

**YANGON UNIVERSITY OF ECONOMICS**  
**DEPARTMENT OF STATISTICS**  
**MASTER OF APPLIED STATISTICS PROGRAMME**

**IMPACTS OF MICROFINANCE FACILITIES ON  
LIVELIHOODS OUTCOME OF HOUSEHOLDS IN  
RURAL AREAS OF MYANMAR**

**YE WINN**

**MAS - 9**

**DECEMBER, 2019**

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This thesis is submitted to the Board of Examination as partial fulfillment of the requirements for the Degree of Master of Applied Statistics

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## ABSTRACT

Microfinance is a current and potential positive impacts on promote livelihoods of the rural households in Myanmar. Economy and type of business were changed day after day and factors that determined on microfinance activities might be different from other practices. This study discusses average total income of rural household for the study areas, Delta, Dry, Rakhine and Upland in Myanmar. It aims to study the function and development of microfinance activities within communities of rural areas in Myanmar and to analyze the impacts of microfinance facilities on livelihoods outcomes of households in rural areas of Myanmar. This study used secondary data from 2017 LIFT household survey. In this study 1,012 households in Delta, Dry, Rakhine and Upland in Myanmar were included in the analysis. Descriptive analysis and multiple linear regression analysis are used in this study. Average total income of rural household are employed as the dependent variable and number of borrower household in region with the same business, total number of working age household members, saving of the household, irregular daily wages, household or any its members own land, any household member set up or use of a savings and or a bank, current debt from all sources of the household, household's assets and wealth and household's current debt from all sources data are independent variables. The results showed that all variables were significantly associated with the average total income of rural household for the study areas, Delta, Dry, Rakhine and Upland in Myanmar. Total number of household members and saving of the household are found positively associated with the average total income of rural household for the study areas. On the other hand, number of borrower household in region with the same business, irregular daily wages, household or any its members own land, any household member set up or use of a savings and or a bank, current debt from all sources of the household, household's assets and wealth, and household's current debt from all sources are also found negatively associated with the average total income of rural household for the study areas..

## ACKNOWLEDGEMENTS

First of all, I would like to express my deepest gratitude to my parents, for their prayers, support and inspirations throughout this study.

I would like to thank Professor Dr. Tin Win, Rector of Yangon University of Economics, Professor Dr. Ni Lar Myint Htoo, Pro-Rector of Yangon University of Economics for their permission to write thesis.

I am greatly indebted to Program Director, Dr. Maw Maw Khin, Professor and Head of Statistics Department, Yangon University of Economics, for her permission, valuable suggestions and recommendations to prepare this thesis study.

I would like to express my indebtedness to Professor Dr. Mya Thandar, Department of Statistics, Yangon University of Economics, for her, valuable suggestions and recommendations to improve my thesis.

I would like to thank External Examiner, Associate Professor (Retired) Daw Win Win Nu, Department of Economics, Yangon University of Distance Education, for her valuable suggestions.

In addition, this study was accomplished by the great supports and encouragement of my supervisor. I would like to express my deepest gratitude to my supervisor, Lecturer Daw Soe Soe Lwin, Department of Statistics, Yangon University of Economics for her invaluable supports, guidance and suggestions throughout this research project.

Besides, I would like to greatly thanks to respectful teachers, Dr. Cing Do Nem (Professor, Department of Statistics,MUE), Dr. Aye Thida (Professor, Department of Statistics, YUE), Daw Khin Nu Win, (Associate Professor, Department of Statistics, YUE) and all from MAS Programme for their intensive teaching, supports and guidance for research knowledge.

Last but not least, I would like to thank all respondents who participated in this study. And I would like to express my special thanks to LIFT to allow to use the data from Household Survey 2017. Lastly, I never forget to thank all colleagues from Master of Applied Statistics (Batch-1).

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## LIST OF ABBREVIATIONS

CAPI	Computer Assisted Personal Interviewing
FAO	Food and Agricultural Organization
LIFT	Livelihoods and Food Security Fund
MADB	Myanmar Agricultural Development Bank
MADB	Myanmar Agriculture Development Bank
MDHS	Myanmar Demographic Health Survey
MFI	Microfinance Institution
MFP	Microfinance Programme
MOU	Memorandum of Understanding
MPLCS	The Myanmar Poverty and Living Conditions Survey
MRA	Multiple Regression Analysis
MUAC	Mid-upper Arm Circumference
PLWHA	People Living with HIV/AIDS
PPP	Purchasing Power Parity
SE	Standard Error
SME	Small and Median Enterprise
SPSS	Statistical Package for Social Science
SRG	Self-Reliance Group
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VSLA	Village Saving and Loan Association
WHO	World Health Organization
WHZ	Weight for height

# CHAPTER I

## INTRODUCTION

### 1.1 Rationale of the Study

The new poverty lines are giving in January 2015 for an individual in Myanmar is considered to be poor if he or she lived in a household with consumption expenditure of 1303 kyat per adult equivalent per day or less, or 1241 kyat in per capita terms. The food poverty line is set at 850 Kyat per adult equivalent per day, or 805 kyat in per capita terms. “The Myanmar Poverty and Living Conditions Survey (MPLCS)” was conducted in early 2015 and that indicates 32 percent of the population lived in the poverty<sup>1</sup>. At the end of 1999, World Bank and International Monetary Fund (IMF) announced a major strategy to help poor countries move on to sustainable faster growth path, bringing a substantial reduction in poverty. The financial sector in Myanmar is small and underdeveloped. It is dominated by four state-owned banks and 19 private banks. Foreign banks currently are not allowed to operate in Myanmar, though 17 foreign banks have already established local representative offices in the country. Without microfinance projects, financial service were limited. Myanmar Agricultural Development Bank (MADB) was the only formal source for obtaining agricultural credit and the people had to rely on local informal moneylenders. Overall, less than 20 percent of the population<sup>2</sup> has access to formal financial service 1.7 million of beneficiaries have received formal financial service<sup>3</sup>.

The demand for microfinance is high. However, few institutions provide microcredit, so unmet the demand, and the demand for formal savings is difficult to be estimated and it may depend on regions. Also crisis in the banking and cooperative sectors in the past have eroded public trust in formal savings. Use of informal provision of credit and transfer services in both urban and rural areas is widespread and the microfinance sector is at its earliest stage for the development of Myanmar. There are great opportunities alongside great challenges for economic growth or urban and rural households. Microfinance deeply emphasizes to the marginalized people living in urban and rural areas because they have little chance to access the

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<sup>1</sup> MPLCS: The Myanmar Poverty and Living Conditions Survey 2015 Report

<sup>2</sup> LIFT 2012 Annual Report

<sup>3</sup> LIFT 2017 Annual Report

credit or no access to proper financial services. The international assistance fund for microfinance aims to create more opportunities for mechanization, agricultural production, creating small and medium sized businesses (SME) including off-farm employment sources through the creation of resilient and financially sustainable microfinance institutions and expand the country's microfinance market by bringing in new foreign investors.

Microfinance Programme is something different from other development activities, because other development programmes are only for utilizing cash assistance effectively and efficiently, but microfinance programme is a payment and repay back system. The responsible loan sizes and small interest rates on reasonable loan amounts are manageable to the communities (borrowers) and less burden to establish their small business or inputs for agricultural activities. It allows the poor to smooth consumption and meet social, religious and other obligations, offers financial protection from crises and disasters, encourages schooling and empowers the marginalized peoples especially small land holder farmers, women headed families and women in the community. Therefore, this study aims to investigate the relationship between microfinance activities, incomes of rural households, their productive assets, wellbeing, social economic of households in rural areas of Myanmar.

## **1.2 Objectives of the Study**

The main objectives of the study are as follows:

- i. To study the function and development of microfinance activities within communities of rural areas in Myanmar.
- ii. To analyze the impacts of microfinance facilities on livelihoods outcomes of households in rural areas of Myanmar

## **1.3 Method of Study**

In this study, the data were combined both quantitative and categorical data for the analysis. Descriptive statistics and multiple linear regressions are used based on secondary data. Multiple Linear Regression Models are used for the analysis of the average incomes of rural households on other influential variables determining microfinance in Myanmar. Additional information is obtained from publications issued by microfinance industry.

#### **1.4 Scopes and Limitations of the Study**

The study area focus on microfinance intervention of LIFT<sup>4</sup> supported projects in Myanmar so the approaches and implementation processes do not cover all microfinance organizations providing microfinance service in Myanmar. The main source of data are LIFT household survey 2017 microfinance villages and these datasets are officially requested to use only for study purpose and that was approved by LIFT.

#### **1.5 Organization of the Study**

The paper is organized into six chapters. Chapter I is introduction which is comprised of five sub-headings: rationale of the study, objectives of the study, scope and limitations of the study, method of study and organization of the study. Chapter II is overview of microfinance which presents concept of microfinance, difference between microfinance and saving, microfinance methodologies, women empowerment pattern, and poverty and microfinance. Chapter III explains the functions and activities of microfinances projects. In this chapter, microfinance policies, financial inclusion activities and risks of microfinance, types of loan and loan products, terms of credit and repayment procedures, village saving loan association, importance of microfinance to household incomes in rural communities and microfinance road map 2018-2025 are included. Chapter IV discusses theoretical background and regression analysis. Chapter V presents the analysis of microfinance facilities on livelihoods outcome of households in rural areas of Myanmar and Chapter VI deals with findings and conclusion.

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<sup>4</sup> LIFT: Livelihoods and Food Security Fund

## **CHAPTER II**

### **OVERVIEWS OF MICROFINANCE**

#### **2.1 Concept of Microfinance**

Myanmar financial sector has received considerable and more attention in recent years because of its limited development during the lengthy period of economic and political isolation that extended from the 1996 to 2012. During the latter part of this period, formal banking sector operations in rural areas were limited by law to the state-owned Myanmar Agricultural Development Bank (MADB) established under Myanmar Agricultural and Rural Development Law 1990. The only national organization apart from MADB with a widespread presence in rural areas was the Myanmar Maternal and Child Welfare Association (MMCWA), with branches in all 324 townships, and which commenced micro lending in 1996. However, their clients were primarily women traders, rather than producers, and their total loan portfolio was also small.

The first significant international support for rural microfinance was launched in 1997 under UNDP the Human Development Initiative-HDI. This program, established through Memorandum of Understanding (MOU) with the Government of the Union of Myanmar, financed three projects in three regions, which are Delta, Dry zone and Shan State. The three projects were permitted to charge the interest of 38-45 percent per annum; considerably above government mandated levels but still insufficient to permit operational sustainability given inflation rates at that time. The projects rapidly became the largest source of agricultural credit in their operating respective areas, which are exceeding MADB loans, but the expansion was restricted by the government for many years.

Human Development Initiative (HDI)-UNDP impact evaluation was carried out in 2007, and a subsequent one in 2011. The impact evaluation found that the microfinance 'had a very positive impact on the lives of the clients it serves'. It seemed to contribute to an increase in the level of economic activity of villages where it operates by providing more employment and better services to non-clients. It increased income measurably, and improved standard of living of clients. On the business side, the microfinance program (1) helped people access credit at lower interest rate than other sources (2) reduced low-wage daily labor in favor of more profitable microenterprise and agriculture investment (3) improved the profitability

and production of agriculture (4) increase the diversity of business. Specifically in agriculture, it encouraged purchasing and planting of agricultural land, produced better yields, and had higher net returns. In other results, the microfinance improved food security, helped households keep children in school, helped them pay for medical expenses, and helped them improve the quality of earnings.

Microfinance is the supply of loans, deposit facilities for saving and other basic financial services to the poor to support to run their daily business, build assets, stabilize daily food consumption and prevent themselves against possible risk to get resilience against shocks and stress. Financial service provides to the poor people through capital loans, consumer credit, saving, social pensions, insurances and cash transfer services. Small businesses are job creators. Improving access to finance for small businesses is a key element of financial Inclusion.

Microfinance institutions exist in many forms- credit unions, commercial banks and NGOs. Many MFI uses social collateral in the form of peer groups to ensure loan repayment. Borrowers take out loans in groups of five to eight individual members. If a member (borrower) defaults on his/her loan, the entire group typically is penalized and sometimes barred altogether from taking further loans. This peer pressure encourages borrowers to be very selective about their peer group members and to repay loans in full and on time, resulting in the higher than 95 percent repayment rates.

