (<i>Plot</i>)	0.229**	0.101	0.379**	0.154
Dependent members (<i>Dep</i>)	-0.279***	0.102	-0.486***	0.156
Non-farming (<i>Nfarming</i>)	0.675***	0.208	1.046***	0.307
Income shock (<i>Shock</i>)	0.294**	0.136	-0.017	0.213
Poor status (<i>Poor</i>)	-0.497***	0.177	-0.409	0.268
Local resident (<i>Local</i>)	0.237***	0.044	0.413***	0.069
Household Fixed effects	YES		YES	
Under-identification test ¹	94.964***		94.964***	
Weak identification test ²	35.208**		35.208**	
Over-identification test ³	2.673		1.396	
Excluded instruments ⁴	3		3	
Number of observations	9,260		9,260	

Note: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively; ¹ Reports the Kleibergen-Paap rk LM statistic; ² Reports the Cragg-Donald Wald F statistic, the Stock-Yogo weak ID test critical values at 5% is 11.04; ³ Reports the Hansen J statistic; ⁴ The three instrument variables include indicator of previous credit borrowing, availability of funds, and highest number of school years of household's members.

The results suggest that microcredit borrowing significantly enhances the size and quality dimensions of rural households' social network in Vietnam. Notably, a one per cent increase in microcredit borrowing (*M*) leads to an expected increase of 0.237 and 0.413 points in the social network size (*SIS*) and quality index (*SIQ*), *ceteris paribus*, respectively. This finding confirms that borrowing microcredit does enable rural households to enhance their social network. With additional resources provided by microcredit borrowing, a household is able to be more active in the regular meetings with their counterparts, enhance their roles in the social group's decision-making process. Subsequently, it improves their reputation in the local community and helps them expand their social network, such as making more friends who are willing to provide supports in time of need.

Given that participating in microcredit facilitates the connection of rural borrowers with their communities, it is important that local authorities, microcredit practitioners, and policymakers improve the effectiveness of microcredit market in rural areas. In using the microcredit loan, a household is more likely to expand its social network size by making friends with other borrowers, joining and interacting actively within the social groups to build up knowledge and reputation. This, in turn, increases the probability of success in its microcredit-funded business. Since microcredit plays a positive role, it is welfare-improving that microcredit providers in rural Vietnam increase access to microcredit. To do so, microcredit providers could rely on “social collaterals”, instead of “physical collaterals” which poor households do not always have.

As expected, the children’s education, non-business income, wealth, education of household head, size of family, age of the head, land size, and non-farm activities positively influence a household’s social network. A household that receives non-business income from non-farm activities, such as working for governments or commercial companies, is more likely to interact and expand its network outside the local community through, for example, friendships with co-workers from other provinces. A relatively wealthy household is more likely to have a higher demand for social activities, such as meeting their business’ partners and regularly participating in parties, which in turn help increase their reputation.

A family with an older head or higher education (less school gap) is likely to have a better understanding of the local community and higher expectation on the benefit of social network than their younger or less educated counterparts and consequently has a larger and better social network. For a household, each of its members is likely to play a role in building up their family social network with the local community. Thus, the bigger a household is, the broader social network the household can achieve. Those households with larger land size are more likely to connect with other farmers to share their experience in land cultivating. Thus, the more land a household owns, the higher motivation to interact with the local community it will have.

Non-farm activities, such as selling fertilisers, are likely to bring higher payoffs with lower risk to rural residents. To achieve that, the rural households are required to interact with both farmers and non-farmers (for example, suppliers) to increase the likelihood of success of their non-farm businesses. Such activities, in turn, enable rural households to expand their social network. Income shock appears to have a positive impact on household social network size. It is possible that in time of facing difficulty, rural households tend to seek for any help and supports from relatives, friends. As a result, its network size becomes wider. Because of better

understanding of local communities, a local household tends to have wider and higher quality network in comparison with a migrant household.

The findings indicate that the number of dependent members and the poor status appear to negatively affect a household's social network. Arguably, a household optimally allocates its limited resources for different needs. The more resources the household allocates for taking care of dependent members, the fewer resources the household invests in social network. The budget constraint of being poor is also a factor that limits a household's social network.

6.4.2 Robustness check

The baseline estimations show that microcredit statistically and significantly impacts rural households' social network, in terms of both size and quality. The results are reported in Table 6-3.

Table 6-3 Robustness check

Control group	2008-2010	2010-2012	2012-2014	2014-2016	2008-2016
Social network size index					
Not borrow in both periods	1.416***	2.061***	1.040*	1.088**	
Never borrowed in 2008-2016	1.288**	1.963***	0.735	0.895	1.276**
Social network quality index					
Not borrow in both periods	1.826**	4.078***	2.588***	2.122**	
Never borrowed in 2008-2016	1.669*	4.063***	2.437**	2.069*	1.861*

Note: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively. The reported coefficients are the average treatment effect on the treated (ATT).

To check for robustness of the findings, the Kernel-based propensity score matching difference-in-differences approach is employed (Juan, 2009). The borrowing households' group (treated group) is matched with non-borrowing households by using the kernel propensity score. I check for each two-round period (2008-2010, 2010-2012, 2012-2014, 2014-2016, and 2008-2016). For instance, in the two-round period 2008-2010, I assign the year 2008 as period zero (t_0) and year 2010 as period one (t_1). The treated group includes those households who do not borrow in 2008 but borrow in 2010. Based on the observed covariation, the Kernel-based propensity score is calculated for all households in 2008. The control groups are formed by matching the score with treated households. Two control groups are formed to check the robustness. One includes households who do not borrow in both 2008 and 2010 but might borrow in other years. Another control group includes households who have never

borrowed in the sample data. Taking advantage of the panel data, it is possible to estimate the average treatment effect on the treated (ATT).

Table 6-3 suggests that borrowing microcredit improves rural household's social network size and quality in all periods. The strongest impacts are found in the period 2010-2012. This chapter also examines the whole period from 2008 to 2016, in which the treated group includes households who have borrowed at least once since 2008. The results indicate significant ATTs of 1.276 and 1.861 for social network size and quality, respectively. Overall, the positive impact of microcredit on social network expansion and quality is confirmed.

6.5 Concluding remarks

This chapter assessed the impacts of microcredit on social network of rural households in Vietnam from two dimensions: the size and quality. It contributes to the existing literature both theoretically and empirically. Theoretically, I developed a comprehensive framework that is based on household utility maximisation (as presented in Chapter 4) and can be used in other similar studies. Empirically, the impact of microcredit on a household's social network is estimated with a panel dataset of the Vietnam Access to Resources Household Surveys from 2008 to 2016. The PCA was employed to measure the household's social network, and GMM IV was used in the estimation to address the potential endogeneity of microcredit borrowing.

The findings suggest that the impact of microcredit is statistically significant on both size and quality of social network. Being a client of microcredit lenders, the borrower can improve the quality of its social network via regular group meetings and non-financial supports from the lenders. Through such activities, the rural household can strengthen its reputation and make more close friends.

The findings have an important implication for fighting rural poverty. Given the significantly positive role of microcredit, it is welfare-improving to increase the microcredit access to the poor households. To do so, microcredit providers need to overcome the lack of "physical collateral", a problem that the rural poor generally has. Microcredit providers can adopt long-term lending strategies that are based upon the social network of their clients, namely to accept the "social collateral", in addition to any "physical collateral". In such ways, poor households will have a better chance to access finance. Successful use of microcredit loans helps them further improve the size and quality of their social network. Eventually, it will make it more likely for those poor rural households to break the poverty trap.

Through its influence on the size and quality of social network, microcredit can become a crucial tool for poverty alleviation and elimination. Donors, government departments, and other supporting agencies should aim to improve the effectiveness of microcredit provision by developing policies and strategies that help enhance the quality of the poor households' social network.

Microcredit providers should also organise regular meetings (e.g., monthly, quarterly) for those who apply for microcredit. Their attendance at such meetings should be made as part of the requirements of obtaining a microcredit loan. These meetings can be used to provide training to help the borrowers to improve their business skills, to ask their clients to update their business progress and performance, or just to provide them with any changes in credit-related regulatory requirements or any other developments in the community that will affect their business operations.

This chapter only focusses on rural areas in Vietnam, where the residents' livelihood is mostly related to agriculture. Future research can extend to urban areas and compare the difference between rural and urban areas regarding the impacts of microcredit. In addition, future research can explore the difference between poor and non-poor households regarding the impacts of microcredit. Results of such investigations will provide valuable insights into the different roles of microcredit.

CHAPTER 7 IMPACTS OF MICROCREDIT ON CHILDREN'S EDUCATION

A revised version of this chapter will be submitted to *World Development*:

Phan, C. T., Sun, S., Zhou, Z. Y., & Beg, R. Does productive microcredit harm rural children's education? Evidence from Vietnam, to be submitted to *World Development*.

CHAPTER OUTLINE

7.1	Introduction	104
7.2	Estimation strategy.....	105
7.3	Variable definitions and summary statistics.....	108
7.4	Results	111
7.5	Concluding remarks	116

This chapter analyses the first optimal decision of the representative household on their children's education after accessing microcredit. Section 7.1 is an introduction to the impact on children's education. Section 7.2 specifies the econometric models and the estimation procedures. Section 7.3 describes the dataset. Section 7.4 presents the results and Section 7.5 concludes.

7.1 Introduction

As discussed previously, microcredit is fast becoming a key instrument in poverty alleviation. It is found to affect recipients not only economically, such as on consumption, income and financial assets (see for example Khandker and Samad (2014) and Khandker (1998)), but also non-economically, such as on social network (Phan et al., 2020) and children's education (You & Annim, 2014).

There has been a growing number of studies that explore the determinants of children's education from both supply and demand sides (see for example, Islam and Choe (2013), and a few more). The supply-side factors include infrastructure, a supply of teachers, and schooling resources. Microcredit programs in the community are likely to positively affect these supply-side factors and subsequently promote children's education. On the demand side, in deciding their children's education, households compare the financial and opportunity costs of sending their children to school with the future return to the family (Hill & King, 1993), subject to their budget constraints. On the one hand, the microcredit borrowing can relax a household's budget constraint, and consequently promote its demand for children's education.

