A STUDY ON THE ROLE OF MICROFINANCE AND ITS CONTRIBUTION ON WELFARE OF HOUSEHOLDS IN THE RURAL DEVELOPMENT PROGRAM OF MYANMAR

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A STUDY ON THE ROLE OF MICROFINANCE AND ITS CONTRIBUTION ON WELFARE OF HOUSEHOLDS IN THE RURAL DEVELOPMENT PROGRAM OF MYANMAR

By

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ABSTRACT

It is no longer news that establishment of microfinance movement, in particular Grameen Bank in the early 1980s in Bangladesh by Professor Muhammad Yunus has not only helped the poor but also the local economies, where microfinance institutions thrive around the world. The success of Grameen Bank in Bangladesh in providing microcredit services to the poor has inspired numerous non-governmental organizations (both local and international) and governments in the developing economies to establish group-lending schemes to deliver credit at the lowest-cost and reasonable interest rates to small-scale rural entrepreneurs and farmers.

In Myanmar, despite recent economic growth at the national level, poverty remains one of the major challenges as majority of the poor in the country lives in the rural areas. The country is ranked 149 out of 168 countries on the Human Development Index, although the scores have been improving in recent years. As at 2011, the per capita income in the country is about $US 832, while food poverty (food insecurity) level is about 5%. But poverty is twice as high in rural areas, compared to urban areas with wide regional inequalities in human development and Millennium Development Goals indicators. About 47% of the country's population lives on less than $1.25 (PPP) per day. The formal financial institutions in Myanmar are under the control of the central bank and borrowers need to have assets or properties to access loan from the bank. This however, left most poor households in the country to depend on microfinance institutions or private lenders to secure needed credit to enhance their welfare.

Because of the difficulty in obtaining credit from the formal financial institution in Myanmar, a number of International Non-Governmental Organizations since 1997 have introduced various microfinance programs designed to empowered poor households with provision of microcredit in the country. Available statistics show that INGOs that provides microfinance exists in 46 townships (6,000 villages) out of 330 townships in Myanmar. Microfinance in Myanmar is currently servicing more than 385,000 participants. But despite the wide spread of microfinance programs in the country, inability to access formal credit support has often been argued as a typical constraint in extending farmers' production and investment in

income generating activities necessary to improve their living conditions. Subsequently, millions of micro-entrepreneurs and farmers have to rely on informal money lenders or pawnshops for credit with monthly interest rates of around 20% without collateral.

However, in the time when the attention of the world has shifted towards Myanmar with increasing number of foreign investment offers and various intervention programs for the poor, it is important to understand whether previous intervention projects such as the INGO's microfinance programs have impacts on the welfare of households in the country. And to the best of our knowledge, this is very first study that have examined, the impact of microcredit on household welfare in Myanmar. While large body of literature have looked into the impact of microcredit on poverty, household income and expenditure and many other welfare indicators across the countries in Asia, there is little evidence in Myanmar. There are two main objectives in our research; to analyze the impact of INGO microfinance program on households' livelihood and their income of rural people in Dry Zone Area and to evaluate the effects of participating in INGOs microfinance program and socioeconomic determinants that influence on welfare and demand on credit use of households from six different townships.

To achieve the research objectives, both primary and secondary data were collected. For primary data, survey were conducted in six villages of Kyaukpadaung Township implementing by PACT UNDP microfinance program (October 2008) and six townships namely Falam, Hakha, Bogalay, Gyune, Mandalay, and Yangon under the International Non-Governmental Organizations microfinance program purposely selected from each of the following regions Chin state, Delta-zone, and Dry-zone, thus making a total of 593 respondents [413 (participants) and 180 (non-participants)]. Hence, two strata of respondents were identified—those that participate in microfinance program and those that did not participate in the program as control group in each of the selected towns.

Descriptive analysis was used to identify the demographic and socioeconomic characteristics of the respondents. Logistic Regression Model, Coub-douglas (functional form), Endogenous Switching Regression Model and Censor Regression Modle were used to investigate the influencing factors on taking

loans, factors influencing household income, the impact of microfinance on welfare of households, and the determinants of households' socioeconomic factors influencing demand on credit use in Myanmar.

According to the empirical results of the logistic regression analysis shows that marital status of respondents, gender of household head, education level, number of crops, changes farming practices and established new business are strongly associated with taking loan and the presence of these variables increase the probability of being taken loan, whereas household size, age of respondents and land holding size are highly significant variables but having negative impact on the probability of taking loan. Regarding to the household income and participating in village activities, no matter these variables increase or decrease have no affecting on taking loan.

The descriptive results of the estimated on the determinants of probability of participating in INGOs microfinance program show that the probability of participating in microfinance program increases among female headed households, educated household head, household headed by married couples, household with higher number of crops, and households with higher wealth (VCD taken as indicator of wealth in the study). Also, we find evidence that the probability decreases among households located in Falam in reference to households in Mandalay (the reference household) in the study, while other dummies representing the remaining townships were significantly not different from zero. Nevertheless, non-significant of township dummies suggest that probability of participating in the microfinance program is indifferent across the households in the townships covered in the sample.

Thereafter, we examine the impacts of microfinance program on household welfare in Myanmar. Two indicators of household welfare were considered, namely household per capita expenditure and per capita income later used to define household welfare function in the study. The results however, show that the covariance term of participation in the microfinance program is significantly different from zero. This implies that bias would have resulted in the welfare function if it was estimated without correcting for selection bias associated with program participation in the study. Other results show that the probability of participating in microfinance program is higher among female headed households,

educated household head, married households, among household with higher number of crops and higher asset (represented by the number of video compact disc players) in the study.

Also, the study employed average treatment effect on the treated to investigate, whether participants in microfinance program have higher per capita income or per capita expenditure than they would have earned if they did not participate in the program. In this regard, the result of the average treatment effect on the treated shows that per capita income and per capita expenditure for the participants are higher than they would have obtained if they did not participate in the program. In conclusion it can be noticed from overall analysis that there is significant impact of microfinance activity on improvement of the livelihoods of the rural households not only in economic term but also in social term. From this study and research, there is a noticeable and positive impact of microfinance program on the living standards, empowerment and poverty alleviation among the rural poor people in the society. The implication of this is that to achieve the millennium Development Goals in Myanmar, it is important for government to consider the role of microfinance schemes, as it is capable of reaching the poor who are left out of formal financial system with expected positive effect on their welfare. In addition, we suggest that the International Non-Governmental Organizations operating various microfinance programs in Myanmar should extend their services to other parts of the country as away of reaching more households.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

ACTED	Agency for Technical Cooperation and Development
ADB	Asia Development Bank
ASEAN	Association of South East Asia Nations
ATT	Average Treatment Effect on the Treated
CGAP	Consultative Group to Assist the Poor
CIDA	Canadian International Development Agency
DZMO	Dry Zone Microfinance Organization
ESR	Endogenous Switching Regression
FAO	Food and Agriculture Organization
FIML	Full-Information Maximum Likelihood
GB	Grameen Bank
GDP	Gross Domestic Product
GRET	Group de Recherche et D'Echanges Technologiques
HDI	Human Development Initiative
ICDP	Integrated Community Development Project
IDE	International Development Enterprises
IFC	International Finance Cooperation
IMF	International Monetary Fund
INGO	International Non-Governmental Organization
LIFT	Livelihoods and Food Security Trust Fund
MADB	Myanmar Agricultural Development Bank
MDGs	Millennium Development Goals
MEB	Myanmar Economic Bank
MF	Microfinance
MFIs	Microfinance Institutions
MOAI	Ministry of Agriculture and Irrigation
MOC	Ministry of Cooperatives
MOFR	Ministry of Finance and Revenue
MOU	Memorandums of Understanding
MSE	Microfinance Supervisory Enterprise
MSLE	Myanmar Small Loans Enterprise

NFBE	Non-Formal Business Education
NNC	Norwegian Nobel Committee
OLS	Ordinary Least Squares
PACT	Partner Agencies Collaborating Together
PPP	Purchasing Power Parity
PSM	Propensity Score Matching
RCT	Randomized Control Trial
SCB	State Commercial Bank
SRGs	Self Reliance Groups
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Program
UNO	United Nations Organization
WVM	World Vision Myanmar

CHAPTER 1
INTRODUCTION

1.1   Country Background

Myanmar is the second largest country with a geographic area of 676,578 km^2 in Southeast Asia; the estimated population is about 62 million. More than seventy percent of the population are residing in rural areas, where agriculture is the back-bone of the economy and the main source of employment. Table 1.1 shows that the country has 14 states and regions, 64 districts, 324 townships, and 65,148 villages. To compare the rests of the country, Yangon, Ayeyarwady, Mandalay, and Mon State are the most densely populated areas. In terms of trade, Myanmar has a favorable geographic location and surrounding with India and Bangladesh to the Northwest, China to the Northeast, and Lao PDR and Thailand to the East. According to the estimation of International Monetary Fund (IMF) on the real GDP growth rate, Fig: 1.2 shows that the economy of the country was with reasonable growth at 5.3% to 5.5% during 2010 -2012. Under the new government of the country, the policy was reformed to improve the new law of financial institutions, Law of Foreign Investment, and Law of Special Economic Zone.

In order to enabling poor people to sustain livelihoods and improve living conditions financial services play a critical role. Figure 1.4 is pointing that there is great need to expand poor people's access to financial services in Myanmar. Over 80% of potential clients are excluded from formal financial services access to credit, deposit and other financial services such as insurances and remittances. Therefore, the poor people have to rely on relatives, friends, traders and money lenders to get the loans.

Table 1.1 Myanmar Demographic Data

No:	States/Regions	Population	Population per sq km	Number of Districts	Number of Townships	Number of Villages	Population (2012)
1	Mandalay Region	14%	620	7	31	5,472	8,865,858
2	Ayeyarwady Region	14%	240	6	26	11,651	8,435,786
3	Yangon Region	12%	744	4	45	2,119	7,563,377
4	Sagaing Region	10%	68	8	37	6,095	6,382,723
5	Bago Region	10%	157	4	28	6,498	6,155,173
6	Shan State	10%	38	11	54	15,513	5,952,852
7	Magway Region	9%	122	5	25	4,774	5,480,736
8	Rakhine State	6%	93	4	17	3,871	3,412,529
9	Mon State	5%	244	2	10	1,199	3,001,724
10	Kayin State	3%	61	3	7	2,092	1,848,959
11	Tanintharyl Region	3%	96	3	10	1,255	1,676,282
12	Kachin State	3%	22	3	18	2,630	1,962,748
13	Chin State	1%	16	2	9	1,355	580,451
14	Kayah State	1%	27	2	7	624	321,447
	Total			**64**	**324**	**65,148**	**61,640,645**

Source: IFC Advisory Services in East Asia and the Pacific, 2013
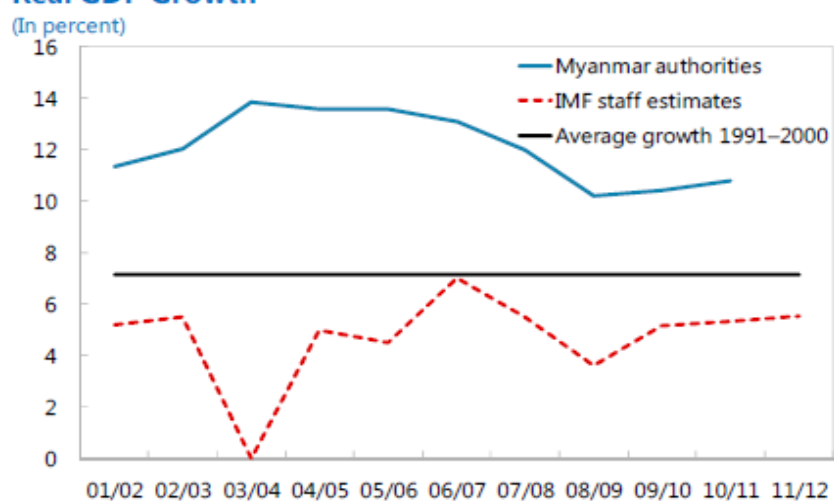
Figure 1.1 Real GDP Growth Rate

Source: IFC Advisory Services in East Asia and the Pacific, 2013

Per Capita GDP (PPP)
(In U.S. dollars)
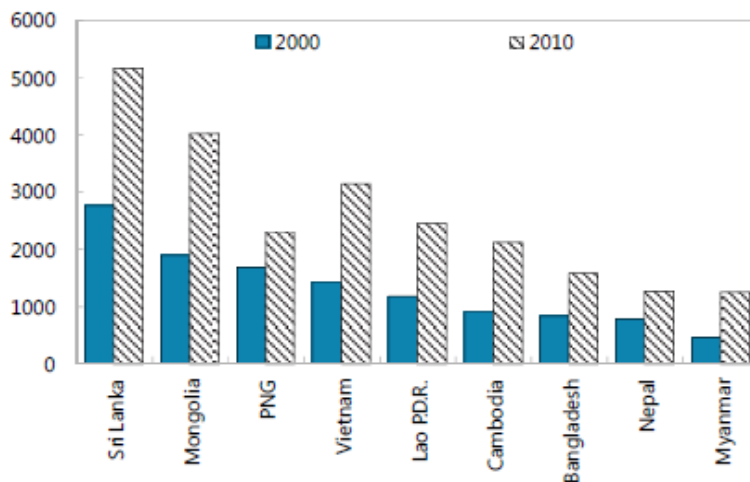
Figure 1.2 Per Capita GDP (PPP) Among ASEAN Countries

Source: IFC Advisory Services in East Asia and the Pacific, 2013

Inflation
(Year-on-year percent change)
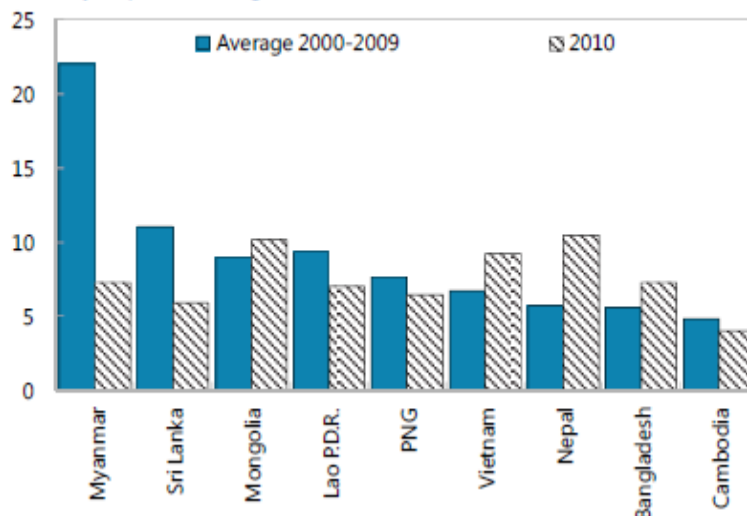
Figure 1.3 Inflation Rate Among ASEAN Countries

Source: IFC Advisory Services in East Asia and the Pacific, 2013

The microfinance sector of the country now stands at the start of a period of rapid growth and institutional development due to the enactment of the "Microfinance Business Law" in November 2011. Myanmar Microfinance Supervisory Enterprise (MMSE) was established and provided the legal framework for setting up both deposit and non-deposit Microfinance Institutions (MFIs) taking. Up to date 142 MFIs have been licensed.

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Credit to the Economy
(In percent of GDP)
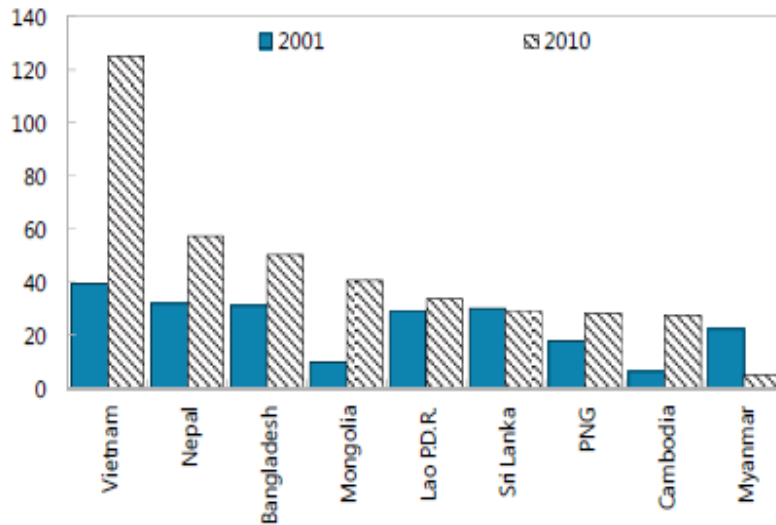
Figure 1.4 Credit to the Economy Among ASEAN Countries
Source: IFC Advisory Services in East Asia and the Pacific, 2013

1.2 Literature Reviews

A microfinance (MF) program is a type of loan assistance provided to economically vulnerable people to augment their household income by increasing investments in their enterprises, farming, and other income-generating activities. Access to finance may contribute to a long-lasting increase in income by means of rise in investments in income generating activities and to a possible diversification of sources of income. In addition, it may contribute to accumulation of assets; guarantee smooth consumption, reduce vulnerability due to illness (healthcare), and contribute to better education, and housing of the borrower. In general, adequate access to finance may contribute to an improvement of the social and economic situation of poor.

In this regard, MF could be viewed as a mechanism designed for poverty reduction and social empowerment with intention of providing credit to the poor. In addition, this can also be use for income generating activities such as investment in small business, investment in crops and animal production, expansion of farm enterprises or for the payment of children school fees and among others.

In other words, MF supports informal sectors that often have low returns and low market demand as well as poor women who are left out of the formal financial system. This however, is important to the economy because poor households are often face difficulties in accessing credit from commercial Banks and local moneylenders, due to lack of assets to use as collateral or large interest rate charge, credit market imperfections, credit rationing that might occur due to factors such as adverse selection, asymmetric information, or government policies (Feder et al., 1990). According to Li et al., (2011), the exploitive interest rate of informal loans have exacerbated farmer's indebtedness and further kept most of the households trapped in poverty. Duvendact et al., (2011) outlined a number of approaches used in the literature to evaluate impacts of MF on well-being.

In a related development, there are various ways through which MF could be view to have impacted well-being and this includes profit level, income, expenditure on food, healthcare and, education, or asset (van Rooyen et al., 2012). Others include, housing, job creation, and food security among others. However, a search in the literature shows that there is a large body of evidence in the literature that has shown positive contribution of microcredit to household's welfare across the globe. Some of these studies include poverty reduction (Morduch 1998; Pitt and Khandler 1998; Copestake et al., 2001; Khandler, 2005; Imai, et al, 2010), increase in profit level (Tedeshi, 2008), and increase in income, expenditure and consumption of poor households (Copestake et al., 2005; Benerjee et al., 2009; Berhane and Gardebroek, 2009).

Also, MF has been credited with improving other financial outcomes (including savings and the accumulation of household assets), as well as non-financial outcomes such as health, nutrition, women's empowerment, and social cohesion (Schuler, et al., 1997; Khandker, 2001; Afrane, 2002; Hietalahti and Linden, 2006; Mohindra et al., 2008). Also, there is a growing number of literatures with evidence that MF has no clear impacts on welfare of participating households (see for detail; Aghion and Mordoch, 2005; 2010).

To mention but a few, one of the most popular studies on the impact of MF on household welfare is by Pitt and Khandker (1998), where the authors used

household survey data for 1991–92 and a village fixed effect model based on data from Bangladesh. They find that access to MF increases consumption expenditure, especially if women take the loans. Coleman (1999) using data from a quasi-experiment conducted in Northeast Thailand in 1995-1996 and also fixed effect model found evidence of little impact of program loans, especially when estimates of impact tend to account for self-selection and endogenous program placement. Chemin (2008), using the same Bangladesh surveys as in Pitt and Khandker (1998), applies the propensity score matching technique and finds that access to microfinance has a positive impact on household expenditures, supply of labor, and school enrollment. Khander and Pitt (2003) examined the impact of MF on a number of outcomes using panel household survey from Bangladesh. They found declining long-term effects of MF as well as the possibility of village saturation from MF loans in the study.

Also, Khandler (2005) using the same data as in Khander and Pitt (2003) and focus on the poverty reduction impacts of MF, found evidence that access to MF contribute to poverty reduction, especially for female participants and to overall poverty reduction at the village level in their study. Thibbotuwawa et al., (2007) used Propensity Score Matching to estimate impacts of MF on household welfare and the authors also showed that MF contributes significantly to the household welfare represented by income, expenditure on consumption and expenditure on education. Imai et al., (2010) using propensity score matching on national household data from India found evidence that MF decreases poverty in rural than in urban areas in their study.

Likewise, Mahjabeen (2008) examines the welfare and distributional implications of MFIs in Bangladesh using a general equilibrium framework. The authors found evidence that MF raises income and consumption levels as well reduce inequality and enhance welfare of households in the sample. Li et al., (2011) with a focus on Chinese rural households and using differences-in-difference (DID) approach found evidence that microcredit program helps improve households welfare defined in terms of income and expenditure on consumption in the study. Thus, as demonstrated from the reviewed literatures, it is obvious that MF is an effective developmental strategy and has important policy implications regarding poverty reduction and income.

1.3   Problem Statements

As noted by Imai et al., (2010), most parts of the developing world would still remain characterize by huge demand for microfinance services, if not for the exceptional growth of microfinance sector during the last three decades in serving around 40 millions clients worldwide. Although the importance of credit in assisting the poor to improve their welfare, poor people are still excluded from formal financial system in developed countries with partial exclusion and in developing countries with full or nearly full exclusion Brau & Woller (2004).

In Myanmar, local community, especially the poor and vulnerable in rural areas, have no capabilities to enable them to come out from the poverty trap. Poor peoples who have limited resources, are in need for access to loan in order to invest for their daily income earning activity such as agriculture, livestock, forestry and so on based on their skills and knowledge. If this group of community is neglected, they have to rely on natural resources which ultimately will cause environmental degradation and make them to become poorer.

More than seventy percent of the population lives in rural areas, where agriculture is the main source of earning income. Poverty remains one of the major challenges as majority of the poor lives in the rural areas. As at 2011, the per capita income in the country is about US$ 832, while food poverty level is about 5% UNDP (2012). But poverty is double in rural areas, compared to urban areas with wide regional inequalities in human development and MDGs indicators.

The demand for credit is high in Myanmar as well. However, few institutions provide microcredit, and unmet demand is estimated by industry experts at close to US$ 1 billion UNCDF (2012). Noted by Lhing, et al., (2013) the formal financial institutions in Myanmar are under the control of the central bank and borrowers need to have assets or properties to access loan from the bank. This however, left most poor households in the country to depend on MFIs or private lenders to secure needed credit to enhance their welfare.

Moreover, a search in the literature shows that Anyanwu (2004) employed collateral, credit rationing, preferences for high income participants and large loans, bureaucratic and lengthy procedure of providing loan in the

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formal sector keep poor people outside the boundary of the formal sector financial institutions in developing countries. As mentioning above, so far there are still few researches on the topic for determinants of households demand for credit use not only in Myanmar even in developing countries. Most of the studies Mohamed (2003), Guiso et al., (2004), Okurut (2004), Mpuga (2008), Ajani & Tijani (2009) they addressed the issue of access without referring to effective demand.

Most rural households find it difficult to finance their farming operations, including their other income-generating activities, owing to their limited savings. Therefore, in order to adopt relevant technologies and improve their farm productivity and income, the households need assistance in the form of production loans. The formal financial institutions in Myanmar (which are governmental financial institutions) are under the control of the Central Bank, and borrowers need to have assets or properties to get a loan from them. Consequently, the poor people in Myanmar are forced to avail credit facilities from certain rich people, brokers, and traders, who charged high interest rates.

1.4 Research Objectives

Based on the above problem statements this study focus to identify the role of different MF programs and to analyze its impact on welfare of household from various locations of the country (especially the places for high level of poverty incidence occur). Most of the poor people and lower income people join MF program in study areas because they can access credit with specified interest rate which is lower than that obtained from informal money lenders. Poor people can invest loans in their business, agricultural production and also, thus, save money. Therefore, it is hypothesized that clients with a long-term participation on the savings group may have better quality of life in terms of income, health, food intake, wealth and expenses on well-being items. In order to achieve the purposes, it is need to address the specific objectives as the following:

1. To analyze the impact of INGO microfinance program on households' livelihood and factors influencing household income of rural people in Dry Zone Area.

2. To evaluate the effects of participating in INGOs microfinance program and socioeconomic determinants that influence on welfare of households and demand on credit use from six different townships.