## **2.2 Difference between Microfinance and Saving**

There are many different types of financial institutions such as cooperatives or microfinance institutions (MFIs). The most basic function of many financial institutions is to collect money from people who do not need their money now (deposits) and lend money to those people currently in need of money (loans), preferably for productive purposes. The bank (or cooperative or MFI) borrows money from people (depositors) and uses the money to give loans to other clients or members. The advantage for the depositor is that his/her money is kept safe and earns money, so-called interest, because the financial institution pays the depositor for the right to use his/her money. But the institution also charges money from the people it gives loans to – and this, too, is interest. The interest charged from the loan recipient, the borrower, is normally higher than the interest paid to the depositor because the financial institution has to make enough money to pay the people who gave their

money to the institution, pay for its own costs, put aside some money for the cases that loans are not repaid and generate enough extra money to be able to grow. The small loans are enough to start small business such as weaving baskets, raising chickens, or buying wholesale products to sell in a market. Income from these businesses provides better food, housing, health care and education for entire families, and most important, additional income provides hope for better future.

Savings are an element that attracted people to become clients of MFIs, although not as attractive a feature as the credit. The earning interest on their savings was a positive factor and participants are appreciated being able to save small amounts regularly, ending up with lump sum (a large amount) for withdrawal to be used in investing in their business or in consumption. For those MFIs that allowed withdrawals of savings (not all do), this ability to withdraw is a positive characteristics. However, some MFIs do not collect savings at all. Some collected compulsory and voluntary savings.

The compulsory savings policies differed for different MFIs. In the MFIs that allowed or encouraged voluntary savings in addition to compulsory savings, not all participants had been able to save voluntarily. This appeared to be due to length of time that they had been with the MFI-less time meant less voluntary savings. MFI deposits their saving at the bank; a passbook is given to each member; there are three saving products as 1) upfront security: deposit 4% of the loan amount as security for the loan 2) compulsory saving; of some small amount of Myanmar Kyat (MMK) bi-weekly 3) voluntary savings; earn group based agreed percentage on their savings. There are many different savings practices among the MFIs ranging from best practice (minimum amount of savings required guaranteeing the loan, and withdrawals of all other savings permitted) to poor practice (large amount to guarantee the loan, and no withdrawals permitted). Women who had been involved with their MFIs for a long time had large amounts of savings. This is a very positive feature of microfinance, and helps families accumulate assets and avoid economic shocks.

Some international organizations are facilitating access to microfinance through VSLA (Village Saving and Loan Association) approach and it is aimed at expending means of generating income or growing small-scale business and ultimately increasing food security. Financial education on the other hand aims to

facilitate improvement in financial capabilities through exposure to knowledge, skills and tools that participants need to make informed financial decisions.

### **2.3 Microfinance Methodologies**

There are three key patterns in the concepts about microfinance behaviors, the first is women empowerment, and the second is the financial self-sustainability and the third the poverty reduction. Each pattern has its own interpretation of concepts like sustainability and participation as well as its own priorities in microfinance delivery, complementary services and organizational structure.

From the beginning, microfinance was called microcredit as its purpose was clearly lending. Over time the concept of microcredits broadened to include other financial services as well (Robinson 2001). A brief summary over the key principles of microfinance by McGuire and Conroy can be found in Turnell (2005): “These include a presumption that access to credit is more important to the poor than the price of that credit, the widespread use of group and progressive lending as a substitute for collateral, the maintenance of low administration costs through simplified procedures, the mobilization of savings through deposit products, and the use of intensive motivational techniques. Ledgerwood (1999:1) also presents a list of activities normally included in a microfinance program:

- Small loans, typically for working capital
- Informal appraisal of borrowers and investments
- Collateral substitutes, such as group guarantees or compulsory savings
- Access to repeat and larger loans, based on repayment performance
- Streamlined loan disbursement and monitoring
- Secure savings products

Even though the definition of microfinance normally only includes financial activities, it is common that a microfinance program is not exclusively about providing the poor with financial services, but often includes a non-economic agenda as well. Examples of such non-economic activities are: skills training, marketing, literacy training and health care.

### **2.4 Women Empowerment Pattern**

There are many reasons why women have become the primary target of microfinance services. At a macro level, it is because 70 percent of the world’s poor

are women. Women have a higher unemployment rate than men in every country and make up the majority of the informal sector of most economies. They constitute the bulk of those who need microfinance services.

As women's empowerment is not a final state but rather than a process, it is very difficult to conceptualize its meaning and there is no simple definition in the literature. As women are individuals that can be found in every division of a society, it is likely that each woman has her own definition of empowerment and her own idea of what empowers her. It is also important to keep in mind that gender disadvantage can take form in several ways and is likely to occur differently in different social and cultural contexts, which consequently means that women empowerment process in one context will not be the same as another context. However, despite cultural differences there are still several common actions that need to be considered, regardless of culture, religion or geographic location, in order to enhance women's empowerment like increasing their participation in decision-making, more equitable status of women in the family and community, increasing political powers and rights, and increasing self-esteem.

The component of empowerment is often associated with decision-making power on household level. Decision-making power in the household concerns women's participation in decision-making in areas such as: Finances (e.g. purchases, pricing of crops, house repairs); Family matters (e.g. family planning; children's education; children's marriage); and Domestic matters (e.g. household work). Today, a majority of the microfinance programs around the world target women as their clients and increasing women's participation in income-generating activities, women's bargaining power and decision-making roles within the household are also strengthened. In other word, reduction in women's vulnerability can sometimes also be translated into empowerment if greater financial security allows women to become more assertive in household and community affairs through microfinance activities within the community.

## **2.5 Poverty and Microfinance**

Starting from the 1980s, microfinance has gained recognition globally as one of the most effective tools for poverty reduction. In 1997, UNDP included a microfinance component as a separate project under its HDI (Human Development Initiative) in Myanmar for 11 townships in the three zones of Delta, Dry Zone and

Shan. This was the first time that microfinance was authorized to operate in the country. The overall goal for the microfinance projects is that poor and vulnerable households in Myanmar achieve improved socio-economic well-being through increased access to sustainable financial services, including different loans, and increases in household assets. The microfinance projects offer loan with no collateral requirements and at interest rates well below those charged by informal money lenders and is therefore able to address the needs of the poor in a more economical manner.

Poor clients use the loans and savings for increasing their income through investments in agriculture, livestock, fishery, trading and services. The poor throughout the world are extremely vulnerable when depending upon only one source of income. Therefore such a significant increase in diversified livelihoods by clients, as compared to non-clients, demonstrates the value of microfinance in reducing the poor's vulnerability and increasing alternative coping mechanisms at the household level. This shows that, the microfinance projects can draw a straight line between access to financial services and positive impacts on the poor in Myanmar.

Micro-credit can reduce poverty and it is important to consider the fulfillment of basic needs (food, clothing, shelter, health, education and psychological well-being), that means to achieve welfare at present and in the future, social networks and empowerment and vulnerability to risk. Reducing poverty is partly a process of increasing income and economic stability which enables fulfillment of basic needs and access to different kinds of services. This may also be understood in the form of developing a range of assets that will reduce the vulnerability of the poor to physical, economic and social shocks. Poverty reduction may also be considered from both short term and long term perspective. In short term, it can be understood with reference to individual borrowers. Different studies show that there is positive correlation between microfinance projects and their benefits in terms of employment, income generation and promotion of social indicators.

## **CHAPTER III**

### **FUNCTIONS, ACTIVITIES AND RISKS OF MICROFINANCE**

#### **3.1 Microfinance Policies, Financial Inclusion Activities and Risks of Microfinance**

According to the new law: “Microfinance means extending microcredit to the grassroots people, accepting deposits from them, carrying out remittances, carrying out insurance business, borrowing money from local and abroad and carrying out other financial activities.” Before the new law, microfinance activities (with the exception of PACT-UNDP) were regulated on the basis of Memorandums of Understanding between NGOs/projects and the government. NGOs/projects did not have legal status, and therefore, their operations were relegated to the informal sector. The new law confers legal status and enables licensed MFIs to provide credit, savings, insurance, and transfers (though this is limited, for the time being, to credit and deposits (see Directive 2 of 23 December). MFIs need to have legal status before they can apply for a microfinance license (e.g., as an NGO, cooperative, or private company). MFIs preparing to open a new branch need the approval of both the Region and the Supervisory Committee. In new microfinance policy, they must have a legal status as cooperative, an NGO, or a private local or international company or organization; have minimum capital of 15 million kyat for non-deposit taking and 30 million kyat for deposit taking; may provide loans and voluntary deposits (for time-being); have a maximum lending rate of 30 percent per annum or 2.5 percent per month; have a minimum rate on deposits of 15 percent per annum or 1.25 percent per month accordingly. In law’s new ‘instructions’ also include some degree of consumer protection. For example, terms and conditions associated with their deposits and loans, including the interest rate and the calculation method.

#### **3.2 Types of Loan and Loan Products**

Loan terms are varied based on the loan products. For special loan, the loan term will be one month to six months or based on one agricultural season or one breeding cycle of particular animals, small loan will be within one month to six months. Repayment schedule for special loans and small loans will be bi-weekly or season basic with interest. Loan term for micro enterprise loans and small enterprise loans are normally six months and payment schedule will be on weekly basic, 25

weekly installments. But monthly repayment is required for agriculture loan. Because of the crops circle, clients need to pay only interest amount on monthly basis and the principle installment will be paid at the end of the loan term. There are altogether four types of loan products the microfinance project deliver to the clients: special loan, small loan, micro enterprise loan, and small enterprise loan.

Another type of loan is called small loan and focused on the poor communities, such as grocery shops, street vendors and some do not have regular business. Interest rate for small loan is the same as special loan, 2 to 2.5% per month but the loan size will be different from the special loan. It starts from 5,000 kyats to 100,000 kyats and loan term will last one month to six months. Repayment for both special loans and small loan are on a weekly basis and the purpose of the loan is only for generating their family income. Interest rate for small enterprise loan is same as micro enterprise loan and loan term and repayment frequency are also the same, weekly and monthly, the loan size for small loan starts from 300,000 kyats to 1,500,000 kyats. Yoma banks in Myanmar, already offered an HP (hire purchased products). The minimum down payment by the client was 30% and the repayments were mostly monthly and the tenor will typically be one year. These loans were unattractive to farmers, who particularly struggled to come up with a down payment of 30% of the asset price before being able to start generating cash flow by applying the agricultural equipment. Yoma Bank reduced the down payment to a minimum of 10%, allowed longer tenors and provided more loans with bi-annual repayment cycles in order to accommodate farmer's seasonal cash flows.

### **3.3 Microfinance Approach, VSLA (Village Saving and Loan Association) Practices and their Repayment Procedures**

Microfinance approach uses community mobilization around income-generation opportunities in order to raise economic status through women's empowerment. This approach has proven successful over the past many years of UNDP experience in managing the largest microfinance programme in Myanmar. PGMF was one of the implanting partners during UNDP programme and it is still processing microfinance projects in most areas of Myanmar. The strategy assists the participating community members to develop their own solidarity groups of five like-minded self-supporting women and to elect group leaders.

After the formation of groups, the project invites the newly formed group members to join training/workshops. These workshops promote a bottom-up and community driven foundation for the program. They attend the Non-formal Business Education (NFBE) trainings which consist of five modules designed to inform potential members of the microfinance rules and regulations. The modules demonstrate through the basic concepts of running business activities, the role of savings and the visions for a better future. The groups are then asked to form a village microfinance center of 30-50 members, upon which further program activities are built. The village center is formed by six to ten, five-member groups.

The center executive committee is made of the group leaders, who are elected from within their respective five-member groups for one year. These center executive committee members decide how they would like to select their leader, by secret ballot, or by a show of hands, and elect the center chair. The center and its members are trained, assisted, and mentored throughout the process by microfinance projects' staff who regularly visits the centers at appointed times to disburse and collect loans and receive savings from individual members. Through the center activities women are introduced to democratic processes and practices which encourage them to make decisions at their family levels as well as local community level. The group then provides individual members with small loans carry out small, income-generating activities. Repayment terms and interest rates are decided by agreement among members. After the group has provided members with a number of loans and those members have proven their capacity to understand the principles of loan repayment and common-fund growth for their own interest.

To collect savings the groups sell shares, allowing the group members to save through the purchase of between one to five shares every meeting. The unchangeable share-value is decided by the VSLA at the start of each cycle. As the share-value is agreed and set by the group members, it is appropriate to economic context of the group. The savings create a fund that is used to disburse loan and the loan size is limited to a maximum of three times the value of the members' share ownership. For instance, if a client buys three shares at a price of 5,000 MMK per a share, he/she is allowed to borrow up to 50,000 MMK. At the start-up of each cycle, the VSLA also decides the unchangeable interest rates to charge for the loans, which is typically between 2.5 and 5%. The income derived from the interest on the loans is added to the group's savings fund and is one of the main ways that the fund grows, increasing the

amount of loan funds available to the members and also increasing the share-out funds to members. Members can also choose to have a social or emergency fund that can be used as small grants or emergency insurance when members are in financial stress. This fund is kept separate from the loan fund and is not included in the end of cycle share-out. It can be carried over into next cycle, or donated if the group members agree.