On the other hand, the microcredit borrowing for the purpose of production (productive microcredit), on which this study focuses, can dampen a household's demand for its children's education. First, the microcredit-funded business may fail, and the loss of income due to business failure tightens the household's budget, which in turns negatively affects the education for its children. Second, an increase in the productive microcredit borrowing help expands the family business, resulting in an increased demand for workers. In such situations, the household is likely to ask the children to help out in the business, reducing their education. Maldonado and González-Vega (2008) find that when parents invest in projects that demand child labour for farming or housework, their children's education is sacrificed. In rural areas, children often work in labour-intensive sectors, such as agriculture, and have limited access to educational facilities. In addition, they are vulnerable to child-labour abuse, particularly when their family is in hard times. It is of significance to investigate the impact of productive microcredit on rural

children's schooling, which will present implications for policymakers and researchers to enhance the rural human capital development in developing countries.

Rural Vietnam is a valuable case for investigating the impacts of microcredit. First, 70 per cent of the population live in rural areas, and 90 per cent of those households are low-income. As microcredit programs mainly focus on poor clients, rural Vietnam provides a sufficient sample for assessing their impacts. Second, in Vietnam, poverty is prevalent. The government has put in significant efforts in poverty alleviation, where microcredit plays an important role, and achieve an impressive outcome.¹⁹ Therefore, lessons from Vietnam, particularly those on the impacts of microcredit, are likely to help policymakers in other developing countries to fine-tune their poverty-alleviation policies.

Despite its importance, to the best of my knowledge, no existing studies investigate the impacts of productive microcredit on rural children's education. Previous studies do not distinguish between the microcredit loans for income-generating activities and loans for consumption purpose (see Islam & Choe, 2013; Maldonado & González-Vega, 2008). The pooling of different types of microcredit loans is one of the factors that result in findings of contrasting impacts of microcredit in the previous studies. Besides, policymakers are usually more interested to understand the role of productive loans, rather than that of consumption loans. Filling this gap, this study focuses on the impact of productive microcredit on children's schooling, using a unique dataset of the Vietnam Access to Resources Household Survey (VARHS) in the period of 2008-2016. This chapter finds that productive microcredit loans exert significant adverse effects on children's education in rural Vietnam, which is more profound for boys.

7.2 Estimation strategy

As illustrated in Chapter 4, the household's optimal decision on its children's education depends on a set of factors, such as microcredit borrowing (M), non-business income (Y), household wealth (W), and other household characteristics (H). It shall be noted that the optimal education in Equation (4.18) is an aggregate of the education of all individual children in the household. For a particular child, his/her education will also depend on his/her characteristics.

¹⁹ The poverty rate declined from 60 per cent in the early 1990s to 20.7 per cent in 2010, then 13.5 per cent in 2014 (World Bank Data, 2016)

Therefore, motivated by Equation (4.18), I write the educational achievement for child j in household i as follows:

$$\ln E_{ij} = \beta_{e1} + \beta_{e2} \ln M_i + \beta_{e3} \ln Y_i + \beta_{e4} \ln W_i + \beta_{e5} \ln H_i + \beta_{e6} \ln I_{ij} + \epsilon_{ij} \quad (7.1)$$

where I denotes a vector of child's characteristics that are expected to influence the schooling years. β_{e6} stands for a vector of parameters need to be estimated.

The vector I includes a child's age, gender, and birth order. A child's age is expected to exert a positive effect. As will be discussed shortly, the child's education will be measured by both a child's completed grades and schooling gap. Not surprisingly, the older a child is, the more schooling grades that he/she will be likely to complete. For the schooling gap, an older child tends to have higher schooling gap by construction (see definition in Chapter 4). For example, a six-year-old child's schooling gap is 0, while in contrast, an eighteen-year-old child has a schooling gap between 0 and 12. A child's gender is a dummy variable that has a value of one for a girl, and zero otherwise. In rural Vietnam, girls are expected to have less schooling years than boys due to son-preference. Hence it is expected to have a negative effect. The birth order of a child in the family is expected to exert a negative impact. In rural areas, parents are believed to take younger children out of schools to do housework when they are too busy.

This chapter measures the children's education from two aspects, namely the child's completed grade and schooling gap. In the literature, a child's education can be proxied by the status of school enrolment (dummy variable); the completed grades (grades); and the schooling gap (number of years). The status of school enrolment does not inform the achievement, level, or quality of schooling for children who are not in school at the survey time. So, instead, this study employs the completed grades and schooling gap for the empirical estimations. The completed grade captures children's schooling grade. However, it does not reflect how well children do in school or whether they complete a grade in more than one year. So, this chapter also employs the schooling gap, which captures such issues as late entries, dropping out, or failed grades.

Because the two dependent variables are non-negative integers from zero to twelve, it is appropriate to use the Poisson model in the estimation. The Poisson model has been widely employed to analyse such count data (Wooldridge, 1997). One might argue that the distributions of school gap and completed grade violate a Poisson model's assumption that the variance equals the mean, namely equi-dispersion. If this assumption is violated, it results in the under/over-dispersion issues.

To address the under-/over-dispersion problem, this chapter also uses the negative binomial model (NB), which is a Poisson maximum likelihood estimation with correction of under/over-dispersion problem. To determine which method is more appropriate, the Likelihood-ratio (LR) test is conducted with a null hypothesis that the under/over-dispersion does not occur. A failure to reject the null hypothesis suggests that there is no under/over-dispersion issue, and both NB and Poisson models can produce consistent results.

Furthermore, if the value of dependent variables contains a significant proportion of zero, namely “excess zeros”, the zero-inflated Poisson or zero-inflated NB models would be more appropriate. In our sample, there is only 0.41 and 0.19 per cent of school gap and completed grade is zero, respectively (see Tables C1 and C2 in Appendix C). Thus, it is not necessary to consider these zero-inflated models.

However, estimating Equation (7.1) directly is subject to selection bias due to the non-random access to microcredit. The selection bias may arise from both the demand and supply sides. On the supply side, the placement of financial institutions is non-random, and as such, it is unlikely that financial services are allocated across the villages randomly. The financial institutions could be located systematically more in high-income villages as the wealthier villagers can afford the loans. On the demand side, there is a tendency for borrowers to possess an attribute that non-borrowers lack (such as the "entrepreneurial ability"). The borrowers with "entrepreneurial ability" are more likely to get loans and earn higher income from investment activities than others. Therefore, the assumption that $E[X_{ijt}\epsilon_{ijt}] = 0$, where X is a vector of all explanatory variables in Equation (7.1), is likely not to hold, which if not addressed, will lead to inconsistent estimates.

To address the endogeneity problem, I instrument the microcredit borrowing in the Poisson regression model. The endogeneity occurs from two aspects, namely one endogenous selection on whether to receive microcredit and the other endogenous amount of credit to be received. I employ the average loan's interest rate at the commune level and the availability of funds at the commune level as excluded instrumental variables for microcredit. Arguably, the interest rate is an important determinant for the microcredit borrowing decision. The interest rate is largely determined on the supply side in the micro-finance market, with borrowers being in a very weak bargaining position. Therefore, the given interest rate directly affects a household's decision to borrow, but not its decision on education (other than indirectly through its effect on the microcredit borrowing). For the amount of microcredit received, Khandker and Faruquee (2003) point out that the availability of funds is a valid predictor for how much a borrower

could receive. I proxy the availability of funds by the sum of all households' borrowing amount in their communes.

For the NB model, I employ the control function approach to account for the endogeneity. In particular, I first obtain residuals in the first stage regression of microcredit against all exogenous independent variables and the two instruments. Then, adding the estimated residuals in the second stage, using the NB model, as an additional regressor (see Wooldridge, 2015).

In the estimations, several tests are conducted to confirm the validity of the two instruments. The under-identification test and weak identification tests both verify the relevance of the instruments (i.e., strongly correlated with microcredit). The over-identification test checks whether the instruments are valid (i.e., uncorrelated with the error term). The relevance and validity of the instruments are confirmed if the null hypothesis in under-identification test and weak identification tests are rejected and fails to be rejected in the over-identification test. Besides, to control for inflation effects, all monetary value is converted to real term by using the producer price index with the base year of 2008 (General Statistics Office of Vietnam, 2017).

7.3 Variable definitions and summary statistics

As discussed earlier, this study focuses on productive microcredit loans. This chapter, therefore, excludes households, who use microcredit only for consumption. Furthermore, communes that contain only borrowers or only non-borrowing households are excluded to avoid any potential bias caused by communes' characteristics.

Only households who have children with ages from eleven to eighteen are included for the analysis. In Vietnam, children's schooling can be classified into primary-school (6-10 years old), secondary-school (11-15 years old), and high-school (16-18 years old). I initially examined the three sub-samples and noted that the *t*-tests in the primary-school sub-sample do not find significant differences in children's education between borrowers and non-borrowers. It is not surprising, because attending primary school is compulsory for all children in Vietnam. Thus, this study focuses on the sub-sample of children from 11 to 18 years old. Through these

filtering, the final sample includes 7,232 observations, which spreads over 1,626 households, 336 communes and 12 provinces, for estimations.²⁰

Table 7-1 reports variable definitions and summary statistics. Both dependent variables, *Grades* and *Schgap*, are in a range from zero to twelve. On average, the schooling grade that a typical child completed is 6.7, and the school gap is around three years, indicating that rural households in Vietnam are facing difficulties in sending their children to school. Many poor households find they must forego education for their children so that the children can help in the family's business.

²⁰ 2,014 children in 2008; 1,642 children in 2010; 1,433 children in 2012; 1,174 children in 2014; and 969 children in 2016.