1.5   Organization of the Dissertation

This dissertation is composed of eight chapters and the relationship of each chapter is presented in Figure 1.5. The detail explanation of each chapter is as following:

The chapter two presents about the MF, theoretical framework and its role on rural development programs. This is the main part of this dissertation and the main purpose of this chapter is to provide the insight about the theories involved in research, which is the base of investigation. It provides the general concept of poverty, definitions of microfinance, characteristics of MF and its methodology. Then it also provides idea about the core program of MF, as, savings mobilizations and human development.

Chapter three introduces the background of MF development and MF programs in Myanmar. This chapter provides the status of the supply of MF: the playing role of informal sector and semi-formal sector, banks, cooperatives, NGOs, specialized agricultural development companies and government organization. Therefore, this chapter closely supports to chapter four, chapter five, chapter six and chapter seven.

While chapter four analyses on impact assessment of the performance of PACT MF on rural households of dry zone area. This chapter used primary data from agricultural farmers from Kyaukpadaung Township in October 2008. To achieve the research objectives, both primary and secondary data were collected. For primary data, survey was conducted in six villages of Kyaukpadaung Township in dry zone area (October 2008). Random sampling method was used to select 162 households, and they were interviewed by face-to-face. Among the whole sample, 102 respondents were taking loan (clients) and 60 respondents were not taking loan (non-clients). Descriptive analysis was used to identify the demographic and socio-economic characteristics of the respondents. A logistic regression model was used to investigate the determinants factors on taking

loans. The results of this chapter have revealed that the respondents who are female, single, younger people, higher educational level, small family size and small scale of land holding size more willing wanted to join in taking loans. The probability of taking loan was also influenced by increasing number of crops, established new business and higher adoption of technology. Regarding to the household income and participating in village activities, these variables, increase or decrease have no significant effect on taking loan.

Chapter five investigates factors influencing the household income of both clients and non-clients and effect of microfinance on clients' socioeconomic characteristics on establishing new enterprises. It uses Cobb-douglas functional form and Logistic regression model with a total sample size of 162 respondents [102 (clients) and 60 (non-clients)]. The empirical results from the model indicate that most common important influencing factor on household income is education. Educational level has a strongly positive impact on household income, suggesting that a client with a higher educational level can generate more income than one with a lower educational level. The results of the pool analysis show that six independent variables—age of the head of household, gender of the head of household, educational level of the head of household, land holding size, number of crops, and established new enterprise—have a significant influence on household income. We found that starting new enterprises is one of the most important factors for increasing the household income of clients. In order to establish new enterprises, the local government should pay more attention to the basic infrastructure requirement, market access facilities in the study area. PACT should focus on business training skills, apart from the provision of loans, to create sustainable microenterprises and other economic activities that increase the income of households.

Chapter six investigates Welfare effect of Microfinance program in Myanmar. It uses Endogenous Switching Regression model that accounts for self-selection and endogenous program participation on a total of 431 respondents [311 (participants) and 120 (non-participants)]. In the study, two indicators of household welfare were considered namely, monthly per capita income and monthly per capita total expenditure. The empirical results show that bias would have resulted if the welfare function defined in terms of per capita

income and per capita expenditure for the participants and non-participants respectively, had been estimated without controlling for selection bias. We also uncover evidence that participants in the MF program have higher average per capita income and per capita expenditure than they would have earned if they did not participate in the program. This implies that microfinance is an effective developmental strategy and has important policy implications to enhance welfare as well as poverty reduction in Myanmar.

Chapter seven designed to identify households' socioeconomic factors influencing the demand for credit use in Myanmar. To avoid the censoring bias that Ordinary Least Squares could generate, a Tobit Model was adopted on a total sample size of 431 respondents from 6 different townships. The empirical results show that gender of household head, educational level, occupation, land holding size, marital status and per capita expenditure are important factors and significantly influencing on the demand for credit use. However, non-significant of the location dummies in the result show that the demand for credit by the households across the areas sampled is not different from each other or follow similar pattern. Based on the results, farming as occupation is a major driver of demand for credit highlights the need for farmers to have access to timely credit in food production in study. Moreover, female headed households demand for more credit than male underscores policy relevance of improving female access to credit to meet timely demand and the finding also stress the role of human capital (education) in demand for credit.

Finally, chapter eight presents overall conclusions and recommendations of this study for policy implications on both UNDP PACT and INGOs MF programs. And then some limitations and further of this research are also presented in this chapter.

CHAPTER 2
MICROFINANCE, THEORETICAL FRAMEWORK AND ITS ROLE ON RURAL DEVELOPMENT PROGRAMS

2.1   Microfinance

Microfinance is a form of financial development that has primarily focused on alleviating poverty through providing financial services such as deposits, loans, payment services, money transfers, insurance to poor and low income households and their microenterprises (ADB, 2003).

2.2   Characteristics of Microfinance

Microfinance gives access to financial and non-financial services to low-income people, who wish to access money for starting or extending an income generating activities. The following are the characteristics of MF products: (Yunus, 1999)

1. Little amounts of loans and savings.
2. Short- terms loan (usually up to the term of one year).
3. Payment schedules attribute frequent installments (or frequent deposits).
4. Installments made up from both principal and interest
5. Higher interest rates on credit (higher than commercial banks rates but lower than loan-shark rates), which reflect the labor-intensive work associated with making small loans and allowing the MF intermediary to become sustainable over time.
6. Easy entrance to the MF intermediary saves the time and money of the client and permits the intermediary to have a better idea about the clients' financial and social status.
7. Application procedures are simple.
8. Short processing periods
9. The clients who pay on time become eligible for repeat loans with higher amounts.
10. The use of tapered interest rates (decreasing interest rates over several loan cycles) as an incentive to repay on time.
11. No collateral is required contrary to formal banking practices.

2.3   Methodology of Microfinance

2.3.1   Group Lending

One of the most novel approaches of lending small amounts of money to a large number of clients who cannot offer collateral is group based lending. The size of the group can vary, but most groups have between four to eight members. Before acquiring a loan, the group selects by themselves for its members. Selected member(s) of the group are first loans granted and then to the rest of the members. Most Microfinance Institutions require a percentage of the loan that is supposed to be saved in advance, which points out the ability to make regular payments and serve as collateral.

To collect repayments, group members are jointly accountable of each other's loans and usually meet weekly. Peer pressure and joint liability works very well ensure repayment. If the entire group will be disqualified, it will not be eligible for further loans, even one member of the group becomes a defaulter. In Saving Group, most of the Clients are women on the basis that women repay their loans better than men and due to the oppression they need more favor. It is believed that loans expanded to women benefit all the household members with improved level of their livelihoods, food intake, health, education and etc.

2.3.2   Individual Lending

There are very few conventional financial institutions which provide individual loans to low-income people because poorer clients are considered higher risk clients due to their lack of collateral, plus the labor-intensive nature of the credits and hence the lack of profitability of small-credits.

2.3.3   Credit Unions

Credit unions are the organizations that are formed on the basis of financial relation of savings and loans between its members. They accumulate savings from its members and provide short-term credit to the needed members. In general, the demand for loans exceeds the supply of savings. In most rural areas credit unions are still the solitary source of deposit and credit services,

besides the informal financial market. Because credit unions have both social and commercial objectives which play a key role in offering pro-poor financial services. It has been observed that some clients have not benefited much from the credit unions because the level of savings required is too high.

2.3.4 Village Banking

This is a kind of financial services that assists poor communities to establish their own credit and saving associations, or village banks. Village bank provides non–collateralized loans to its members and a place to invest savings and promote social community. The sponsoring organization provides loan for the village banks and village banks in turn provide individual loans to its members. Peer pressure and support among the members are considered as the bank guarantees of these loans. To ensure repayment, borrowers need to do small working capital to repay every four to six months. At the beginning, borrowers start with a very small loan and gradually they establish loan ceiling. Loan sizes depend on the amount which borrower has saved. Member's savings are kept for the purpose of lending or investing to increase the resource base of the bank.

2.3.5 Self Help Groups/Associations

They are known to be female dominated organizations that save small amount of money and members can borrow from common pool on a rotating basis. These types of organizations or self help groups have sometimes been used by MFI for group lending among the members.

CHAPTER 3
MICROFINANCE DEVELOPMENT AND MICROFINANCE PROGRAMS IN MYANMAR

3.1   Microfinance Development in Myanmar

Historically, microfinance services were first introduced in 11 township in 3 zones of Delta, Dry and Shan in 1997 by United Nation Development Program's (UNDP) Human Development Initiative (HDI) via a plot project that was regulated by a special MoU with Myanmar government (ACTED 2010). Subsequently, a number of International Non-Governmental Organizations (INGOs) with microfinance program emerges, which include Groupe de recherché et dechanges technologiques (GRET), World Vision Myanmar (WVM), Association of Medical Doctors of Asia (AMDA), Private Agencies Collaborating together (PACT), Save the Children, and International Development Enterprises (IDE), while private sector involvement in microfinance program include ─Total, especially in the areas of Delta Regions, Dry Zone, Mountainous and Shan State. Because the operation of these microfinance actors lack specific regulatory framework by law they are refer to as microfinance project (MFP) not microfinance institutions (MFI) in the country. MFP offers loans/credit as their main product with no collateral requirement and the interest rate is far below charge by informal lender as part of their broader poverty alleviation intervention in the country. As noted by UNDP (2012), the demand for microfinance service is very high as it help the poor households to increase investment in agriculture, livestock, fishery, trading and services in Myanmar. But the industry remains underdeveloped as its growth constraint by the lack of a clear regulatory framework (ACTED 2010).

Accordingly, a new law backing microfinance activities paved way for the expansion of microfinance services and legalization of MFP as microfinance institutions (MFI) in November 2011 in the country. Presently, MFI exists in more than 22 townships (6,000 villages), as they service more than 400,000 clients of whom at least 90% are women in the country (UNDP 2012). Unfortunately, Foerch et al., (2013) identify some concern related to the enacted microfinance regulation, which include the following. First, low capita requirement has led to a

large number (about 166) of newly licensed MFIs between November 2011 and September 2013. Second, supervision is fragmented and lacks necessary know-how. Third, funding remains a key challenge for MFIs since they cannot tap re-financing from local and foreign financial institutions under the current rules and regulations.

There are six kinds of providers of microfinance services currently operating in Myanmar, namely informal and semi formal sector, banks, cooperatives, specialized agriculture development companies, government organizations and INGOs as noted by Foerch et al., (2013). As for the later, only AMDA, GRET, PACT, Save the Children and World Vision currently operate in the country, while PACT is regarded as the dominant provider of microcredit services in the country. But despite the wide spread of microfinance programs in the country, inability to access formal credit support has often been argued as a typical constraint in extending farmers' production and investment in income generating activities necessary to improve their living conditions. Subsequently, millions of micro-entrepreneurs and farmers have to rely on informal money lenders or pawnshops for credit with monthly interest rates of around 20% without collateral (ACTED, 2010).

Generally speaking, MFI in Myanmar employ a number of criteria to select which individual is eligible for their micro credit services. Some of these criteria include; size of the loan, compulsory mobilization of saving by members before credit is provides, availability of guarantor, and farmers that cultivate at least 5 acres among others (Foerch et al., 2013; UNDP 2012). Unfortunately, these criteria create selection bias problem as mentioned previously.

3.2   Supply of Microfinance

Table 3.1 shows that current microfinance outreach in Myanmar is about 2.8 million borrowers, with a total loan portfolio of 236 billion kyats. There are few institutions that provide microfinance services that have potential to reach a large scale while providing their services in a financially sustainable (IFC, 2013). Generally, microfinance operators offer products designed to help small enterprises meet production needs or enable poor to meet primary needs.

Products include income-generating loans, agricultural loans, consumer loans, healthcare loans, education loans, client welfare schemes, and voluntary savings. Micro-savings remains underdeveloped due to a limited number of suppliers and the aforementioned lack of savings culture. Approximately 2.2 million people have access to formal voluntary "microsavings," mostly through state banks, private banks, and cooperatives. There are six kinds of providers of microfinance services in the country: (IFC,2013)

1. Informal and semi-formal sector
2. Banks
3. Cooperatives
4. International Non-governmental Organizations
    i) Partner Agencies Collaborating Together
    ii) International Development Enterprises Proximity Design
    iii) World Vision Myanmar
    iv) Group de Recherche et D'Echanges Technologiques
5. Specialized agricultural development companies and
6. Government organizations

3.3   International Non-Governmental Organizations

Before establishing of the Microfinance Law in November 2011, only PACT UNDP was allowed to operate in Myanmar legally. Since 2011, most international NGOs and local NGOs have received MFI license. As shown in Table 3.1 the leading institutions (GRET, PACT, Save the Children, and World Vision) have reached over 450,000 active borrowers with an aggregate loan portfolio of over US$69 million.

3.3.1   PACT UNDP

The PACT UNDP microfinance project in Myanmar is currently servicing more than 440,000 clients, among them 97% are women with a total portfolio around US$29.5 million. This PACT program is one of the largest and most successful in the world and ranked 20th among all microfinance programs worldwide. The microfinance operations have a huge impact on the poor,

benefiting particularly women who enter into business of their own and are having income of their own. Now they are playing increasing roles in decisions within their households as well as their community and their self confidence and social status are also also rising. UNDP initiated a microfinance project during the second phase of UNDP's HDI in 1997 and implemented by three International NGOs (Grameen Trust from Bangladesh in the Delta Region, GRET from France in Shan State, and PACT from the United States in the Dry Zone). In 2006, PACT was selected through an international bidding process to be the sole implementing agency. As of March 2012, PACT UNDP operated in 25 townships covering 5,984 villages. With 105 branches and a total staff of 1,780, PACT UNDP is the largest operator in the country and it reaches 365,410 active borrowers with a loan portfolio of 52,701 million kyats (US$62 million). PACT UNDP offers 10 products, including eight microloans (with loan sizes ranging from US$65 to US$250), one microenterprise loan (with loan size up to US$1,875), and one micro-insurance product. The microfinance methodology used in the PACT UNDP project is similar to that of the Grameen methodology. According to PACT UNDP, repayment rates are close to 100 percent, and most loans are meant for agriculture (34 percent), livestock (33 percent), and trading (21 percent). Borrowers can access higher loan amounts based on successful repayment of previous loans.

3.3.2   International Development Enterprises Proximity Design

IDE Proximity Design is a United States based international NGO that has operated in Myanmar since 2004. Products of the IDE project include foot-operated irrigation pumps, drip irrigation sets, water storage tanks, solar lanterns, financial services, and farm advisory services. Proximity delivers its products through an extensive agent network in 125 townships (out of a total of 330 townships in Myanmar). Up to date, Proximity has delivered more than 110,000 products that have helped generate income for more than 500,000 people. IDE Proximity Design started credit lending for three years ago. It has a total of eight offices, 135 sales and collection officers, and 17 dedicated credit officers. It offers two loan products. The first enables farmers to buy Proximity irrigation products and purchase basic farm inputs (e.g., seed and fertilizer).

Over the past three years, Proximity has made a total of 42,517 of these loans, at an average loan size of around US$54. The second product is a crop loan targeting small-plot rice farmers who need to purchase inputs and hire labor. These are six month bullet loans with a flat rate of 2.5 percent per month on an average loan size of US$125.

3.3.3   World Vision Myanmar

World Vision is an international NGO that has been in Myanmar since 1958. It provides a wide range of community development activities, such as healthcare, infrastructure projects, school construction and education and nutrition support to children, agriculture and livelihoods trainings, etc. It operates in 11 out of 14 states and divisions in the country. For microfinance operations, World Vision started in 1998 with microloans to the agriculture and commerce sectors. Total number of active borrowers is 13,282 (83 percent women) and a loan portfolio of US $2.3 million with a loan range of US$40–1,200 as of early November 2012. The loans are mostly group loans that follow a methodology similar to that of Grameen. Repayment rate is 99 percent. Two-thirds of the loans are used for trade and production, 18 percent are for agriculture purposes, and 12 percent are for the services sector. World Vision charges an interest rate of 2.5 percent flat per month.

3.3.4   Group de Recherche et D'Echanges Technologiques (GRET)

GRET is the first international NGO to receive a non deposit-taking microfinance license under the new Microfinance Law. It started a microfinance program in remote areas in Chin State since1995. The program was set up using a network of village credit schemes (i.e., a decentralized system enabling the community to be actively involved in the management of the service). Each village bank comprises 10 to 30 solidarity groups with five members per group. Members of the group assume joint liability for the loans. In each village bank, a credit committee, a management committee, a bookkeeper, and a cashier are chosen by the members and trained by GRET. The management committee approves the loans, and the credit committee disburses and collects money.

From 2008, GRET introduced an individual microenterprise loan, with the support of the European Commission, that uses individual lending methodology with two witnesses. The program also offers vocational training on off-farm businesses. As of October 2012, GRET had 6,155 active borrowers and a total portfolio of 840,041,000 kyats (US$988,283), covering four townships and 99 credit schemes (89 villages) in Chin State. Most loans are used for pig and chicken breeding. GRET charges 2.5 percent interest per month plus an application fee. Loans are based on bullet repayments, with 12 months for group loans and 18 months for microenterprise loans.

Table 3.1 Microfinance Providers in Myanmar

Category	Individual Institutions	No. of Branches/ Outlets	No. of Borrowers	Outstanding Loan Portfolio (in Kyats)	Average Loan Outstanding (in Kyats)	Regulated	Supervisory Agency
State Owned Bank	MADB[1]	205	1,420,000	84,000,000,000	59,155	Yes	MOFR[2]
	MSLE[3]	143	208,778	31,341,790,000	150,120	Yes	MOFR[2]
Private Bank	MLFDB[4]	53	N/A	N/A	N/A	Yes	CBOM[5]
	PACT-UNDP[6]	105	365,410	52,701,000,000	144,224	No	N/A
	PACT MFI[7]	16	57,128	4,234,502,910	74,123	Yes	MSE[8]
	GRET MFI[9]	4	6,155	840,041,000	136,481	Yes	MSE[8]
Non-Governmental Organization	Save the Children MFI	N/A	7,737	367,747,782	47,531	Yes	MSE[8]
	World Vision MFI	12	13,282	1,910,033,328	143,806	Yes	MSE[8]
	IDE Proximity Design MFI	8	16,000	3,113,831,000	194,614	Yes	MSE[8]
	AMDA[10]	N/A	1,510	55,109,960	36,497	No	N/A
	Total	N/A	1,197	165,077,000	137,909	No	N/A
Cooperatives	Central Cooperative Society MFIs	46	32,851	1,125,690,000	34,267	Yes	MSE[8]/CCO[11]
	Financial Cooperatives Union of Saving and Credit Federation	1,625	476,632	16,500,000,000	34,618	Yes	CCO[11]
Specialized Agricultural Companies	Rice Specialization Companies	38	57,502	20,092,708,226	349,426	No	N/A
	Other Agri: Specialized Companies	22	140,000	20,000,000,000	142,857	No	N/A
Women's Union		16	4,800	48,000,000	10,000	No	N/A
Union Solidarity Development Association		N/A	N/A	N/A	N/A	N/A	N/A
Community Based Organizations		N/A	N/A	N/A	N/A	No	N/A
TOTAL		**2,293**	**2,808,982**	**236,495,531,206**	**119,763**		

Note to the Table

1. Myanmar Agriculture Development Bank
2. Ministry of Finance and Revenue
3. Myanmar Small Loan Enterprise
4. Myanmar Livestock and Fisheries Development Bank
5. Central Bank of Myanmar
6. Partner Agencies Collaborating Together-United Nations Development Program
7. Partner Agencies Collaborating Together Microfinance Institution
8. Microfinance Supervisory Enterprise
9. GRET Microfinance Institution
10. Association of Medical Doctors of Asia
11. Central Cooperative Society

Source: IFC Advisory Services in East Asia and the Pacific, 2013

CHAPTER 4
AN IMPACT ASSESSMENT OF THE PERFORMANCE OF PACT MICROFINANCE ON RURAL HOUSEHOLDS BY USING LOGISTIC REGRESSION ANALYSIS

4.1   Introduction

Microfinance is the form of financial development that has its primary aim to alleviate the poverty and also which is significant source of finance for poor, lower income people in Myanmar. Government, donors and NGOs around the world responded enthusiastically with plans and promised to work together towards the realization of these goals. Therefore the objectives of this chapter are: to compare the demographic and socioeconomic characteristics of the clients and non–clients, to investigate the impact of PACT MF program on changes in earned income, household assets, crop diversification, technology, education, saving, food intake, clothing, housing improvement and health aspects of the clients and finally to examine the determinants or influencing factors on taking loans. The analysis used data on 102 clients who are participating in the program and 60 who are not participating. To do a case study, PACT Myanmar MF program which is operating in Dry Zone Area of central Myanmar was chosen.

4.2   Study Site

Kyaukpadaung Township is considered as a case study for Dry Zone Area of Myanmar. Kyaukpadaung Township is situated in Mandalay Division   central area of Myanmar and the total land area is 485,341 acres (1 ha=2.4 acres). There are 339 villages composing 109 village tracts and 78,935 households. The total population is about 394,674.In Kyaukpadaung, 268,703 acres of the total land area are under cultivated land. Among them, 27,461acres, 240,736 acres and 506 acres are for lowland, upland and others respectively. The annual average rainfall is 28.07 inches. The daily average maximum temperature is 41 degree Celsius with average minimum is 12 degree Celcius, so high temperature fluctuation. There is an irrigation source, namely Kyetmaut and Pin Dams, mainly for summer rice cultivation. The major economic activities in this study area are

agriculture and trade. Agriculture is by far the most important sector with individual small holders as the most important production units.

Table 4.1 The Demographic Information of the Study Area

No	Classify	Total household	Under 18 years			Above 18 years		
			Male	Female	Total	Male	Female	Total
1	Urban	15,764	9,611	9,622	19,233	28,701	30,884	59,585
2	Rural	63,171	40,233	40,281	80,514	112,726	122,616	235,342
	Total	78,935	49,844	49,903	99,747	141,427	153,500	294,927

Source: Kyaukpadaung Township's Office

4.3 Methodology

4.3.1 Functions of Logistic Regression Model

Logistic Regression Model is a form of regression which is used when the dependent variable is dichotomy and the independents are of any types (categorical and continuous variables). It can be used i) to predict a dependent variable on the basic of independent and to determine the percentage of variance in the dependent variable explained by the independents, ii) to rank the relative importance of independents, iii) to assess interaction effects, and iv) to understand the impact of covariate control variables.

The success of logistic regression can be assessed by looking at the classification table, showing correct and incorrect classification of the dichotomous dependent. Also, goodness-of-fit tests such as model chi-square are available as indicator of model appropriateness as is the Wald Statistic to test the significance of individual independent variables. The regression model will be predicting the logit, that is, the natural log of the odds of having made one or other status. So the odd ratio is the natural log (base e) to the b power, where b is the unstandardized parameter. Odd is the ratio of probability of event occurring divided by the probability event not occurring. When odds are greater than 1, the event is more likely to happen than not. The larger odd ratio within tier indicates which variables have the most effect for that tier's category of the dependent variable.

The logistic regression predicts the probability of Y occurring given known value of X_1 (or Xs). The equation bears many similarities to the regression equations just described. In its simplest form, when there is only one predictor variable X_1, the logistic regression from which the probability of Y is predicted is given by the following equation. (Aldrich and Nelson, 1984)

$$P(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + e_1)}} \qquad 4.1$$

$$P(Y) = \frac{e^{(\beta_0 + \beta_1 X_1 + e_1)}}{1 + e^{(\beta_0 + \beta_1 X_1 + e_1)}} \qquad 4.2$$

in which, $P(Y) =$ the probability of Y occurring

$e =$ the base of natural logarithms

$\beta_0 =$ constant

$X_1 =$ predictor variable

$\beta_1 =$ the coefficient of X_1

$e_i =$ residual term

When there are several predictors the equation becomes:

$$P(Y) = \frac{1}{1 + e^{-z}} \qquad 4.3$$

$$Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + e_i \qquad 4.4$$

The resulting value from the equation is a probability value that varies between 0 and 1. If a value close to 0, Y is very unlikely to have occurred. If the value close to 1, Y is very likely to have occurred.