### **3.4 Risks**

Generally there are six types of risks in Microfinance Industry (1) Credit Risk (2) Market Risk (3) Financing Risk (4) Currency Risk (5) Operational Risk and (6) Reputation Risk. Credit Risk is that a client will not repay a loan to a lender. Market risk is defined as potential for financial loss from adverse changes in underlying market factors. Interest Risk (Financing Risk) is that an institution will lose value due to change in market interest rates. Currency Risk is that investments in MFI will lose value due to changes in foreign exchange rates. Operational Risk that losses may result from inadequate or failed internal processes, systems or from human error or external events. The largest risks faced by the MFI in the managing of their operations are credit risk and mission risks. Managing credit risk at the MFI level is one of the primary strategies in risk management. Reputation Risks that improper dealing with clients or governments result in loss of confidence by clients, lenders or regulators. Much time and training is given on proper lending and fraud avoidance. In addition, MFI work closely with the authorities and regulators to ensure compliance with all laws and regulatory guidelines.

Regarding as VSLA, based on the analysis of the factors that have positive causal relation to the sustainability of VSLA suggested the member discipline is the strongest predictor of group's survival rates, and followed by an ability to develop social capital, age of the group, financial capacities of its members, proportion of members involved in IGA activities. Member discipline was discovered to be the most influential factor enabling the groups to sustain.

### **3.5 Importance of Microfinance to Household Incomes and Social Impacts in Rural Communities**

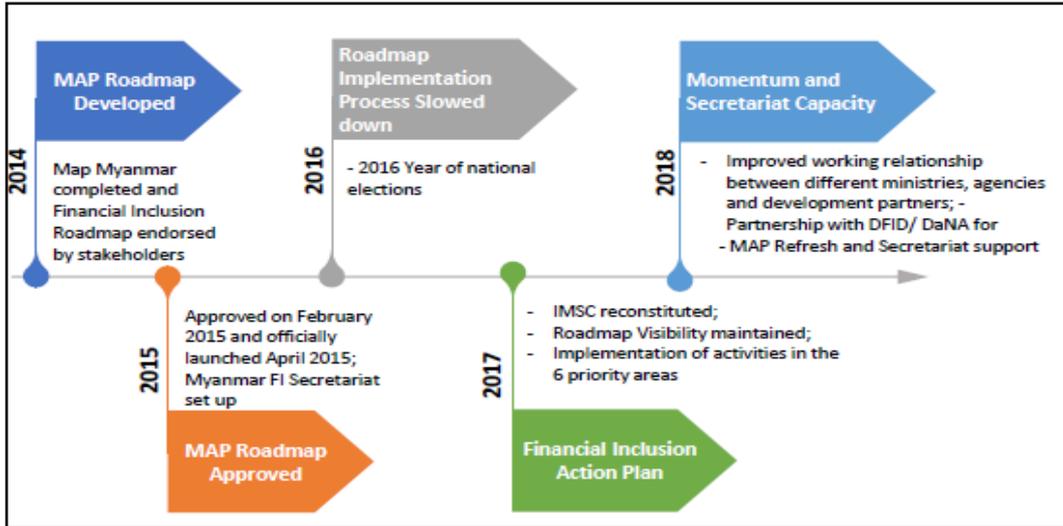
The microfinance has increased access to affordable credit, and this is the primary attraction of MFIs. Although most clients (excluding the poorest) had access to some form of credit (moneylenders, wholesalers, suppliers), the microfinance loans

are much affordable. Access to these loans helps clients realize greater profits from their investments. The loans help people invest larger amounts in their business, buy inventory that sells more profitably, buy tools and equipment that improve productivity, and pay for transportation. Families may have more than one loan at a time. Infrequently, these are 2 MFIs that are providing the loans. More frequently, a person gets a loan from an MFI and also the MADB, or from an MFI and the moneylender (using in the early cycles of the MFI loan, when the loan amounts are small). The affordable rate of interest, the variety of loan products, the reasonable installment amounts, the balloon payment for agricultural loans, and the fact that no collateral is required, are all mentioned as positive attributes of the credit. Savings are also appreciated, in those MFIs that provided this service.

Another impact is on education expenses. Some MFI provide low interest loans for this. Clients use their savings or profits to invest in their children's education. Clients also are able to increase their assets, in the form of savings, animals, transport, telephones, and bulk purchases of food. In addition to the expenditures on health care, some clients had medical emergencies that are solved by microfinance-either loans or savings. Members of these groups reported more solidarity, natural support, sharing of business information and an increase in self-confidence and entrepreneurship.

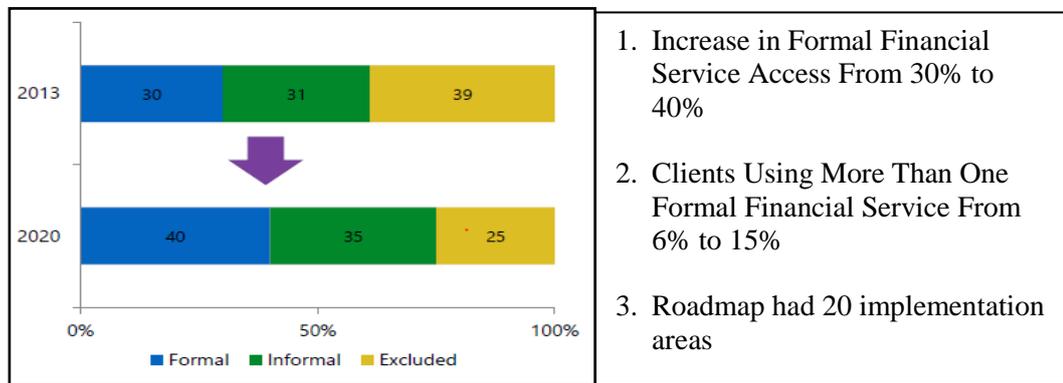
### **3.6 Microfinance Road Map 2018-2022**

MAP (Making Access Possible) Myanmar updated roadmap for 2018-2020 has been developed by MOPF (Ministry of Planning and Finance), Da Na Facility, FMT (FINMARK TRUST) with assistance of UK aid illustrates in figure (3.1) and it includes three primary objectives as (1). Increase in formal financial service access from 30% to 40% (2). Clients using more than one formal financial service from 6% to 15% (3). Road map had 20 implementation areas illustrate in figure (3.2).



Source: Ministry of Planning and Finance

**Figure (3.1) MAP  
(Making Access Possible) Myanmar Roadmap**



Source: Ministry of Planning and Finance

**Figure (3.2)  
Three Primary Objectives**

As far as 2018 in vision level, there is much improved range of products, however gaps remain in variety, affordability, quality and effectiveness. Many providers have installed their IT systems and stakeholders have more forums to engage to improve the offering to consumers. In the sector level, significant share of customers for commercial banks, MFIs & cooperatives and emerging role of mobile money. Significant access of formal products (except insurance). About 51% has increased financial access in Agriculture by increasing the quality and diversity of products to farmers. About 49% has increased financial access to MSME (Micro, Small and Medium Enterprises) by strengthening institutions best positioned to serve them. About 30% has provided financial inclusion and resilience to low

income households by creating and incentivizing business models and partnerships that are best positioned to provide the services, especially in rural areas.

Microfinance facilities reaches agricultural finance and other products from farmers, allows agricultural credit guarantee schemes, and provides wider range of savings facilities to help manage seasonally cash flows and grants crop insurance and builds credit risk assessment capacity. It reforms and support industry recommendations to expand credit capacity especially for all low income segments by tiered regulation. These allow private and foreign insurance companies and develop affordable micro-insurance products with distribution and collection mechanisms. These help to improve inclusion for women includes saving mobilisation, specialized financial literacy strategies and monitoring of financial access and usage.

## **CHAPTER IV**

### **THEORETICAL BACKGROUND OF REGRESSION ANALYSIS**

This chapter presents the statistical methodology used in the study. It is divided into two sections. The first section explains the description of data source and sample population. The second section discusses theoretical background of multiple linear regression models.

#### **4.1 Source of Data**

The study used the secondary data from LIFT Household Survey 2017. The objective of LIFT Household Survey to provide information on livelihoods and food security in the LIFT agro-ecological zones: the Delta, the Dry Zone, Uplands and the Rakhine. The household survey collected information to gain an understanding of the living conditions of rural inhabitants in the programme areas, including agriculture and non-agriculture related information, microfinance, and nutritional information and anthropometry measurements for children age under five. The survey provide a partial basis to evaluate the effectiveness and outcomes of LIFT programme support to households and to highlight some of the successes of the programme to-date to report to donor countries.

#### **4.2 The Sample Households**

The study areas were four agro-ecological zones such as Delta, Dry, Uplands and the Rakhine. The total sample size for the household survey for financial inclusion component was 1,012 households, selected from 63 villages within five States and seven Regions, 40 townships. The sampling framework was drawn from the lists of villages provided by LIFT for microfinance activities through partner organizations for the four ago-geological zones sampled households were than randomly selected and interviewed.

#### **4.3 Multiple Linear Regression Model**

Multiple linear regression analysis is a method of taking into account simultaneously the relationship between all the variables when two or more independent variables are to be used in making estimates of the dependent variable.

The use of two or more independent variable regression analysis is an extension of the use of two or more independent variable regression analysis is an extension of the basic principles used in two-variable regression analysis.

The multiple regression equation takes the following form:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_k X_{ki} + e_i \quad (4.1)$$

where,

- $Y_i$  = the dependent variable
- $\beta_0$  = the constant term (or) intercept of the equation
- $\beta_1, \beta_2, \beta_3, \dots, \beta_k$  = regression coefficients
- X's = the independent variables
- $e_i$  = the random error term

Multiple regression analysis studies the relationship between a dependent (response) variable and k independent variables (predictors, regressors, IV's).

The sample multiple regression equation is

$$\hat{Y}_i = \hat{\beta}_0 + \hat{\beta}_1 X_{1i} + \hat{\beta}_2 X_{2i} + \hat{\beta}_3 X_{3i} + \dots + \hat{\beta}_k X_{ki} + e_i \quad (4.2)$$

Where  $\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3, \dots, \hat{\beta}_k$  are the estimated values for the parameters and  $\hat{Y}_i$  is the estimated value of the dependent variable. The estimation procedure for multiple linear regression models is nearly identical to simple regression.

#### 4.4 Assumptions of the Multiple Linear Regression Model

The validity of the regression model rests on the satisfaction of all or some of the assumptions given below.

1. Multiple linear regressions need the relationship between the independent and dependent variables to be linear. It is also important to check for outliers since multiple linear regressions are sensitive to outlier effects. The linearity assumption can best tested with scatter plots.
2. The multiple linear regression analysis requires that the error between observed and predicted values (i.e., the residuals of the regression) should be normally distributed.

3. The multiple linear regression analysis makes homoscedasticity. The scatter plot is good way to check the homoscedasticity.
4. There is no linear relationship among the explanatory variables. That means no multicollinearity. Multicollinearity may cause the algebraic signs of the coefficients to be the opposite of what logic may dictate while greatly increasing the standard error of the coefficients.

#### 4.5 Testing For Significance

The significance tests for the simple regression model were the t test and F test. In the simple regression model, these tests always generated the same conclusion. If the null was rejected, concluded that not equal to zero. In multiple regression analysis, the t test and F test have different purposes.

1. The F test is used to determine whether there exists a significant relationship between the dependent variable and the entire set of independent variables in the model; thus the F test is a test of the overall significance of the regression.
2. If the F test shows that the regression has overall significance, the t test is then used to determine whether each of the individual independent variables is significant. A separate t test is used for each of the independent variables; thus the t test is a test for individual significance.

#### 4.6 Test for the Significance of Overall Multiple Regression Model

The overall F-test is used to test for the significance of overall multiple regression model. The ANOVA procedure tests the null hypothesis that all the values are zero against the alternative that at least one  $\beta$  is not zero.

The hypothesis for the F test takes the following form

$$\begin{aligned} \text{Null Hypothesis} & : \beta_1 = \beta_2 = \beta_3 = \dots = \beta_k = 0 \\ \text{Alternative Hypothesis} & : \text{At least } \beta_i \text{ is not zero.} \end{aligned} \quad (4.3)$$

If the null hypothesis is not rejected, there is no linear relationship between Y and any of the independent variables. On the other hand, if the null is rejected, then at least one independent variable is linearly related to Y. F-test is used to make the determination. The ratio of test statistics is

$$F = \frac{MSR}{MSE} \quad (4.4)$$

where, the MSR is the mean square error which is equal to

$$\text{MSR} = \frac{\text{SSR}}{k} \quad (4.5)$$

And, the MSE is the mean square error which is equal to

$$\text{MSE} = \frac{\text{SSE}}{n-k-1}$$

Where, n-k-1 is the degree of freedom and k is the number of independent variables.