Table 7-1: Variable definition and descriptive statistics

Variables	Description	Min.	Max.	Mean	Std. Dev.
<i>Grades</i>	Grade a child completed in school (grades)	0	12	6.70	2.49
<i>Schgap</i>	Difference between the expected schooling and the actual schooling years (years)	0	12	3.07	1.75
<i>M</i>	Total microcredit borrowing (million VND)	0	3,100	10.31	54.86
<i>Childgender</i>	Gender of child (1-female; 0-otherwise)	0	1	0.49	0.50
<i>Childage</i>	Age of child (years)	11	18	14.77	2.26
<i>Birthorder</i>	The birth order of a child in its family (start from 1 for the oldest child)	1	11	2.23	1.32
<i>Y</i>	Income from sources other than the family business (million VND)	0	1,080	23.45	34.72
<i>W</i>	Household wealth (million VND)	0	1,570	27.86	63.65
<i>EduH</i>	The number of school years of the household head	0	12	5.32	3.04
<i>HSize</i>	The number of household members	2	17	5.82	1.98
<i>AgeH</i>	The age of household head (years)	21	84	42.91	7.26
<i>Plot</i>	Total land holding (hectares)	0	32	1.39	1.74
<i>Dep</i>	The number of dependent members	0	10	2.53	1.56
<i>Nfarming</i>	Whether a household is involved in non-farming business activities (1-yes; 0-otherwise)	0	1	0.24	0.43
<i>Shock</i>	Whether a household experienced any income shock (1-yes; 0-otherwise)	0	1	0.62	0.49
<i>Poor</i>	Poverty status. Whether a household is classified as poor by authority (1-yes; 0-otherwise)	0	1	0.27	0.45
<i>Local</i>	Whether a household is local (1-yes; 0-otherwise)	0	1	0.76	0.43
<i>IV1</i>	The average interest rate of loans at the commune level (% monthly)	0	4.4	0.77	0.46
<i>IV2</i>	Availability of funds at the commune level (million VND)	0.20	7,885	313.31	528.11

N= 7,232. VARHS 2008-2016.

Total microcredit borrowing (*M*), the variable of interest, is measured by summing up all current loans. On average, a rural household in the sample can borrow an amount of 500 USD. The average interest rate and the availability of funds are used as instruments for *M*. The interest rate is, measured by the average rate at the commune level, 0.77 per cent per month, which is not as high as the commercial interest rate in the credit market (greater than one per cent monthly). The Vietnamese government has significantly supported rural residents by reducing the interest rate in rural areas. For the second instrument, the average funds of around 313 million VND (13,608 USD) are available in each commune.

Children's characteristics include age, gender, and birth order. The average age of children is 14.77 years old. Forty-nine per cent of children are female. Most of the families in the sample have three or four children.

On average, a household's income, from sources other than its family business, is about 23.45 million VND (1,019 USD). The average household wealth is 27.86 million VND (1,211 USD).

²¹ The average age of the household head is nearly 43 years old. The highest schooling years of household's head is 12. On average, s/he can accumulate only 5.32 schooling years. A household tends to have around six members and owns 1.39 hectares of land. One-fourth of children in the sample are involved in non-farming business activities. Sixty-two per cent of the children come from households that experienced at least one income shock. Twenty-seven per cent of children belong to poor households. The local children (non-migrant) account for 76 per cent in the sample.

7.4 Results

Table 7-2 reports the main estimation results. I employ the IV Poisson and the control function method in the negative binomial regression to estimate Equation (7.1). The results for *school gap* are reported in Columns (1) and (2), while the results for *completed grade* are presented in Columns (3) and (4). Overall, the sign and magnitude of the coefficient of microcredit borrowing remain consistent and relatively close to each other across the two estimation approaches.

²¹ Measured by household's assets plus saving.

Table 7-2 The effects of microcredit on children's education.

VARIABLES	(1)	(2)	(3)	(4)
	School gap (<i>Schgap</i>)		Completed grade (<i>Grades</i>)	
	IV-Poisson	NB	IV-Poisson	NB
log Microcredit (<i>M</i>)	0.063** (0.030)	0.069** (0.035)	-0.070* (0.037)	-0.068** (0.032)
Child's gender (<i>Childgender</i>)	-0.260*** (0.038)	-0.263*** (0.038)	0.266*** (0.039)	0.267*** (0.037)
Child's age (<i>Childage</i>)	0.222*** (0.009)	0.222*** (0.009)	0.772*** (0.010)	0.773*** (0.009)
Birth order (<i>Birthorder</i>)	0.049*** (0.016)	0.048** (0.019)	-0.061*** (0.020)	-0.059** (0.024)
log Non-business income (<i>Y</i>)	0.005 (0.008)	0.005 (0.007)	-0.004 (0.006)	-0.004 (0.007)
log Wealth (<i>W</i>)	-0.039*** (0.008)	-0.041*** (0.009)	0.048*** (0.010)	0.047*** (0.009)
Education of head (<i>EduH</i>)	-0.312*** (0.026)	-0.314*** (0.025)	0.289*** (0.026)	0.291*** (0.023)
Household size (<i>HSize</i>)	0.045*** (0.017)	0.047** (0.020)	-0.081*** (0.020)	-0.081*** (0.023)
Age of head (<i>AgeH</i>)	0.010*** (0.003)	0.011*** (0.004)	-0.010*** (0.004)	-0.010*** (0.004)
log Land (<i>Plot</i>)	0.090*** (0.019)	0.087*** (0.018)	-0.062*** (0.019)	-0.063*** (0.015)
Dependent members (<i>Dep</i>)	0.094*** (0.021)	0.092*** (0.022)	-0.065*** (0.024)	-0.066*** (0.023)
Non-farming (<i>Nfarming</i>)	-0.141*** (0.047)	-0.150*** (0.055)	0.113** (0.050)	0.113*** (0.040)
Income-shock (<i>Shock</i>)	-0.089** (0.039)	-0.094*** (0.033)	0.094** (0.040)	0.091** (0.040)
Poor status (<i>Poor</i>)	0.343*** (0.048)	0.345*** (0.048)	-0.381*** (0.053)	-0.385*** (0.053)
Local household (<i>Local</i>)	0.187*** (0.058)	0.194*** (0.066)	-0.196*** (0.065)	-0.194*** (0.069)
Estimated residuals		-0.072** (0.035)		0.071** (0.033)
Observations	7,232	7,232	7,232	7,232
Anderson canon. corr. LM statistic	105.359***		105.359***	
Cragg-Donald Wald F statistic	53.333*		53.333*	
Hansen's J statistic	0.874		0.935	
Likelihood-ratio (LR) statistic	0.000		0.000	

Notes: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively; the coefficients reported are marginal effects; bootstrap standard errors presented in the parentheses.

About the choice of models, the likelihood-ratio (LR) tests obtain a test statistic of zero with a p-value greater than 0.1, which fails to reject the null hypothesis that there is no under/over-dispersion in both cases of *school gap* and *completed grade*. This test verifies that the Poisson model is appropriate for this empirical study. Therefore, the following discussions are based on the IV Poisson estimation results in Columns (1) and (3).

For the two excluded instruments, I conduct several tests to verify their relevance and validity. The estimated value of the Anderson canonical correlation LM statistic is 105.359, with a p-value of 0.000. It thus rejects the null hypothesis and implies the instruments are relevant and correlated with microcredit borrowing. In the weak identification test, the value of the Cragg-Donald Wald F statistic is 53.333, which rejects the null hypothesis that the correlation between the instruments and the endogenous regressor is weak. The Hansen's J test has test statistics of 0.874 and 0.935, respectively, and both p-values greater than 0.1. I thus fail to reject the null hypothesis that the instruments are valid. Hence, the tests confirm the relevance and validity of the two excluded instruments.

The estimations find microcredit borrowing exerts significantly positive impacts on children's school gap, but significantly negative impacts on children's completed grades in rural areas of Vietnam. The finding suggests that microcredit access discourages borrowers from sending their children to school. Particularly, a one per cent increase in the amount of microcredit borrowing is expected to increase children's school gap by 0.06 year, and decrease the completed grade by 0.07, *ceteris paribus*. The finding is consistent with those of Augsburg et al. (2012); Banerjee et al. (2015); Islam and Choe (2013) who report adverse impacts of microcredit on children's education in Bosnia, India, and Bangladesh, respectively.

A possible explanation for the negative effect is that productive microcredit in rural areas promotes the need for more labour. Borrowers tend to invest in agriculture-related projects that may be more labour-intensive. They have limited resources to hire workers, and so resort to their own school-aged children: pulling their children out of school to do housework or help them with some basic tasks in farming.

The findings should draw the attention of policymakers and development practitioners on the unintended effects of microcredit on rural children's education. It is expected that production loans would help rural borrowers increase their income, which then helps their children to attend schools. This investment in education, in turn, will have a long-term positive impact to improve their children's future lives. Unfortunately, the findings do not seem to support the

hypothesis that in rural Vietnam, microcredit helps children to have longer schooling. On the contrary, I find that the child-labour effect dominates the income, risk management, gender, and information effects.

The other explanatory variables also exert considerable influences on children's education. For children's characteristics, I find that a child's birth order adversely affects its education. It appears that parents tend to take the younger child out of school to take care of housework. Interestingly, the results indicate that a girl receives 0.266 more grades than a boy. This finding is in contrast to the son preference in rural areas, where parents are more likely to send their sons rather than daughters to school if they have to pick one. This suggests that the son preference is perhaps weakening nowadays. The coefficients of a child's age are found to be positive in both the *school gap* and *completed grade* estimations. Not surprisingly, an older child tends to have completed more grades, and because of age s/he has a higher likelihood to have a bigger school gap.

Regarding the impacts of household characteristics, wealth, the head's education, and non-farming activities have significantly positive influences on children's education. A household with better endowment tends to bring more opportunities for children to achieve better education. Educated parents tend to encourage their children to pursue high academic standing and have a higher expectation for education. In rural areas, non-farming activities are expected to reduce risk and increase income for households whose livelihood strategies mostly rely on the unstable nature of weather. Involving in non-farming activities helps diversify rural household's income sources and minimise losses in case of negative income shocks.

In contrast, family size, age of head, land ownership, number of dependent members, poverty status, and being a local household significantly reduce children's academic achievement. Arguably, the bigger a family is, the less resource can be allocated for each member, especially for its education. The negative impact of age of household head appears to suggest that older household heads are more conservative in terms of evaluating the return on education investment. It is likely that the longer they are involved in agricultural activities, the stronger they believe that their children would follow them to work on their farms and do not need to study too much. This is also consistent with the adverse impact of land ownership. More labour is required when households obtain more land. Subsequently, they might pull their children out of school to increase family labour force. A household with more dependent members or designated as poor tend to have limited resources to support their children's education.