4.3.2   The Wald Statistics

The crucial statistic is the Wald statistics, which has a chi-square distribution and tell us whether the b coefficient for that predictor is significantly different from zero. If the coefficient is significantly different from zero then we can assume that the predictor is making a significant contribution to the prediction of the outcome Y. The Wald Statistic is usually used to ascertain

whether a variable is significant predictor of the outcome. The Wald statistic can be calculated by the following equation. (Aldrich and Nelson, 1984)

$$\text{Wald statistic} = \left[\frac{\beta_1}{S.E} \right]^2 \qquad \qquad 4.5$$

4.3.3 The ODD Ratio

More crucial to the interpretation of logistic regression is the value of exponential β, which is an indicator of the change in odds resulting from a unit change in the predictor. The odds of an event occurring are defined as the probability of event occurring divided by the probability of that event not occurring. It can be obtained by the following equation. (Aldrich and Nelson, 1984)

$$\text{ODD} = \frac{\text{Probability (event)}}{1 - \text{Probability (event)}} \qquad \qquad 4.6$$

If we know the odds before and after a unit change in the predictor variable, the proportionate change in odds (Exp β) can be calculated by dividing the odds after a unit change in predictor by the odds before that change.

$$\text{Exp } \beta = \frac{\text{Odds after a unit change in predictor}}{\text{Original odds}} \qquad \qquad 4.7$$

$$\text{Probability} = \frac{\text{ODD}}{(1+\text{ODD})} \qquad \qquad 4.8$$

That is,

$$\text{Log(ODD)} = \text{Log}\left[\frac{P(X)}{1-P(X)} \right] = \beta_0 + \beta_1 X \qquad \qquad 4.9$$

Where Y is the predicted probability of the event which is coded with 1 (taking loan) rather than with 0 (not taking loan), 1 −Y is the predicted probability of the other status (not taking loan), and X is the predictor variable.

4.3.4 Likelihood Ratio Test

This test uses the ratio of the maximized value of likelihood function for the full model (L_1) over the maximized value of the likelihood function for the simpler model (L_0). (Aldrich and Nelson, 1984)

The likelihood-ratio test statistic equals:

$$-2\log\left[\frac{L_0}{L_1}\right] = -2\left[\log(L_0)\text{-}\log(L_1)\right] = -2\ (L_0\text{-}L_1) \qquad\qquad 4.10$$

This log transformation of the likelihood functions yields a chi-squared statistic. This is the recommended test statistic to use when building a model through backward stepwise elimination.

4.3.5 Hosmer-Lemshow Goodness of Fit Test

The Hosmer-Lemshow statistic evaluates the goodness-of-fit by creating 11 ordered groups of subjects and then compares the number actually in the each group (observed) to the number predicted by the logistic regression model (predicted). Thus, the test statistic is a chi-square statistic with a desirable outcome of non-significance, indicating that the model prediction does not significantly differ from the observed. (Aldrich and Nelson, 1984)

In this chapter, the empirical analysis of the determinants or influencing factors on taking microfinance program in the area of Kyaukpadaung Township is carried out by using Logistic Regression Model. In a Logit Model, the endogenous variable is a dummy or categorical variable with 1 representing household is taking loan and 0 if the household is not taking loan. The present study considered some significant quantitative variables besides some qualitative or dichotomous variables. (Aldrich and Nelson, 1984)

Expressing differently and expanding the logistic equation, we can state:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \beta_9 X_{9i} +$$
$$\beta_{10} X_{10i} + \beta_{11} X_{11i} + e_i \qquad\qquad 4.11$$

The list of some selected variables for Logistic Regression Model is given in table which gives a description of the variables, hypothesis and the expected signs for each of the estimated coefficients. This table is followed by a description of extant literature of the 11 factors- family size, marital status, gender, age, education, land holding size, number of crops, income, technology adoption, participating in social activity, and establishing new business that determine taking loan.

4.3.6 Variables Explanation

Table 4.2 List of Variables Affecting Taking Loan for Logistic Regression Analysis

Variables	Description	Hypothesis
Dependent		
Taking loan	= 1 if household is taking loan	
	= 0 if household is not taking loan	
Independent		
FSize	Size of the Household	Increasing family size of the Respondents are more likely to taking loan(+)
MStatus	Marital Status (1=Single,0=Married)	Single respondents more willing to join on taking loan (+)
Gender	Gender (1=Female,0=Male)	Female respondents are more likely to participate in taking loan (+)
Age	Age (Years)	Older head of households are less likely to participate in taking loan (-)
Edu:Level	Educational Level (Years)	Higher level of head of households are more likely to participate in taking loan (+)
LHSize	Land Holding Size (Acres)	Higher land holding size of respondents are more likely to join taking loan (+)
NCrops	Number of Crops	Respondents with increasing number of crops are more likely to join in taking loan (+)
Income	Income per year (Kyats)	Higher income per year of respondents are less likely to join in taking loan (+) or (-)
Tech:Adop	Technology adoption (1= Yes, 0=No)	Higher changing farming practices may increase access and participate in taking loan (+)
Soc:Act	Participating in social activity (1= Yes,0=No)	Respondents who are participating in village activities more likely to join in taking loan (+)
Est:Buss	Established new business(1=Yes,0= No)	Household who established new business have high opportunity to participate in taking loan (+)

4.4　Results and Discussions

4.4.1　Descriptive Analysis for the Socio-Economic Characteristics

This chapter provides the empirical findings from the data analyzing of the collected data. It provides demographic and socioeconomic information of both clients and non-clients, the changes of living standard of clients and the statistical analysis of the information collected from them. Microfinance institutions target more women than men.

Table 4.3 provides the information on demographic and socioeconomic information for both respondents. In terms of gender distribution, 77.5 % of the clients are female while 22.5% are male. The main shares of the respondents are women that testify to the fact that most of the beneficiaries of microfinance are female. In some microfinance institutions like the Grameen Bank which is the biggest microfinance institution in terms of outreach, 96.0% of their clients are women.

In terms of age, although 50.0% of the clients are in the age group of 36 to 50 years, non-clients are 21.7%. Here it can be concluded that more younger respondents want to participate in the program. From this survey, I realized that many of the Clients had at least middle education, which represents 42.4% of the clients, however for non-clients about 21.7%. According to the result of marital status, 1.7% of non-clients still single when in clients 35.3%, which indicates that respondents who unmarried are more likely to join microfinance program. The average family size of the clients (5.5ppl) is lower than non-clients (7.2ppl). It is because as mentioned above 35.3% of clients still unmarried.

The analysis also reveals that 47.1% of clients have owned small microenterprise after joining PACT microfinance program and on the other hand for non-clients only 23.3% (last 3 years). We can see that more clients have owned small microenterprise and also can expand their business however higher proportion of non-clients did not have owned small microenterprise. So indirectly, PACT program can able to clients to earn income from small microenterprise.

Table 4.3 Descriptive Analysis on Socioeconomic Characteristics of Both Respondents

Variables	Measuring Group	Clients (N=102)		Non-Clients (N=60)	
		Frequency	Percentage	Frequency	Percentage
Gender	Male	23	22.5	43	71.7
	Female	79	77.5	17	28.3
Age(years)	≤35	23	22.5	6	10.0
	36-50	51	50.0	13	21.7
	≥51	28	27.5	41	68.3
Marital Status	Married	66	64.7	59	98.3
	Single	36	35.3	1	1.7
Educational	Not at all	18	17.6	13	21.7
	Primary	29	28.2	31	51.7
	Middle	43	42.4	13	21.7
	High	12	11.8	3	4.9
No: of Family Member	≤5	58	57.0	18	30.0
	≥6	44	43.0	42	70.0
Established New Microenterprise	Yes	48	47.1	14	23.3
	No	54	52.9	46	76.7

Source: Self Survey (2008)

4.4.2   The Impact of Microfinance on Livelihoods of Rural Household
4.4.2.1 Overall Household's Income

The overall household's income is another ingredient and the majority of the client's responded positively that they have registered 52.9% increased in incomes as shown in figure 4.1 while 13.7% answered decreased and 33.4% remained the same. Clients who increased income reported that agriculture and small micro-enterprise profits are an important income source for them. Especially for clients who generate own businesses like small microenterprise have higher income than agriculture.
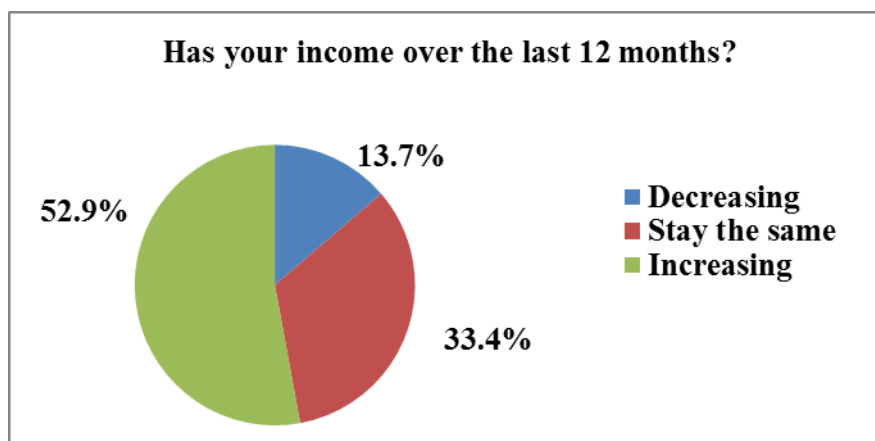
Figure 4.1 Situation of Household Income over the last 12 months

Source: Self Survey (2008)

4.4.2.2 Household's Saving
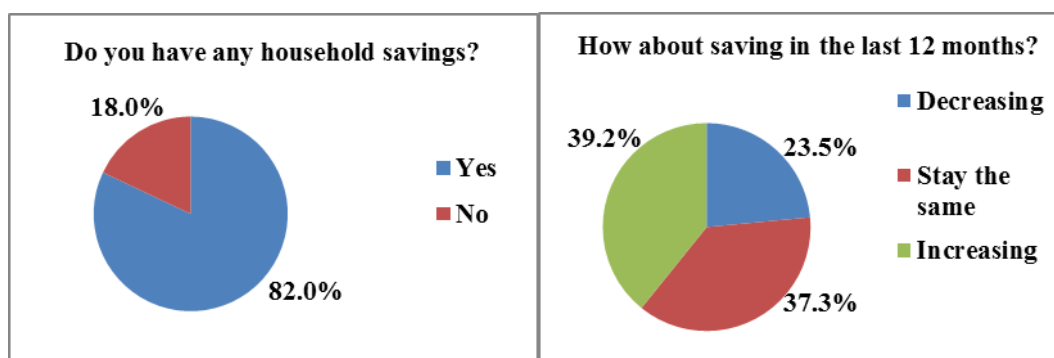
Figure 4.2 Situation of saving in the last 12 month

Source: Self Survey (2008)

Figure 4.2 shows that most of the clients (82.0%) responded that they have personal savings however 18.0% said they had no savings. The right hand side of the figure shows 39.2% having increased savings while 23.5% decreased and 37.3% remained constant.

4.4.2.3 Condition of Children's Schooling

There are different questions asked to the clients about their children's education who are in the school age (5-16 years of age) and how many attended school of their children before and after joining in the program. The findings are that there are 206 school aged from all of the households, most of the clients'

children can attend school. Concerning about how many children are going to school before/after participating loans, the questions are asked to the clients and the responses were very positively because of encouragement by PACT microfinance program. Most of the clients have enrolled all their school-age children in school. Before taking loan, only 125 students could attend to school however after taking loan 169 (89.0%) students can now attending school.

Table 4.4 The comparison of Children Schooling before and after Participating Program

Items	Clients (102)
Schooling Aged in Household	206
Before participating in microfinance program	125
After participating in microfinance program	169
% of schooling at present	89

Source: Self Survey (2008)

4.4.2.4 Health

It is evident that most of the clients interviewed took household health as a critical issue for their continued well being. At least more than half of the households had a sick person in the household in the last two weeks of the interview. Almost all of the clients could afford to visit health clinics and hospitals and also could afford to pay the medical expenses every time a member of the household when sick.
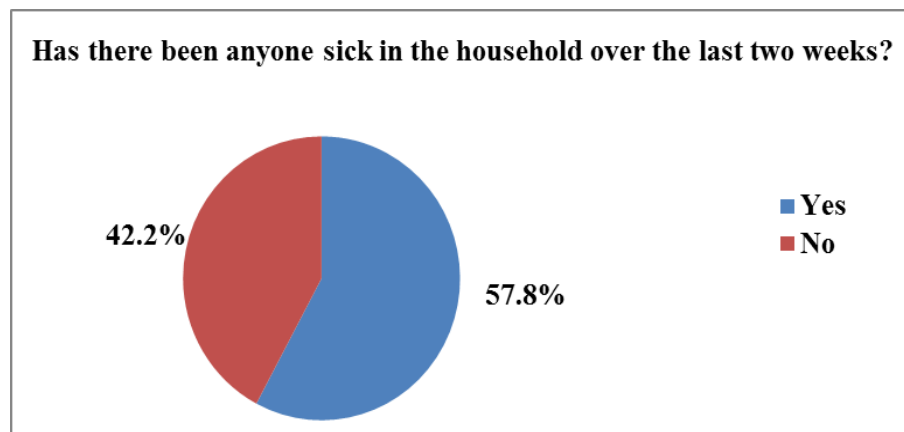
Figure 4.3 Is there any Sick in the Household over the last two weeks

Source: Self Survey (2008)

4.4.2.5 Technology Adoption

In the study area, out of 102 clients, 59 of them (57.8%) adopted one or more innovations from Agricultural Extension and NGOs. Table 4.5 shows that the innovations most adopted by clients were planting improved seeds, use of chemical fertilizer, processing of farm produce and changed cropping pattern.

Table 4.5 The number of Clients in Adoption of Technology

Items	Clients(N=59)	
	Frequency	Percentage (%)
Planted improved seeds	27	45.8
Used chemical fertilizer	12	20.3
Changed cropping pattern	10	16.9
Processed farm produce	7	11.8
Other	3	5.2
Total	59	100

Source: Self Survey (2008)

4.4.2.6 Food Consumption

Table 4.6 The Impact of Microfinance Program on Food Intake

During the last 12 months, has	Clients (N=102)	
your food intake:	Frequency	Percentage (%)
Worsened	9	8.8
Stay the same	29	28.4
Improved	64	62.8
Total	102	100

Source: Self Survey (2008)

For the large majority of the entire sample, more than a half (62.8%) of clients felt that there has been an improvement in their food intake. However, among the clients, it may be noted that (28.4%) of the households' food intake remained the same over the previous 12 months. On the other hand, a less number of clients (8.8%) felt that the situation have worsened in this regard.

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Thus, the benefits of participation in the PACT microfinance program are significantly differences between clients and non-clients.

4.4.2.7 Housing Improvement

Table 4.7 The Impact of Microfinance Program on Living Conditions

During the last 2 years, were any repairs, improvements or additions made to your home?	Units	Clients N=102	% of those who were members of the program
House repairs or improvements (fixed or improved existing roof, floor, walls or kitchen)	%	84.6	84.8
House expansion (built new room, shed, fence or wall)	%	37.2	86.2
Improved water or sanitation system (new well, latrine)	%	24.0	94.4
Lighting/Electricity	%	13.3	80.0
Other	%	11.8	87.5

Note: Multiple responses possible

Source: Self Survey (2008)

To concern the impact of the program on improvements in living conditions, 84.6% of the clients answered that they have undertaken repairs or improvements in the roof, floors, etc. Amongst the clients, a large majority 84.8% specified that these works have been undertaken only after they joined the program. In the case of housing expansion, 37.2% of the clients have done such work. Concerning to the improved water and sanitation system, the percentage was only 24.0%.

4.4.3   Empirical Results of the Logistic Regression Model Analysis

Table 4.8 informs how the procedure handled the dichotomous dependent variable, which helps to interpret the values of the parameter coefficients. Here, "non-client" was coded as a 0, while "client" was coded as a 1. (Aldrich and Nelson, 1984)

Table 4.8 Dependent Variable Encoding for Logistic Regression Analysis

Original Value	Internal Value
Non-Client	0
Clients	1

The omnibus tests are measures of how well the model performs. The chi-square is the change in the -2 log likelihood from the previous step, block, or model. If the step was to remove a variable, the exclusion makes sense if the significance of the change is large (i.e., greater than 0.10). If the step was to add a variable, the inclusion makes sense if the significance of the change is small (i.e., less than 0.05). In this analysis, the change is from Block 0, where no variables are entered. The statistics for the step, model and block are the same. In this case, the model is statistically significant because the p-value is less than 0.000. (Aldrich and Nelson, 1984)

Table 4.9 Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	157.825	11	0.000
	Block	157.825	11	0.000
	Model	157.825	11	0.000

From the model summary table, tests such as -2 log likelihood, Cox and Snell R square and Nagelkerke R square are reasonably good. Nagelkerke R-square is 0.85, 85% of the variations in dependent, taking loan, have been explained by the independent variables.

Table 4.10 Model Summary for Logistic Regression Analysis

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	55.740[a]	0.623	0.850

a. Estimation terminated at iteration number 8 because Parameter estimates changed by less than .001.

The below classification table shows how many cases are correctly predicted (54 cases are observed to be 0, non-client, and are correctly predicted to be 0; 97 cases are observed to be 1, client, and are correctly predicted to be 1), and how many cases are not correctly predicted (6 cases are observed to be 0 but are predicted to be 1; 5 cases are observed to be 1 but are predicted to be 0).The percentage of correct prediction is 93.2%. We can conclude that model classification is statistically accepted and is not due to chance factor.

Table 4.11 Classification Table of the Model

			Predicted		
			Respondent		Percentage Correct
			Non-Client	Client	
Step 1	Respondent	Non-Client	54	6	90.0
		Client	5	97	95.1
	Overall Percentage				93.2

Analysis of the survey data revealed that nine out of the eleven variables included in the model are significant (at 1% to 10%) in explaining the variation in taking microfinance status of household in the study area. These variables are family size, marital status, gender, age, educational level, land holding size, number of crops, technology adoption, and establishing new business and have signs in accordance with my hypotheses except family size and land holding size. The coefficients of Income is the correct sign but insignificant. Moreover, participating in social activities is also insignificant. The age of the respondents, has a negative coefficient that was significant at 1% level. This probably indicates that the older the respondents, the lower the probability that household would be taking loan. The younger respondents tend to be directly participated by increasing rate of taking loan than older respondents.

Table 4.12 The Variables Results of Logistic Regression Model Analysis

Independent Variables	Coefficients β	Std.Error S.E	Wald Statistics	Significance	Exp(β) or Odds ratio
FSize	-0.77	0.23	11.17	***	0.46
MStatus	2.83	1.22	5.42	**	16.92
Gender	2.10	0.89	5.61	**	8.18
Age	-0.15	0.05	7.75	***	0.86
Edu:level	0.45	0.18	6.40	**	1.57
LHSize	-0.34	0.14	6.32	**	0.71
NCrops	1.36	0.54	6.28	**	3.90
Income	0.00	0.00	0.13	n.s	1.00
TechAdop	1.82	0.97	3.53	*	6.16
SocAct	0.76	0.85	0.80	n.s	2.14
Estbus:	2.56	0.95	7.21	**	12.93
Constant	3.21	2.31	1.12	n.s	11.54

Number of Sample Size = 162

Notes: * Indicates that the coefficients are significant at the 10% level.

** Indicates that the coefficients are significant at the 5% level.

*** Indicates that the coefficients are significant at the 1% level.

n.s Indicates that the coefficients are not significant

Source: Self Survey (2008)

In terms of the household size, it is highly significant at the 99.0% percent confidence level and having negative impact on the probability of taking loan. It suggests that higher household size has a decreasing rate on taking loan. It is because in the survey area most of the clients have few members in their family, which indicates that respondents are either unmarried, or have no children. On the other hand, 98.0% of non-clients are married and almost their family members interested in working farms, which indicates that they don't want to participate in the microfinance program. The results also shows that the income variable is insignificant which means that there is no relationship and not affecting between whether the income higher or lower and taking loan. Apart from income, the other significant variables in the model are the educational

level of the respondents, gender of the respondents, age of the respondents, marital status, number of crops did they grow, awareness of technology adoption, and establishing new business. This implies that the probability of taking loan is higher with educated, female, younger single, as head of the family compared to others.

In addition, the respondents who have increased number of crops growing, higher adopted technology, and establishing new business are also significant factors affecting on taking microfinance program. Although the expected sign of land holding size is positive, in the result it is negative and significantly affecting on taking loan. Due to the criteria of land holding size, even the respondents have owned more than 10 acres the organization limited the loan amount. They will not be increased the loan amount based on the areas of the land holding size. For variable of participating in social activity it is not only insignificant but also the expected sign is opposite way.

4.5   Conclusions and Recommendations

This chapter focuses on the impact of microfinance program on the livelihoods of the clients household in Kyaukpadaung Township and a comparison group of non-clients household. It is observed that poverty alleviation efforts in terms of projects such as microfinance or microcredit programs are on the right track at micro level but there is need to support them with macroeconomic stability in the country. Impact evaluation plays an important role in an assessing the advantages and disadvantages attained through implementation of this development program. Nowadays, microfinance has become a very important tool for the alleviation of poverty and enhances the social and economic well-being of its recipients around the world.

According to the demographic and socioeconomic characteristic results, there are significant differences between clients and non- clients. This shows that most of the respondents who participating in the microfinance program are female, younger, still single and higher educational level than non-clients. We found that program participation had an impact on clients' enterprises, expenditures on household assets, and agricultural activities. The findings from the clients in the survey area reveal that a range of positive impacts from

participation in the microfinance program. After participating in the program, clients adopted technology innovations at a significantly higher rate than before participating. The major reason given for adoption of innovations is the availability of technical knowledge. This could be because most of the clients were trained before the loans are given to them.

In study area, the majority of the clients used their loans are especially on agriculture and small micro-enterprise purposes to buy agricultural inputs, agricultural tools, more stock, materials or supplies and to hire more workers. However, at least one-half of the clients used a portion of the loan for non-business purposes to buy food for the family, pay for health care and pay for their children education. In the case of non-clients, the reasons why they don't want to participate in the program are because of too complicated procedures, fear of legal action when they default, some are not interesting in the program and some are because they don't need loan. For client, respondents are also empowered through the program participation to increase the amount of money spent on accumulation of durable household assets. Program participation is strongly associated with specific types of diversification of income sources. The diversification of income sources involved households established new enterprises and increasing the number of crops cultivated.

Regarding to the results of household income, the household clients have reported an increase in their incomes is the main effectiveness of participating in the program. It is these incomes that can help clients to solve some problems of poverty, isolation, physical weaknesses as they can afford a good diet, can deal with vulnerability as they can save. In addition, they can also send their children to school and to pay for their health which is critical for their continued well-being and as a consequence break the poverty trap.

Microfinance program positively improved the living conditions of rural household who participated in the program as evidenced by changes in their income, savings and housing improvement. Compared to non-clients, the expenditures of clients on education, food, health care and clothing increased. This study is also attempted to analyze influencing factors or determinants of taking loan on PACT microfinance program in Dry Zone Area of Myanmar by

using Logistic Regression Model. The main findings of this empirical analysis are summarized: i) Marital status of respondent, gender, education level, number of crops, technology adoption and establishing new business are strongly associated with taking loan and the presence of these variables increases the numbers of being taken loan and ii) Family size, age of respondent and land holding size are highly significant variables but having negative impact on the program which means that the value of these variables increase the numbers of taking loan decrease.

It is recommended that Myanmar government should pay special attention to basic infrastructure, market access facilities in many of the remote areas of Myanmar. From research results, some non-clients couldn't join because of lacking of information therefore PACT MF program should collaborate with extension services to develop an educational and information program in order to disseminate the information to as many people as possible. And also the program should make easier and simple loan procedures, reduce some of their legal action and give more information of the advantage of taking loans which are good strategies for making respondents to become easily to join the program.

In order to guarantee sustainability and to achieve a greater impact of microfinance program, appropriate ways must be put in place to provide the basic social services especially education and health care which are needed to improve the quality of life of rural households. And also the size of loans given should be carefully adjusted, basing the loan size on the type of business. Therefore, new strategies might be required to accommodate flexible and variable loan sizes within groups.

Some clients suggested that the program should be reduced their interest rate to make the program attractive to more rural households. The duration of repayment rate also should be extended on time to meet the farming season. Most of the agricultural production in developing countries depend on the weather and are therefore seasonal. Short duration of repayment rate leads to difficult and poor to get the income from crop on timely. The program should introduce more income generating activities and effective education program to open up more income-earning opportunities for the farm households especially in

the non-farm sector. Therefore, to achieve the Millennium Development Goal of eradicating poverty in Myanmar, it is recommended that microfinance strategies should be designed in a way that would focus on and address the identified determinants as well as other factors that are related to improving household social wellbeing such as agricultural production, access to market, health education, and subsidy programs.