The decision rule for the F-test takes the following form;

$$\text{Reject the null hypothesis} \quad : \text{if } F > F_{\alpha,k,n-k-1} \quad (4.6)$$

$$\text{Do not reject null hypothesis} \quad : \text{if } F \leq F_{\alpha,k,n-k-1}$$

Where,  $F_{\alpha,k,n-k-1}$  is based on the F distribution with k degree of freedom in the numerator, n-k-1 degrees of freedom in the denominator, and a probability of the upper-tail of the probability distribution. The existence of a regression relation by itself does not ensure that useful predictions can be made by using it.

#### 4.7 Tests for Individual Partial Regression Coefficient

An individual partial regression coefficient  $\beta_i$  in the multiple regression model is tested to determine the significance of relationship between  $X_i$  and Y.

The hypothesis for the t-test takes the following form:

$$\text{Null Hypothesis} \quad : \beta_i = 0 \quad (4.7)$$

$$\text{Alternative Hypothesis} \quad : \beta_i \neq 0$$

The test statistic for this test uses a t-distribution. The t-test statistic is

$$t = \frac{b_i - \beta^*}{S_{b_i}} \quad (4.8)$$

Where, there is the null's claim about which in this case means and

$$t = \frac{b_i}{S_{b_i}} \quad (4.9)$$

Where  $b_i$  = the individual coefficient being tested

$S_{b_i}$  = the standard error of  $b_i$

The decision rule for this test,

$$\text{Reject the null hypothesis} \quad : \text{ If } |t| > t_{\frac{\alpha}{2}, n-k-1} \quad (4.10)$$

$$\text{Do not reject null hypothesis} \quad : \text{ If } -t_{\frac{\alpha}{2}, n-k-1} \leq t \leq t_{\frac{\alpha}{2}, n-k-1}$$

#### 4.8 Coefficient of Multiple Determinations

The coefficient of multiple determinations, denoted by  $R^2$ , is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by an independent variable or variables in a regression model. Whereas correlation explains the strength of the relationship between Y and independent variables, R-squared explains to what extent the variance of one variable explains the variance of the second variable.

The coefficient of multiple determinations is defined as follows:

$$R^2 = \frac{\sum(\hat{Y}_i - \bar{Y})^2}{\sum(Y_i - \bar{Y})^2} = 1 - \frac{\sum(Y_i - \hat{Y})^2}{\sum(Y_i - \bar{Y})^2} \quad (4.11)$$

The numerator of the middle term is the explained sum of squares, or the sum of squares due to regression, SSR, as it is sometimes called. The denominator is the total sum of squares, SST. The subscription of  $R^2$  indicates the Y is the dependent variable and  $X_1, X_2, \dots, X_k$  is one independent variable.

In the simple linear regression, the total sum of squares, the total variation in the dependent variables (SST), can be broken into parts; the sum of squares due to regression (SSR) and the sum of squares due to error (SSE). This same partition works for multiple linear regressions.

$$SST = SSR + SSE \quad (4.12)$$

The quality of the fit for the regression can be calculated by computing the coefficient of determination. The coefficient of determination is still computed as

$$R^2 = \frac{SSR}{SST} \quad (4.13)$$

The value of  $R^2$  can only be between zero and one, where  $R^2 = 0$ , the regression model cannot explain anything about the variation in the dependent variable or the

estimated model does not fit the data. The case of  $R^2 = 1$  represents a perfect fit of the estimated model of the data. A high value of  $R^2$  shows good fit and a low value of  $R^2$  shows a poor fit.

#### 4.9 The Adjusted Coefficient of Multiple Determinations

With a multiple regression made up of several independent variables, the R-squared must be adjusted. The adjusted R-squared compared the descriptive power of regression models that include diverse numbers of predictors. Every predictor added to a model increases R-squared and never decreases it. Thus, a model with more terms may seem to have a better fit just for the fact that it has more terms, while the adjusted R-squared compensates for the addition of variables and only increases if the new term enhances the model above what would be obtained by predictor enhances the model less than what is predicted by chance.

The adjusted  $R^2$  is a modification of the  $R^2$  that adjusts for the number of independent variables. The adjusted  $R^2$  is always less than or equal to the original  $R^2$ , and the discrepancy gets longer as the number of independent variables increases. Therefore, it is a common practice in multiple regression and correlation analysis to report the adjusted coefficient of determination.

The adjusted coefficient of determination is

$$\bar{R}^2 = \frac{\sum(Y_i - \hat{Y})^2}{(n-k-1)} / \frac{\sum(Y_i - \bar{Y})^2}{(n-1)} \quad (4.14)$$

#### 4.10 Linearity

This assumption is the most important, as it directly relates to the bias of the results of the whole analysis (Keith, 2006). Linearity defines the dependent variable as a linear function of the predictor (independent) variables (Darlington, 1968). Multiple regressions can accurately estimate the relationship between dependent and independent variables when the relationship is linear in nature (Osborne & Waters, 2002).

Linearity can be interpreted in two different ways. The first interpretation is linearity in the variables. It is that the conditional expectation of Y is a linear function of  $X_i$  such as  $E(Y | X_i) = \beta_1 + \beta_2 X_i$ . Geometrically, the regression curve in this case is a straight line. In this interpretation, regressions function such as;

$$E(Y | X_i) = \beta_1 + \beta_2 X_i \quad (4.15)$$

It is not a linear function because the variable X appears with a power or index of 2 (Gujarati).

The second interpretation of linearity is that the conditional expectation of Y,  $E(Y|X_i)$  is a linear function of the parameters, the  $\beta$ 's; it may or may not be linear in the variable X. In this interpretation  $E(Y|X_i) = \beta_1 + \beta_2 X_i^2$  is a linear (in the parameter) regression model. The model  $E(Y|X_i) = \beta_1 + \beta_2^2 X_i$  which is nonlinear in the parameter  $\beta_2$ . This model is a nonlinear (in the parameter) regression model (Gujarati).

Linear in the parameters as well as the variables is a linear regression model and so is a model that is linear in the parameter but nonlinear in the variables. If a model is nonlinear in the parameters it is a nonlinear (in the parameter) regression model whether the variables of such a model are linear or not. For some models look nonlinear in the parameters but are inherently or intrinsically linear because with suitable transformation they can be made linear in the parameter regression models. But if such models cannot be linearized in the parameters, they are called intrinsically nonlinear regression model.

#### 4.11 Homoscedasticity or Constant Variance of Disturbances $u_i$

One of the important assumptions of the classical linear regression model is that the variance of each disturbance term  $\mu_i$  conditional on the chosen value of the explanatory variables is some constant number equal to  $\sigma^2$ . This is the assumption of homoscedasticity or equal (homo) spread (scdsticity) that is equal variance. Symbolically,

$$E(\mu_i^2) = \sigma^2, \quad i=1, 2, 3 \dots n \quad (4.16)$$

The conditional variance of  $Y_i$  increase as X increases. Here, the variances of  $Y_i$  are not the same. Hence, there is heteroscedasticity. Symbolically,

$$E(\mu_i^2) = \sigma_i^2, \quad i=1, 2, 3 \dots n \quad (4.17)$$

Heteroscedasticity can be divided into pure and impure version. Pure heteroscedasticity is caused by the error term of the correctly specified equation; impure heteroscedasticity is caused by a specification error such as an omitted variable.

#### 4.12 White Test for Detection of Heteroscedasticity

Heteroscedasticity can be detected by using the informal method such as graphical method and formal method such as Park test, Glejser test, Spearman's Rank Correlation test and Goldfeld-Quandt test, etc. In this study, White's General Heteroscedasticity test are used. Unlike the Goldfeld-Quandt test, which requires reordering the observations with respect to the X variable that supposedly caused heteroscedasticity, or the BPG test, which is sensitive to the normality assumption, the general test of heteroscedasticity proposed by White does not rely on the normality assumption and is easy to implement. Consider the regression model

$$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_k X_{ki} + \mu_i \quad (4.18)$$

The White test proceeds as follows:

**Step 1.** Given the data, estimate Eq (4.18) and obtain the residuals,  $\hat{u}_i$

**Step 2.** Run the following (auxiliary) regression:

$$\hat{u}_i^2 = \alpha_1 + \alpha_2 X_{2i} + \alpha_3 X_{3i} + \dots + \alpha_k X_{ki} + \alpha_{k+1} X_{(k+1)i}^2 + \dots + \alpha_{2k} X_{2i} X_{3i} + \dots + V_i \quad (4.19)$$

Obtain the  $R^2$  this (auxiliary) regression.

**Step 3.** Under the null hypothesis that there is no heteroscedasticity, it can be shown that sample size (n) times the  $R^2$  obtained from the (auxiliary) regression asymptotically follows the chi-square distribution with degree of freedom equal to the number of regressors (excluding the constant term) in the auxiliary regression. That is,

$$n.R^2 \sim \chi_{df}^2 \quad (4.20)$$

**Step 4.** If the chi-square value obtained in Eq (4.20) exceeds the critical chi-square value at the chosen level of significance, the conclusion that there is heteroscedasticity. If it does not exceed the critical chi-square value, there is no heteroscedasticity, which is to say that in the auxiliary regression (4.19),  $\alpha_2 = \alpha_3 = \dots = 0$ .

### 4.13 Multicollinearity

Multicollinearity problem arises when one of the independent variables is linearly related to one or more of the other independent variables. Such a situation violates one of the conditions for the conditions for multiple regression. Specially, multicollinearity occurs if there is a high correlation between two independent variables,  $X_i$  and  $X_j$  if the correlation coefficient  $r_{ij}$  between  $X_i$  and  $X_j$  in the multiple linear regression models is high, multicollinearity exists.

The most direct way of testing for multicollinearity is to produce a correlation matrix for all variables in the model. If a correlation is greater than 0.7 or less than 0.7, the independent variables are highly correlated. If a correlation is less than 0.5, it can be concluded that multicollinearity is not a problem.

Another way to detect multicollinearity is to use the value of Tolerance. Tolerance is the extent to which an independent variable cannot be predicted by the other independent variables. Tolerance is calculated as  $(1 - R^2)$  where the variable being considered is used as the dependent variable in a regression analysis and all other variables are used as independent variables. Tolerance varies between zero and one. A tolerance value of zero for a variable means that it is completely predictable from the other independent variables and that there is a perfect collinearity. If a variable has a tolerance value of one, this means that the variable is completely uncorrelated with the other independent variables. Therefore, a tolerance value will require close to one. Variance Inflation Factor is closely related to the Tolerance.

The third way to detect multicollinearity is to use the variance inflation factor (VIF). The VIF associated with any X-variable is found by regression it on all the other X-variables. The resulting  $R^2$  is then used to calculate that variable's VIF. The VIF for any  $X_i$  represents that variable's influence on multicollinearity. The VIF for any independent variable is a measure of the degree of the multicollinearity contributed by that variable.

The VIF for any independent variable  $X_i$  is

$$\text{VIF}(X_i) = \frac{1}{1-R^2} \quad (4.21)$$

Multicollinearity produces an increase in the variation, or standard error, of the regression coefficient. VIF measures the increase in the variation regression

coefficient over that which occurs if multicollinearity were not present. It relates to the amount that the standard error of the variable has been increased because of collinearity. The increase in standard error (SE) is equal to the square root of the VIF. Therefore, a VIF value should be less than two.

## CHAPTER V

### RESULTS AND FINDINGS

This chapter provides the empirical research findings and including economic characteristics and respondents households and loans size by different geographical regions. In addition, describes the results and findings of multiple linear regression analysis with the assumptions.

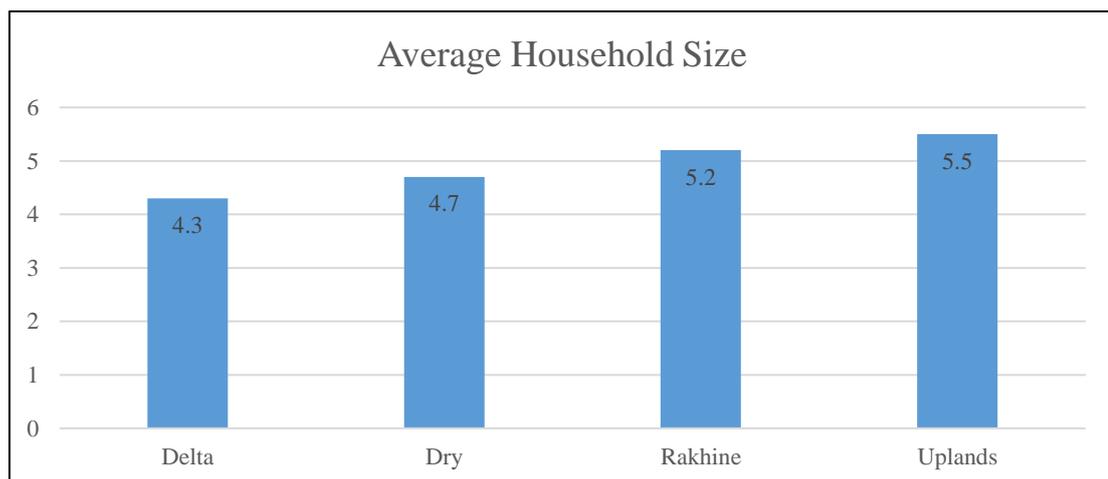
#### 5.1 Average Size of Respondents' Households

Over the entire sample of 1,012 households, the average household size was 4.6 members. There was some variability between regions with households in uplands having the largest average size of 5.5 and Delta with the smallest of 4.3 is shown in Table 5.1 and Figure 5.1.