In order to examine whether the impact of microcredit is heterogeneous across children's genders and poverty status, the Equation (7.1) is estimated with sub-samples of boys, girls, poor, and non-poor, separately. In developing countries, such as Vietnam, it is generally believed that parents are more likely to be biased in favour of their son's education. Therefore, it is necessary to investigate whether such perception is true or not. This chapter also considers whether microcredit really helps the ultra-poor in rural areas. This analysis, thus, aims to provide some in-depth insights into the impacts of microcredit for policymakers. The estimated results are presented in Table 7-3, where the top panel reports the regression results for boys and girls, the bottom panel presents the estimated results for poor and non-poor. Overall, this chapter analysis only finds that microcredit has statistically significant and adverse effects on boys' education. For the poverty status, microcredit appears to have negative impacts on both poor and non-poor households on the completed grades and raise the schooling gap for the non-poor households.

Table 7-3 Marginal effects of microcredit in sub-samples.

log Microcredit (<i>M</i>)	Observation	School gap (<i>Schgap</i>)		Completed grade (<i>Grades</i>)	
		Coef.	Robust S.E	Coef.	Robust S.E
Boys versus girls					
Boys	3,691	0.0896**	0.0399	-0.0922*	0.0522
Girls	3,541	0.0418	0.0450	-0.0653	0.0517
Poor versus non-poor					
Poor	4,154	0.0764	0.0501	-0.110*	0.0621
Non-poor	3,078	0.0825**	0.0383	-0.107**	0.0495

Notes: ** and * indicate the statistical significance at the 5 and 10% levels, respectively; the coefficients reported are marginal effects; other estimated coefficients are presented in Tables C3 and C4, Appendices C; all estimations are IV Poisson regression model; group of poor households includes those households identified as poor at least once in any survey round.

For a child's gender, the sub-sample estimations indicate that rural male children tend to drop out if their parents borrow loans for business, while it has no impact on girls' education. Particularly, a one per cent increase in microcredit borrowing leads to a decrease of 0.092 year in completed grades and an increase of 0.089 years in school gap of boys, *ceteris paribus*. This finding contradicts the traditional view of preferring boys to girls in rural developing countries. In Bangladesh, Islam and Choe (2013) and Mark and Shahidur (1998) also detect adverse effects of microcredit on male children's education.

Given the estimation results, it appears that the child labour effect is a significant concern in rural Vietnam, which is likely to exist in other developing countries as well. Most rural

households have low income and are not able to hire external labours for farming activities. As a result, children are pulled out of school to support the family income. Boys are more likely to be held at home to work than girls, perhaps due to their greater physical strengths.

For the poverty status, the coefficients in the bottom panel of Table 7-3 suggest that microcredit borrowing negatively impacts rural households regardless of their poverty status. Particularly, there is no significant difference in the impacts between the two groups. For example, for completed grades, the size of microcredit impacts is 0.11 and 0.107 for poor and non-poor groups, respectively. For the school gap, the corresponding coefficients of poor and non-poor households are 0.07 and 0.08, respectively, although the impact on the poor group is not statically significant. It is expected that the microcredit borrowing would be a burden for poor parents due to their limited resources and lack of labour to work on their business. As such, poor children would be taken out of school to support their family's business. Nevertheless, this negative impact can be alleviated by the tuition fee exemption policy in Vietnam. The tuition fee exemption for the poor makes it less expensive for poor households to keep their children at school.

7.5 Concluding remarks

This chapter examined the impact of microcredit on children's schooling in rural areas of Vietnam. For this purpose, I utilise a theoretical framework set up in Chapter 4. Briefly, a representative household borrows microcredit to invest in its small business. Then it is involved in a three-stage decision-making process, namely first on its children's education, then social network and finally, consumption. The investment in the small business brings in additional income, should it achieve success. The household maximises its life-time utility, subject to a budget constraint, which yields an optimal education as a function of microcredit borrowing and a set of control variables. Guided by the theoretical framework, the impact of microcredit on children's education in rural Vietnam is empirically estimated.

The results indicate that productive rural microcredit has negative effects on children's education, especially for boys. Given the negative impact on children's education, local authorities and development practitioners need to pay more attention to the effectiveness of rural production loans. Although microcredit can serve the poor as a key effective tool for poverty alleviation and promote local economy in the short term, the microcredit programs might also have an undesired side effect on rural children's education, which, in the longer term, exacerbates poverty. The negative impact is found not to be homogenous across the

child's genders and a household's poverty status. Access to microcredit could reduce the effectiveness of government policies which aim to eliminate gender imbalance in education.

From the findings, three key implications can be drawn for policymakers and microcredit providers. First, policymakers and financial institutions should pay more attention to the possible child labour effect due to utilizing microcredit. Using microcredit for household's business often requires extra labour to work. For instance, rural borrowers might use the loans to purchase livestock or new farms. Consequently, children might be asked to take care of the animals or household, while their parents are not able to allocate time for such work. In the end, children's schooling is scarified. To avoid such a situation, a term of no using child labour can be added to the loan contract, particularly for the labour-intensive projects.

Second, one of possible causes for the negative effect on children schooling is that the parents are not able to hire external labour for their projects due to limited resources. Subsequently, their children serve as a cheap available resource, which they tap in if needed. This problem can be overcome if the size of loans is increased, and more low-interest-rate loans are distributed to the poor. Particularly, microcredit for the poor households is more likely to be small and associated with high-interest rates and shorter repayment conditions. As a result, the poor are more likely to reduce cost by using their children as labour in the business, thereby limiting the children's schooling. A larger size of loans allows the borrowers to invest in more profitable projects and, hence, higher return and more resources enable the borrowers to hire external labour, instead of using their children as an input in the family business.

Third, in order to minimise the child labour effect in the society, especially in rural areas, the government can introduce preferred loans that target only education, such as credit for school-related fees (i.e., textbook and tuition fee). Along with the loan, lenders can provide training courses to increase borrowers' awareness of the value of education for their children. Through these ways, it is hoped that more opportunities will be made available for the poor, schooling demand from the poor will increase, and the poor will keep their children longer in school.

CHAPTER 8 CONCLUSIONS

CHAPTER OUTLINE

8.1	Findings and conclusions	119
8.2	Significance and contributions	121
8.2.1	Contribution to microcredit literature	121
8.2.2	Contributions to research methodology	122
8.2.3	Contributions to the policy debate	122
8.3	Policy implications.....	123
8.4	Limitations and future research	125

In this final chapter of the thesis, key findings and conclusions derived from the research are first summarised in Section 8.1. Section 8.2 highlights the thesis's contributions. Policy implications of this research are elaborated in Section 8.3. Finally, addressed in Section 8.4 are likely limitations of the study and areas to which future research attention is warranted.

8.1 Findings and conclusions

This thesis stands on the viewpoint of microcredit suppliers, such as donors, policymakers, and MFIs, to examine whether the financial service is an effective instrument in fighting against poverty. In light of the need for a comprehensive study, this thesis investigated the influences of microcredit on food consumption, social network, and children's education. The main findings are summarised as follows:

- **Impacts of microcredit on food consumption.**

Chapter 5 analyses the impacts of microcredit on rural households' food consumption in Vietnam. This analysis focuses on the optimal household decision in stage three of the multi-stage decision-making process. The study employs the System GMM estimators with a panel dataset, VARHS, from 2008 to 2016. The estimations suggest that the microcredit programs in rural areas of Vietnam appear to be effective in terms of improving household food consumption in both the short and long terms. However, it is worth noting that previous borrowings can negatively affect the current-period consumption of borrowers. This burden is caused by repayment of earlier microcredit borrowings. This means although rural Vietnamese households can benefit from microcredit loans, they also face the risk of falling into a "credit trap". Hence, it is important to improve the microcredit policy to facilitate positive impacts and mitigate adverse impacts.

- **Impacts of microcredit on social network**

The effect of microcredit borrowings on the rural households' social network is examined in Chapter 6. This empirical study focuses on stage two, where a representative household makes an optimal decision for its social network. The household's social network is summarised into two dimensions, namely the social network size and social network quality indexes, which are constructed by using the PCA. The findings suggest that the impacts of microcredit on both the size and quality of a household's social network are statistically significant. As microcredit clients, households are likely to gain benefits from regular meetings with their counterparts.

With financial supports, households become more active and gain more confidence to enhance their roles in the social group's decision-making process. Through such activities, rural households can strengthen their reputation and extend their circle by making more close friends or participating in more social events.

This finding highlights a significant benefit for the poor. In particular, a wider and better social network can enable the poor to access external supports when facing adverse income shocks. The support network also helps the households acquire new skills from peers within its social network to build a route out of poverty. Moreover, the research findings suggest a solution to address one microcredit market failure, namely the poor are not able to get loans because of physical collateral requirement. Traditionally, microcredit providers usually ask for physical collaterals before they approve any loan application. Therefore, the poor's loan applications tend to be rejected due to a lack of valuable assets as collaterals. This problem could be solved if microcredit providers accept the "social collaterals", instead of only "physical collaterals" which poor households do not always have.

- **Impacts of microcredit on children's education**

Unlike the other two impacts, accessing microcredit loans appears to harm borrower's children's education. The finding indicates that children are pulled out of school if their parents borrow productive microcredit. This adverse effect is even more profound for boys. In other words, this research suggests that rural microcredit promotes the need for child labour and reduces the intention of sending children to school. Possibly this is because most of the livelihood strategies in rural areas are related to the agriculture sector. As such, rural parents tend to invest micro borrowings into agriculture-related projects, which are more likely to be labour-intensive, such as purchasing new lands or equipment for its self-enterprise. With limited resources, the parents might not be able to hire external labour for the projects. Consequently, the parents prefer pulling their children out of school to help them, such as doing basic tasks of farming, doing housework, taking care of younger siblings, or feeding livestock. In addition, boys are more likely held at home to work than girls, perhaps due to their greater physical strengths. The negative effect requires attention from policymakers and practitioners: microcredit programs have a negative effect on rural children's education, which, in the long term, can exacerbate poverty.

Overall, microcredit positively contributes to the rural household's welfare in terms of economic aspect and social aspect, but negatively affects the human capital aspect. These

findings suggest that microcredit appears to be a useful tool for poverty alleviation in rural Vietnam. However, Vietnamese authorities, policymakers, and MFIs should pay more attention to its adverse effect on children's education.

8.2 Significance and contributions

This thesis makes several significant contributions in terms of microcredit literature, research methodology, and policy debate.