CHAPTER 5
AN ANALYSIS OF FACTORS INFLUENCING HOUSEHOLD INCOME:
A CASE STUDY OF DRY ZONE AREA

5.1   Introduction

In Myanmar, most rural households find it difficult to finance their farming operations, including their other income-generating activities, owing to their limited savings. Therefore, in order to adopt relevant technologies and improve their farm productivity and income, the households need assistance in the form of production loans. The formal financial institutions in Myanmar (which are governmental financial institutions) are under the control of the Central Bank, and borrowers need to have assets or properties to get a loan from them. Consequently, the poor people in Myanmar are forced to avail credit facilities from certain rich people, brokers, and traders, who charged high interest rates.

To solve this problem, PACT microfinance program is introduced in 1997, with support from UNDP, to disburse loans in Myanmar's Dry Zone area. Currently, the microfinance program is implemented in 46 townships. The program proposes to cover over 385,000 clients in around 6,000 villages, 90% of them are women MMIR (2010). PACT is a non-governmental organization that provides finance without collaterals. The only requirement between the clients and the financing organization is trust.

A microfinance program is a type of loan assistance provided to economically vulnerable people to augment their household income by increasing investments in their enterprises, farming, and other income-generating activities. Many research findings in the literature are related to this study. For example, Maikasuwa (2012) found that participating in the program increased not only the earning capacity of borrowers but also their wealth. An analysis of the impact of microfinance on the income of beneficiaries by Nudamatiya (2010) showed that microfinance has a positive impact on the income of beneficiaries. Chua (2000) said that microfinance contributes to building all kinds of assets and lead to the diversification of sources of income for the participants. Rubana Mahjabeen (2008) concluded that microfinance institutions made increase income and

consumption levels of households, reduce income inequality, and enhance welfare. The findings of Babajide Abiola (2011) based on the results of the Binary Logistic Regression Model, concluded that microfinance alleviated the financing difficulties of small enterprises. We conducted two objectives: (i) to analyze the factors influencing household income of both clients and non-clients, and (ii) to estimate the effect of microfinance and clients' socioeconomic characteristics on establishing new enterprises.

5.2   Review of PACT Microfinance Program

PACT is established in the United State in 1971 as an umbrella group to assist member NGOs. By 1992, PACT was not just an organization assisting member NGOs but was totally like an NGO, with the purpose of alleviating poverty around the world through local capacity building. PACT first entered Myanmar in 1997 and went on to manage the Dry Zone Microfinance Organization (DZMO), established under the UNDP's HDI Program to provide loans to the vulnerable people to invest in income-generating activities Turnell (2005). The following figure (Figure 5.1) shows the source of funds for PACT Myanmar and the loan outflow to the clients.
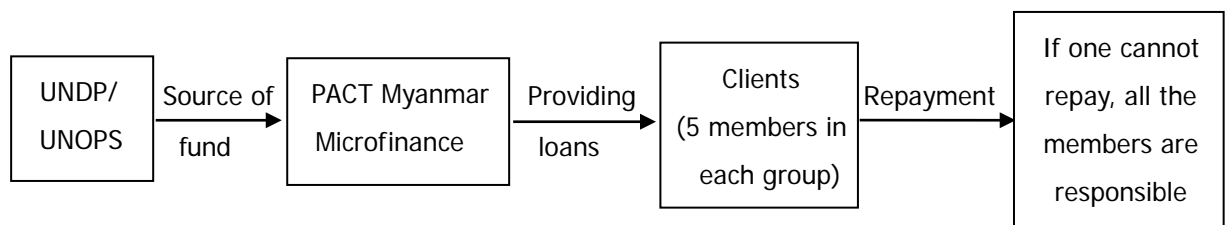
Figure 5.1 The flow of the loans to clients

Table 5.1 reveals that the sustainable microfinance project to improve the livelihood of the poor is introduced in the dry zone area in 1997 by PACT Myanmar. The total number of villages operating in the microfinance program is 311, with about 32,000 clients actively participating in the program, 98.0% of whom are female. PACT Myanmar has disbursed about 280,000 loans to the clients. As their record shows, the yearly repayment rate of the clients is 99.0%. PACT Myanmar provides various kinds of training programs to clients, such as training in non-formal business education (NFBE), institutional development, and record keeping.

Table 5.1 Sustainable microfinance by PACT to improve the livelihood of the poor

Items		Units	Number/Amount
Village Tracts Covered		Numbers	109
Villages Covered		Numbers	311
Number of Credit and Savings Groups		Numbers	5,854
	Male	Numbers	560
Number of Clients	Female	Numbers	31,488
	Total	Numbers	32,048
Savings Mobilized		Kyats	189,532,477
Number of Loans Disbursed		Numbers	279,443
Amount of Active Loans		Kyats	2,209,782,000
Loan Amount Disbursed		Kyats	12,692,990,000
	Principal	Kyats	11,570,801,544
Amount of Repayment	Interest	Kyats	2,464,198,266
	Total	Kyats	14,034,999,810
Loan Outstanding		Kyats	1,122,188,456
Male–Female Client Ratio	Male	%	2.0
	Female	%	98.0
Yearly Repayment Rate		%	99.0
Clients Completed NFBE Training		Numbers	29,833
Institution Development Training		Numbers	1,487
Record Keeping Training		Numbers	573

Source: PACT Office

Donor: United Nations Development Program (UNDP)/

United Nations Office of Project Services (UNOPS)

According to the PACT Myanmar microfinance rules, it takes three days for a group to get a loan. On the first day, the PACT Myanmar officials go to the village and announce the details of the loan in a meeting or at the village president's house. The PACT officials then call a meeting of the poor people in the village who are interested to avail a loan under the program. On the second day, the PACT officials form groups of the interested borrowers comprising five members each. If the groups are in an unstructured form, the PACT officials act as facilitators. On the third day, every group has to select its group leader and the treasurer, who would manage their savings. After that, the PACT officials disburse the loans. For repayment of the loans and interest, all the members of

each group are responsible for each other. If a client cannot repay the loan, the rest of the members of the group will be responsible for the loan of that client. For a clear understanding of the procedure, the following figure (Figure 5.2) shows the process of loan disbursement to the clients.
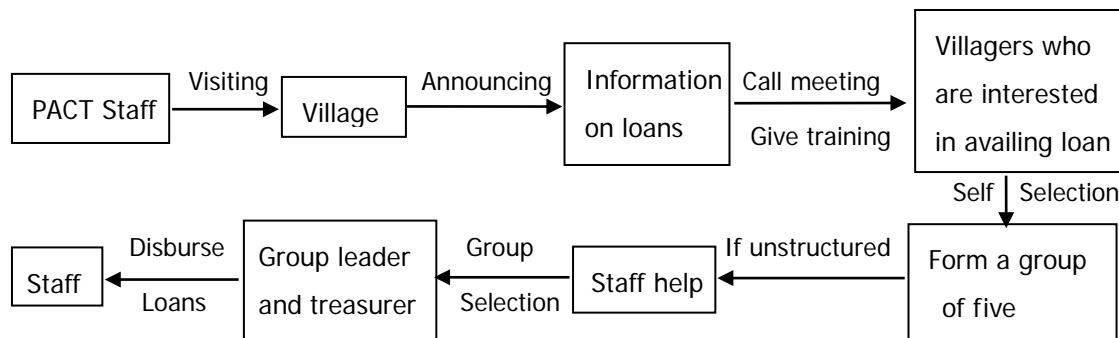
Figure 5.2 The process of loans disbursement to clients

5.3   Research Methodology

5.3.1   Study Area

The study is carried out in the Kyaukpadaung township, Mandalay Region, in the central part of Myanmar. The township has a total land area of 485,341 acres (1 ha = 2.4 acres), and is composed of 339 villages with 109 village tracts and 78,935 households, 80% of them relying on agriculture. However, in the summer season when there is a drought, getting irrigation water for their crops is a problem in all the villages, and as a result, most of the households in the area invest their loans in small businesses or trade, especially in summer. The total population is about 394,674, and about 268,703 acres of land are under cultivation. The area comprises 27,461 acres of lowland, 240,736 acres of upland, and 506 acres of other types of land. The annual average rainfall is 28.07 inches. The daily average maximum temperature is 41 degree Celsius, with an average minimum of 12 degree Celcius. There are two water irrigation sources for the township's summer rice cultivation, namely, the Kyetmaut and Pin dams. The major economic activities are agriculture and trade. Agriculture is by far the most important sector, with individual small holders being the most important production units MOAI (2008). Rice, pulses, sesame, groundnut, sugarcane, and certain horticulture crops are grown.

Table 5.2 Demographic information of the study area

Classification	Total households	Under 18 years			Above 18 years		
		Male	Female	Total	Male	Female	Total
Urban	15,764	9,611	9,622	19,233	28,701	30,884	59,585
Rural	63,171	40,233	40,281	80,514	112,726	122,616	235,342
Total	78,935	49,844	49,903	99,747	141,427	153,500	294,927

Source: Kyaukpadaung Township's Office

5.3.2 Survey Design

In October 2008, a survey is conducted in six villages in the Kyaukpa daung Township covering 162 households. Two strata of respondents were identified—those taking microfinance (clients), and those not taking microfinance (non-clients). Prior to data collection, the clients who had at least three years of experience as members of the program are interviewed. Data collection is done using the participatory approach, through questionnaires in a random-sampling face-to-face interview technique. The asking questions are very specific, with a fixed range of answers. Some of the questions had multiple-choice answers, and some had two response alternatives for the respondents; 102 responses are collected from the clients, and 60, from the non-clients. The questionnaire also covered data on the household demographic and socioeconomic characteristics, such as age, household size, gender, assets, income, expenditure, health aspects, adoption of advanced technology, number of crops, participation in social activities, and establishing new businesses. For village information, the data are collected through the president of the village and members of the village committee, and for program information, the data are collected by interviewing the PACT microfinance program officials.

5.3.3 Data Analysis

Data on the socioeconomic characteristics of the respondents are analyzed using descriptive statistics—the Cobb–Douglas (double-log) functional form and the Binary Logistic Regression Model.

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(i) The Cobb–Douglas (double-log) functional form: it is used to identify the independent variables that are important factors for increasing household income.

$$\text{Log } Y = \text{Log } a + b_1 \text{Log}X_1 + b_2 X_2 + \ldots + b_{10} X_{10} + e \qquad\qquad 5.1$$

Where; Y = household income of respondents (annual income)

X_i = independent variables (i = 1-10)

b_i = estimated coefficients (i = 1-10)

e = error term

(ii) The Binary Logistic Regression Model: it is used to estimate the effect of microfinance and clients' socioeconomic characteristics on establishing new enterprises.

$$Z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_{10}x_{10} + \mu \qquad\qquad 5.2$$

Where; Z = establishing new enterprise (if the response is Yes, it is 1; otherwise, it is 0)

X_i = independent variables (i = 1-10)

β_i = estimated coefficients (i =1-10)

μ = error term

Table 5.3 explains the variables, codes, and the expected signs for each of the estimated coefficients and describes eleven independent variables—age of the head of household, gender of the head of household, marital status, education, household size, changes in farming practices, land holding size, number of crops, establishing new enterprises, participation in the program and household income. PACT Myanmar provides their clients with training in non-formal business education. After participating in the program, some of the clients could establish new small business enterprises such as tailor shops, motorcycle carriers, animal husbandry, vegetable shops, food shops, drug stores, drink stores, and horse carts. In the study area, male clients showed a preference for motorcycle carriers, animal husbandry, and horse cart businesses.

Table 5.3 List of variables, codes & expected signs for Cobb–Douglas and Logit Models

			Cobb–Douglas		Logistic Model	
Independent Variables	Descriptions	Codes		Signs		Signs
X_1 Age	Age	Years	Age	+/-	Age	+/-
X_2 Gen:	Gender	Male =1, Female =0	Gender	+/-	Gen:	+/-
X_3 MS	Marital Status	Married =1,Single =0	MStatus	+/-	MS	+/-
X_4 Edu:	Education	Years	Education	+	Edu:	+
X_5 HHS	Household Size	Numbers	HSizes	+	HHS	+/-
X_6 CFP	Change in Farming Practices	Yes = 1, No = 0	CFPractices	+/-	CFP	+/-
X_7 LHSizes	Land Holding Size	Number of acres	LHSizes	+	LHS	+/-
X_8 NCrops	Number of Crops	Numbers	NCrops	+	NCrops	+/-
X_9 ENE	Establishing New Enterprises	Yes =1, No =0	ENEnterprise	+	(b)	(b)
X_{10} PP	Participation in Program	Client =1, non-client =0	PProgram	+	PP	+
X_{11} HHI	Household Income	Amount (US $/year)	(a)	(a)	HHI	+

Note: "(a)" denotes dependent variable for Cobb–Douglas (double-log) functional form

   "(b)" denotes dependent variable for Binary Logistic Regression

Source: Self Survey (2008)

On the other hand, females preferred to invest in businesses such as tailor shops, vegetable shops, food shops, drug stores, and drink stores. In this analysis, "gender of the head of the household" is an important factor. Even before this analysis, we expected that gender would be a significant factor because most of the clients in the study area are women owning small businesses, established with loans for income-generating activities. It would be interesting to analyze whether females make more money than males.

5.4   Results and Discussions

For information on the demographic and socioeconomic characteristics of the clients and non-clients, see Table 5.4. In terms of gender of the head of household distribution, 77.5% of the clients are female and 22.5% male. This

agrees with the findings of Adebayo (1997), ADB (2000), Olomola (2001), and Adeyeye (2003). In the study area, the main participants of the program are female, indicating that the majority of program beneficiaries are female. This finding is in line with the work of Yunus Muhammad (1999), who stated that in Bangladesh's Grameen Bank—the biggest microfinance institution in terms of outreach—96.0% of the clients are women.

In Table 5.4, in terms of age of the head of household distribution, the majority of clients (50.0%) are within the 36–50 age range, while 22.5% are younger. Thus, 72.5% of the clients are below 51 years, indicating that most of the clients in the microfinance program are young and active. These findings agree with those of Adinya (2011) that people under the age of 50 are economically more active and independent than those above the age of 50 years. For non-clients, only 31.7% are aged below 51 years. For household size, while 57.0% of the client families has between one and five members, only 30.0% of non-client families has between one and five members. According to marital status results, while 98.3% of non-clients are married, only 64.7% of clients are married, indicating that the unmarried are more likely to join microfinance programs. The table also revealed that many of the clients have at least middle-level education, representing 42.4%, while only around 21.7% of non-clients have the same level of education. The average household income of the clients and non-clients are, US $1090 and US $939 respectively. With regard to establishing new enterprises, 48 clients established new enterprises after participating in the program, while 14 non-clients already owned small enterprises.

The clients participated in the microfinance program due to the following reasons: the interest rates are low, collateral security is not required, the clients need loans, and they enjoy group financing. For non-clients, the reasons for not participating in the program include such as they considered the procedures too complicated, feared legal action in case of default, are not interested in the program, did not need the loan, lacked information, and considered the loan terms unfavorable. From these findings, we can make some helpful suggestions and recommendations for the future programs, by adding or reducing some rules.

Table 5.4 Descriptive analysis for demographic & socioeconomic factors of respondents

Var:	Mea: Item	Clients (N = 102)						Non-Clients (N = 60)					
		Freq	%	Avg	Max	Min	CV	Freq	%	Avg	Max	Min	CV
Age	≤35	23	22.5					6	10.0				
	36-50	51	50.0	47	71	26	190.08	13	21.7	52	77	35	133.02
	≥51	28	27.5					41	68.3				
Gen:	Male	23	22.5	0.23	1	0	0.17	43	71.7	0.72	1	0	0.20
	Female	79	77.5					17	28.3				
MS	Married	66	64.7	0.65	1	0	0.23	59	98.3	0.98	1	0	0.01
	Single	36	35.3					1	1.7				
Edu:	Illiterate	18	17.6					13	21.7				
	Primary	29	28.2	2.97	4	1	1.147	31	51.7	2.27	4	1	1.182
	Middle	43	42.4					13	21.7				
	High	12	11.8					3	4.9				
HHS	≤5	58	57.0	5.49	12	1	9.69	18	30.0	7.18	13	3	5.00
	≥6	44	43.0					42	70.0				
HHI	≤800	39	38.2					30	50.0				
(yearly)	801 –1600	48	47.1	1090	3365	253	4.294	20	33.3	939	2540	157.4	4.066
US $	≥1601	15	14.7					10	16.7				
ENE		48	47.1	0.47	1	0	0.252	14	23.3	0.23	1	0	0.182

Source: Self Survey (2009)

5.4.1 Determinants or Factors Influencing Household Income

Before examining the results of both models, we first analyze the correlation between the variables. In the correlation matrix, most of the values of the variables are suitable to the analysis in the models. However, the values of two variables, education and changed farming practices, is 0.641, indicating a moderate correlation between them. Although this study first analyzed all the variables in the models and then the nine variables excluding changed farming practices, the values of all the parameters and significant variables from both the results are the same. Therefore, we used all the variables to analyze in both models.

Table 5.5 shows the results of the independent variables that influence the household income of clients, non-clients, and both (combined clients and non-clients) using the Cobb–Douglas (double-log) functional form. From these

results, we discuss the relationship between the dependent and independent variables as follows:

(i) For the clients' analysis, we examine nine independent variables to analyze which of them are important factors on household income. The value of the adjusted r^2 shows that about 80.0% of the independent variables are closely related to household income. For correlation, the independent variables such as gender, marital status, education, household size, land holding, number of crops, and establishing new enterprises are positively correlated with household income. However, two variables, age of the head of household and change in farming practices, are negatively correlated with household income. For significance, three independent variables such as gender of the head of household, educational level, and establishing new enterprises, are positively significant factors influencing household income. For age of the head of household, the factor has a negatively significant influence on household income: a 1% increase in age reduces the household income by 0.461%. This finding agrees with the work of Kudi (2009), who studied the impact of the UNDP microfinance programs on poverty alleviation among the farmers in selected local government areas of Kaduna State, Nigeria. Their study found that a unit increase in age would reduce household income by 31.5%. The gender variable has a significant positive relationship with household income: male clients recorded higher household income than female clients did. This effect is significant at the 5% level.

Table 5.5 Analysis of factors influencing the household income of clients and non-clients

Var:	Clients		Non-clients		Both (Clients and Non-clients)	
	Double-log	t value	Double-log	t value	Double-log	t value
Constant	9.521***	11.022	4.507***	3.553	6.393***	11.654
Age	-0.461***	-4.491	0.074	0.812	-0.228*	1.662
Gen:	0.124**	2.472	-0.011	-0.127	0.144**	2.138
MS:	0.067	1.164	-0.104	-1.459	-0.016	-0.190
Edu:	0.191**	2.334	0.538***	4.828	0.511***	7.011
HHS	0.004	0.082	0.130*	1.753	0.013	0.256
CFP	-0.011	-0.147	-0.007	-0.088	-0.106	-1.461
LHS	0.061	0.973	0.248**	2.353	0.227***	3.749
NC	0.094	1.658	0.076	0.890	0.186*	1.942
ENE	0.269***	3.255	0.164	1.588	0.460***	5.646
PP	-	-	-	-	-0.052	-0.631
r^2	0.817		0.774		0.758	
Adjusted r^2	0.799		0.733		0.742	
F ratio	45.573***		19.041***		47.377***	
N	102		60		162	

Source: Survey conducted by self (2008).

Note: *, **, *** Significant at 10% ($P < 0.1$), 5% ($P < 0.05$), and 1% ($P < 0.01$), respectively.

The clients' educational level is critical and statistically significant for enhanced household income. As shown, a 1% increases in the education of the client will increase the household income by 0.191%. This finding agrees with the work of Oluwasola (2010), who studied the stimulation of rural employment and income for cassava processing farming households in Oyo State, Nigeria. The author found that a unit increase in the level of education would increase the net income of clients by 29.5%. In addition, this study shows that a 1% increase in establishing new enterprises will increase the household income by 0.269%, as the variable is positively correlated with high statistical significance.

(ii) For the analysis of non-clients, nine independent variables are used, just as for clients. From the results, six independent variables (age of the

head of household, educational level of the head of household, household size, land holding size, number of crops, and establishing new enterprises) have positive signs, while three (gender of the head of household, marital status, and changed farming practices) has negative signs. With regard to significance level, the variable for educational level is positive and highly significant at the 1% level, and is an important factor for influencing household income. Two variables, household size and land holding size, are also positively related to household income and significant at the 5% and 10% levels, respectively. This implies that a 1% increase in household size and land holding will increase crop production and, at the same time, household income, by 0.130% and 0.248%, respectively.

(iii) For the combined analysis, one independent variable (participation in the program) is added in the model to check whether the microfinance program has an impact on program participation or not. Thus, ten independent variables are used in the model to determine the variables influencing household income. This study showed that six independent variables have significant influence on household income. Except for the variable of age of the head of household, the other five variables such as gender of the head of household, educational level of the head of household, land holding size, number of crops, and establishing new enterprises, have significant positive influences on household income. This implies that a 1% increase in these variables will increase the household income by 5%, 1%, 1%, 10%, and 1% significance levels, respectively. From the above three analyses, the variable for the educational level of the head of household is a common significant variable and the most important factor influencing household income. These findings indicate that the respondent with higher educational level can increase their household income rather than those with lower educational level.

5.4.2   Relationship between Establishing new Enterprises and Socioeconomic Factors

We used the Binary Logistic Regression Model to estimate the effect of microfinance and socioeconomic characteristics on establishing new enterprises. Table 5.6 shows that the parameter estimates of the significant variables are as described in Equation 5.2. In the model, we analyzed ten independent variables using the Binary Logistic Regression Model to estimate their relation with establishing new enterprises. The overall fitness measure of the model is given by the likelihood value (-2 log likelihood), which shows how well the model fits the data. In this study, the value of -2 log likelihood is 61.76, indicating that the data fit the model well, following Hair (1998), who mentioned that the smaller the value of -2 log likelihood, the more well-fitting the model.

In this analysis, the probability of the model chi-square (158.539 and Sig .000) is less than the significance level at 0.05. It is hypothesized that the coefficient of the independent variables is equal to zero with the degree of freedom 10. This supports the existence of a relationship between the independent variables and the dependent variable. The fitness of the model was also determined using the Cox and Snell (r^2 = 0.624) and the Nagelkerke (r^2 = 0.841) methods. The Nagelkerke r^2 can be explained to mean that 84.1% of the variation in establishing new enterprises is owing to the independent variables in the model.

The direction of change in the probability of establishing new enterprises in relation to the independent variables can be explained according to the sign of the coefficients. In Table 6, three out of ten independent variables strongly favor the odds of establishing new enterprises, because the value of the odds of these variables are greater than one and significant. These variables are household income, changed farming practices, and program participation. More specifically, the odds of establishing new enterprises (Y) are positively related to program participation, household income, and changed farming practices; this finding indicates that the probability of improvement on establishing new enterprises increases with increases in program participation, household income, and

changed farming practices. The coefficients of the three variables are statistically significant at the 5%, 1%, and 5% levels, respectively.

Table 5.6 Binary logistic regression estimates of the effect of microfinance and clients′ Socio-economic characteristics on establishing new enterprises

Variables	B	S.E	Wald	Sig.	Exp(B)
HHIncome (X_1)	0.007***	0.002	16.593	0.000	1.007
Age (X_2)	-0.068	0.042	2.660	0.103	0.934
Gender (X_3)	0.698	1.033	0.456	0.499	2.009
MStatus (X_4)	-0.315	0.983	0.102	0.749	0.730
Education (X_5)	-0.741	0.524	1.999	0.157	0.477
HHSizes (X_6)	0.120	0.127	0.888	0.346	1.127
CFPractices (X_7)	2.645**	1.039	6.476	0.011	14.088
LHSizes (X_8)	0.068	0.096	0.510	0.475	1.071
NCrops (X_9)	0.002	0.339	0.000	0.995	1.002
PProgram (X_{10})	2.451**	1.228	3.982	0.046	11.600
Constant	-6.532*	3.396	3.699	0.054	0.001

Source: Self Survey (2008).

Note: *, **, *** Significant at 10% ($P < 0.1$), 5% ($P < 0.05$), and 1% ($P < 0.01$), respectively; N = 162, -2 Loglikelihood = 61.176; Chi-square = 158.539; Cox and Snell R^2 = 0.624; Nagelkerke r^2 = 0.841.

5.5   Conclusions and Recommendations

Microfinance is a type of financial service providing loans to the poor to help them increase their household income and economic welfare, acquire property and reduce poverty, and support their need for better livelihood. By participating in the microfinance program, the clients received loans to establish new enterprises based on their skills. The new enterprises helped some of them increase their household income, and many of them could gain better education for their children and improved household assets. This study aimed to analyze the factors influencing the household income of both clients and non-clients, and to examine the relationship between establishing new enterprises and the

socio-economic factors of both clients and non-clients. The Cobb–Douglas (double-log) functional form is applied to analyze the former and the Binary Logistic Regression Model is applied to examine the later.