**Table (5.1)**  
**Average Size of Respondents' Households**

Delta	Dry	Rakhine	Uplands	Total sample
4.3	4.7	5.2	5.5	4.6

Source: LIFT household survey 2017 data



Source: LIFT household survey 2017 data

**Figure (5.1)**  
**Average Size of Respondents' Households**

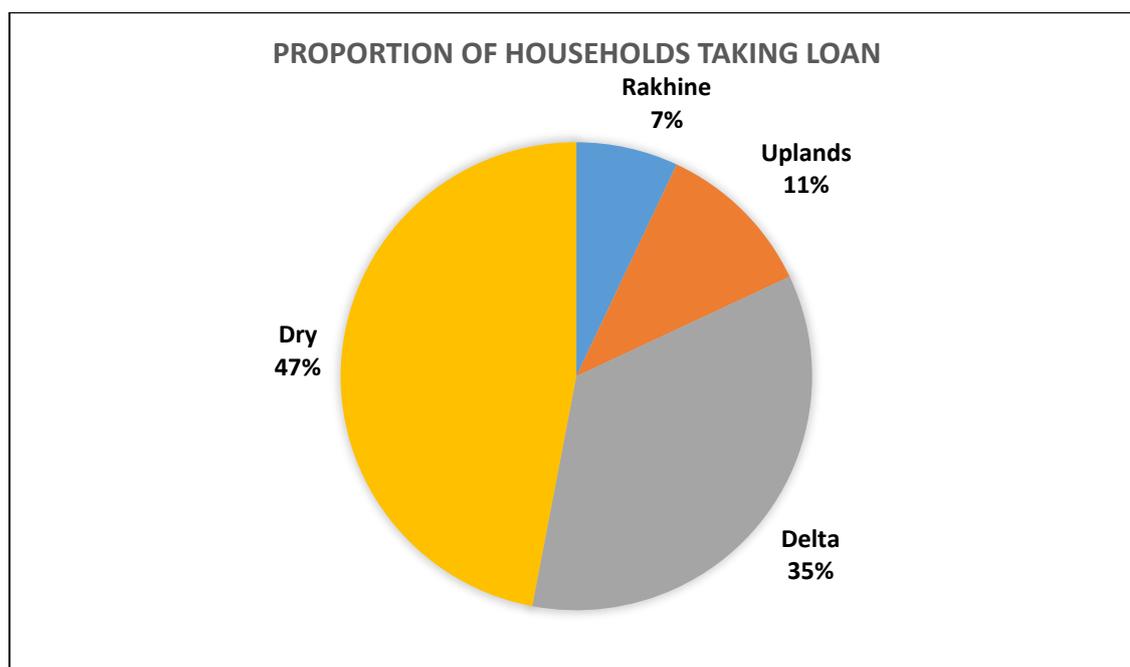
Microfinance programme has been initiated in Myanmar since 1996 and it is still in effect in the respective community. The number of clients joining the program increased gradually year after year. The proportion of households that took out a loan in the past twelve months are 35 percent in Delta, 47 percent in Dry, 11 percent in

Uplands an 7 percent in Rakhine respectively. The proportion of households that took out a loan in last 12 months is shown in Table 5.2 and Figure 5.2.

**Table (5.2)**  
**Proportion of Households that Took Out a Loan in the Last 12 Months**

	Dry		Delta		Uplands		Rakhine	
Proportion of households that took out a loan in the last 12 months	447	47%	358	35%	105	11%	68	7%

Source: LIFT household survey 2017



Source: LIFT household survey 2017

**Figure (5.2)**  
**Proportion of Household Taking Loan**

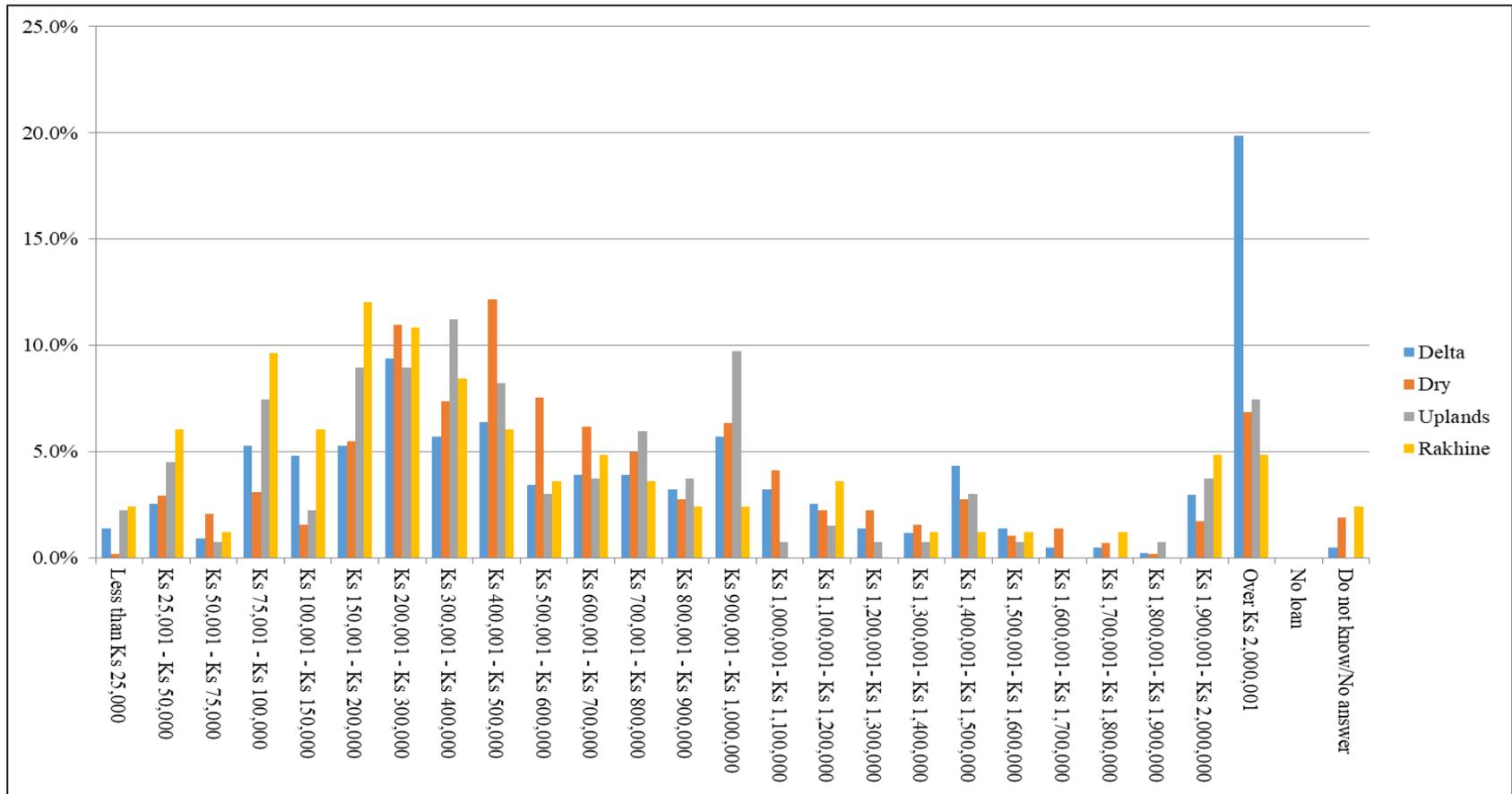
The size of loans is given in Table 5.3. The size of loan ranges generally from 150,000 to 600,000 kyats. The loan size of most of clients fell within the range: 200,000 to 500,000 kyats and over 2,000,000 kyats in Delta, 200,000 to 500,000 kyats in Dry and Uplands, mostly 300,000 to 500,000 kyats and 150,000 to 200,000 kyats in Rakhine respectively. A few of the clients, it is less than 6 percent, 7 percent and 4 percent received 2,000,000 kyats and above in Dry, Uplands and Rakhine.

By comparison, richer households were much more likely to use their loans to purchase their business investment and it was a common use of loans for wealthier households and it is shown in Table 5.3 and Figure 5.3.

**Table (5.3)**  
**Value of Taken All Loans Taken in the Last 12 Months**

Value of taken all loans in the last 12 months	Percent			
	Delta	Dry	Uplands	Rakhine
Less than Ks 25,000	1.4	.2	2.2	2.4
Ks 25,001 - Ks 50,000	2.5	2.9	4.5	6.0
Ks 50,001 - Ks 75,000	.9	2.1	.7	1.2
Ks 75,001 - Ks 100,000	5.3	3.1	7.5	9.6
Ks 100,001 - Ks 150,000	4.8	1.5	2.2	6.0
Ks 150,001 - Ks 200,000	5.3	5.5	9.0	12.0
Ks 200,001 - Ks 300,000	9.4	11.0	9.0	10.8
Ks 300,001 - Ks 400,000	5.7	7.4	11.2	8.4
Ks 400,001 - Ks 500,000	6.4	12.2	8.2	6.0
Ks 500,001 - Ks 600,000	3.4	7.5	3.0	3.6
Ks 600,001 - Ks 700,000	3.9	6.2	3.7	4.8
Ks 700,001 - Ks 800,000	3.9	5.0	6.0	3.6
Ks 800,001 - Ks 900,000	3.2	2.7	3.7	2.4
Ks 900,001 - Ks 1,000,000	5.7	6.3	9.7	2.4
Ks 1,000,001- Ks 1,100,000	3.2	4.1	.7	0.0
Ks 1,100,001- Ks 1,200,000	2.5	2.2	1.5	3.6
Ks 1,200,001- Ks 1,300,000	1.4	2.2	.7	0.0
Ks 1,300,001- Ks 1,400,000	1.1	1.5	.7	1.2
Ks 1,400,001- Ks 1,500,000	4.3	2.7	3.0	1.2
Ks 1,500,001- Ks 1,600,000	1.4	1.0	.7	1.2
Ks 1,600,001- Ks 1,700,000	.5	1.4	0.0	0.0
Ks 1,700,001- Ks 1,800,000	.5	.7	0.0	1.2
Ks 1,800,001- Ks 1,900,000	.2	.2	.7	0.0
Ks 1,900,001- Ks 2,000,000	3.0	1.7	3.7	4.8
Over Ks 2,000,001	19.9	6.8	7.5	4.8