8.2.1 Contribution to microcredit literature

The study significantly contributes to the microcredit literature with a comprehensive investigation of the causal relationship between productive microcredit and rural household wellbeing. As stated in Chapter 3, there is no standard framework for evaluating the impacts of microcredit at the household level. In particular, previous approaches offer different methodologies and draw conflicting and even inconclusive conclusions, suggesting that the roles of microcredit in development depend on the level the financial interventions. Rather than simply following an existing approach, this research proposed a mechanism which allows exploring three aspects that microcredit can affect rural households. Based on this mechanism, I identify the three aspects to capture the contribution of microcredit to household socio-economics development, namely food consumption, social network, and children's education.

Chapter 5 adds to the literature on the impact on food consumption. Unlike previous studies which employ other proxies such as income or assets, this study utilises food consumption which directly affects the household utility to assess the economic impact of microcredit. Moreover, this study analyses the impact in a dynamic context which provides a better examination of the causal relationship. Chapter 6 contributes to the literature with a quantitative study of the impact on rural households' social network. There is a lack of quantitative studies in the literature. Besides, although a few studies have addressed the social impacts of microcredit, they are qualitative. Chapter 7 provides evidence of the impact of microcredit on borrower's children's education. Previous studies do not distinguish between consumption and productive microcredit in investigating its impacts on education, which is likely to result in a bias. In contrast, I focus on productive microcredit loans.

This thesis, therefore, contributes to the advancement of knowledge on how to better identify the impacts of microcredit interventions on rural households. In fact, to the best of my knowledge, this is the first study that attempts to construct a comprehensive framework to

empirically examine the roles of the microcredit services in the fight against poverty in Vietnam, especially in rural areas.

8.2.2 Contributions to research methodology

One of the significant contributions of this thesis is a theoretical framework which allows researchers to empirically examine the impacts of microcredit in anti-poverty programs. The theoretical approach offers a method to assess the effects of financial interventions on three aspects at the household level. These effects can be included in the impact assessment studies, which are crucial management tasks for any interested agencies, such as donors, policymakers, and practitioners.

In particular, this framework incorporates the three aspects into a multi-stage decision-making process in which a representative household makes the optimal decisions on its children's education, social network, and food consumption sequentially. This framework can be applied to investigate the impacts of microcredit in other countries.

Besides, this thesis addresses the selection bias issue, a common problem in microcredit impact assessment studies. Instrumental variables that are employed in this research are relevant and valid and can be implemented in other microcredit-related studies.

Furthermore, unlike most previous studies of microcredit in Vietnam which utilised cross-section data or panel data of a short time frame, this research comprehensively assesses the impacts of microcredit on rural households using a high-quality panel dataset from the VARHS. Hence, the impact evaluation could account for the dynamic aspect of the household's welfare to explore the long-term impacts on consumption, social network and education of households.

8.2.3 Contributions to the policy debate

Global demand for microcredit continues to increase, but the impacts of microcredit are subject to ongoing debate. According to Microfinance Barometer (2019), around 139.9 million borrowers had accessed microcredit globally in 2018. MFIs have lent hundreds of billions of dollars with an average annual growth rate of 11.5 per cent over the past five years. South Asia continues to dominate the global microcredit market, with the top three markets in terms of the number of borrowers being India, Bangladesh, and Vietnam. This trend is expected to continue but has raised concerns from the sceptics. The sceptics are worried that the microcredit provision is not commensurate with empirical evidence for fighting poverty. Therefore, without

strong evidence resulting from robust empirical studies on the role of microcredit in poverty alleviation, donors and policymakers might withdraw their supports for microcredit programs. This might lead to a possible policy blunder.

Findings based on comprehensive analyses in this empirical study strongly endorse that there is a role for microcredit in development, especially poverty alleviation. The findings of this study also call for attention from government policymakers and microcredit providers to lessen any negative impacts of microcredit on the wellbeing of the borrowing households, especially on their children's education, which is crucial to any society's goal to curtail poverty in the long run.

8.3 Policy implications

Based on the findings from this in-depth analysis, microcredit appears to be an effective tool for the poor to smooth consumption and improve other welfares. However, to lift the poor out of poverty in a sustainable way, the Vietnamese government should implement a number of policies to boost up microcredit provision and its effectiveness.

First, the loan size needs to be increased. Small loans limit the scope of investment options for households. Due to the limit, borrowers might only invest in less profitable projects and generate an income that is insufficient to cover all costs of borrowing, such as repayment, and at the same time maintain a reasonable living standard. Consequently, the repayment for previous borrowings become a burden for household's food consumption.

Second, additional skill training workshops/short courses should be provided along with microcredit provision. The additional non-financial services, such as business skills training and information on investment options, are to improve the effectiveness of using microcredit loans. The non-financial services help, in a sustainable way, the less-fortune class gain sufficient knowledge of doing business or investment. As such, the poor microcredit clients might gain more confidence and is expected to increase the probability of being successful in using microcredit.

Third, the requirement of physical collateral to secure a loan should be made flexible or waived. Given the significant positive role of microcredit, it is welfare-improving to increase the microcredit access to poor households. To do so, microcredit providers need to overcome the lack of "physical collateral" by accepting "social collateral". Microcredit providers can adopt long-term lending strategies that are based upon the social network of their clients. In that way,

the poor households will have a better chance to access finance. Successful use of microcredit loans helps them further improve the size and quality of their social network. Eventually, it is likely for those poor rural households to break the poverty trap.

Fourth, policymakers and microcredit providers should regularly examine the impacts of their services at the household level. The impacts might change over time and depend on the objectives of different microcredit programs. Therefore, frequently assessing the programs' impacts allows the microcredit stakeholders to revise and improve their policies to achieve their development goals, especially poverty reduction. More importantly, MFIs should strictly monitor loan use to make sure their financial assistance to the poor is used for the right purposes.

Fifth, microcredit providers should also organise regular meetings (e.g., monthly, quarterly) for its clients. Their attendance at such meetings should be made as part of the requirements of obtaining a microcredit loan. These meetings can be used by microcredit officers to (1) provide training to help the clients to improve their business skills, (2) ask their clients to update their business progress and performance, and (3) provide their clients with any changes in credit-related regulatory requirements.

Sixth, MFIs should offer preferred loans that target only education such as credit for school-related fees (i.e., textbook, tuition fee) as an additional option to minimise the adverse impact of microcredit on children's education. Along with lending, lenders should provide training courses to increase borrowers' awareness of the value of education for their children. This can help the poor to keep their children longer in school, most beneficial to curtail poverty for those households and the broad community in the long run.

Seventh, policymakers and financial institutions should pay more attention to the child labour effect. Using microcredit for household's business often requires extra labour to work. For instance, borrowers might use the loans to purchase livestock, such as cows or chickens. Subsequently, children might be asked to take care of the animals, and thereby it affects negatively the children's school time. To overcome such a barrier, a term of non-using child labour should be added to the loan contract, particularly for the projects that are labour intensive. Such policies help to avoid adverse effects on children's education.

8.4 Limitations and future research

There are some limitations in this research, which also helps to pinpoint directions for future research. First, one of the main limitations of this research is that the data were obtained from general-purpose surveys and cover only 12 provinces in Vietnam. It is possible for future studies to shed more light on the role of microcredit by using quasi-experimental data or randomised experiments with a more nationally representative dataset that covers all 64 provinces in Vietnam.

This study has only focussed on rural areas in Vietnam, where the residents' livelihood is mostly related to agriculture. Future research can be extended to urban areas and compare the difference between rural and urban areas regarding the impacts of microcredit. In addition, future research can explore the difference between the poor and non-poor households regarding the impacts of microcredit, which should provide better insight regarding the differential role of microcredit.

In this study, a household's food consumption is measured by summing up expenditure on several food items in the last four weeks at the time of the survey. It is possible that not all food expenditure is captured in the surveys. Moreover, the four-week food expenditure might not be representative of monthly average food spending. Similarly, the social network size and quality indexes are used to proxy a household's social capital. These two dimensions might not be sufficient to capture the whole picture of the household's network. Improvements in the measurements of food consumption and social networks are beneficial and are called for.

This thesis has focused on three outcomes of interest, namely food consumption, social network, and children's education. They are three important dimensions of the multi-faceted poverty issue. Still, they cannot provide a full picture of how microcredit helps combat poverty issue. To provide more comprehensive assessments, future studies need to extend their examination of the impacts of microcredit on more aspects of poor households, such as individual members' wellbeing, women empowerment, and health expenditures.

References

- ADB. (2014). *Sector assessment: Microfinance*. Retrieved from <https://www.adb.org/sites/default/files/evaluation-document/219386/files/pvr-478.pdf>
- Ahmed, J. U., Chowdhury, M. H. K., Uddin, M. J., & Ferdous, M. M. (2014). Sadakalo: Marketing of traditional fashion in the modern fashion industry. *Vision*, 18(2), 125-135.
- AIMS. (2001). Conceptual framework for assessing the impacts of microenterprise services. *USAID AIMS Project. Brief*(31).
- Akram, S., & Kumar, R. J. (2013). Investigating causal relationship between social capital and microfinance: Implications for rural development. *International Journal of Social Economics*, 40(9), 760-776.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297.
- Attanasio, O., Augsbury, B., De Haas, R., Fitzsimons, E., & Harmgart, H. (2015). The impacts of microfinance: Evidence from joint-liability lending in mongolia. *American Economic Journal: Applied Economics*, 7(1), 90-122.
- Augsburg, B., De Haas, R., Harmgart, H., & Meghir, C. (2012). *Microfinance at the margin: Experimental evidence from bosnia and herzegovina*. Available at SSRN 2021005. EBRD Working Paper. European Bank for Reconstruction and Development.
- Augsburg, B., De Haas, R., Harmgart, H., & Meghir, C. (2015). The impacts of microcredit: Evidence from bosnia and herzegovina. *American Economic Journal: Applied Economics*, 7(1), 183-203.
- Banerjee, A., Duflo, E., Glennerster, R., & Kinnan, C. (2015). The miracle of microfinance? Evidence from a randomized evaluation. *American Economic Journal: Applied Economics*, 7(1), 22-53.
- Barnes, C. (1996). Assets and the impact of microenterprise finance programs. *AIMS, USAID's Office of Microenterprise Development, Washington*.
- Barslund, M., & Tarp, F. (2008). Formal and informal rural credit in four provinces of vietnam. *The Journal of Development Studies*, 44(4), 485-503.
- Basargekar, P. (2010). Measuring effectiveness of social capital in microfinance: A case study of urban microfinance programme in india. *International Journal of Social Inquiry*, 3(2), 25-43.
- Basu, K., & Ray, R. (2002). The collective model of the household and the unexpected implication for child labor. *World Bank Policy Research Working Paper*(2813).
- Basu, K., & Van, P. H. (1998). The economics of child labor. *American Economic Review*, 88(3), 412-427.
- Behrman, J., & Rosenzweig, M. (2002). Does increasing women's schooling raise the schooling of the next generation? *American Economic Review*, 92(1), 323-334.
- Behrman, J. R., & Knowles, J. C. (1999). Household income and child schooling in vietnam. *The World Bank Economic Review*, 13(2), 211-256.
- Bellman, R. E., & Dreyfus, S. E. (2015). *Applied dynamic programming*: Princeton university press.
- Bhuiya, M. M. M., Khanam, R., Rahman, M. M., & Nghiem, H. S. (2015). *Impact of microfinance on household income and consumption in bangladesh: Empirical evidence from a quasi-experimental survey*. Paper presented at the Proceedings of the 44th Australian Conference of Economists (ACE 2015).
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115-143.
- Bond, S. R., Hoeffler, A., & Temple, J. R. (2001). Gmm estimation of empirical growth models. *CEPR Discussion Paper No. 3048*.