From the demographic and socioeconomic characteristics results, we found that most of the clients who participated in the program are young, female, and single; has a higher educational level and higher average household income; and on average had established more new enterprises than non-clients. From the results of three regression analyses, we found that the most common important influencing factor on household income is education. Educational level has a strongly positive impact on household income, suggesting that a client with a higher educational level can generate more income than one with a lower educational level.

The results of the combined analysis show that six independent variables—age of the head of household, gender of the head of household, educational level of the head of household, land holding size, number of crops, and established new enterprise—have a significant influence on household income. Out of these, gender of the head of household, educational level of the head of household, land holding size, number of crops, and establishing new enterprises significantly increased household income. However, the age variable significantly decreased household income. From the logistic regression results, three variables, household income, changed farming practices, and participation in the program, have a positive and highly significant impact on establishing new enterprises.

From the above results, we found that starting new enterprises is one of the most important factors for increasing the household income of clients. In order to establish new enterprises, the local government should pay more attention to the basic infrastructure requirement, market access facilities in the study area. PACT should focus on business training skills, apart from the provision of loans, to create sustainable microenterprises and other economic activities that increase the income of clients.

The study area is located in Dry Zone area, where it is very difficult to grow crops in the summer owing to drought conditions. Therefore, the PACT

program should provide effective training to open up more income-generating opportunities for the households, especially in the non-farm sector. The government also should collaborate with the microfinance organizations in this regard.

The major reasons for non-clients not participating in the program are the following: the procedures are too complicated, there is a fear of legal action, the program is not interesting, and there is a lack of information. Therefore, for non-clients, PACT should introduce easier and simpler loan procedures, reduce their exposure to legal action, and give attractive and more convincing information about the advantages of the program.

CHAPTER 6
THE IMPACT OF INGOs MICROFINANCE ON WELFARE OF HOUSEHOLDS: AN ENDOGENOUS SWITCHING REGRESSION APPLICATION

6.1   Introduction

It is no longer news that establishment of microfinance movement, in particular Grameen Bank (GB) in the early 1980s in Bangladesh by Professor Muhammad Yunus has not only helped the poor but the local economies, where microfinance institutions (MFI) thrive around the world. The success of GB in Bangladesh in providing microcredit services to the poor has inspired numerous non-governmental organizations (NGOs) (both local and international) and governments in the developing economies to establish group-lending schemes to deliver credit at the lowest-cost and reasonable interest rates to small-scale rural entrepreneurs and farmers (Coleman, 1999). As noted by Imai et al., (2010), most parts of the developing world would still remain characterized by huge demand for microfinance services, if not for the exceptional growth of microfinance sector during the last three decades in serving around 40 million clients worldwide.

While recognizing the role which microfinance play among the poor, the Norwegian Nobel Committee highlighted the significant contribution of microcredit to wellbeing in their speech when 2006 Nobel peace Prize was awarded to Muhammad Yunus (and Grameen Bank) for pioneering the idea of microcredit in Bangladesh in the early 80s. Subsequently, the Norwegian Nobel Committee (2006) concluded that microcredit is one means through which large population can break out of poverty. This is because access to finance contribute to a long lasting increase in income by means of rise in investments in income generating activities and to a possible diversification of sources of income. In addition, it may contribute to accumulation of assets; guarantee smooth consumption, reduce vulnerability due to illness (healthcare), and contribute to better education, and housing of the borrower. In general, adequate access to finance may contribute to an improvement of the social and economic situation of poor.

In Myanmar, despite recent economic growth at the national level, poverty remains one of the major challenges as the majority of the poor in the country lives in the rural areas. The country is ranked 149 out of 168 countries on the Human Development Index (HDI), although the scores have been improving in recent years (UNDP, 2012). As at 2011, the per capita income in the country is about $US 832, while food poverty (food insecurity) level is about 5% (UNDP, 2012). But poverty is twice as high in rural areas, compared to urban areas with wide regional inequalities in Human Development Index and Millennium Development Goals (MDGs) indicators. According to ADB (2013), about 27% of the country's population based on 2010 data is below poverty line, while about 47% of the country's population based on 2011 UNDP's HDI lives on less than $1.25 (PPP) per day (Takamatsu, 2012).1 But as noted by Lhing, et al., (2013), the formal financial institutions in Myanmar are under the control of the central bank and borrowers need to have collateral (assets or properties) to access loan from the bank. This however, left most poor households in the country to depend on MFI or private lenders to secure needed credit to enhance their welfare.

Given the fact that the attention of the world has shifted towards Myanmar with increasing number of foreign investment offers and various intervention programs for the poor, it is important to understand whether previous intervention projects of the International Non-Governmental Organizations (INGOs) in form of microfinance programs have impact on the welfare of households in the country. While large body of literature have looked into the impact of microcredit services on poverty, household income and expenditure and many other welfare indicators across countries in Asia (Morduch 1998; Coleman, 1999; Khandker 2005; Mohindra et al., 2008; Mahjabeen, 2008; Imai et al., 2010; Li et al. 2011 etc.), there is little evidence in Myanmar. Hence, to the best of our knowledge, this is very first study that examine the impact of microcredit on household welfare so as to complement the existing studies by adding the perspective of Myanmar. In this regard, we believe a study of the impact of microfinance program on indicator of household welfare is important to provide evidence base research as to whether previous intervention program such as microcredit services is an effective strategy to reduce poverty in the country.

Meanwhile, attempt to investigate the impact of program participation with a simple comparison of the mean difference of outcome indicator (which could be expenditure, income, asset etc.) between the participating and non-participating households, could highlight selection bias and therefore not provide any convincing impact estimates (Caliendo, 2006). The selection bias arises because participation in microfinance program is not entirely random, due to following reasons. First, endogenous program placement also known as targeting bias, where microfinance program is designed to target poor households or poor households tend to take loans from MFI, especially when microfinance program is targeted to recipients based on characteristics that are unobservable to researchers. Second, it can be due to self-selection bias problem associated with participation in microfinance programmes, where households themselves decide whether or not to participate in the program, depending on observable and unobservable characteristics. Hence, selection bias may lead to different probabilities of participating in the program (Imai, et al., 2010).

That said, Coleman (1999) noted that although group-lending program are having little impact on household welfare in Thailand in his study, nevertheless, the author concluded that 'naïve' estimates of any impact that fail to take into account self-selection and endogenous program placement were found to have overestimate the impact.

Thus, we address the problem of selection bias in the present study by using endogenous switching regression (ESR) model that combines features of standard sample selection model and endogenous variable models (Maddala, 1983). Although, other non-experimental methods such as Heckman selection model or Instrumental Variable (IV) regression could as well be used, but these two methods assume that outcome equation representing welfare function in the present study would differ only by constant term (i.e., unobservable factors) between the participating and non-participating households in the microfinance program. According to Heckman et al., (1997), it is likely that the differences between two individuals with or without exposure to program may be more systematic even after conditioning on unobservable or observable factors. Another equally relevant non-experimental method is the propensity score matching (PSM) technique. Unfortunately, PSM assumes that the outcome

equation is influence only by observable factors. The implication of this is that when outcome equation differs by unobservable factors, then the result of the PSM may give biased estimates. In this case, ESR model takes into account the limitation of Heckman sample selection, IV regression and PSM by considering both observable and unobservable factors. 2 Besides, ESR model aligns with the objective of this study, which also motivated its application in the present paper. However, a search in the literature shows that Nuryantono et al., (2005), Baiyegunhi et al., (2010) and Dong et al., (2010) employed ESR to investigate impact of credit on welfare of households in their respective studies.

To sum up, the objective of this study is divided into twofold: First, to identify factors influencing probability of participating in microfinance program. Second, to examine whether participants in the microfinance program have higher welfare than they would have earned if they did not participate in the program. Meanwhile, keeping with the United Nations' Millennium Development Goals (MDGs) of reducing poverty across the globe by the 2015, we consider two indicators of household welfare for the empirical analysis in the present study, namely monthly per capita income and monthly per capita expenditure. A search in the literature shows that previous studies by Nghiem et al., (2007), Ogundari and Aromolaran (2014) and Baiyegunhi et al., (2010) employed per capita expenditure as a proxy for household welfare in their respective studies, while Nghiem et al., (2007), Dong et al., (2010) and Li et al., (2011) employed household income as a proxy for household welfare in their respective studies.

6.2 An Overview of Microfinance and Its Impact on Household Welfare

Access to finance may contribute to a long-lasting increase in income by means of rise in investments in income generating activities and to a possible diversification of sources of income. In addition, it may contribute to accumulation of assets; guarantee smooth consumption, reduce vulnerability due to illness (healthcare), and contribute to better education, and housing of the borrower. In general, adequate access to finance may contribute to an improvement of the social and economic situation of poor.

In this regard, microfinance could be viewed as a mechanism designed for poverty reduction and social empowerment with intention of providing credit to the poor. In addition, this can also be use for income generating activities such as investment in small business, investment in crops and animal production, expansion of farm enterprises or for the payment of children school fees and among others. In other words, microfinance program supports informal sectors that often have low returns and low market demand as well as poor women who are left out of the formal financial system. This however, is important to the economy because poor households are often face difficulties in accessing credit from commercial Banks and local moneylenders, due to lack of assets to use as collateral or large interest rate charge, credit market imperfections, credit rationing that might occur due to factors such as adverse selection, asymmetric information, or government policies (Feder et al., 1990). According to Li et al., (2011), the exploitive interest rate of informal loans have exacerbated farmer's indebtedness and further kept most of the households trapped in poverty.

Investigating the impacts of intervention program such as microfinance by analyzing the mean differences between participants and non-participants, could give rise to selection bias problem as earlier mentioned. To avoid this, it is either to have detail information on the participants prior the intervention program, which in most cases is unknown and often regarded as missing data problem or simply substitute non-participants details for lack of detail information on the participants prior the intervention as counterfactual to participants. Unfortunately, the later always give rise to selection bias problem.

Duvendact et al., (2011) outlined a number of approaches used in the literature to evaluate impacts of microfinance on well-being, which include randomized control trial (RCT), two-stage instrumental variable (IV) regression (also known as multivariate control function), propensity score matching and multivariate (control function). Others include; computable general equilibrium model, endogenous switching regression, and Heckman model. Of these approaches, RCT is the only approach that compare the outcome of participants and non-participants if participants were a random sample of all those qualified, in what is called randomized design experiment (Imbens and Wooldridge 2008). But RCT is very expensive to implement and time consuming.

In a related development, there are various ways through which microfinance could be view to have impacted well-being and this includes profit level, income, expenditure on food, healthcare and, education, or asset (van Rooyen et al., 2012). Others include, housing, job creation, and food security among others. However, a search in the literature shows that there is a large body of evidence in the literature that has shown positive contribution of microcredit to household's welfare across the globe.

Some of these studies include poverty reduction (Morduch 1998; Pitt and Khandler 1998; Copestake et al., 2001; Khandler, 2005; Imai, et al, 2010), increase in profit level (Tedeshi, 2008), and increase in income, expenditure and consumption of poor households (Copestake et al., 2005; Benerjee et al., 2009; Berhane and Gardebroek, 2009). Also, microfinance has been credited with improving other financial outcomes (including savings and the accumulation of household assets), as well as non-financial outcomes such as health, nutrition, women's empowerment, and social cohesion (Schuler, et al., 1997; Khandker, 2001;Afrane, 2002; Hietalahti and Linden, 2006; Mohindra et al., 2008). Also, there is a growing number of literature with evidence that microfinance has no clear impacts on welfare of participating households (see for detail; Aghion and Mordoch, 2005; 2010).

To mention but a few, one of the most popular studies on the impact of microfinance on household welfare is by Pitt and Khandker (1998), where the authors used household survey data for 1991–92 and a village fixed effect model based on data from Bangladesh. They find that access to microfinance increases consumption expenditure, especially if women take the loans. Coleman (1999) using data from a quasi-experiment conducted in Northeast Thailand in 1995-1996 and also fixed effect model found evidence of little impact of program loans, especially when estimates of impact tend to account for self-selection and endogenous program placement. Chemin (2008), using the same Bangladesh surveys as in Pitt and Khandker (1998), applies the propensity score matching technique and finds that access to microfinance has a positive impact on household expenditures, supply of labor, and school enrollment. Khander and Pitt (2003) examined the impact of microfinance on a number of outcomes using panel household survey from Bangladesh. They found declining long-term effects

of microfinance as well as the possibility of village saturation from microfinance loans in the study.

Also, Khandler (2005) using the same data as in Khander and Pitt (2003) and focus on the poverty reduction impacts of microfinance, found evidence that access to microfinance contribute to poverty reduction, especially for female participants and to overall poverty reduction at the village level in their study. Thibbotuwawa et al., (2007) used Propensity Score Matching to estimate impacts of microfinance on household welfare and the authors also showed that microfinance contributes significantly to the household welfare represented by income, expenditure on consumption and expenditure on education. Imai et al., (2010) using propensity score matching on national household data from India found evidence that microfinance decreases poverty in rural than in urban areas in their study. Likewise, Mahjabeen (2008) examines the welfare and distributional implications of microfinance institutions in Bangladesh using a general equilibrium framework.

The authors found evidence that microfinance raises income and consumption levels as well reduce inequality and enhance welfare of households in the sample. Li et al., (2011) with a focus on Chinese rural households and using differences-in-difference (DID) approach found evidence that microcredit program helps improve households welfare defined in terms of income and expenditure on consumption in the study. Thus, as demonstrated from the reviewed literatures, it is obvious that microfinance is an effective developmental strategy and has important policy implications regarding poverty reduction and income.

6.3   Theoretical Framework and Empirical Model
6.3.1   Theoretical Framework

The study employs a random utility model in which decision to participate in microfinance program is modeled as a discrete comparison of expected utility of household welfare indicators represented by per capita income/per capita expenditure from the alternative regimes (i.e., non-participants). In this case, we assume respondents weigh up the expected

utility of the welfare indicators π for the participants $U_P(\pi)$, and the expected

utility of the welfare indicators π for the non-participants $U_N(\pi)$. Consequently,

we assume households' decision to participate in the program can be viewed as a

binary choice decision problem that tries to maximize utility of the welfare

indicators π.

Thus, let assume the difference between the utility of the welfare

indicator $\pi \left[U_P(\pi) - U_N(\pi) \right]$ is denoted by $U^*(\pi)$, such that $U^*(\pi) > 0$

$(U^*(\pi) \leq 0)$ corresponds to the welfare indicators π for the participants greater

(less) than that of non-participants as a decision stage. Unfortunately, this

decision stage is usually not observed, but can be represented by a latent

variable defined as

$$D_i = \begin{cases} 1 & if \quad U^*(\pi) > 0 \\ \\ 0 & if \quad U^*(\pi) \leq 0 \end{cases} \qquad\qquad 6.1$$

The individual preferences of the respondents are normally unknown to

the analysts with exception of the characteristics of the respondents and the

attributes of microfinance program under consideration represented by Z during

the survey period. In this regard, the binary decision choice to participate in

microfinance program conditioned on the observed covariates can be expressed

as

$$D_i = Z'\beta + \mu_i \qquad\qquad 6.2$$

Equation 6.2, which represents selection equation can be estimated by

probit model, where D_i is a binary variable, which represents decision to

participate in the microfinance program similar to equation 6.1; Z' is vector of

household socio-economic and demographic variables; β is a vector of unknown

parameters to be estimated and μ_i is a random error term. By construction, the

probit model (equation 6.2) can also be expressed as

$$pr\left(D=1\right)=pr\left(U_{P}\left(\pi\right)>U_{N}\left(\pi\right)\right)=pr\left(\mu_{i}>Z^{'}\beta\right)=1-F\left(-Z^{'}\beta\right) \qquad 6.3$$

where, F is the cumulative distribution function for ε_{i} which assumes a normal distribution. The outcome equation required to investigate the impact of microfinance program on welfare indicator of households (π) is specified as

$$\pi_{i}=X^{'}_{j}\alpha+\gamma D_{i}+\varepsilon_{i} \qquad 6.4$$

Equation 6.4 is a linear function of explanatory variables ($X^{'}_{j}$), where π is the vectors of welfare indicators represented by household per capita income (PCI) and household per capita expenditure (PCE) as $\pi=\left[PCI,PCE\right]^{'}$; $X^{'}_{j}$ is vector of households socio-economic and demographic variables; D_{i} is the participating dummy; ε_{i} is the error term of the regression and α and γ are parameters to be estimated. Intuitively, γ captures impacts of program participation on welfare indicator defined by π.

Unfortunately, non-random assignment of the participants due to sample selection bias associated with endogeneity of program placements (or targeting bias) and self selection problem that arises when decision to participate in the program or not may be associated with welfare effects of participation. In this case, the estimated parameter γ that captures the impact of the program participation likely to yield biased estimates as earlier mentioned.

Consequently, participation dummy (D_{i}) of equation 6.4 is endogenous by construction since D_{i} is likely to influence π due to both unobservable and observable factors. For example, selection bias arises if unobservable factors influencing both the error terms (i.e., error terms of participating equation- μ and that of outcome or welfare equation- ε), resulting in correlation of both error terms. In this case, when the correlation is greater than zero, OLS regression

techniques tend to yield biased estimates. The implication of this is that the use of standard regression techniques-OLS to estimate the parameters of equation 6.4 would result in biased and inconsistent estimates for policymaking.

That said, we employ endogenous switching regression (ESR) model proposed by Lee (1978) and Maddala (1983) to account for selection bias and systematic differences across the participants and non-participants in microfinance program in the study. The ESR corrects for selection bias in the households' welfare function for different regime, conditional on the decision to participate in microfinance program estimated by probit model. Thus, a typical ESR defined by equation 4 for both the participants and non-participants can be defined as

$$\pi_P = X_j^{'}\alpha_P + \varepsilon_P \qquad\qquad\qquad 6.5a$$

$$\pi_N = X_j^{'}\alpha_N + \varepsilon_N \qquad\qquad\qquad 6.5b$$

$$D_i^{*} = Z'\beta + \mu_i \qquad\qquad\qquad 6.5c$$

where, π_P and π_N represent household welfare indicator for the participating

and non-participating households in the program, respectively; D_i^{*} is the

unobserved latent index determining the probability of participating in

microfinance program; α_P, α_N and β are parameters to be estimated; $X_j^{'}$

and Z' are vectors of confounding factors defined above and $\varepsilon_P, \varepsilon_N$ and μ_i

are error terms of the respective, regressions. However, the relationship between

π and D_i^{*} can be illustrated using the expression below:

$$\pi_i = \begin{cases} \pi_P & if\ \ D_i^{*} > 0 \\ \\ \pi_N & if\ \ D_i^{*} \leq 0 \end{cases} \qquad and \qquad D_i = \begin{cases} 1 & if\ \ D_i^{*} > 0 \\ \\ 0 & if\ \ D_i^{*} \leq 0 \end{cases} \qquad 6.6$$

Following the work of Lee (1978), we assume a joint-normal distribution for the error terms in the equations 6.5a-6.5c with mean zero and

variance-covariance matrix (Ω) to control for selection bias in equation 6.6 as

$$\Omega = cov\left(\mu_i, \varepsilon_P, \varepsilon_N\right) = \begin{pmatrix} \sigma_P^2 & \sigma_{PN} & \sigma_{P\mu} \\ \sigma_{PN} & \sigma_N^2 & \sigma_{N\mu} \\ \sigma_{P\mu} & \sigma_{N\mu} & \sigma^2 \end{pmatrix} \qquad 6.7$$

where; $\sigma_P^2 = \mathrm{var}\left(\varepsilon_P\right)$; $\sigma_N^2 = \mathrm{var}\left(\varepsilon_N\right)$; $\sigma^2 = var\left(\mu_i\right)$; $\sigma_{PN} = \mathrm{cov}\left(\varepsilon_P, \varepsilon_N\right)$;

$\sigma_{P\mu} = cov\left(\varepsilon_P, \mu_i\right)$; $\sigma_{N\mu} = cov\left(\varepsilon_N, \mu_i\right)$; σ^2 represents variance of the error term

in the selection equation and σ_P^2 and σ_N^2 represent variance of the error terms

in the outcome equations for the participants and non-participants, respectively.

According to Maddala (1986), when there are unobserved factors associated with selection bias, it is likely the correlation between the error terms of equation 6.5c and that of equation 6.5a for participants (i.e., $\sigma_{P\mu}$) and 6.5b for non-participants (i.e., $\sigma_{N\mu}$) give rise to endogenous switching regression, which implies that $\sigma_{P\mu} \neq \sigma_{N\mu} \neq 0$. Also, when $\sigma_{P\mu} = \sigma_{N\mu} = 0$, there exist exogenous switching regression.

Thus, following the work of Lokshin and Sajaja (2004), we assume $\sigma^2 = 1$, since α in equations 6.5 is estimable only up to a scalar factor. In addition, $\sigma_{PN} = 0$; since π_P and π_N are never observed. Therefore, the conditional expectation of the truncated error terms ε_p and ε_N can be expressed following the work of Johnson and Kotz (1970) as

$$E\left(\varepsilon_P | D = 1\right) = E\left(\varepsilon_P | \mu > -Z'\beta\right) = -\sigma_{P\mu}\left(\frac{\phi\left(Z'\beta/\sigma\right)}{\Phi\left(Z'\beta/\sigma\right)}\right) \equiv -\sigma_{P\mu}\lambda_P \qquad 6.8a$$

$$E\left(\varepsilon_N | D = 0\right) = E\left(\varepsilon_N | \mu \leq -Z'\beta\right) = \sigma_{N\mu}\left(\frac{-\phi\left(Z'\beta/\sigma\right)}{1-\Phi\left(Z'\beta/\sigma\right)}\right) \equiv \sigma_{N\mu}\lambda_N \qquad 6.8b$$

where ϕ and Φ are the probability density and cumulative distribution

functions of the standard normal distribution, respectively. The ratio of ϕ and Φ evaluated at $Z'\beta$ represented by λ_P and λ_N in equations 6.8a and 6.8b is referred to as inverse mills ratio (IMR) which denotes selection bias terms.

Because of possible correlation between the error terms of the selection equation (6.5c) and outcome equations (6.5a and 6.5b), a two-stage method can be used to estimate the parameters of the equations. In this case, a first stage probit model similar to equation 5c is estimated to generate IMR represented by λ in equation 6.8, which can viewed as missing variable in outcome equations 6.5a and 6.5b. In the second stage, the selection bias term λ_P for participants and λ_N for non-participants are incorporated into equations 6.5a and 6.5b, respectively, because ESR model treats the sample selection problem as a missing variable problem and this gives rise to the following sets of equations

$$\pi_P = X'_j\alpha_P - \sigma_{P\mu}\lambda_P + \tau_p \qquad\qquad 6.9a$$

$$\pi_N = X'_j\alpha_N + \sigma_{N\mu}\lambda_N + \tau_N \qquad\qquad 6.9b$$

where, π_P, π_N, X'_j, α_P, and α_N are as earlier defined; $\sigma_{P\mu}\lambda_P$ and $\sigma_{N\mu}\lambda_N$ control for bias associated with sample selection problem, especially when respondents within and outside the program, respectively may be different from an average respondents with characteristics X and Z due to unobserved factors.

The λs and ε_P and ε_N of equations 6.5a and 6.5b, respectively cannot be used to calculate standard errors of the second-stage estimates (Fugile and Bosch, 1995). In this case, Lee (1978) suggested a procedure to derive consistent standard errors most especially for the two-stage approach while Maddala (1983) argue that such procedure requires potentially cumbersome and complicated process, which could not be implemented using earlier two stage approach. Thus, in the present study, a single stage approach where Full-Information Maximum Likelihood (FIML) method proposed by Lokshin and Sajaia (2004) using the *movestay* command in the statistical software STATA

is employed for the empirical analysis. The FIML simultaneously fit the selection (i.e., equation 6.5c) and outcome (i.e., equation 6.5a and 6.5b) equations in order to yield consistent standard errors, thus, making λ_P and λ_N in equations 6.9a and 6.9b, respectively homoscedastic.