Source: LIFT household survey 2017



Source: LIFT household survey 2017

**Figure (5.3)**  
**Loan Size by Different Geographical Regions**

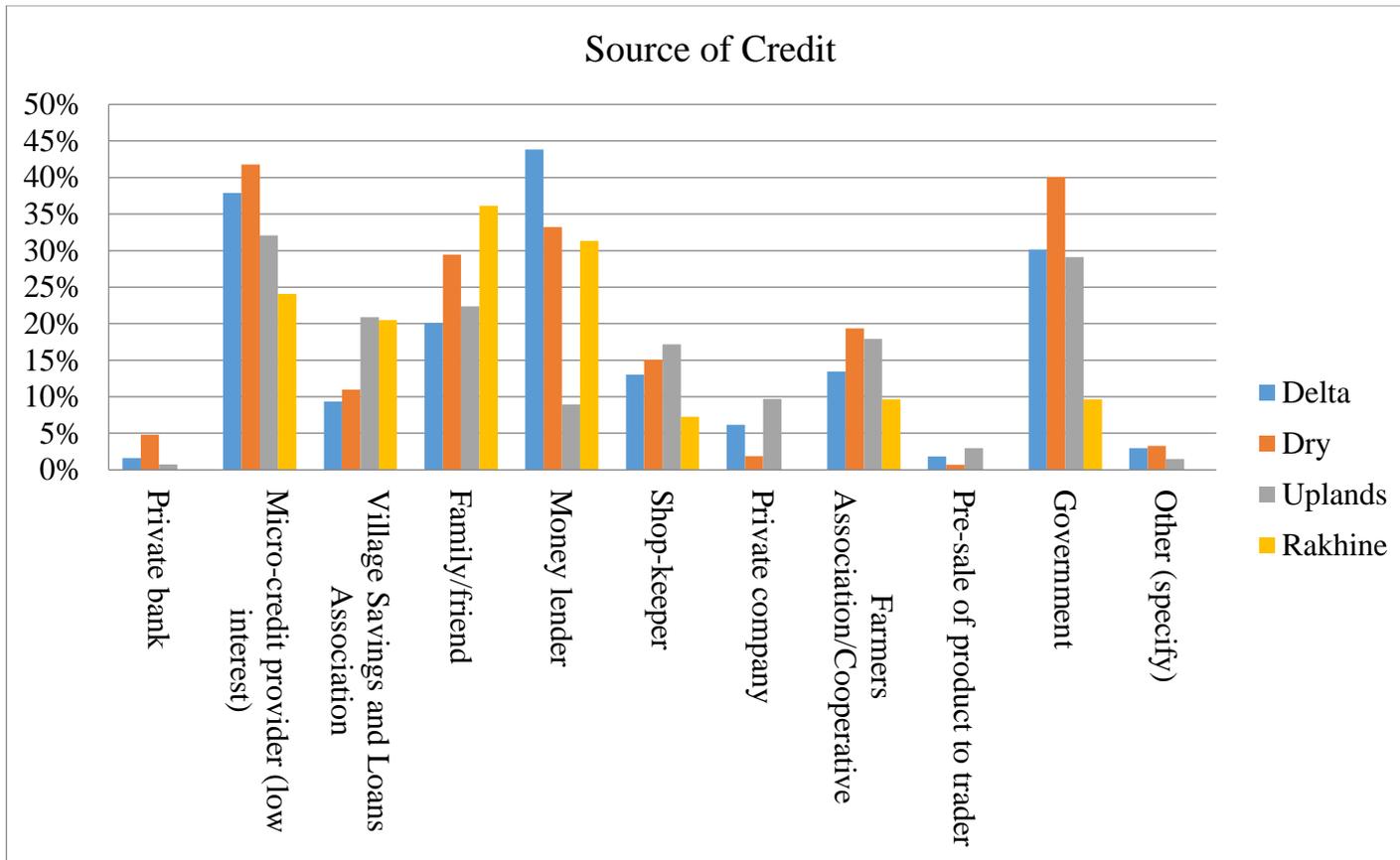
Majority of households had taken out a loan in the 12 months prior to the survey. There were important differences in the source of those loans, particularly among LIFT households. The main source of credit among households was micro-credit providers (low interest rate of 2.5 percent) in Delta in 38 percent and Dry in 42 percent, 32 percent in Uplands and 24 percent in Rakhine respectively. Other major credit source was local money lender 44 percent in Delta, 33 percent in Dry, 9 percent in Uplands and 31 percent in Rakhine. Government also provided agricultural loans to farmers and it was 10 percent in Rakhine, 40 percent in Dry, 29 percent in Uplands and 30 percent in Delta it is shown in Table 5.4 and Figure 5.4.

**Table (5.4)**

**Proportion of Households Taking out Loans and the Source for this Money**

Source of credit	Percent			
	Delta	Dry	Uplands	Rakhine
Private bank	2	5	1	0
Micro-credit provider (low interest)	38	42	32	24
Village Savings and Loans Association	9	11	21	20
Family/friend	20	29	22	36
Money lender	44	33	9	31
Shop-keeper	13	15	17	7
Private company	6	2	10	0
Farmers Association/Cooperative	13	19	18	10
Pre-sale of product to trader	2	1	3	0
Government	30	40	29	10
Other (specify)	3	3	1	0

Source: LIFT household survey 2017



Source: LIFT household survey 2017

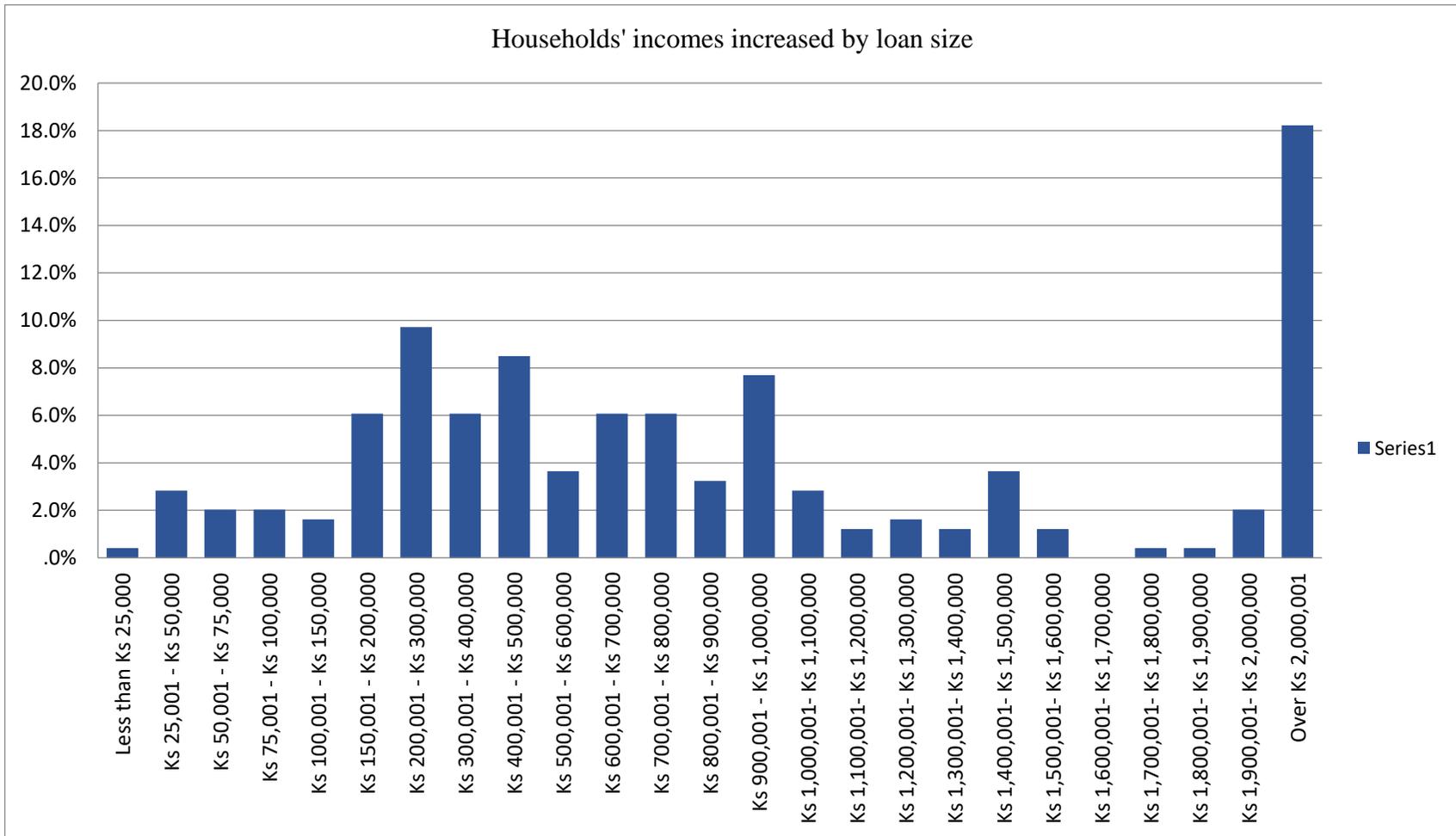
**Figure (5.4)**  
**Source of Credit**

Most of the households had more than one source of income in 2017 and income levels are depend on type of business and value of investment on particular business. Loan size differences are varying when looking at their income level increased in Table 5.5. Main incomes are driven by a small proportion of loan size households borrowed with very large loan size, particularly in the loan size more than 2,000,000 MMK. The proportion of households reporting having increased income reported with 18 percent with loan size of over 2,000,000 MMK, 9 percent and 8 percent with loan size between 200,000 to 300,000 MMK and 400,000 to 500,000 MMK, 6 percent with loan size between 600,000 to 800,000 MMK, 5 percent to 6 percent with loan size between 400,000 to 1,000,000 MMK. 2 percent with loan sizes from 1,200,000 to 1,300,000 MMK and 4 percent from 1,400,000 to 1,500,000 MMK. Small amount of loans are less than 25,000 and 50,000 to 75,000 MMK with about 2 percent only. The Table (5.5) and Figure (5.5) are shown in the results on incomes change appear to indicate that households that received more lone above 2,000,000 MMK, 200,000 to 300,000 MMK ware better to maintain their incomes, were better able to large and median size of business rather than small enterprise business.

**Table (5.5)****Compare Household's Income during the past 12 Month by Value of Loan Size**

Value of loan size	Compare household's income during the past 12 months (Percent)		
	Increased	Stay the same	Decreased
Less than Ks 25,000	0.4	1.1	1.1
Ks 25,001 - Ks 50,000	2.8	3.6	2.6
Ks 50,001 - Ks 75,000	2.0	1.6	0.8
Ks 75,001 - Ks 100,000	2.0	5.2	5.8
Ks 100,001 - Ks 150,000	1.6	2.9	4.2
Ks 150,001 - Ks 200,000	6.1	6.2	6.3
Ks 200,001 - Ks 300,000	9.7	10.6	9.7
Ks 300,001 - Ks 400,000	6.1	7.8	7.1
Ks 400,001 - Ks 500,000	8.5	9.8	8.9
Ks 500,001 - Ks 600,000	3.6	5.6	6.1
Ks 600,001 - Ks 700,000	6.1	4.9	4.5
Ks 700,001 - Ks 800,000	6.1	4.4	3.9
Ks 800,001 - Ks 900,000	3.2	2.8	3.2
Ks 900,001 - Ks 1,000,000	7.7	7.5	3.2
Ks 1,000,001- Ks 1,100,000	2.8	3.1	3.4
Ks 1,100,001- Ks 1,200,000	1.2	2.3	3.2
Ks 1,200,001- Ks 1,300,000	1.6	1.1	2.4
Ks 1,300,001- Ks 1,400,000	1.2	1.6	0.8
Ks 1,400,001- Ks 1,500,000	3.6	2.9	3.4
Ks 1,500,001- Ks 1,600,000	1.2	0.8	1.6
Ks 1,600,001- Ks 1,700,000	0.0	0.7	1.6
Ks 1,700,001- Ks 1,800,000	0.4	0.7	0.5
Ks 1,800,001- Ks 1,900,000	0.4	0.3	0.0
Ks 1,900,001- Ks 2,000,000	2.0	3.1	2.1
Over Ks 2,000,001	18.2	7.8	12.6

Source: LIFT household survey 2017



Source: LIFT household survey 2017

**Figure (5.5)**  
**Households Incomes Increased by Loan Size**

Loans are used by households to cover basic needs and in limited cases invest in assets and their livelihoods. Most loans are taken from government loan schemes as they do not carry rules as to how the loan can be spent and membership is not required. Microfinance Organizations organized loans carry rules, such as strict deadlines and are often for specific purposes that do not included basic daily living such as food. However, these saving groups are active in the majority of villages and mostly perceived positively by members and non-members. In most cases, capital cannot be built up from debt as loans are being used to cover daily living expenses but in some cases households use loans to invest in their business through labor migration as transportation cost in internal migration in one hand capital investment as out migration in other hand.

Rural households in Myanmar take loans from a variety of purposes in LIFT supported villages had taken loans from 50,000 MMK up to more than 2,000,000 MMK.

## 5.2 Analysis of Multiple Linear Regression Model

In fitting multiple linear regression model, average total income of rural household is used as the dependent variable where, region of the household, total number of household members, saving of the household, irregular daily wages, household or any its members own land, any household member set up or use of a savings and or a bank, household's assets and wealth and household's current debt from all sources are used as the independent variables. The Multiple Linear Regression Equation is:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + e_i$$

$Y_i$  = The average total income of rural household from all sources in the last 12 months

$\beta_0$  = Constant (coefficient of intercept)

$X_1$  = Number of borrower household in region with the same business

$X_2$  = Total number of working age household members in the household

$X_3$  = Household saving during the last 12 months

$X_4$  = Household income from the source of irregular daily wages in the last 12 months

$X_5$  = Household head or any of its members own land (including land of any type)

$X_6$  = Household with any member set up or use of a saving and or a bank account

$X_7$  = Household's assets and wealth

$X_8$  = Household's current debt from all sources

$e_i$  = Random Error

## 5.3 Results for Model Summary

The results of model summary are described in the following Table (5.6):

**Table (5.6)**  
**Results of Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.698	0.488	0.483	2.610

Source: SPSS Output

According to Table (5.6), the correlation coefficient is 0.698 (nearly 0.7). Therefore, there is strongly correlation between average total income of rural

household and its independent variables. The adjusted correlation coefficient of determination is 0.483, thus 48.3 percent of variation in average total income of rural household is explained by its independent variables.