- Boonperm, J., Haughton, J., & Khandker, S. R. (2013). Does the village fund matter in thailand? Evaluating the impact on incomes and spending. *Journal of Asian Economics*, 25(2013), 3-16.
- Chen, M. A. (1997). A guide for assessing the impact of microenterprise services at the individual level. In: Citeseer.
- Claridge, T. (2004). *Social capital and natural resource management*. (PhD Thesis), University of Queensland, Brisbane.
- Cohen, M., Chen, M. A., & Dunn, E. (1996). *Household economic portfolios*. Retrieved from Washington D.C.: www.eldis.org/vfile/upload/1/document/0708/DOC2932.pdf
- Coleman, B. E. (1999). The impact of group lending in northeast thailand. *Journal of Development Economics*, 60(1), 105-141.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95-S120.
- Conroy, J. D., & MacGuire, P. B. (2000). *The role of central banks in microfinance in asia and the pacific*: Asian Development Bank.
- Convergences. (2019). *Microfinance barometer*. Retrieved from Paris, France: <http://www.convergences.org/en/104906-2/>
- Crépon, B., Devoto, F., Duflo, E., & Parienté, W. (2015). Estimating the impact of microcredit on those who take it up: Evidence from a randomized experiment in morocco. *American Economic Journal: Applied Economics*, 7(1), 123-150.
- Creusot, A.-C., & Thanh, Q. T. T. (2003). La microfinance at-elle encore sa place lorsque l'offre publique de crédit s' étend? L'expérience des caisses autogérées par l'association des femmes au nord vietnam. *Coopérer Aujourd'hui*, 33(GRET).
- Dasgupta, P. (1999). *Poverty reduction and non-market institutions*. Paper presented at the Conference on Evaluation and Poverty Reduction, Washington, DC: World Bank.
- Dasgupta, P., & Serageldin, I. (1999). *Social capital: A multifaceted perspective*. Washington, DC: The World Bank.
- Doan, T., Gibson, J., & Holmes, M. (2014). Impact of household credit on education and healthcare spending by the poor in peri-urban areas, vietnam. *Journal of Southeast Asian Economies (JSEAE)*, 31(1), 87-103.
- Dowla, A. (2006). In credit we trust: Building social capital by grameen bank in bangladesh. *The Journal of Socio-Economics*, 35(1), 102-122.
- Dunn, E., Kalaitzandonakes, N., & Valdivia, C. (1996). Risk and the impacts of microenterprise services. In: AIMS Project Report, USAID/G/EG/MD. Washington, DC: Management Systems International.
- Duong, A. H. (2015). *Does microfinance really help reduce poverty? New evidence from vietnam*. (Doctoral dissertation), Griffith University,
- Duong, H. A., & Nghiem, H. S. (2014). Effects of microfinance on poverty reduction in vietnam: A pseudo-panel data analysis. *Journal of Accounting, Finance and Economics*, 4(2), 58-67.
- Duong, P. B., & Thanh, P. T. (2014). Impact evaluation of microcredit on welfare of the vietnamese rural households. *Asian Social Science*, 11(2), 190-201.
- Edmonds, E. V. (2006). Child labor and schooling responses to anticipated income in south africa. *Journal of Development Economics*, 81(2), 386-414.
- Feigenberg, B., Field, E. M., & Pande, R. (2017). *Microfinance in asia* (N. B. o. E. Research Ed. Vol. 16018): National Bureau of Economic Research.
- Gan, C., Nartea, G. V., & Xia, J. L. (2017). An overview of microfinance. In *Microfinance in asia* (pp. 1-22): World Scientific.
- Garikipati, S. (2008). The impact of lending to women on household vulnerability and women's empowerment: Evidence from india. *World development*, 36(12), 2620-2642.

- General Statistics Office of Vietnam. (2017). *Statistical handbook of vietnam 2017*. Retrieved from: https://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=18941
- Gine, X., & Karlan, D. (2008). *Peer monitoring and enforcement: Long term evidence from microcredit lending groups with and without group liability*. Working paper. Yale University, Department of Economics.
- Hazarika, G., & Sarangi, S. (2008). Household access to microcredit and child work in rural malawi. *World Development*, 36(5), 843-859.
- Hill, M. A., & King, E. M. (1993). Women's education in developing countries: An overview. *King, Elizabeth M. and M. Anne Hill, eds*, 1-50.
- Holvoet, N. (2004). Impact of microfinance programs on children's education. *ESR Review*, 6(2), 27.
- Hsiao, C. (2014). *Analysis of panel data*: Cambridge university press.
- Hulme, D. (2000). Impact assessment methodologies for microfinance: Theory, experience and better practice. *World development*, 28(1), 79-98.
- Imai, K. S., & Azam, M. S. (2012). Does microfinance reduce poverty in bangladesh? New evidence from household panel data. *Journal of Development Studies*, 48(5), 633-653.
- Islam, A. (2011). Medium-and long-term participation in microcredit: An evaluation using a new panel dataset from bangladesh. *American Journal of Agricultural Economics*, 93(3), 847-866.
- Islam, A. (2015). Heterogeneous effects of microcredit: Evidence from large-scale programs in bangladesh. *Journal of Asian Economics*, 37(2015), 48-58.
- Islam, A., & Choe, C. (2013). Child labor and schooling responses to access to microcredit in rural bangladesh. *Economic Inquiry*, 51(1), 46-61.
- Islam, A., & Maitra, P. (2012). Health shocks and consumption smoothing in rural households: Does microcredit have a role to play? *Journal of Development Economics*, 97(2), 232-243.
- Islam, N. (2008). Vietnam's lesson for china: An examination of the sachs–woo hypothesis. *Comparative Economic Studies*, 50(1), 111-157.
- Islam, T. (2016). *Microcredit and poverty alleviation*. New York, USA: Routledge.
- Jacoby, H. G., & Skoufias, E. (1997). Risk, financial markets, and human capital in a developing country. *The Review of Economic Studies*, 64(3), 311-335.
- Juan, M. V. (2009). Diff: Stata module to perform differences in differences estimation [Statistical Software Components S457083]. Boston College Department of Economics. revised 31 Jul 2018.
- Kaboski, J. P., & Townsend, R. M. (2012). The impact of credit on village economies. *American Economic Journal: Applied Economics*, 4(2), 98-133.
- Karlan, D., & Zinman, J. (2008). Lying about borrowing. *Journal of the European Economic Association*, 6(2-3), 510-521.
- Karlan, D., & Zinman, J. (2010). Expanding microenterprise credit access: Using randomized supply decisions to estimate the impacts in manila. *Innovations for Poverty Action working paper*.
- Kennedy, E., & Peters, P. (1992). Household food security and child nutrition: The interaction of income and gender of household head. *World development*, 20(8), 1077-1085.
- Khamar, M. (2019). *Global outreach and financial performance benchmark report 2017-2018*. Retrieved from Washington, DC, USA.: <https://www.findevgateway.org/paper/2019/05/global-outreach-and-financial-performance-benchmark-report-2017-2018>
- Khandker, S. R. (1998). *Fighting poverty with microcredit: Experience in bangladesh*: Oxford University Press.
- Khandker, S. R. (2005). Microfinance and poverty: Evidence using panel data from bangladesh. *The World Bank Economic Review*, 19(2), 263-286.