Therefore, the FIML's log likelihood Function for switching regression model employed in this study proposed by Lokshin and Sajaia (2004) can be define as

$$lnL_i = \sum_{i=1}^{Q} \left\{ \begin{array}{l} \pi_i(.)w_i\left[\ell n\left(\phi\left(\psi_{P_i}\right)\right) + \ell n\left(f\left(\varepsilon_P / \sigma_P\right)/\sigma_P\right)\right] + \\ \left(1 - \pi_i(.)\right)w_i\left[\ell n\left(1 - F\left(\psi_{Ni}\right)\right) + \ell n\left(\Phi\left(\varepsilon_N / \sigma_N\right)/\sigma_N\right)\right] \end{array} \right\} \qquad 6.10$$

where $\psi_{P_i} = \dfrac{\left(Z'\beta + \rho_{P\mu}\varepsilon_{Pi} / \sigma_P\right)}{\sqrt{1 - \rho_{P\mu}^2}}$; $\psi_{N_i} = \dfrac{\left(Z'\beta + \rho_{N\mu}\varepsilon_{Ni} / \sigma_N\right)}{\sqrt{1 - \rho_{N\mu}^2}}$; $\varepsilon_{Pi} = \left(U_P(\pi) - X_j'\alpha_P\right)$;

$\varepsilon_{Ni} = \left(U_N(\pi) - X_{ji}'\alpha_N\right)$; ϕ and Φ are as earlier defined; w_i is an optimal weight for observation i ($i=1,2.....Q$); $\rho_{P\mu} = \dfrac{\sigma_{P\mu}}{\sigma_P.\sigma_\mu}$ is the correlation coefficient between ε_P and μ_i ; $\rho_{N\mu} = \dfrac{\sigma_{N\mu}}{\sigma_N.\sigma_\mu}$ is the correlation coefficient between ε_N and μ_i .To ensure that estimated parameters ρ_{PS} and ρ_{NS} are bounded between -1 and 1 and σ_P and σ_N to always be positive, the maximum likelihood directly estimates $\ell n\sigma_P$ and $\ell n\sigma_N$ and $a\,tanh\,\rho_{M\mu}$, where

$a\tanh\rho_{M\mu} = \dfrac{1}{2}\ell n\left(\dfrac{1 + \rho_{M\mu}}{1 - \rho_{M\mu}}\right)$ (where, $M = P$, N).

However, the sign of covariance terms $\rho_{P\mu}$ and $\rho_{N\mu}$ have a number of economic interpretations (Lokshin and Sajaia, 2004). For example, if $\rho_{P\mu}$ and $\rho_{N\mu}$ have alternate signs, then an individual participate in the microfinance program on the basis of comparative advantage. Also, if $\rho_{P\mu}$ and $\rho_{N\mu}$ have the same positive (negative) sign, then this indicates positive (negative) hierarchical

sorting). Likewise, if $\rho_{P\mu} < 0$ ($\rho_{P\mu} > 0$) implies that participants in the microfinance program have lower (higher) per capita income or per capita expenditure than a random households in the sample. Similarly, when $\rho_{N\mu} > 0$ ($\rho_{N\mu} < 0$) implies that non-participants have higher (lower) per capita income or per capita expenditure than a random households in the sample.

Therefore, following the work of Fugile and Bosch (1995), we can compute the impact of microfinance program on welfare indicator for the participants by estimating the per capita income or per capita expenditure they would have earned if they did not participate in the program. This is called average treatment effect on the treated (ATT), which can be calculated as follows

$$ATT = E\left(\pi_P - \pi_N \middle| D = 1\right) = X_j'\left(\hat{\alpha}_P - \hat{\alpha}_N\right) + \left(\hat{\sigma}_{N\mu} - \hat{\sigma}_{P\mu}\right)\lambda_P \qquad 6.11$$

From equation 11, $E\left(\pi_P \middle| D = 1\right) = X_j'\hat{\alpha}_P - \hat{\sigma}_{P\mu}\lambda_P$ represents the expected per capita income/per capita expenditure for respondents within the microfinance program had they chose to participate in the program; $E\left(\pi_N \middle| D = 1\right) = X_j'\hat{\alpha}_N - \hat{\sigma}_{N\mu}\lambda_P$ represents the expected per-capita income/per-capita expenditure for the participants had it been they choose not to participate in the program. According to Maddala (1983), ATT is the difference in the estimated coefficients $\hat{\alpha}_P$ and α_N represented by $\left(\hat{\sigma}_{N\mu} - \hat{\sigma}_{P\mu}\right)$. But, whenever $\left(\hat{\sigma}_{N\mu} - \hat{\sigma}_{P\mu}\right) > 0$, indicates that respondents within the program would obtain higher per capita income or per capita expenditure under selection bias than under random assignment.

6.3.2   Empirical Model

The selection equation (probit model) employs in the study to investigates empirically, which socio-economic characteristics of the respondents' influence the probability of participating in the microfinance program can be defined as

$$D_i = Z_k^{'}\beta_k + \mu_i \text{ and } \mu_i \square N(0,1) \qquad\qquad 6.12$$

where, D_i takes the value of 1 for the participants and 0 otherwise; Z_k is a vector of explanatory variables (this includes; household assets (such as number of VCD, Television, Bicycle, Motor cycle), household size, land holding size, crop, marital status, location, and age, gender, occupation, and education of household head); β_k is a vector of parameters to be estimated and μ_i is a random error term with zero mean and a unit variance.

Also, to investigate the impact of microfinance program on welfare indicators (π) in the study, we specified the welfare function as

$$\ell n\pi_M = \delta_{0M} + \sum_{j=1}^{J}\alpha_{jM}X_{jM} + \varepsilon_M \quad \text{M=P,N} \qquad\qquad 6.13$$

where, π represents per capita income or per capita expenditure; X_j represents household assets (such as number of VCD, Television, Motor cycle), household size, land holding size, location, crop, and age, gender, occupation, and education of household head, ℓn denotes the natural logarithm; subscript M=P, which stands for participants and M =N, which stands for non-participants) ; δ and α are parameters to be estimated; ε is the error term for the regression. Meanwhile, equation 6.12 and 6.13 were simultaneously estimated using the "movestay" command in "STATA" software by Lokshin and Sajaja (2004), which is based on Full Information Maximum Likelihood (FIML) estimator.

However, it is important to mention that we impose exclusion restrictions in the study such that at least two variables in the first stages (selection equation) were not included in the second stage (outcome equation) for identification purpose. In this regard, variables representing the number of Bicycle and Marital Status in participating equation 6.12 were not included in welfare function of equation 6.13.

Furthermore, the preliminary analysis of both welfare indicators (per capita income and per capita expenditure) using regression technique shows that these indicators are not normally distributed with normality assumption rejected

at p-value 0.0000. Based on this, we follow the suggestion of McDonald (2008) that if non-normality is detected, the simplest approach is to take the logarithm of the data, which explain why the dependent variable in equation 6.13 was logged.

6.4   Study Area, Sampling Technique, and Description of the Data
6.4.1   Study Area and Sampling Technique

The study was carried out in Chin state, Delta-zone region, and Dry-zone region of Myanmar. Geographically, Chin state lies between North Latitude 21 ° 0' and 24° 15' and East Longitude between 93 ° 15' and 94°0', while Delta-zone, lies in the southern end of the central plains of Myanmar. For Dry-zone, it is located in Central Myanmar.   These areas were selected because poverty remains considerably higher than the rests of the country.

For the sampling framework, two townships known for the presence and activities of INGOs' microfinance program were purposely selected from each of the following regions Chin state, Delta-zone, and Dry-zone, thus making a total of 6 townships namely Falam, Hakha, Bogalay, Gyune, Mandalay, and Yangon selected for the study. Hence, two strata of respondents were identified—those that participate in microfinance program and those that did not participate in the program as control group in each of the selected towns.

Thereafter, a well structure questionnaire was administered to a randomly selected 60 participants and non-participants in each of the selected 6 townships from September-October 2012, thus making a total of 120 respondents per town. The questionnaire covered information on the household income and expenditure per month, household demographic and socioeconomic characteristics, such as age, household size, gender, assets such as number of VCD, Bicycle, motorcycle, television, land holding size, number of crops planted, etc. Unfortunately, not all the questionnaire were retrieved from or fully completed by the respondents for further process.

Therefore, a total of 50 questionnaire for participants and 21 for non-participants were retrieved from Falam. Likewise, 48 participants and 19 non-participants from Hakha, 56 participants and 21 non-participants from

Bogalay, 56 participants and 19 non-participants from Gyune, 53 participants and 20 non-participants from Mandalay, and 48 participants and 20 non-participants from Yangon were also retrieved for further analysis. The overall households available for the empirical analysis include 311 participants and 120 non-participants with a total of 431 households in the study.

6.4.2   Descriptions of the Data

Table 6.1 presents summary statistics of the variables, segregated by participation in the study. Two variables are considered as welfare variables (or outcome variables), namely monthly per capita income (PCI) and monthly per capita expenditure (PCE). The explanatory variables hypothesized to explain these welfare variables include: GENDER equal to 1 if household head is male and zero otherwise, EDU represents total year of schooling of the household head, HHS represents household size, AGE represents age of the household head, MS defined the marital status of the respondents and equal to 1 if household head is married and zero otherwise, OCCU equal 1 if occupation of household head is farming and zero otherwise, LHS represents land holding size of the respondents, CROP represents the number of different crops planted, TV represents number of television sets per household, VCD represents number of VCD per household, BCYCLE represents number of Bicycle per households, MCYCLE represents the number of motor cycle per households, FAL equal to 1 if households is located in Falam, HAK equal to 1 if households is located in Hakha, GYUNE equal to 1 if households is located in Mawlamyainggyune, BOG equal to 1 if households is located in Bogalay and YAN equal to 1 if households is located in Yangon.

Meanwhile, as reveal in the table, there are some notable differences between participants and non-participants with respect to the variables, which is confirmed by the test statistics. The mean monthly per capita expenditure was computed as the net expenditure on food, clothing and other social activities. The mean monthly per capita income was computed as the net return from both farm and non-farm sectors. Table 6.1 shows that the mean monthly per capita income and mean monthly per capita expenditure for respondent within the

program is significantly higher than that of an average respondent outside the program. This results perhaps can be linked to support services inform of microcredit services provided by the INGOs to the respondents within the program, which could be used to improve the welfare of the participating households in the sample.

Table 6.1 Definition of variables and descriptive statistic used in the analysis

Variable	Description	Unit	Participant (n=311)	Non-participant (n=120)	Differences
			Mean (SD)	Mean (SD)	(t statistics)
PCI	Per-capita income	Kyats/month	56329(52003)	43591(41067)	2.4085**
PCE	Per capita exp.	Kyats/month	19767(11333)	18090(10859)	1.8033*
GENDER	Gender	Dummy	0.4405(0.4972)	0.6083(0.4902)	-3.1726***
EDU:	Educational year	Years	6.4887(3.3867)	5.9583(4.0134)	1.2822
HHS	Household size	Numbers	4.7685(1.6455)	4.7250(1.7391)	0.2362
AGE	Age of respondent	Years	43.6913(11.5024)	45.2833(13.3764)	-1.1500
MS	Marital status	Dummy	0.8907(0.3125)	0.8000(0.4017)	2.2270**
OCCU:	Occupation	Dummy	0.5884(0.4929)	0.4667(0.5010)	2.2706**
LHS	Land holding size	Acres	3.2379(4.6458)	2.4208(5.4781)	1.4456
CROP	Crop	Numbers	1.3376(1.4871)	0.8500(1.2613)	3.4166***
TV	Television	Numbers	0.7524(0.5141)	0.7333(0.4441)	0.3825
VCD	VCD	Numbers	0.6559(0.5685)	0.5333(0.5010)	2.1911**
BCYCLE	Bicycle	Numbers	0.4437(0.6445)	0.4167(0.6296)	0.3964
MCYCLE	Motor cycle	Numbers	0.4341(0.7011)	0.4583(0.6723)	-0.3309
FAL	Falam	Dummy	0.1608(0.3679)	0.1750(0.3816)	-0.3497
HAK	Hakha	Dummy	0.1543(0.3619)	0.1583(0.3666)	-0.1019
GYUNE	Mawlamyainggyune	Dummy	0.1801(0.3849)	0.1583(0.3666)	0.5456
BOG	Bogalay	Dummy	0.1801(0.3849)	0.1750(0.3816)	0.1241
YAN	Yangon	Dummy	0.1543(0.3619)	0.1667(0.3742)	-0.3112

Note: * indicate the following levels of significance: *** $P < 0.01$; ** $P < 0.05$; * $P < 0.1$.

Source: Self Survey (2012)

6.5   Results and Discussions

As a precursor to the results and discussions, we attempt to test the hypothesis that all regression coefficients are the same across the participation categories (i.e., participating and non-participating households in microfinance program), which is useful in determining whether endogeneity exists between the categories.8 To this end, we follow the works of Yen et al., (2009) and Ogundari and Abdulai (2014) by estimating separate OLS regression for the participants and non-participants as well as for the pooled sample. Subsequently, we employ log likelihood ratio (LR) test statistic defined as $LR = 2 [L - (L_P + L_N)]$ and this is χ^2_{df} distributed test with $df = k_P + k_N - k$ .Where, L_P , L_N , and L represent log-likelihood for participants, non-participants and pooled sampled, respectively while df is the degree of freedom. k , k_N and k_P represent the number of parameters estimated for pooled, non-participants and participants households, respectively. Based on the LR test (detail regression results is presented in the appendix), we reject the null hypothesis that the coefficients of the separate regressions for the participants and non-participants are equal at 1% level of significance, which show that endogenous switching regression (ESR) is most appropriate in the study.

6.5.1   Determinants of Probability of Participating in the Program

The results of the estimated ESR model on the determinants of probability of participating in microfinance program are presented in the second column of Table 6.2. The results show that the probability of participating in micro finance program increases among female headed households, educated household head, household headed by married couples, household with higher number of crops, and households with higher wealth (VCD taken as indicator of wealth in the study). Also, we find evidence that the probability decreases among households located in Falam in reference to households in Mandalay (the reference household) in the study, while other dummies representing the remaining townships were significantly not different from zero.

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Table 6.2 Probability of participating in the microfinance program

Variables	Descriptions	Units	Probit (N=431)	
GENDER	Gender	Dummy	-0.6325***	(0.1601)
EDU:	Educational year	Years	0.0455*	(0.0239)
HHS	Household size	Numbers	0.0115	(0.0422)
AGE	Age of respondent	Years	-0.0023	(0.0064)
MS	Marital status	Dummy	0.6863***	(0.1823)
LHS	Occupation	Dummy	-0.0059	(0.0188)
OCCU:	Land holding size	Acres	0.4012	(0.2948)
CROP	Crop	Numbers	0.1878 **	(0.0832)
TV	Television	Numbers	-0.3475*	(0.2101)
VCD	VCD	Numbers	0.5673**	(0.2269)
BCYCLE	Bicycle	Numbers	0.1008	(0.1255)
MCYCLE	Motor cycle	Numbers	-0.1572	(0.1305)
FAL	Falam	Dummy	-0.7054**	(0.3218)
HAK	Hakha	Dummy	-0.3049	(0.3077)
GYUNE	Mawlamyainggyune	Dummy	0.0765	0.3848)
BOG	Bogalay	Dummy	-0.1026	(0.3949)
YAN	Yangon	Dummy	-0.2655	(0.2770)
CONSTANT	-	-	-0.1442	(0.4620)

Notes: * indicate the following levels of significance: *** $P < 0.01$; ** $P < 0.05$; * $P < 0.1$.

Source: Self Survey (2012)

However, a search in the literature shows that the positive effect of education on probability of participating in microfinance program obtained in the present study contradict the finding of Nuryartono et al., (2005) where the authors found a negative effect of education on probability of obtaining credit rationing in Indonesia. We also notice that the positive effect of durable asset such as TV (taken as a proxy for household wealth) on the probability of participating in microfinance program in the study contradict the finding of Thibbotuwaws et al., (2012) who found evidence of negative effect of asset such as TV, Radio, Fridge, Telephone on the probability of participating in microfinance program in SriLanka. Nevertheless, non-significant of township dummies suggest

that probability of participating in the microfinance program is indifferent across the households in the townships covered in the sample.

6.5.2 Relationship between Households' Demographic Variables and Household Per Capita Income for the Participants and Non-participants

Table 6.3 Parameter estimates of the endogenous switching regression model

Variables	Impact on per capita income				Impact on per capita expenditure			
	Participants (n=311)		Non-participants (n=120)		Participants (n=311)		Non-participants (n=120)	
GENDER	0.1642**	(0.0649)	0.3869	(0.1254)	-0.0398	(0.0494)	0.1937**	(0.0913)
EDU:	0.0551***	(0.0102)	0.0326**	(0.0150)	0.0257***	(0.0070)	0.0045	(0.0117)
HHS	0.0426**	(0.0174)	0.0812***	(0.0264)	-0.1612***	(0.0118)	-0.0861***	(0.0203)
AGE	-0.0020	(0.0026)	-0.0052	(0.0039)	-0.0009	(0.0018)	0.0012	(0.0030)
LHS	0.0261***	(0.0081)	0.0071	(0.0102)	-0.0023	(0.0056)	0.0051	(0.0080)
OCCU:	-0.0090	(0.1365)	-0.2805	(0.1819)	0.0095	(0.0970)	0.0069	(0.1384)
CROP	-0.0658**	(0.0305)	0.1286**	(0.0593)	0.0100	(0.0211)	-0.0753*	(0.0438)
TV	0.2368***	(0.0897)	0.2256	(0.0593)	0.1458**	(0.0635)	0.0676	(0.1237)
VCD	0.1585*	(0.0860)	0.0260	(0.1797)	0.1280**	(0.0636)	-0.0505	(0.1236)
MCYCLE	0.2234***	(0.0549)	0.1399	(0.0883)	0.0966***	(0.0377)	0.1601**	(0.0670)
FAL	-0.3955***	(0.1352)	-0.3949*	(0.2096)	-0.4989***	(0.0984)	-0.4181***	(0.1544)
HAK	-0.6570***	(0.1291)	-0.3696**	(0.1742)	-0.5691***	(0.0913)	-0.4276***	(0.1354)
GYUNE	-1.1091***	(0.1682)	-0.8324***	(0.2253)	-0.7858***	(0.1164)	-0.9980***	(0.1676)
BOG	-0.7866***	(0.1675)	-0.7163***	(0.2441)	-0.5240***	(0.1157)	-0.6654***	(0.1881)
YAN	0.0271	(0.1148)	0.0999	(0.1722)	0.0171	(0.0785)	0.2332*	(0.1312)
CONSTANT	11.8548***	(0.1882)	11.7438***	(0.3396)	11.8548***	(0.1882)	9.9159***	(0.2520)
σ_p	0.4937***	(0.0319)			0.3158***	(0.0154)		
ρ_p	-0.7487***	(0.1046)			0.2000	(0.3153)		
σ_n			0.4757***	(0.0430)			0.3993***	(0.0559)
ρ_n			0.2389	(0.3759)			-0.6435***	(0.1892)

Note: For all implies: *** significant at 1%; ** significant at 5%; * significant at 10%. Figure in parentheses represent the standard error.

Source: Self Survey (2012)

The estimated results on the relationship between households' demographic variables and household per capita income for the participants and non-participants are presented in Table 6.3. The results however, show that per capita income is significantly higher among participating households headed by male, among households with higher family size, among households with higher farm holdings and with higher number of assets such as TV, VCD, and Motorcycle in the study. But it decreases significantly for participants with higher number of crops and among households in Falam, Hakha, Mawlamyaing, Bogalay and Yangon.

As for the non-participants, the per capita income increases among educated head, among households with higher household size, among households with higher number of crops and decreases significantly among households in Falam, Hakha, Mawlamyaing , Bogalay and Yangon regions. While size of the land holding has significant effects on the per capita income for the participants, it has no significant effect for non-participants, which contradict the work of Akobundu et al., (2004) who found no significant effect of farm size on the income when assessing the effect of participating in extension services. The implication of these findings is that the effect of household's socio-economic and demographic variables on per capita income differs considerably among the participants and non-participants in the sample.

Furthermore, the significance of covariance term ρ_p in the lower panel of Table 6.3 shows the existence of endogenous switching between the selection and welfare equations for the respondents within the program. In other words, the significance of ρ_p implies the presence of selection bias, which would have biased the result of the impact of microfinance on the participants if not controlled for in the welfare function for in the study. The covariance terms ρ_p and ρ_N have alternate signs, which indicate that participating in the microfinance program is based on its comparative advantage as the model fulfills the necessary condition for consistency. Thus, with $\rho_p < 0$ and significantly different from zero implies that participants in the microfinance program have significant lower per capita income than a randomly selected households in the sample. Similarly, with $\rho_N > 0$ and significantly not different from zero, suggests

that non-participants in the microfinance program have insignificant higher per capita income than a randomly selected households in the sample.

6.5.3 Relationship between Households' Demographic Variables and Household Per Capita Expenditure for the Participants and Non-participants

The estimated results of the relationship between households' demographic variables and household per-capita expenditure for the participants and non-participants are presented in Table 6.3. To this end, the results show that education and wealth indicator (VCD, TV, motorcycle) increase significantly household per capita expenditure for the participants. But, it decreases as household size increases and among households in Falam, Hakha, Mawlamyaing, Bogalay regions. With regards to non-participants, we find evidence that per capita expenditure increases significantly among male-headed households and among households in Yagon, but it decreases as household size and number of crops increase and among households in Falam, Hakha, Mawlamyaing and Bogalay in the study area.

However, a search in the literature shows that effect of educational level from this study is in agreement with recent finding from Nigeria by Ogundari and Aromolaran (2013), where the authors assess the impact of education on household welfare, defined in terms of household per-capita expenditure. Given the results obtain in the present study, it is obvious that the effects of household socioeconomic and demographic variables on per capita expenditure differ considerably across the participants and non-participants in the sample.

Furthermore, the significance of covariance term ρ_N in the lower panel of Table 6.3 shows the existence of endogenous switching between the selection and welfare equation defined by per capita expenditure for the respondents outside the program. In other words, the significance of ρ_N implies presence of selection bias in non-participants welfare function, which would have been an issue if not controlled.

Also, the covariance terms ρ_p and ρ_N have alternate signs, which indicate that participating in the microfinance program is based on its comparative advantage as the model fulfills the necessary condition for consistency. But with $\rho_p > 0$ although not significant, implies that participants in the microfinance program have higher average per capita expenditure but not significantly different from zero than a random households in the sample. On the other hand, with $\rho_N < 0$ and significantly different from zero, suggests that non-participants in the microfinance program have significant lower average per capita expenditure than a random households in the sample.

6.5.4 Estimated Average Treatment Effect on the Treated of the Impact of Microfinance on Households' Welfare Indicators

In an attempt to provide answer to the second objective of the study, we compute the average treatment effect on the treated (ATT) based on equation 6.11 using estimated parameters of equation 6.13 as shown in Table 6.4. In this regard, the ATT shows that per capita income and per capita expenditure for the participants is higher than they would have earned if they did not participate in the program by 25,173.87 kyats, 3,318.18 kyats, respectively. This implies that participation in the microfinance program has a positive effect on poverty reduction in Myanmar as it raises household income and consumption (expenditure) level in the study areas. However, the substantial increase in the per capita income and per capita expenditure for the participating households may largely be due to the support services received by the participants from the microfinance institutions, which basically includes provision of microcredit to help improve welfare of the households.

In this regard, a search in the literature shows that Mahjabeen (2008) and Li et al., (2011) found similar evidence in Bangladesh and China, respectively. In addition, we observe that the findings of this study align with the argument by Morduch and Haley (2002) that over the last three decades evidences support the idea that microfinance institutions have become an effective way of reaching a large number of poor and improving their welfare across the globe.

Table 6.4 Estimated Average Treated for Treatment (ATT) on the impact of microfinance on Households' Welfare Indicators

Welfare Indicators	ATT	Mean	Std. Error
Per capita Income	$E\ ((Y_1 - Y_2)\,|\,D = 1^a)$	4.40	0.53
Per capita Expenditure	$E\ ((Y_1 - Y_2)\,|\,D = 1^b)$	3.52	0.41

Note: Because of logarithmic transformation of the dependent variable of Tables 3, then:

    (a) The actual Per capita income = $10^{4.40}$ = 25,173.87 kyats;

    (b) The actual Per capita expenditure = $10^{3.53}$ = 3,318.18 kyats.

6.6 Conclusions and Recommendations

This chapter employed endogenous switching regression (ESR) model, which takes into account selection bias associated with endogeneity of program participation as well as self-selection problem. Using the estimated parameters of the ESR, we examine the impacts of microfinance program on household welfare defined as monthly per capita expenditure and monthly per capita income in Myanmar. The study uses a total of 431 households [311 (participants) and 120 (non-participants)]. The results however, show that the covariance term of participation in the microfinance program is significantly different from zero. This implies that bias would have resulted in the welfare equation (i.e., monthly per capita income and expenditure) had been it was estimated without correcting for selection bias associated with program participation in the study. Other results show that the probability of participating in microfinance program is higher among female-headed households, educated household head, married households, among household with higher number of crops and higher asset (represented by the number of video compact disc players) in the study.