#### 5.4 Results for Analysis of Variance (ANOVA) Table

Table (5.7)

Results of ANOVA Table

Sources	Sum of Squares	Degree of Freedom	Mean Square	F	p-value
Regression	6500.404	8	812.550	119.287	0.000
Residual	6832.161	1003	6.812		
Total	13332.564	1011			

Source: SPSS Output

From the result of Table (5.7), F value shows that the entire model is highly significant at 1 percent level. Therefore, all independent variables in the model jointly influence the dependent variable.

## 5.5 Results for Coefficients of Regression Model

The estimated model for the average total income of rural household is described in Table (5.8):

**Table (5.8)**  
**Results of Estimated values for coefficients**

Variables	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
(Constant)	13.698	0.876		12.797	0.000
Number of borrower household in region with the same business	-0.578	0.107	-0.129	-5.440	0.000
Total number of working age household members in the household	0.187	0.042	0.110	4.306	0.000
Household saving during the last 12 months	1.145	0.311	0.085	3.667	0.000
Household income from the source of irregular daily wages in the last 12 months	-1.547	0.177	-0.209	-8.494	0.000
Household head or any of its members own land (including land of any type)	-0.916	0.181	-0.125	-5.002	0.000
Household set up or use of savings and or a bank account	-1.119	0.392	-0.065	-2.841	0.005
Household's assets and wealth	-0.618	0.159	-0.090	-3.913	0.000
Household's current debt from all sources	-176648.849	85151.175	-0.502	-20.196	0.000

Source: SPSS Output

According to Table (5.8), all variables are significant. The number of borrower household in region with same business pattern has negative relationship with the average total income of rural household. It means that when one-borrower households with the same business in the region increase the average total income of rural borrower household will decrease about 58,000 Kyat ( $b_1 = -0.583$ ) in the last 12 months. It is statistically significant at 1 percent level. Microfinance mainly focus on small, median business for borrowers (group members) business are limited among the community within region, and they are doing the same business pattern because off microfinance. It causes less profit margin daily income overtime.

The total number of working age household members has positive relationship with the average total income of rural household. It means that when total number of working age household members increases one person the average total income of rural household will increase about 19,600 Kyat ( $b_2 = +0.196$ ) in the last 12 months. It is statistically significant at 1 percent level. The households with more available labor would be able to generate more income.

The saving of the household has positive relationship with the average total income of rural household. It means that when one household or its any of family member increase their saving practice the average total income of rural household will increase about 115,200 Kyat ( $b_3 = +1.152$ ) in the past 12 months. It is statistically significant at 1 percent level. Members of VSLA (Village Saving and Loan Association) are saving their money by monthly and then shared out at the end of yearly cycle to all VSLA members. Borrowers from Microfinance Institution are saving by monthly and they draw back to expend their own business. Saving money are normally used for their investment cost for small or median size business.

The irregular daily wages has negative relationship with the average total income of rural household. It means that one household with source of income from irregular daily wages increase the average total income of rural household will decrease about 152,900 Kyat ( $b_4 = -1.529$ ) in the last 12 months. It is statistically significant at 1 percent level. The unstable day wages for casual labor and effects to the negative impact to the normal income of the family. Most of the community in Myanmar rural areas engaged with more than one source of family income and the casual labor is the highest proportion compare with other source of incomes especially for better off and poor families.

The household head or any its members own land has negative relationship with the average total income of rural household. It means that the number of household own land increase the average total income of rural household will decrease about 91,300 Kyat ( $b_5 = -0.913$ ) in the last 12 months. It is statistically significant at 1 percent level. In 2017, there was crops failure in many geographical areas by landslides, unusual rain and flooded. There was a big loss of farmers from their crop production and much more effected to large and median scale farmers with lands.

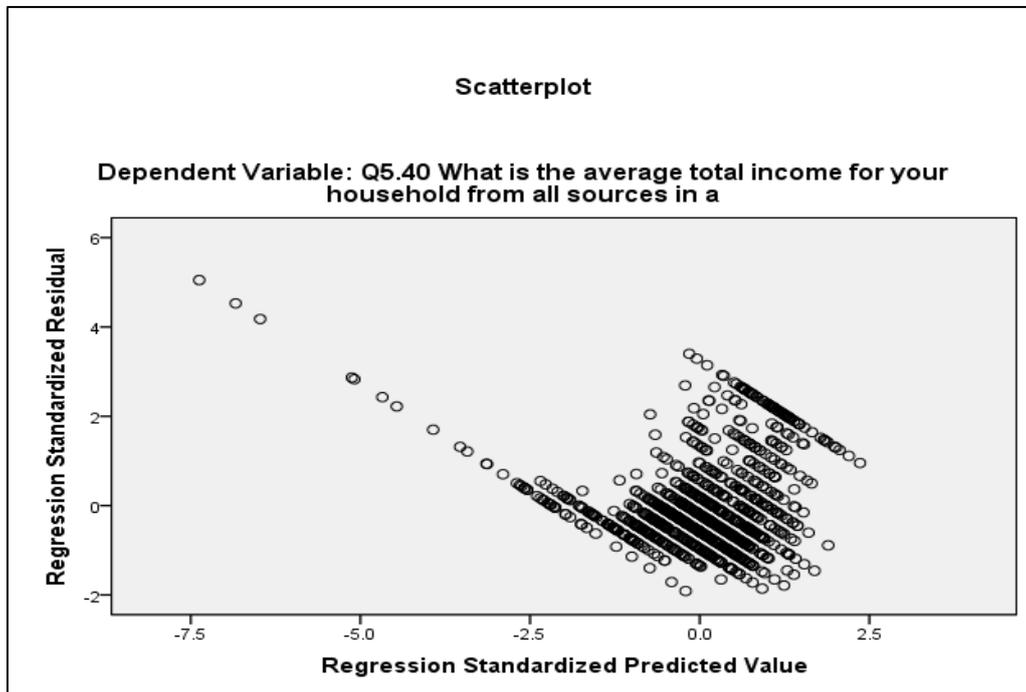
The any household member set up or use of a savings and or a bank has negative relationship with the average total income of rural household. It means that when one household with any household member set up or use of a savings and or a bank account increase the average total income of rural household will decrease about 111,700 Kyat ( $b_7 = 1.117$ ). It is statistically significant at 1 percent level. Microfinance more focus on less income groups of poor and very poor rural community in Myanmar especially in women. Open a bank account (bank passport) and saving money are the mandatory to get loan.

The household's assets and wealth has negative relationship with the average total income of rural household. It means that one household has increased assets and wealth the average total income of rural household will decrease about 62,700 Kyat ( $b_7 = -0.627$ ) in the 12 months. It is statistically significant at 1 percent level. YOMA bank and microfinance institutions provides hire purchase and sold out major used of farming machines (for example: tractor, power tiller, hand tractor, sprayer, etc.) to increase their income. In addition, whether the household income decreased, the mobile phone and solar usage are significantly getting higher for essential productive asset for recent days with cash down or credit sales.

The current debt from all sources of the household has negative relationship with the average total income of rural household. It means that when current debt from all sources of the household increase 100,000 Kyat the average total income of rural household will decrease about 176,648 Kyat ( $b_8 = -176648.849$ ) in the last 12 months. Most of the borrowers has taken more than one source of loans and that cause to debt cycle.

## 5.6 Result of Testing for Linearity

As regression analysis is based on the concept of correlation, the linearity of the relationship between dependent and independent variables is important. Linearity can easily be examined by residual scatterplots which are shown in Figure (5.6).



Source: SPSS Output

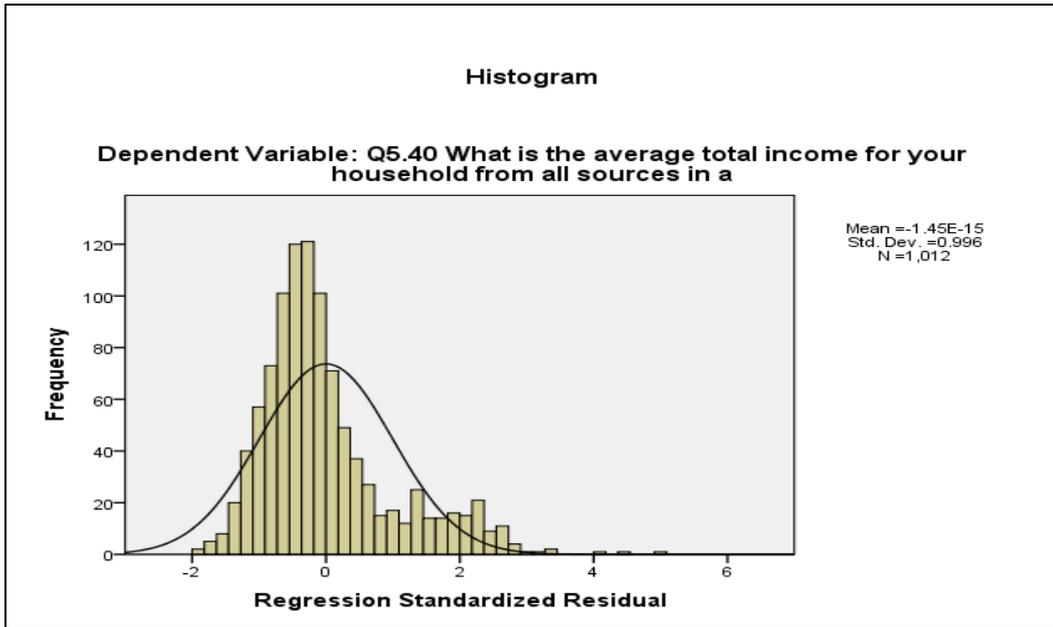
**Figure (5.6)**

### **Residual Pattern for Linearity and Homoscedasticity**

According to Figure (5.6), the scatter plot of standardized residuals (ZRESID) against the standardized predicted values (ZPRED) shows that there is consistent with the assumptions of linearity.

## 5.7 Results of Testing for Normality of Disturbances

One of the basic assumptions of multiple regression models is that the disturbances are normally distributed with zero mean and constant variance. To check whether the disturbances are normally distributed, histogram of the standardized residual and Normal P-P plot of the regression standardized residual are given in the following Figure (5.6) and Figure (5.7). If the standardized residuals are normally distributed, the scatters should fall on or tightly close to the normal distribution line.

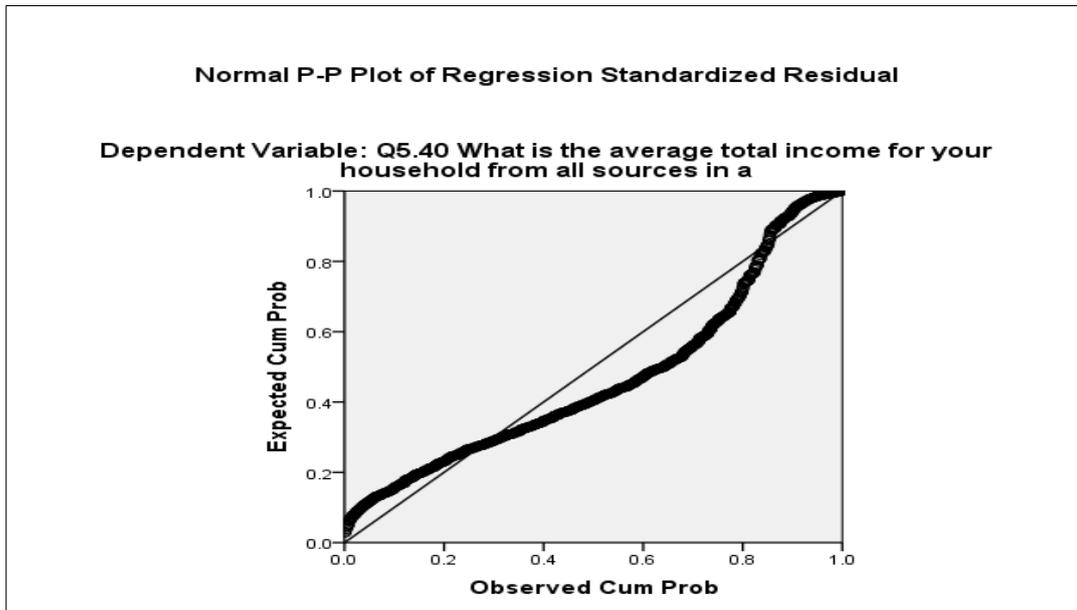


Source: SPSS Output

**Figure (5.7)**

**Histogram for the Regression Standardized Residual**

According to Figure (5.7), the scatters of the residuals nearly fall straightly on the normal distribution line, so the null hypothesis of the normality test is failed to reject. Therefore, the error terms are normality distributed.



Source: SPSS Output

**Figure (5.8)**

**Normal P-P plot for the Regression Standardized Residual**

In Figure (5.8), the normal distribution forms nearly a straight diagonal line, and if a variable's distribution is normal, the data distribution will fall more or less on the diagonal. According to the normal P-P plot, it can be concluded that the normality assumption appears to be generally reasonable.