- Khandker, S. R., & Faruquee, R. R. (2003). The impact of farm credit in pakistan. *Agricultural Economics*, 28(3), 197-213.
- Khandker, S. R., & Samad, H. A. (2014). Dynamic effects of microcredit in bangladesh. *World Bank Policy Research Working Paper*(6821).
- Krishna, A., & Uphoff, N. (2002). Mapping and measuring social capital through assessment of collective action to conserve and develop watersheds in rajasthan, india. *The role of social capital in development: An empirical assessment*, 85-124.
- Larance, L. Y. (2001). Fostering social capital through ngo design: Grameen bank membership in bangladesh. *International Social Work*, 44(1), 7-18.
- Lehner, M. (2009). *Group lending versus individual lending in microfinance*. 299. SFB/TR 15 Discussion Paper. University of Munich.
- Li, X., Gan, C., & Hu, B. (2011). Accessibility to microcredit by chinese rural households. *Journal of Asian Economics*, 22(3), 235-246.
- Li, X., Gan, C., & Hu, B. (2011). The impact of microcredit on women's empowerment: Evidence from china. *Journal of Chinese Economic and Business Studies*, 9(3), 239-261.
- Li, X., Gan, C., & Hu, B. (2011). The welfare impact of microcredit on rural households in china. *The Journal of Socio-Economics*, 40(4), 404-411.
- Madajewicz, M. (2011). Joint liability versus individual liability in credit contracts. *Journal of Economic Behavior & Organization*, 77(2), 107-123.
- Maldonado, J. H., & González-Vega, C. (2008). Impact of microfinance on schooling: Evidence from poor rural households in bolivia. *World Development*, 36(11), 2440-2455.
- Mark, P., & Shahidur, K. (1998). The impact of group-based credit programs on poor households in bangladesh: Does the gender of participants matter? *Journal of Political Economy*, 106(5), 958-996. doi:10.1086/250037
- Markussen, T., & Tarp, F. (2014). Political connections and land-related investment in rural vietnam. *Journal of Development Economics*, 110(1), 291-302.
- McGregor, J. A., Mosley, P., Johnson, S., & Simanowitz, A. (2000). *How can impact assessment take into account wider social and economic impacts?* (1765-2016-141583). Retrieved from <https://ageconsearch.umn.edu/record/23747/files/wp000003.pdf>
- Mencher, J. (1988). Women's work and poverty: Women's contribution to household maintenance in south india. *A Home divided: Women and Income in the Third World*, 99-119.
- Microfinance Barometer. (2019). *10 years already! A look back at the trends in microfinance*. Retrieved from Paris, France: http://www.convergences.org/wp-content/uploads/2019/09/Microfinance-Barometer-2019_web-1.pdf
- Moehling, C. (2006). Children's pay envelopes and the family purse: The impact of children's income on household expenditures. *Unpublished paper (Rutgers University, New Brunswick NJ)*.
- Mollah, T. H., Shishir, S., Ullah, W., & Nihei, T. (2019). Assessing ngos micro-credit programs: A geo-spatial and socio-economic scenario from rural bangladesh. *International Review of Economics*, 66(2), 79-99.
- Moore, M., & Putzel, J. (1999). Politics and poverty: A background paper for the world development report 2000/1. *IDS, Brighton*.
- Morduch, J., & Aghion, B. (2000). Microfinance beyond group lending. *The Economics of Transition*, 8(2), 401-420.
- Morduch, J., & Haley, B. (2001). *Analysis of the impact of microfinance on poverty reduction*. Working paper series 1014. New York University. New York.

- Morris, S. S., Woodworth, W. P., & Hiatt, S. R. (2006). The value of networks in enterprise development: Case studies in eastern europe and southeast asia. *Journal of Developmental Entrepreneurship*, 11(04), 345-356.
- Nghiem, H. S. (2005). Analysing the effectiveness of microfinance in vietnam: A conceptual framework. *Unpublished manuscript, School of Economics, The University of Queensland*.
- Nghiem, S., Coelli, T., & Rao, P. (2012). Assessing the welfare effects of microfinance in vietnam: Empirical results from a quasi-experimental survey. *Journal of Development studies*, 48(5), 619-632.
- Oikocredit. (2005). *Acceleration growth*. Retrieved from The united states Year of Microcredit: <http://www.ired.org/modules/infodoc/cache/files/english/augastend1.pdf>
- Osborne, T. (2006). Credit and risk in rural developing economies. *Journal of Economic Dynamics and Control*, 30(4), 541-568.
- Phan, C. T., Sun, S., Zhou, Z.-Y., & Beg, R. (2020). Does microcredit improve rural households' social network? Evidence from vietnam. *The Journal of Development Studies*, 1-17. doi:10.1080/00220388.2020.1725485
- Phan, D. K., Gan, C., Nartea, G. V., & Cohen, D. A. (2014). The impact of microcredit on rural households in the mekong river delta of vietnam. *Journal of the Asia Pacific Economy*, 19(4), 558-578. doi:10.1080/13547860.2014.920591
- Philips, S., & Burton, P. (1998). What's mine is yours? The influence of male and female incomes on patterns of household expenditures. *Economica*, 65(260), 599-613.
- Pimhidzai, O. (2018). *Climbing the ladder: Poverty reduction and shared prosperity in vietnam*. Retrieved from Washington, DC: <http://documents.worldbank.org/curated/en/206981522843253122/pdf/124916-WP-PULIC-P161323-VietnamPovertyUpdateReportENG.pdf>
- Pitt, M. M., & Khandker, S. R. (1998). The impact of group-based credit programs on poor households in bangladesh: Does the gender of participants matter? *Journal of Political Economy*, 106(5), 958-996.
- Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6(1), 65-78.
- Quach, M., Mullineux, A., & Murinde, V. (2005). Access to credit and household poverty reduction in rural vietnam: A cross-sectional study. *Edgbaston, UK: The Birmingham Business School, The University of Birmingham*.
- Ronchi, P. E. (2004). Microfinance: A new way of development? *Institut Universitaire De Hautes Etudes Internationales*, 126(1), 1-85.
- Roodman, D., & Morduch, J. (2009). The impact of microcredit on the poor in bangladesh: Revisiting the evidence. *Center for Global Development Working Paper*(174).
- Roodman, D., & Morduch, J. (2014). The impact of microcredit on the poor in bangladesh: Revisiting the evidence. *The Journal of Development Studies*, 50(4), 583-604. doi:10.1080/00220388.2013.858122
- Sanyal, P. (2009). From credit to collective action: The role of microfinance in promoting women's social capital and normative influence. *American Sociological Review*, 74(4), 529-550.
- Savita, S. (2007). Transaction cost in group microcredit in india. *Management Decisions*, 45(2007), 1331-1342.
- Schreiner, M. J. (1997). *A framework for the analysis of the performance and sustainability of subsidized microfinance organizations with application to bancosol of bolivia and grameen bank of bangladesh*. Ohio State University,
- Schroeder, E. (2010). The impact of microcredit borrowing on household consumption in bangladesh. *Department of Economics, Georgetown University*.

- Scoones, I. (1998). *Sustainable rural livelihoods: A framework for analysis*. IDS Working Paper 72. Institute of Development Studies. Brighton: IDS.
- Sebstad, J., & Cohen, M. (2001). Microfinance, risk management and poverty. In: CGAP, World Bank: Washington, DC.
- Sebstad, J., Neill, C., Barnes, C., & Chen, G. (1995). *Assessing the impacts of microenterprise interventions: A framework for analysis*: USAID. Center for Development Information and Evaluation.
- Seibel, H. D., Llanto, G., & Quiñones, B. (2000). *How values create value: Social capital in microfinance-the case of the philippines*. Working paper. University of Cologne, Development Research Center. Retrieved from <https://www.econstor.eu/handle/10419/23688>
- Swain, R. B., Sanh, N., & Tuan, V. (2008). Microfinance and poverty reduction in the mekong delta in vietnam. *African and Asian Studies*, 7(2-3), 191-215.
- Team, A. (2001). Conceptual framework for assessing the impacts of microenterprise services. *USAID AIMS Project. Brief(31)*.
- Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of Human Resources*, 25(4), 635-664. doi:10.2307/145670
- Thomas, D. (1997). Incomes, expenditures, and health outcomes: Evidence on intrahousehold resource allocation. *Intrahousehold Resource Allocation in Developing Countries*, 142-164.
- Todd, H. (1996). *Women at the center: Grameen bank borrowers after one decade*: Boulder (Colo.) : Westview press, 1996.
- Trigueros, A. (2002). The economics of schooling and child labor for boys and girls in rural households in el salvador, 1995-1999. *Unpublished doctoral dissertation, Department of Economics, Vanderbilt University*.
- Van, B. T. (1999). Imperfect information, social capital and the poor's access to credit. *Social Capital and the Poor's Access to Credit (October 1999)*. IRIS Center Working Paper, 234.
- Van, B. T. (2000). *Does social capital facilitate the poor's access to credit? A review of the microeconomic literature*. Understanding and Measuring Social Capital: A Multidisciplinary Tool for Practitioners. Working Paper. The World Bank. Washington, DC. Retrieved from <https://www.findexgateway.org/paper/2000/01/does-social-capital-facilitate-poor-access-credit-review-microeconomic-literature>
- VBARD. (2019). *Annual report 2019*. Retrieved from No. 2 Lang Ha street, Ba Dinh district, Hanoi, Vietnam: https://www.agribank.com.vn/wcm/connect/f07b21ec-1556-4e0f-b7c2-55737de02a30/Annual+report+2019.pdf?MOD=AJPERES&CONVERT_TO=url&ACHEID=ROOTWORKSPACE-f07b21ec-1556-4e0f-b7c2-55737de02a30-ndHi5sb
- Vyas, S., & Kumaranayake, L. (2006). Constructing socio-economic status indices: How to use principal components analysis. *Health Policy and Planning*, 21(6), 459-468.
- Wolz, A. (1997). *The transformation of rural finance systems in vietnam*. Discussion Paper No. 60. Research Centre for Agrarian and Economics Development. Heidelberg, Germany.
- Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *The World Bank Research Observer*, 15(2), 225-249.
- Wooldridge, J. (1997). Quasi-likelihood methods for count data. In *Handbook of applied econometrics. Microeconomics* (Vol. 2, pp. 352-406). London: Blackwell Publishers.
- Wooldridge, J. M. (2015). Control function methods in applied econometrics. *Journal of Human Resources*, 50(2), 420-445.
- World Bank. (2019). *Population in vietnam*. Retrieved from: <https://data.worldbank.org/country/vietnam>

- World Bank Data. (2016). *Poverty headcount ratio at national poverty lines (% of population)*. Retrieved from: <http://data.worldbank.org/indicator/SI.POV.NAHC?locations=VN>
- Wydick, B. (1999). The effect of microenterprise lending on child schooling in Guatemala. *Economic Development and Cultural Change*, 47(4), 853-869.
- You, J., & Anim, S. (2014). The impact of microcredit on child education: Quasi-experimental evidence from rural China. *Journal of Development Studies*, 50(7), 926-948.
- Zohir, S., & Matin, I. (2004). Wider impacts of microfinance institutions: Issues and concepts. *Journal of International Development*, 16(3), 301-330.

Appendix A: Difference Generalised Method of Moments estimation.