Also, the study employed average treatment effect on the treated (ATT) to investigate whether participants in microfinance program have higher monthly per capita income or monthly per capita expenditure than they would have earned if they did not participate in the program. In this context, the result of the ATT shows that monthly per-capita income and monthly per capita expenditure for the participants are higher than they would have obtained if they did not participate in the program. Meanwhile, considering the various efforts or

strategies employ by Myanmar government to achieve the millennium Development Goals (MDGs) over the years, the present finding shows that the role of microfinance services in having poverty cannot be overemphasis in the country. To this end, the study suggests introduction of policies that support establishment of national based microfinance programs to complement the International Non-Governmental Organizations (INGOs) efforts in the country, so as to extend the services to more households in the country.

CHAPTER 7
DETERMINANTS OF HOUSEHOLDS DEMAND FOR CREDIT USE:
A TOBIT REGRESSION MODEL APPROACH

7.1   Introduction

Myanmar is the second largest country in Southeast Asia in size. It has an estimated population of 62 millions. More than two-thirds of the population lives in rural areas, where agriculture is the main source of earning income (IMF, 2012b). Poverty remains one of the major challenges as majority of the poor in the country lives in the rural areas. As at 2011, the per capita income in the country is about US$ 832, while food poverty level is about 5% UNDP (2012). Poverty is twice as high in rural areas, compared to urban areas with wide regional inequalities in human development and Millennium Development Goals (MDGs) indicators.

As noted by Imai et al., (2010), most parts of the developing world would still have remained characterize by huge demand for microfinance services, if not for the exceptional growth of microfinance sector during the last three decades in serving around 40 millions clients worldwide. The demand for credit is high in Myanmar as well. However, few institutions provide microcredit, and unmet demand is estimated by industry experts at close to US$ 1 billion (UNCDF, 2012). As noted by Lhing et al., (2013), the formal financial institutions in Myanmar are under the control of the central bank and borrowers need to have assets or properties to access loan from the bank. This however, left most poor households in the country to depend on microfinance institutions or private lenders to secure needed credit to enhance their welfare. In many developing countries, credit has been used as an essential instrument for promoting not only the development of agriculture especially to the small scale farming sector but also for poverty reduction in rural areas. But accessibility to credit depends on a number of factors, which include: the type of production, consumption, the extent of market integration and education among others are important for household livelihood.

According to Qbai (1983), in many developing countries, official credit programs have become important components of development expenditure. Increasing access to financial services holds the promise to help the poor to reduce poverty and improve development outcomes. Bauchet et al., (2011) also mentioned that credit can enable the poor to smooth consumption especially in the case of adverse shock, can start or expand a business, can also cope with risk and increase or diversify household income. Anyiro and Oriaku (2011) also confirmed that access to credit can help the rural poor economy in several ways.

However, despite the importance of credit in assisting the poor to improve their welfare, poor people are still excluded from formal financial system in developed countries with partial exclusion and in developing countries with full or nearly full exclusion as noted by Brau and Woller (2004). Moreover, a search in the literature shows that Anyanwu (2004) identified collateral, credit rationing, preferences for high income participants and large loans, bureaucratic and lengthy procedure of providing loan in the formal sector to keep poor people outside the boundary of the formal sector financial institutions in developing countries. As mentioned above, so far, there are still few researches on the topic for determinants of households demand for credit use not only in Myanmar, but even in developing countries. Most of the studies, especially those of Mohamed (2003), Guiso et al., (2004), Okurut (2004), Mpuga (2008), Ajani and Tijani (2009) they addressed the issue of access without referring to effective demand. Hence, the objective of this study is to identify household's socioeconomic factors influencing the demand for credit use in Myanmar.

7.2   Materials and Methods

7.2.1   Survey Area

The study was carried out in Chin state, Delta-zone region, and Dry-zone region of Myanmar. Geographically, Chin state lies between North Latitude 21 ° 0' and 24° 15' and East Longitude between 93 ° 15' and 94°0', while Delta-zone, lies in the southern end of the central plains of Myanmar. For Dry-zone, it is located in Central Myanmar. These areas were selected because poverty remains considerably higher there than the rest of the country. For the sampling

framework, two townships known for the presence and activities of International Non-Governmental Organizations (INGOs)'s microfinance program were purposively selected from each of the following regions Chin state, Delta-zone, and Dry-zone, thus making a total of 6 townships selected for the study. These towns are Falam, Hakha, Bogalay, Gyune, Mandalay, and Yangon.

Thereafter, a well structured questionnaire was administered to a randomly selected 72 respondents in each of the selected 6 townships from September to October 2012, thus making a total of 144 respondents per Organization. The questionnaire covered information on the household expenditure per month, household demographic and socioeconomic characteristics, such as age, household size, gender, assets such as number of VCD, Bicycle, motorcycle, television, land holding size, number of crops planted, etc. Unfortunately, not all the questionnaires were retrieved from or fully completed by the respondents for further processing. A total of 71 questionnaires were retrieved from Falam. Likewise, 67 respondents from Hakha, 77 respondents from Bogalay, 75 respondents from Gyune, 73 respondents from Mandalay, and 68 respondents from Yangon were retrieved for further analysis. The overall households available for the empirical analysis comprised of 431 households in the study.

7.2.2   Description of the Variables

Table 7.1 presents the definition of the independent variables and their measurement for the study. As revealed in the table, there are three concepts to analyze this research: demographic characteristics in which we used gender, educational level, household size, age of the respondent and marital status. For gender and marital status, were coded as a dummy variable if the household head is male/married 1 and 0 is for otherwise. For the variables, education, household size and age of the respondent, we used continuous variables. The second concept, which we analyzed, is economic factors of the respondents such as land holding size, occupation and per capita expenditure. Dummy variable was used for occupation of respondent. If the respondent is into farming activity, 1 is allocated and 0 if otherwise. We used continuous variable for land holding size

Table 1: Definition of independent variables and their measurement

Concept	Indicator	Variable	Expected signs
Demographic characteristics	Gender is a dummy variable takes a value of 1 if the household head is male and 0 otherwise	Gender	+/-
	The educational level of the household head by the total number of years the household head spent in receiving formal education.	Educational level	+
	Number of peoples in the household	Household size	+
	Age of the household head in years	Age	+/-
	A dummy variable 1 if the household head is married and 0 otherwise.	Marital status	+/-
Economics factors	Cultivated land area in acres	Land holding size	+
	A dummy variable 1 if the household head is farmer and 0 otherwise	Occupation	+
	Amount of money spent for total expenditure by person in the household with continuous variable	Per_capita_expend-iture	+/-
Location factors	A dummy variable 1 if the respondent live in this area and 0 otherwise	Falam	+/-
	A dummy variable 1 if the respondent live in this area and 0 otherwise	Hakha	+/-
	A dummy variable 1 if the respondent live in this area and 0 otherwise	Mawlamyaing Gyune	+/-
	A dummy variable 1 if the respondent live in this area and 0 otherwise	Bogalay	+/-
	A dummy variable 1 if the respondent live in this area and 0 otherwise	Mandalay	+/-
	A dummy variable 1 if the respondent live in this area and 0 otherwise	Yangon	+/-

and per capita expenditure as was mentioned in the table acres/ kyats per month. The mean per capita expenditure was computed as the net expenditure on food, clothing and other social activities. Location factor was considered for the third concept in the analysis. The location variable was coded with dummy variable for all locations if the respondent lives in an area in focus 1 is allocated and 0 if otherwise. To avoid dummy variable trap, we only used five locations in the

analysis. The results perhaps can be attributed to support services inform of microcredit provided by the INGOs which could be used in terms of credit access in the study areas and others to the next steps.

7.3   Analytical and Empirical Models

7.3.1   Analytical Model

Feder et al., (1985) mentioned that the determination of household factors influencing the demand for credit use using Probit and Tobit is appropriate but not with Ordinary Least Square (OLS) regression as the estimates of the latter may be biased. Moreover, to avoid the censoring bias that OLS could generate, a Tobit censored at zero was used because the level of credit amount in the analysis was not smaller than zero and some respondents reported zero application. Holloway et al., (2004) pointed out that even when a Tobit procedure is used, incorrectly assuming that the true point of censoring in the sample is zero also imparts a bias to the parameter estimates. In addition, the use of a Probit model is not suitable for the determination of households demand for the credit use even though it is adapted for dichotomous dependent variables. The intensity of demand for credit use in this study is a continuous dependent variable.

Tobit model can be used based on the assumption that there is no selection bias. It also provides both the influence of exogenous factors on the probability of households demand on the credit use and the intensity of the credit demand to estimating the marginal effects of the factors (Chukwuji and Ogisi, 2006). In this study, the Tobit model was used to analyze the socioeconomic, demographic and location factors which are influencing the intensity of the households demand on the credit usage. The credit usage is defined as the amount of credit obtained by the respondents. The stochastic model underlying Tobit according to Tobin (1958) is expressed by the following relationship:

$$Y_i = \begin{cases} X_i\,\beta + \mu_i, & \text{if } X_i\,\beta + \mu_i > 0 \\ 0 & \text{if } X_i\,\beta + \mu_i \leq 0 \end{cases} \qquad 7.1$$

$i = 1,2,3, \dots,N$

Where N is the number of observations, Y_i is the dependent variable (amount of credit obtained), X_i is a vector of independent variables, β is a vector of unknown coefficients, and μ_i is an independently distributed error term assumed to be normal with zero mean and constant variance σ^2. Thus the model assumes that there is an underlying, stochastic index equal to $(X_i \beta + \mu_i)$ which is observed only when it is positive, and hence qualifies as an observed, latent variable.

7.3.2　Empirical Model

The empirical specification of the Tobit model for study is presented below

$$\log Y_i = \beta_0 + \sum_{k-1}^{K} \beta_{ik} X_{ik} + \varepsilon_i \qquad\qquad 7.2$$

where, Y_i represents total amount of credit obtained, X_{ik} is vector of explanatory variables hypothesized to explain the demand for total amount of credit in the study, β_0 and β_{ik} are parameters to be estimated, while ε_i is the error term for the regression.

Meanwhile, using previous studies as a guide, the study considers the following X_{ik} variables in the empirical analysis; Gender (dummy variable; 1=male, 0=female), Level of education (years), Occupation (dummy; 1=farming, 0=otherwise), Household size (numbers), Age (years), Land holding size (acres), Marital status (dummy; 1=married, 0=otherwise), Per capita expenditure (kyats/month), Falam (dummy; 1=live in the area, 0=otherwise), Hakha (dummy; 1=live in the area, 0=otherwise), Mawlamyaing Gyune (dummy; 1=live in the area, 0=otherwise), Bogalay (dummy; 1=live in the area, 0=otherwise), and Mandalay (dummy; 1=live in the area, 0=otherwise).

7.4 Results and Discussions

7.4.1 Descriptive Statistics on Socio-Economic Characteristics of Households

Before examining all variables in the model, we first analyzed whether there is multicolinearity problem between each independent variable or not. The finding from the correlation matrix chart in Table 7.2 shows that almost all of the variables are appropriate to analyze in the model. Since the correlation between occupation and per capita expenditure is slightly high (0.5491), suggest that one these two variables is consider for subsequent analysis.

Table 7.2 The correlation matrix chart between using each independent variable

	Amou:	gen:	edu:	HHS	Age	MS	Occ:	LHS:	PCE	Fal:	Hak:	Gyu	Bog	Man
Amou	1													
gen:	-0.194	1												
edu:	0.1749	-0.0411	1											
HHS	0.0567	-0.0107	0.0692	1										
Age	0.0143	0.2088	-0.3741	0.0382	1									
MS	0.0792	0.0715	-0.1165	0.0810	0.1839	1								
Occ:	0.3142	0.3133	-0.2399	-0.0218	0.1426	0.0980	1							
LHS:	0.1267	0.2197	-0.0900	-0.0479	0.0549	0.0616	0.4889	1						
PCE	0.4210	-0.2399	0.3529	-0.3151	-0.1306	-0.0815	-0.5491	-0.2680	1					
Fal:	0.1252	0.0051	0.2553	0.1548	0.0065	0.0285	0.1715	-0.1582	-0.1175	1				
Hak:	0.0893	-0.0211	-0.1772	-0.0295	0.0011	0.0941	0.0624	-0.1377	-0.1367	-0.1905	1			
Gyu	0.2146	0.2137	-0.1844	-0.1714	-0.0199	-0.0342	0.3129	0.3004	-0.3404	-0.2038	-0.1969	1		
Bog	0.1028	0.2361	-0.1938	0.0173	0.1336	0.0774	0.4180	0.4360	-0.2256	-0.2071	-0.2001	-0.2141	1	
Man	0.4463	-0.1679	0.1439	0.0400	-0.1108	-0.0938	-0.5038	-0.2070	0.4570	-0.2005	-0.1937	-0.2073	-0.2106	1

The definition and descriptive statistics of variables used in the Tobit model are presented in Table 7.3. The average amount of the credit received by the respondent in this study is 166844.5 kyats. The average age of respondents is 44 years old with majority married with middle educational level. About 55% of the respondents are earning their income from farming activity. The per capita expenditure, the average amount for all respondents is 19299.72 kyats per month. An examination of the results showed that households demand for the

credit use was common among the active age group and middle educational level group.

Table 7.3 The descriptive statistics result of the variables used in the analysis

Variables	Definition	Unit	Mean	S.D	Min:	Max:
Amount	Amount of credit	Kyats	166844.5	197341.1	0	1000000
Gen:	Gender	Dummy	0.49	0.50	0	1
Edu:	Educational level	Years	6.34	3.58	0	15
HHS	Household sizes	Numbers	4.76	1.67	1	11
Age	Age of household head	Years	44.13	12.06	18	76
MS:	Marital status of household head	Dummy	0.87	0.34	0	1
Occup:	Occupation household head	Dummy	0.55	0.50	0	1
LHS	Land holding size	Acres	3.01	4.90	0	45
PCE	Per capita expenditure	Kyats/month	19299.72	11216.12	4000	75000
Fal:	Falam	Dummy	0.16	0.37	0	1
Hak:	Hakha	Dummy	0.16	0.36	0	1
Gyun:	Mawlamyaing Gyune	Dummy	0.17	0.38	0	1
Boga:	Bogalay	Dummy	0.18	0.38	0	1
Mand:	Mandalay	Dummy	0.17	0.38	0	1

Note: Survey conducted by self (2012)

Number of observations = 431

USD ($) 1 = 850 Kyats (2012)

1 ha = 2.471 acres

Source: Self Survey (2012)

7.4.2 Determinants of Household Demand on Credit Use

As presented in section 7.3 above, the Tobit model was used to investigate the factors that determine households demand for credit use. The results of the Tobit model are summarized and presented in Table 7.4. The overall performance of the model is fit at 1% significant level and adequate as can be shown from the Wald test statistics (X^2). This implies that the independent variables are important explanatory factors to understand the variation in credit demand.

There exists a positive and significant relationship between demand for credit use and educational level of the respondent. It was interesting to note that in this study the educational level had positive and significantly impacted on the loan demanding behavior of households. Similar to our result, Magri (2002) mentioned that educated individuals have the potential to expand income and thereby own assets necessary for collateral, better able to appreciate the need of credit and have less entry costs as they face fewer difficulties in collecting and evaluating the information needed to apply for a loan.

Marital status also affected demand for credit positively and significantly. Married respondents are more likely to demand for credit use since they establish and maintain family and hence their consumption level and demand for credit level is expected to increase as family size increases. Contrary to our results however, Habtu (2012) found that married people were less likely to have a demand for credit.

Result for the land holding size was also found to have positive and significant effect on the total credit. Those with large land holding size are more likely to demand for more credit. This may be because big land holding size needs to grow different kinds of crops and large investment for inputs to get higher yield on production. We find that our result conforms to the finding of Adebosin et al., (2013), where the authors considered the farmers' demand for credit on the land variable which provides collateral for low income households. This result is also in line with the finding of Atieno (1997), where he found out that the higher the farming size, the higher the amount of loan that a farmer is likely to apply for. The positive and significant variable for occupation is consistent with the expectation. This implies that the respondent with farming activity is more likely to demand more credit.

With respect to the result of per capita expenditure, it was 10% significant and positively influenced dependent variable. It suggested that increased respondent's monthly expenditure causes a higher demand for credit. However, the gender of the respondent has negative coefficient and it is significant at 5% level. This indicates that the female headed households are more likely to demand for credit. This finding was contrary to that of Balogun

(2011). The author pointed that the male respondent who are joining in NGO/Cooperative had more demand for microcredit.

Household size and age of respondent have positive but insignificant coefficients. These suggest that family size and age of respondents do not significantly affect demand for credit. Location which explains the demand for credit by the households across the areas sampled is not different from one area to the other. In other words, it follows similar pattern.

Table 7.4 Tobit Regressions results on determinants of the demand of credit usage

Variables	Coefficients	Std.Err	t	$P > |z|$	95% C. I.	
Gen:	-2.87	0.79	-3.65	0.000	-4.41	-1.32
Edu:	1.32	0.63	2.09	0.037	0.77	2.57
HHS	0.98	1.09	0.90	0.367	-1.16	3.12
Age	0.41	1.40	0.29	0.769	-2.34	3.16
MS:	2.94	1.07	2.75	0.006	0.84	5.04
Occup:	3.16	1.32	2.39	0.017	0.56	5.76
LHS	1.65	0.68	2.44	0.015	0.32	2.99
PCE	1.72	0.99	1.74	0.082	-0.22	3.66
Fal:	-1.68	1.67	-1.01	0.314	-4.96	1.59
Hak:	-0.57	1.65	-0.35	0.727	-3.81	2.66
Gyun:	-1.39	2.11	-0.66	0.510	-5.55	2.76
Boga:	-2.77	2.11	-1.31	0.190	-6.91	1.38
Mand:	1.15	1.22	0.94	0.348	-1.26	3.55
Constant	-17.43	11.83	-1.47	0.142	-40.69	5.83

Note: X^2 = 53.45, Prob> chi = 0.0000, Log likelihood = -1162.5246, Pseudo R^2 = 0.0225

Number of observations = **431**

Observation summary: **120** left-censored observations at amount credit<=0

309 uncensored observations

2 right-censored observations at amount credit>=13.81551

Source: Self Survey (2012)

7.5   Conclusions and Recommendations

This chapter identifies household socioeconomic factors influencing the demand for credit use in Myanmar by using a Tobit Regression

Model. The study used a total of 431 households from six different townships. The major findings of this research reveal that married female headed household with higher educational level, farming occupation, large land holding size and higher per capita expenditure demand highly for credit. However, insignificant variables for some demographic factors such as age of the respondent and household size showed that age or family size do not matter. Similarly, results from the study areas imply that the demand for credit by the households across the areas sampled is not different from each other or follow similar pattern. Based on our findings, there are some recommendation and implication for this research. Farming as occupation is a major driver of demand for credit which highlights the need for farmers to have access to timely credit in food production. From the gender point of view, female headed households demand for more credit than male, thus underscoring policy relevance of improving female access to credit to meet their timely demands. Our findings also would like to encourage the role of human capital, especially for education in the study areas on demand for credit.

CHAPTER 8
CONCLUSIONS AND RECOMMENDATIONS

The main purpose of whole study is to assess the role of microfinance on rural households and to explore the impact of microfinance intervention on welfare of households. The result of the study indicates that microfinance has positive effects on living standards of the respondents. Microfinance helps the government's aim of reducing poverty by providing financial help to start a small business of the poor. Microfinance enhances not only the economic situation of poor (income & expenditure) but also has the positive effects on social life such as better access to education, health facilities, food intake and empowerment etc.

8.1   Main Conclusions

The main findings are summarized from each chapter as follows: the result of chapter four provided important information of factors effecting on taking loans and this chapter also evaluated on the performance of PACT microfinance program in the Dry zone area of Myanmar. From the results of Binary Logistic Regression analyses, we found that the respondents who are male, older, primary educational level, lower assets and lower total income are higher percentage in non-clients than clients. In MF program those who are female, single, younger, middle educational level, small family size and small scale land holding size more willingly want to join. The increasing number of crops, established new business and higher adoption of technology are also influenced on the probability of being taken loan. More than half of the clients can improve on their livelihoods such as housing condition, food intake, furniture, and health facilities with increasing rate. Household income and education expenses are also increasing however the percentage is still lower than the other categories.

Chapter five analyzed on factors influencing households' income of rural people in Kyaukpadaung Township of Myanmar. We found that the most common important influencing factor on household income is education. Educational level has a strongly positive impact on household income, suggesting that a client with

a higher educational level can generate more income than one with a lower educational level. The results of the combined analysis show that six independent variables—age of the head of household, gender of the head of household, educational level of the head of household, land holding size, number of crops, and established new enterprise—have a significant influence on household income. Out of these, gender of the head of household, educational level of the head of household, land holding size, number of crops, and establishing new enterprises significantly increased household income. However, the age variable significantly decreased household income. From the logistic regression results, three variables, household income, changed farming practices, and participation in the program, have a positive and highly significant impact on establishing new enterprises.

Chapter six has analyzed the impact of microfinance on welfare of households using an endogenous switching regression model, which takes into account selection bias associated with endogeneity of program participation as well as self-selection problem. Thereafter, we examine the impacts of microfinance program on household welfare in Myanmar. The study uses a total of 431 households [311 (participants) and 120 (non-participants)]. Also, in the study, two indicators of household welfare were considered, namely household per capita expenditure and per capita income later used to define household welfare function in the study. The results however, show that the covariance term of participation in the microfinance program is significantly different from zero. This implies that bias would have resulted in the welfare function had been it was estimated without correcting for selection bias associated with program participation in the study. Other results show that the probability of participating in microfinance program is higher among female-headed households, educated household head, married households, among household with higher number of crops and higher asset (represented by the number of video compact disc players) in the study.

Also, the study employed average treatment effect on the treated to investigate, whether participants in microfinance program have higher per capita income or per capita expenditure than they would have earned if they did not participate in the program. In this regard, the result of the average treatment

effect on the treated shows that per capita income and per capita expenditure for the participants are higher than they would have obtained if they did not participate in the program.

Chapter seven has investigated household socioeconomic factors influencing the demand for credit use in Myanmar using a Tobit Regression Model. The study used a total of 431 households from six different townships. The major findings of this research reveal that married female headed household with higher educational level, farming occupation, large land holding size and higher per capita expenditure are highly demand on credit. However, insignificant variables for some demographic factors such as age of the respondent and household size pointed that do not matter being older or younger age and larger or smaller family size on demanding credit. Similarly, for location factors such Falam, Hakha, Bogalay, Maylamyaing gyune, Yangon and Mandalay implies that the demand for credit by the households across the areas sampled is not different from each other or follow similar pattern.

8.2   Recommendations

Based on the main finding of this study, there are some recommendation to respected organizations and government. PACT microfinance program should introduce income generating activities and effective education program which open up more income-earning opportunities for the clients especially in the non-farm sector. Regarding to the reasons for not participating, PACT is suggested to collaborate with extension services to develop information program in order to disseminate the information to as many people as possible and also the program should be made easier in terms of loan procedures, legal action. More information on the advantage of taking loans should be made in order to attract peoples to join the program. Starting new enterprises is one of the most important factors for increasing the household income of clients. In order to establish new enterprises, the local government should pay more attention to the basic infrastructure requirement, market access facilities in the study area. PACT should focus on business training skills, apart from the provision of loans, to create sustainable microenterprises and other economic activities that increase the income of clients. The study area is located in Dry

Zone area, where it is very difficult to grow crops in the summer owing to drought conditions. The government also should collaborate with the microfinance organizations in this regard. The major reasons for clients not participating in the program are the following: the procedures are too complicated, there is a fear of legal action, the program is not interesting, and there is a lack of information. Therefore, for non-clients, PACT should introduce easier and simpler loan procedures, reduce their exposure to legal action, and give attractive and more convincing information about the advantages of the program.

Moreover, in the study areas, farming as occupation is a major driver of demand for credit which highlights the need for farmers to have access to timely credit in food production. For gender point of view, female headed household demand for more credit that male underscores policy relevance of improving female access to credit to meet their timely demand. Our findings also would like to encourage the role of human capital especially for education in the study areas on demand for credit. In order to achieve the millennium Development Goals in the country, it is important for government to consider the role of microfinance schemes, as it is capable of reaching the poor who are left out of formal financial system with expected positive effect on their welfare. In addition, we suggest that the International Non-Governmental Organizations operating various microfinance programs in Myanmar should extend their services to other parts of the country as away of reaching more households.