Table A1. Impacts of microcredit on household food consumption (Difference GMM)

Household food consumption	Difference GMM		Difference GMM with external IVs	
	Coefficients	Robust SE	Coefficients	Robust SE
$\log C_{t-1}$	0.619	1.106	-0.230	0.231
$\log K_t$	-0.270	0.593	0.159	0.148
$\log K_{t-1}$	0.683	0.496	0.859**	0.369
E_t	-0.832	0.608	-0.443	0.300
E_{t-1}	2.403	1.637	2.153	1.500
SIS_t	-1.679*	0.983	-1.568*	0.912
SIS_{t-1}	-0.050	0.112	-0.099	0.087
$\log Y_t$	0.061	0.086	0.030	0.067
$\log Y_{t-1}$	-0.022	0.127	-0.094	0.081
$EduH_t$	0.049	0.089	0.035	0.071
$EduH_{t-1}$	-0.481	0.360	-0.374	0.260
$HSize_t$	0.648	0.808	0.025	0.237
$HSize_{t-1}$	0.040	0.037	0.029	0.034
$AgeH_t$	-0.003	0.034	-0.015	0.031
$AgeH_{t-1}$	-0.394	0.440	-0.474	0.402
$\log Plot_t$	0.612*	0.335	0.416*	0.225
$\log Plot_{t-1}$	-0.064	0.296	0.111	0.192
Dep_t	-0.798	1.227	0.148	0.340
Dep_{t-1}	-1.514	1.204	-1.890*	0.999
$Nfarming_t$	0.931*	0.555	0.810*	0.477
$Nfarming_{t-1}$	-0.447	0.456	-0.434	0.403
$Shock_t$	0.956**	0.421	0.765**	0.326
$Shock_{t-1}$	0.978*	0.551	0.838	0.524
$Local_t$	0.833	0.774	1.029	0.712
$Local_{t-1}$	-0.627	0.762	-0.327	0.586
$Poor_t$	0.286	0.427	0.085	0.306
$Poor_{t-1}$	0.253	0.319	0.118	0.250
Year	YES		YES	
AR(1)	-1.86**		-2.54**	
AR(2)	0.39		0.02	
Hansen test	4.24		4.85	
Number of instruments	33		36	
Observations	6,827		6,827	
Number of households	2,687		2,687	

Note: ***, **, and * indicate the statistical significance at the 1, 5, and 10% levels, respectively.

Appendix B: Collinearity diagnostics.

Table B1. Collinearity diagnostics

Variables	VIF	SQRT VIF	Tolerance	R-Squared
log Microcredit (<i>M</i>)	1.06	1.03	0.9456	0.0544
School gap (<i>E</i>)	1.31	1.14	0.7644	0.2356
log non-business income (<i>Y</i>)	1.08	1.04	0.9240	0.0760
log Wealth (<i>W</i>)	1.24	1.11	0.8072	0.1928
Education of head (<i>EduH</i>)	1.33	1.15	0.7514	0.2486
Household size (<i>HSize</i>)	2.33	1.53	0.4288	0.5712
Age of head (<i>AgeH</i>)	1.19	1.09	0.8416	0.1584
log Land size(<i>Plot</i>)	1.37	1.17	0.7283	0.2717
Dependent members (<i>Dep</i>)	1.90	1.38	0.5261	0.4739
Non-farming (<i>Nfarming</i>)	1.11	1.05	0.8999	0.1001
Income shock (<i>Shock</i>)	1.11	1.06	0.8983	0.1017
Poor status (<i>Poor</i>)	1.20	1.10	0.8300	0.1700
Local resident (<i>Local</i>)	1.08	1.04	0.9218	0.0782

Note: Author's own calculation.

Appendix C: Impacts of microcredit on children's education.

Table C1: Summary of school gap for children aged from 12 to 18

School gap	Frequency	Per cent	Cumulative
0	30	0.41	0.41
1	536	7.41	7.83
2	3,094	42.78	50.61
3	1,514	20.93	71.54
4	911	12.6	84.14
5	455	6.29	90.43
6	258	3.57	94
7	187	2.59	96.58
8	129	1.78	98.37
9	62	0.86	99.23
10	35	0.48	99.71
11	10	0.14	99.85
12	11	0.15	100
Total	7,232	100.00	100.00

Table C2: Summary of completed grades for children aged from 12 to 18

Completed grade	Frequency	Per cent	Cumulative
0	14	0.19	0.19
1	92	1.27	1.47
2	185	2.56	4.02
3	465	6.43	10.45
4	762	10.54	20.99
5	971	13.43	34.42
6	955	13.21	47.62
7	916	12.67	60.29
8	847	11.71	72.00
9	1,011	13.98	85.98
10	560	7.74	93.72
11	396	5.48	99.20
12	58	0.8	100
Total	7,232	100.00	100.00

Table C3: Marginal effects of microcredit, boys versus girls.

VARIABLES	(1)	(2)	(3)	(4)
	School gap (<i>Schgap</i>)		Completed grade (<i>Grades</i>)	
	Girls	Boys	Girls	Boys
log Microcredit (<i>M</i>)	0.0418 (0.0450)	0.0896** (0.0399)	-0.0653 (0.0517)	-0.0922* (0.0522)
Child's gender (<i>Childgender</i>)				
Child's age (<i>Childage</i>)	0.191*** (0.0129)	0.249*** (0.0130)	0.804*** (0.0141)	0.741*** (0.0136)
Birth order (<i>Birthorder</i>)	0.0471** (0.0220)	0.0501** (0.0230)	-0.0607** (0.0275)	-0.0620** (0.0287)
log Non-business income (<i>Y</i>)	0.00565 (0.0106)	0.00150 (0.0111)	-0.00484 (0.00917)	-0.000103 (0.00946)
log Wealth (<i>W</i>)	-0.0189 (0.0118)	-0.0633*** (0.0116)	0.0235* (0.0142)	0.0761*** (0.0149)
Education of head (<i>EduH</i>)	-0.320*** (0.0379)	-0.308*** (0.0365)	0.310*** (0.0383)	0.275*** (0.0357)
Household size (<i>HSize</i>)	0.0261 (0.0237)	0.0610** (0.0244)	-0.0585** (0.0280)	-0.0997*** (0.0289)
Age of head (<i>AgeH</i>)	0.0179*** (0.00486)	0.00307 (0.00452)	-0.0192*** (0.00586)	-0.00217 (0.00480)
log Land (<i>Plot</i>)	0.128*** (0.0259)	0.0353 (0.0282)	-0.0898*** (0.0251)	-0.0149 (0.0284)
Dependent members (<i>Dep</i>)	0.0816*** (0.0298)	0.106*** (0.0302)	-0.0515 (0.0335)	-0.0820** (0.0341)
Non-farming (<i>Nfarming</i>)	-0.141** (0.0609)	-0.171** (0.0729)	0.118* (0.0631)	0.148* (0.0798)
Income-shock (<i>Shock</i>)	-0.116** (0.0530)	-0.0664 (0.0569)	0.125** (0.0552)	0.0699 (0.0575)
Poor status (<i>Poor</i>)	0.423*** (0.0661)	0.245*** (0.0694)	-0.474*** (0.0743)	-0.271*** (0.0769)
Local household (<i>Local</i>)	0.255*** (0.0810)	0.105 (0.0831)	-0.281*** (0.0890)	-0.116 (0.0921)
Observations	3,541	3,691	3,541	3,691
Anderson canon. corr. LM statistic	44.008***	64.507***	44.008***	64.507***
Cragg-Donald Wald F statistic	22.180*	32.685*	22.180*	32.685*
Hansen's J statistic	0.412	2.189	0.332	2.196

Notes: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % level, respectively; the coefficients reported are marginal effects; bootstrap standard errors presented in the parentheses; the variable *Childgender* is omitted to avoid the multicollinearity problem; all estimations are IV Poisson regression model.

Table C4: Marginal effects of microcredit, poor versus non-poor children.

VARIABLES	(1)	(2)	(3)	(4)
	School gap (<i>Schgap</i>)		Completed grade (<i>Grades</i>)	
	Poor	Non-poor	Poor	Non-poor
log Microcredit (<i>M</i>)	0.0764 (0.0501)	0.0825** (0.0383)	-0.110* (0.0621)	-0.107** (0.0495)
Child's gender (<i>Childgender</i>)	-0.274*** (0.0564)	-0.262*** (0.0482)	0.284*** (0.0584)	0.272*** (0.0521)
Child's age (<i>Childage</i>)	0.268*** (0.0132)	0.160*** (0.0122)	0.715*** (0.0138)	0.857*** (0.0135)
Birth order (<i>Birthorder</i>)	0.0550*** (0.0210)	0.0388 (0.0258)	-0.0640** (0.0252)	-0.0460 (0.0297)
log Non-business income (<i>Y</i>)	-0.0165 (0.0172)	0.00594 (0.00778)	0.0122 (0.0151)	-0.00683 (0.00789)
log Wealth (<i>W</i>)	-0.0389*** (0.0105)	-0.0358** (0.0148)	0.0429*** (0.0122)	0.0378** (0.0159)
Education of head (<i>EduH</i>)	-0.271*** (0.0405)	-0.301*** (0.0306)	0.254*** (0.0386)	0.306*** (0.0329)
Household size (<i>HSize</i>)	0.0367 (0.0241)	0.0545** (0.0241)	-0.0627** (0.0267)	-0.0967*** (0.0294)
Age of head (<i>AgeH</i>)	0.0119*** (0.00433)	0.00861 (0.00575)	-0.0120*** (0.00460)	-0.00946 (0.00648)
log Land (<i>Plot</i>)	0.213*** (0.0305)	-0.0150 (0.0271)	-0.170*** (0.0258)	0.0387 (0.0311)
Dependent members (<i>Dep</i>)	0.111*** (0.0298)	0.0510* (0.0304)	-0.0792** (0.0328)	-0.00713 (0.0328)
Non-farming (<i>Nfarming</i>)	-0.134* (0.0690)	-0.199*** (0.0686)	0.130* (0.0739)	0.217*** (0.0745)
Income-shock (<i>Shock</i>)	-0.122** (0.0591)	-0.0652 (0.0519)	0.119** (0.0598)	0.0768 (0.0565)
Poor status (<i>Poor</i>)				
Local household (<i>Local</i>)	0.134 (0.0962)	0.158** (0.0646)	-0.174 (0.113)	-0.189*** (0.0725)
Observations	4,154	3,078	4,154	3,078
Anderson canon. corr. LM statistic	60.418***	38.701***	60.418***	38.701***
Cragg-Donald Wald F statistic	30.537*	19.495*	30.537*	19.495*
Hansen's J statistic	2.547	0.551	2.724	0.551

Notes: ***, **, and * indicate the statistical significance at the 1, 5, and 10 % levels, respectively; the coefficients reported are marginal effects; bootstrap standard errors presented in the parentheses; the variable *Poor* is omitted to avoid the multicollinearity problem; all estimations are IV Poisson regression model; group of poor households which includes those households identified as poor at least once in any survey round.