8.3   Limitation of the Study and Future Research

Although this dissertation indicates that the clients who participated in microfinance programs have improved the well-beings of households as a result of improved incomes, expenditures, children education, etc: the challenge remains how to represent the actual scenario of the whole country because the data collection was restricted only some parts of the country, which can represent for respected locations but which may fail to represent the whole country. And also the results cannot be generalized to other areas (i.e. Shan state) which areas are also operating with microfinance programs. In addition, during interviewing the people; we have faced difficulties especially in

communications and explaining the questions because of some of the respondents are illiterate and use different languages. Therefore, it was a little bit difficult to make them to clearly understand for the technical terms. For future research, similar analysis for these regions is needed. Moreover, it is also needed to consider to analysis for the other measures of welfare such as poverty index (eg: poverty gap, severity of poverty) and measure of inequality (eg: gini index) for the households within and outside of microfinance program.

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App: Table 1: Questionnaire for INGOs Staffs, Clients and Non-Clients

No	Questions	Coding category		
1	Name of Staff			
2	Name of INGO			
3	Date when established			
4	State/Region for MF			
5	Township for MF			
6	Total Village tracts for MF			
7	Total Villages for MF			
8	Total Clients (i) women (ii) men			
9	Total budget for MF			
10	Information for providing loans:			
	No	Name of loan	Amount of loan	Interest rate	Duration of installment
	i				
	ii				
	iii				
	iv				
	v				
11	How would you rate the activities of microfinance programs in the country?	1=Excellent, 2=Good, 3=Encouraging, 4=Bad, 5=Others(specify)		
12	What do you think are the role of microfinance in poverty reduction?	1=Providing financial services, 2=Providing entrepreneurial advice, 3=Monitoring and evaluation, 4=Provision of facilities like savings, 5=Others(specify)		
13	How effective are microfinance programs in the country?	1=Very effective, 2=Encouraging, 3=Not the best, 4=Bad, 5=Others(specify)		
14	What are the major challenges faced by microfinance programs?	1=Inadequate loan, 2=Disbursement of facilities, 3=Poor collaboration between INGOs, 4=Others(specify)		
15	Do you provide business training to your clients?	1=Yes, 0=No		
16	If yes, what are the topics?			
17	Do you provide any social activities to your clients?	1=Yes, 0=No		
18	If yes, please indicate some of the areas covered?			

No	Questions	Coding category
19	Do you have a group made up of men and women?	1=Yes, 0=No
20	If yes, how many of the group leader's are women?	
21	Do you provide any leadership training?	1=Yes, 0=No
22	If yes, what are the topics treated?	
23	Would you say that the women who have accessed your facility have been empowered?	1=Yes, 0=No
24	If yes, what kind of changes do you see? Or what are the indicators?	1=Contribution to household income, 2=Decision making in using of loan, 3=Decision making in using money, 4=Decision making in children education, 5=Others(specify)
25	If no, what are the reasons?	
26	What kind of problems do you encounter in handling the clients?	
27	What are the complaints that you receive from the women as regards their business activities after accessing the loans?	
28	What are the complaints that you receive from the women as regards their relationship with their husband after accessing the loan?	
29	According to your point of view, name three strengthens of the program?	1=Lower interest rate than other informal lenders, 2=Steady source of working capital, 3=Training or technical assistance, 4=Better services than other Competitor organization, 5=No collateral, 6=Others(specify)
30	According to your point of view, name three weakness of the program?	1=High interest rate, 2=Size of loans too small, 3=Loan cycle too long, 4=Loan cycle too short, 5=Repayment policy (frequency, amount), 6=Forced savings, 7=Others(specify)

No	Questions	Coding category
31	If you could change anything about the program to make it operate better in the future, what would you change and why?	

Interviewer…………………................….

Date:……….………………….…………..

Name of Client		Name of INGO	
State/Region		Township	
Village Tract		Village	

A. Household Information

HH size	Age	Family relation [a]	Gender [b]	Marital status [c]	Education [d]	Job [e]

(a) 1=Head, 2=Spouse, 3=Son, 4=Daughter, 5=Others(specify)

(b) 1=Male, 0=Female

(c) 1=Married, 0=Single

(d) 1=Illiterate, 2=Primary, 3=Middle, 4=High, 5=College/University, 6=Others(specify)

(e) 1=Own business, 2=Agriculture, 3=Others(specify)

Total Land Holding Size	( )acres
Total Number of Crops	

B. Information Regarding to the Program

No	Questions	Coding category
1	When did you join in the program?	( ) Year, ( ) Month
2	How did you know about it?	1=Friend/relative, 2=Advertisement, 3=Others(specify)
3	How many types of loan you took?	
4	What are they?	
5	How much have you taken from each?	
6	What did you do with the loan?	1=Established own business, 2=Invested in agriculture, 3=Invested in animal husbandry, 4=Children education, 5=Others(specify)

No	Questions	Coding category
7	What do you think about the repayment period of the loan?	1=Short, 2=Satisfactory, 3=Long
8	Do you feel any difficulties in loan repayment?	1=Yes, 0=No
9	If yes, what are that you faced?	1=Loan activity was not profitable, 2=Profitable but used for other expenditures, 3=Family member has been sick, 4=Loss of assets, 5=Others(specify)
10	Why did you join in the program?	1=Other advised me, 2=Low interest rate, 3=Other people have increased their income by this program, 4=Due to its incentive programs, 5=Others(specify)
11	Have you got opportunity to participate in any training program?	1=Yes, 0=No
12	If yes, what are they?	1=Capacity building, 2=Agriculture, 3=Animal husbandry, 4=Others(specify)
13	Are you satisfied from the achievement that you get after joining the program?	1=Fully satisfied, 2=Partly satisfied, 3=Not satisfied, 4=Others(specify)
14	What suggestions do you recommend for effective operation of that program?	1=To extend the period of the loan repayment, 2=To increase loan amount, 3=To reduce the interest rate, 4=Others(specify)

C. Information about Empowerment (For married women only)

No	Questions	Coding category
1	Who decides on the use of loans you have taken?	1=Husband, 2=Only you, 3=Both, 4=Others(specify)
2	And why?	1=Because of head of household, 2=Because of with my name, 3=Others(specify)
3	Who decides to expend money in the household?	1=Husband, 2=Only you, 3=Both, 4=Others(specify)
4	And why?	1=Because of head of household, 2=Because of with my name, 3=Others(specify)
5	Who decides on the use of profits in your business?	1=Husband, 2=Only you, 3=Both, 4=Others(specify)
6	And why?	1=Because of head of household, 2=Because of with my name, 3=Others(specify)
7	Has loan experience led to a feeling of being more capable of handling money and making economic decision?	1=Yes, 0=No
8	Do you feel more confident about yourself after participating in program?	1=Yes, 0=No
9	Are you confident enough to go to the mentioning places to get services on your own?	**Yes** **No** School Association Hospital Police Court Village Meeting

No	Questions	Coding category			
10	Effect of loan on your: (a) Level of income (b) Diversity of income sources (c) Educational facilities (d) Medical facilities (e) Housing condition (f) Total consumption (g) Capacity to save (h) Agricultural production (i) Empowerment (economical decision making)	**1**	**2**	**3**	**4**
Note: 1=Increased sig:, 2=Increased slight:, 3=Stay the same, 4=Decreased					

D. Situation of Household Income

No	Questions	Coding category
1	What is your average monthly income?	1=(10,000 - 100,000) MMK, 2=(100,001 – 200,000) MMK, 3=(200,001 – 300,000) MMK, 4=> 300,000 MMK
2	During the last twelve months has your over all income	1=Decreased **(go Q:3),** 2=Stay the same, 3=Increased **(go Q:4)**
3	If decreased, what is the main reason?	1=Household member has been sick, 2=Poor sales, 3=Production was poor, 4=Lost job, 5=Others(specify)
4	If increased, what is the main reason?	1=Expanded existing enterprise, 2=Established new enterprise, 3=Got a job, 4=Income from other sources, 5=Others(specify)

E. Situation of Household Assets

No	Questions	Coding category
1	Did you have a house before you join the program?	1=Yes **(go Q:3)**, 0=No
2	If no, did you have a house after join the program?	1=Yes, 0=No **(go Q:6)**
3	If you have a house what is the condition of the house?	1=Poor quality, 2=Medium quality, 3=Good quality
4	During the program period, is there any improvements or additions made to your home?	1=Yes, 0=No **(go Q:3)**
5	If yes, which one you have done? (you can choose more than one)	1=House repair(roof, floor, wall), 2=House expansion, 3=Improved water or sanitation system, 4=Lighting/Electricity, 5=Others(specify)
6	Do you have the following assets? (indicate by (√) mark)	

	No	Asset type	Acquired	
			Before loan	**After loan**
	1	TV		
	2	Bicycle		
	3	Motor cycle		
	4	Chair		
	5	Table		
	6	Shelf		
	7	Radio		
	8	Livestock		
	9	Others(specify)		

No	Questions	Coding category
7	Have you got any assets from your parents?	1= Yes, 0=No
8	If yes, what are these assets?	1=Agriculture land, 2=House, 3=Gold, 4=Furniture, 5=Others(specify)

F. Expenditure on Food

No	Questions	Coding category
1	What was the average monthly expenditure of your household before the loan?	1=(1,000 – 30,000) MMK, 2=(30,001 – 60,000)MMK, 3=(60,001 – 100,000) MMK, 4= > 100,000 MMK
2	What is the average monthly expenditure of your household after the loan?	1=(1,000 – 30,000) MMK, 2=(30,001 – 60,000)MMK, 3=(60,001 – 100,000) MMK, 4= > 100,000 MMK
3	What is your household diet condition looks like?	1=Worsened, 2=Stay the same, 3=Improved **(go Q:4)**
4	If improved, do you think that the nutritional status of your family improved because of the loan you received?	1=Yes, 0=No

G. Access to Educational Facilities

No	Questions	Coding category
1	Did the number of your household member attending school?	1=Decreased **(go Q:3)**, 2=Stay the same, 3=Increased **(go Q:2)**
2	If increased, what is the main reason?	1=Improved income, 2=Increase awareness towards education, 3=New schooling building in the area, 4=Others(specify)
3	If decreased, what is the main reason?	1=Lack of income for school tuition, 2=Lack of interest to attend school, 3=Needed for help to the household, 4=Lack of access to school in the area, 5=Others(specify)
4	Do you think your family access to educational facilities have improved following the loan?	1=Yes, 0=No

H. Medical Facilities and Health Condition of the Household

No	Questions	Coding category
1	Is there any member sick or injured during the last 6 months?	1=Yes, 0=No **(go Q:5)**
2	If yes, did they get medical treatment?	1=Yes, 0=No **(go Q:4)**
3	If yes, where did you get money you paid for medical treatment?	1=Business profit, 2=Borrowed from relative/friend, 3=Others(specify)
4	If they didn't get medical treatment, what is the main reason?	1=Lack of medical facilities, 2=High price medical facilities, 3=Low level of income(lack of income), 4=Distance of the health clinic, 5=Others(specify)
5	In general, do you think your access to medical facilities?	1=Decreased, 2=Stay the same, 3=Increased **(go Q:6)**
6	If increased, what is the main reason?	1=Access of credit from the program, 2=Borrowed from the others, 3=Sold household assets, 4=Others(specify)

I. Saving Information

No	Questions	Coding category
1	During the last twelve months have your savings	1=Decreased, 2=Stay the same, 3=Increased
2	For what purpose do you save?	1=Loan repayment, 2=Consumption, 3=To earn interest,4=To buy household assets, 5=To make improvement to the house, 6=To withdraw during emergency, 7=Others(specify)

J. Quality of Life (Subjective)

No	Questions	Coding category
1	Since receiving the loan do you feel like your family welfare has improved?	1=Yes, 0=No
2	Has receiving the loans been beneficial to you?	1=Yes, 0=No
3	Recently do you think you feel your family welfare has improved?	1=Yes, 0=No

K. Degree of Satisfaction on the Program

No	Questions	Coding category				
		SDA ←			→	SA
1	The rate of interest of microfinance is reasonable	1	2	3	4	5
2	The procedure is easier than official banking	1	2	3	4	5
3	The income has increased	1	2	3	4	5
4	The savings has increased	1	2	3	4	5
5	Better access to education	1	2	3	4	5
6	Better access to healthcare	1	2	3	4	5
7	Role in decision making process has increased	1	2	3	4	5
8	Improvement in the living standard of the family	1	2	3	4	5

Interviewer:.….…………………....

Date:..……..…….....................

Name of Non-Client			
State/Region		Township	
Village Tract		Village	

B. Household Information

HH size	Age	Family relation [a]	Gender [b]	Marital status [c]	Education [d]	Job [e]

(a) 1=Head, 2=Spouse, 3=Son, 4=Daughter, 5=Others(specify)

(b) 1=Male, 0=Female

(c) 1=Married, 0=Single

(d) 1=Illiterate, 2=Primary, 3=Middle, 4=High, 5=College/University,
     6=Others(specify)

(e) 1=Own business, 2=Agriculture, 3=Others(specify)

Total Land Holding Size	( )acres
Total Number of Crops	

B. Situation of Household Income

No	Questions	Coding category
1	What is your average monthly income?	1=(10,000 - 100,000) MMK, 2=(100,001 – 200,000)MMK, 3=(200,001 – 300,000) MMK, 4=> 300,000 MMK
2	During the last twelve months has your over all income	1=Decreased **(go Q:3)**, **2**=Stay the same, 4=Increased **(go Q:4)**
3	If decreased, what is the main reason?	1=Household member has been sick, 2=Poor sales, 3=Lost job, 4= Production was poor, 5=Others(specify)
4	If increased, what is the main reason?	1=Expanded existing enterprise, 2=Established new enterprise, 3=Got a job, 4=Income from other sources, 5=Others(specify)

C. Situation of Household Assets

No	Questions	Coding category
1	Did you have a house before you join the program?	1=Yes **(go Q:3)**, 0=No

No	Questions	Coding category	
3	If you have a house what is the condition of the house?	1=Poor quality, 2=Medium quality, 3=Good quality	
4	During the program period, is there any improvements or additions made to your home?	1=Yes, 0=No **(go Q:3)**	
5	If yes, which one you have done? (you can choose more than one)	1=House repair(roof, floor, wall), 2=House expansion, 3=Improved water or sanitation system, 4=Lighting/Electricity, 5=Others(specify)	
6	Do you have the following assets? (indicate by (√) mark)		

		Acquired	
No	Asset type	Before loan	After loan
1	TV		
2	Bicycle		
3	Motor cycle		
4	Chair		
5	Table		
6	Shelf		
7	Radio		
8	Livestock		
9	Others(specify)		

No	Questions	Coding category
7	Have you got any assets from your parents?	1= Yes, 0=No
8	If yes, what are these assets?	1=Agriculture land, 2=House, 3=Gold, 4=Furniture, 5=Others(specify)

D. Expenditure on Food

No	Questions	Coding category
1	What was the average monthly expenditure of your household?	1=(1,000 – 30,000) MMK, 2=(30,001 – 60,000)MMK, 3=(60,001 – 100,000) MMK, 4= > 100,000 MMK
2	What is your household diet condition looks like?	1=Worsened, 2=Stay the same, 3=Improved **(go Q:4)**

E. Access to Educational Facilities

No	Questions	Coding category
1	Did the number of your household member attending school?	1=Decreased **(go Q:3)**, 2=Stay the same, 3=Increased **(goQ:2)**
2	If increased, what is the main reason?	1=Improved income, 2=Increase awareness towards education, 3=New schooling building in the area, 4=Others(specify)
3	If decreased, what is the main reason?	1=Lack of income for school tuition, 2=Lack of interest to attend school, 3=Needed for help to the household, 4=Lack of access to school in the area, 5=Others(specify)
4	Do you think your family access to educational facilities have improved following the loan?	1=Yes, 0=No

F. Medical Facilities and Health Condition of the Household

No	Questions	Coding category
1	Is there any member sick or injured during the last 6 months?	1=Yes, 0=No **(go Q:5)**
2	If yes, did they get medical treatment?	1=Yes, 0=No **(go Q:4)**
3	If yes, where did you get money you paid for medical treatment?	1=Business profit, 2=Borrowed from relative/friend, 3=Others(specify)

No	Questions	Coding category
4	If they didn't get medical treatment, what is the main reason?	1=Lack of medical facilities, 2=High price medical facilities, 3=Low level of income(lack of income), 4=Distance of the health clinic, 5=Others(specify)
5	In general, do you think your access to medical facilities?	1=Decreased, 2=Stay the same, 3=Increased **(go Q:6)**
6	If increased, what is the main reason?	1=Access of credit from the program, 2=Borrowed from the others, 3=Sold household assets, 4=Others(specify)

G. Saving Information

No	Questions	Coding category
1	During the last twelve months have your savings	1=Decreased, 2=Stay the same, 3=Increased
2	For what purpose do you save?	1=Loan repayment, 2=Consumption, 3=To earn interest, 4=To buy household assets, 5=To make improvement to the house, 6=To withdraw during emergency, 7=Others(specify)

H. General Information of your Household:

No	Questions	Coding category			
		1	**2**	**3**	**4**
1	(a) Level of income (b) Diversity of income sources (c) Educational facilities (d) Medical facilities (e) Housing condition (f) Total consumption (g) Capacity to save (h) Agricultural production (i) Empowerment (economical decision making)				
Note: 1=Increased sig:, 2=Increased slight:, 3=Stay the same, 4=Decreased					

No	Questions	Coding category
2	Why you don't want to participate in the microfinance program?	1=No need credit, 2=Unacceptable to taking group responsibility, 3=Dislike group meeting, 4=Loan size is too small, 5=No information about credit provision, 6=Easier get loans from other sources, 7=Due to high interest rate, 8=Fear of indebtedness, 9=Disagreement with families, 10=Others(specify)

I. Quality of Life (Subjective)

No	Questions	Coding category
1	Recently do you think you feel your family welfare has improved?	1=Yes, 0=No

Interviewer:……………………….....

Date:……….………........................

App: Table 2: OLS estimates of the determinants of per capita income (welfare function)

Explanatory Variables	Determinants of monthly per capita income across different segments		
	Pooled (N=431)	Participants (N=311)	Non-participants (N=120)
GENDER	0.033 (0.053)	0.065 (0.058)	0.077 (0.116)
EDU	0.057***(0.008)	0.062***(0.010)	0.030 (0.015)
HHS	0.063***(0.014)	0.047***(0.017)	0.080***(0.028)
AGE	-0.002 (0.002)	-0.002 (0.003)	-0.005 (0.004)
LHS	0.015***(0.006)	0.026***(0.008)	0.008 (0.011)
OCCU	-0.078 (0.103)	-0.082 (0.132)	-0.314* (0.185)
CROP	-0.010 (0.026)	-0.046 (0.029)	0.116** (0.059)
TV	0.155** (0.075)	0.171** (0.084)	0.256 (0.169)
VCD	0.234***(0.072)	0.246***(0.079)	-0.033 (0.161)
MCYCLE	0.184***(0.047)	0.196***(0.052)	0.151***(0.092)
FAL	-0.473***(0.108)	-0.522***(0.128)	-0.348* (0.208)
HAK	-0.611***(0.103)	-0.735***(0.124)	-0.358* (0.185)
GYUNE	-0.930***(0.130)	-1.138***(0.164)	-0.834***(0.229)
BOG	-0.666***(0.133)	-0.833***(0.161)	-0.711***(0.260)
YAN	-0.016 (0.096)	-0.061* (0.109)	0.124 (0.179)
CONSTANT	11.551***(0.154)	11.6504***(0.174)	11.629***(0.302)
R-squared	0.671	0.731	0.603
[Adj. R-squared]	[0.660]	[0.717]	[0.545]
F-statistics	56.390	53.32	10.51
[P-values]	[0.000]	[0.000]	[0.000]
LL-statistics	-283.871	-180.188	-78.704

Note: *** significant at 1%; ** significant at 5%; * significant at 10%.

Figure in parentheses represent the standard error.

Source: Self Survey (2012)

App: Table 3: OLS estimates of the determinants of per capita expenditure (welfare function)

Explanatory Variables	Determinants of monthly per capita expenditure across different segments		
	Pooled (N=431)	Participants (N=311)	Non-participants (N=120)
GENDER	-0.022 (0.038)	-0.023 (0.042)	0.099 (0.084)
EDU	0.021***(0.006)	0.025***(0.007)	0.012 (0.011)
HHS	-0.137***(0.010)	-0.162***(0.012)	-0.085***(0.020)
AGE	0.000 (0.001)	0.001 (0.002)	0.001 (0.003)
LHS	-0.001 (0.005)	-0.002 (0.006)	0.004 (0.008)
OCCU	-0.057 (0.073)	-0.006 (0.096)	0.085 (0.134)
CROP	-0.006 (0.018)	0.006 (0.021)	-0.047 (0.043)
TV	0.114** (0.053)	0.159** (0.061)	0.003 (0.123)
VCD	0.102** (0.051)	0.110* (0.058)	0.054 (0.117)
MCYCLE	0.120***(0.033)	0.101***(0.038)	0.137** (0.067)
FAL	-0.520***(0.077)	-0.476***(0.093)	-0.508***(0.151)
HAK	-0.534***(0.073)	-0.554***(0.090)	-0.441***(0.135)
GYUNE	-0.838***(0.092)	-0.780***(0.119)	-0.984***(0.167)
BOG	-0.568***(0.094)	-0.514***(0.117)	-0.657***(0.190)
YAN	0.083 (0.068)	0.024* (0.079)	0.196 (0.130)
CONSTANT	10.406*** (0.109)	10.1262***(0.126)	10.190*** (0.220)
R-squared	0.668	0.715	0.619
[Adj. R-squared]	[0.656]	[0.700]	[0.565]
F-statistics	55.730	55.730	11.280
[P-values]	[0.000]	[0.000]	[0.000]
LL-statistics	-137.057	-80.202	-40.585

Note: *** significant at 1%; ** significant at 5%; * significant at 10%.

Figure in parentheses represent the standard error.

Source: Self Survey (2012)

LIST OF RELATED PUBLICATIONS

A. List of Refereed Papers

1. Nem Nei Lhing, Teruaki NANSEKI, Kazuhiko HOTTA and Shoji SHINKAI, An Impact Assessment of the Performance of PACT Microfinance Program on Rural Households, Japanese Journal of Farm Management 2010, Vol.48, No.1, pp.124 -129.

2. Nem Nei Lhing, Teruaki NANSEKI and Shigeyoshi TAKEUCHI, An Analysis of Factors Influencing Household Income: A Case Study of PACT Microfinance in Kyaukpadaung Township of Myanmar, American Journal of Human Ecology 2013, Vol.2, No.2, pp.94 -102.

3. Nem Nei Lhing, Kolawole OGUNDARI and Teruaki NANSEKI, The Impact of Microfinance on Welfare of Households in Myanmar: An Endogenous Switching Regression Application.
   Status: Under Revising in Quarterly Review of Economics and Finance

4. Nem Nei Lhing and Teruaki NANSEKI, Determinants of Households Demand for Credit Use in Myanmar.
   Status: Accepted and will be published in Vol:10 of International Journal of Applied Agricultural and Agricultural Research.

B. List of Non-Refereed Papers

1. Nem Nei LHING, Shoji SHINKAI, Kazhiko HOTTA, Teuaki NANSEKI ,The Effects of PACT Microfinance Program in the Dry Zone Area of Central Myanmar, Journal of the Faculty of Agriculture, Kyushu University, 2010, Vol.55, No.1, pp.173-180.

LIST OF RELATED PRESENTATIONS

1. Nem Nei Lhing, Teruaki NANSEKI, Kazuhiko HOTTA, Shoji SHINKAI, An Impact Assessment of the Performance of PACT Microfinance Program on Rural Households, Annual Conference of the Farm Management Society, September 2009, Tokyo, Japan.

2. Nem Nei Lhing, Teruaki NANSEKI, Kazuhiko HOTTA, Shoji SHINKAI, The Effects of PACT Microfinance Program in the Dry Zone Area of Central Myanmar. Annual Conference of the Food and Agricultural Resource Economics Society, September 2009, Saga, Japan.

3. Nem Nei Lhing, Kolawole, O., and Nanseki, T., 2013. The Impact of Microfinance on Welfare of Households in Myanmar: An Endogenous Switching Regression Application. Workshop on Poverty Reduction in Asia: Drivers, Best Practices and Policy Initiatives, August 2013, Sogang University, Seoul, South Korea.