### 5.8 Result of Testing for Homoscedasticity

Another basic assumption of the multiple regression models is homoscedasticity. In the presence of heteroscedasticity, the regression coefficients become less efficient. Heteroscedasticity can often be detected by plotting the estimated Y values against the disturbances. Figure (5.6) present the predicted value on X axis and disturbance on Y axis.

According to Figure (5.6), it can be seen that there is no definite pattern. Therefore, it can be concluded that residuals from the estimated model has an evidence of homoscedasticity.

### 5.9 Result of White Test for Homoscedasticity

The following Table (5.9) is the white test for homoscedasticity.

**Table (5.9)**  
**Result of White Test for Homoscedasticity**

	<b>Chi-square</b>	<b>p-value</b>
<b>White test</b>	3.61	0.0574

Source: SPSS Output

From the result of Table (5.8), the null hypothesis of no heteroscedasticity (homoscedasticity) is not rejected at 1 percent significance level.

### 5.10 Result of Testing for Detecting Multicollinearity

Multicollinearity can be detected with the help of tolerance and its reciprocal, called variance inflation factor (VIF). If the value of tolerance is less than 0.2 or 0.1 and, simultaneously, the value of VIF 10 and above, there is multicollinearity problem between independent variables. The values of tolerance and variance inflation factor (VIF) for collinearity statistics are given in the following Table (5.10):

**Table (5.10)**  
**Results of Collinearity Statistics**

<b>Variables</b>	<b>Tolerance</b>	<b>VIF</b>
Number of borrower household in region with the same business	.922	1.084
Total number of working age household members in the household	.908	1.102
Household saving during the last 12 months	.976	1.025
Household income from the source of irregular daily wages in the last 12 months	.868	1.152
Household head or any of its members own land (including land of any type)	.836	1.195
Household set up or use of savings and or a bank account	.969	1.032
Household's assets and wealth	.982	1.018
Household's current debt from all sources	.858	1.166

Source: SPSS Output

According to Table (5.10), there is no evidence of significance problem in multicollinearity because the tolerance value for each independent variable is not less than 0.2 or 0.1 and VIF value is not more than 10. It is concluded that multicollinearity is not problem in the model.

## **CHAPTER VI**

### **CONCLUSION**

This study provides an empirical analysis of the impacts of microfinance on livelihoods outcomes of rural community and it is found that most of the member from microfinance institutions give more priority to get loans and that will be contributed to use of investment purpose, income generation activities of small and median size of enterprises. It is also observed that the profit of these loans or their daily incomes having had a medical emergency and education for all members of the family. In addition women were also contributed family income from their daily small business activities.

Microfinance institutions can be increased and more emphasized to other types of loans to more relevant with male household head through agricultural loans, mechanization loans, migration loans, etc. but that will lead getting light of gender roles of women within the community as well as in their family.

The access to microfinance was significantly associated with households' income. The credit was used to inputs for business and they invested their loans in their income-generating activities. The borrower used their loans to expand their product offerings into more profitable products and it was used to diversity their type of business or starting a new business.

Before taking loans from MFI, they would to go to the individual moneylenders at least twice every year for their agriculture requirements. At times, after harvesting they would end up paying all earnings to the moneylenders as principal and interest. The clients seem to become more independent from moneylenders they have money to invest in their business, and their profits are higher. More debt on business investment will create more income opportunity if it is effectively used overtime.

Saving is one the element that attracted people to become clients of MFIs and appreciated being able to save small amounts regularly, ending up with a lump sum (a large amount) for withdrawal to be used in investing in their businesses or consumption, this ability to withdraw was a positive characteristic. The saving is usually generating the saving practice especially for women in very poor and poor family rather than profit and mostly favorable to low income groups of households within the community.

It is suggest a number of policies to be adopted by the concerned authority so that the existing and future generations can be benefitted from microcredit. First, the MFIs should adopt cost effective channel to enhance the outreach in remote area and provide fast services to the existing customers. In this regard, MFIs may establish strategic partnership with mobile phone operators and banks to reach the unbanked low income groups in the community. Second, the government should take policy to inject subsidized funds which include food relief, health facilities. The large MFI have already taken special programs to address the problems but well-coordinated area-based sufficient programmes are required by each large MFI, which can play the leading role in particularly economically backward areas avoiding overlapping.

Based on this study, further study should include the proximate intermediate variables such as primary real data with absolute values in most variables instead of coding variables to get more appropriate statistical data for various analysis. Also, the further study should employ average incomes of rural households relating to their socioeconomic data and that provides more effective statistical analysis in the study.

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## **APPENDIX**

### The description of variables

Variable	Description	Unit	Coding Details/Range
$Y_i$	The rural household who report that the average amount of total income they received from all sources in the previous 12 months.	Kyats	MMK 100,000-200,000 MMK 200,000-300,000 MMK 300,000-400,000 MMK 400,000-500,000 MMK 500,000-600,000 MMK 600,000-700,000 MMK 700,000-800,000 MMK 800,000-900,000 MMK 900,000-1,000,000 MMK 1,000,000-1,200,000 MMK 1,200,000-1,400,000 MMK 1,400,000-1,600,000 MMK 1,600,000-1,800,000 MMK 1,800,000-2,000,000 MMK 2,000,000
$\beta_0$	Constant (coefficient of intercept)		
$X_1$	This measures the number of rural who received loans from MFI (Microfinance Institution) in particular region in the last 12 months.	Households	1,2,3,4=Delta, Dry, Uplands, Rakhine borrower household with same business
$X_2$	This measures the number household reported the total number of household members who normally live and eat their meals together (eating the same pot).	Households	Number of 15-65 working age members in the household
$X_3$	This measures the number of household who reported with saving in the last 12 months.	Households	1= Yes, 2=No
$X_4$	This measures the number of household who reported with irregular daily wages in the last 12 months.	Households	1= Yes, 2=No

$X_5$	This measures the number of household who reported any of its household members own land (any types of land) in the last 12 months.	Households	1= Yes, 2=No Note: Ownership should be considered very broadly to include cases where land is formally titled and registered in one or more household member's name; land that has been purchased, transferred or inherited but not formally titled (or if titled not registered in the household's name); land leased from government; and, land where the household believes it has an established right (formal or informal) to use the land, a right that is generally recognized by the community.
$X_6$	Household with any household member set up or use of a savings and or a bank account	Households	1= Yes, 2=No
$X_7$	The number of households who reported an increase in asset ownership during the last 12 months. It is based on perceptual data.	Households	This is perceptual question 1= Increased, 2= Still the same, 3= Decreased.
$X_8$	Household's current debt from all sources	Households	The value of current debt.
	Random Error		

Source: LIFT Household Survey 2017

**Regression**  
**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.698 <sup>a</sup>	.488	.483	2.610	1.834

- a. Predictors: (Constant), VAR00003, R1.6.1 Irregular daily wages , R18.9A Looking back over the past 12 months, do you think that your household's , Q1.7 Household number from village list, R2.9 Savings , Q15.1a Have you or any household member set up or used a savings and or a bank a, Total number of HH members, Q15\_4b What is the value of your household's current debt from all sources of cr, Sex of the head of the households, Q11.1 Does your household or any of its members own land? (Including land of ANY, Total Number of HH Members).
- b. Dependent Variable: Q5.40 What is the average total income for your household from all sources

**ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6500.404	8	812.550	119.287	.000 <sup>a</sup>
	Residual	6832.161	1003	6.812		
	Total	13332.564	1011			

- a. Predictors: (Constant), VAR00003, R1.6.1 Irregular daily wages , R18.9A Looking back over the past 12 months, do you think that your household's , Q1.7 Household number from village list, R2.9 Savings , Q15.1a Have you or any household member set up or used a savings and or a bank a, Total number of HH members, Q15\_4b What is the value of your household's current debt from all sources of cr, Sex of the head of the households, Q11.1 Does your household or any of its members own land? (Including land of ANY, Total Number of HH Members).
- b. Dependent Variable: Q5.40 What is the average total income for your household from all sources.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error				Beta	Lower Bound	Upper Bound	Tolerance
1	(Constant)	13.698	.876		15.644	.000	11.979	15.416	13.698	.876
	Q1.7 Household number from village list	-.578	.107	-.127	-5.416	.000	-.787	-.368	-.578	.107
	Total Number of HH Members	.187	.042	.105	4.415	.000	.104	.269	.187	.042
	R2.9 Savings	1.145	.311	.084	3.677	.000	.534	1.756	1.145	.311
	R1.6.1 Irregular day-wages	-1.547	.177	-.211	-8.717	.000	-1.895	-1.199	-1.547	.177
	Q11.1 Does your household or any of its members own land? (Including land of ANY)	-.916	.181	-.125	-5.062	.000	-1.270	-.561	-.916	.181
	Q15.1a Have you or any household member set up or used a savings and or a bank account	-1.119	.392	-.066	-2.854	.004	-1.888	-.350	-1.119	.392
	R18.9A Looking back over the past 12 months, do you think that your household's	-.618	.159	-.088	-3.878	.000	-.931	-.306	-.618	.159
VAR00003	-1766481.849	85151.175	-.506	-20.745	.000	-1933576.723	-1599386.976	-1766481.849	85151.175	

a. Dependent Variable: Q5.40 What is the average total income for your household from all sources

### Correlations

		$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$Y_i$
$X_1$	Pearson Correlation	1	.138**	-.040	.021	-.121**	.036	.014	.142**	-.181**
	Sig. (2-tailed)		.000	.206	.503	.000	.252	.666	.000	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_2$	Pearson Correlation	.138**	1	.040	.073*	-.046	-.022	.011	-.233**	.199**
	Sig. (2-tailed)	.000		.209	.021	.143	.476	.728	.000	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_3$	Pearson Correlation	-.040	.040	1	-.043	-.030	-.058	-.082**	-.124**	.180**
	Sig. (2-tailed)	.206	.209		.170	.334	.067	.009	.000	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_4$	Pearson Correlation	.021	.073*	-.043	1	.333**	.131**	.037	.042	-.285**
	Sig. (2-tailed)	.503	.021	.170		.000	.000	.239	.177	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_5$	Pearson Correlation	-.121**	-.046	-.030	.333**	1	.103**	.032	.178**	-.287**
	Sig. (2-tailed)	.000	.143	.334	.000		.001	.311	.000	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_6$	Pearson Correlation	.036	-.022	-.058	.131**	.103**	1	.037	.097**	-.170**
	Sig. (2-tailed)	.252	.476	.067	.000	.001		.243	.002	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_7$	Pearson Correlation	.014	.011	-.082**	.037	.032	.037	1	.101**	-.161**
	Sig. (2-tailed)	.666	.728	.009	.239	.311	.243		.001	.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$X_8$	Pearson Correlation	.142**	-.233**	-.124**	.042	.178**	.097**	.101**	1	-.606**
	Sig. (2-tailed)	.000	.000	.000	.177	.000	.002	.001		.000
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012
$Y_i$	Pearson Correlation	-.181**	.199**	.180**	-.285**	-.287**	-.170**	-.161**	-.606**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	
	N	1012	1012	1012	1012	1012	1012	1012	1012	1012

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

### Collinearity Diagnostics<sup>a</sup>

Dimension	Eigenvalue	Condition Index	(Constant)	Sex	region	children aged under five	Members	Savings	Var1	Irregular day-wages	own land	Q15.1a	current debt	Wealth, assets	VAR00003
1	6.714	1.000	.00	.00	.00	.00	.01	.00	.00	.00	.01	6.714	1.000	.00	.00
2	.955	2.652	.00	.00	.00	.86	.00	.00	.00	.00	.04	.955	2.652	.00	.00
3	.568	3.439	.00	.00	.02	.10	.03	.00	.00	.00	.74	.568	3.439	.00	.00
4	.384	4.182	.00	.02	.02	.02	.80	.00	.00	.00	.01	.384	4.182	.00	.02
5	.146	6.775	.00	.51	.05	.00	.07	.17	.00	.03	.01	.146	6.775	.00	.51
6	.118	7.548	.00	.25	.85	.00	.00	.01	.00	.01	.17	.118	7.548	.00	.25
7	.074	9.547	.00	.10	.01	.00	.07	.58	.00	.37	.01	.074	9.547	.00	.10
8	.036	13.677	.05	.10	.03	.01	.01	.23	.11	.55	.00	.036	13.677	.05	.10
9	.005	35.371	.95	.01	.02	.01	.01	.02	.88	.04	.00	.005	35.371	.95	.01

a. Dependent Variable: Q5.40 What is the average total income for your household from all sources in a

### Residuals Statistics<sup>a</sup>

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-12.18	12.51	6.52	2.536	1012
Residual	-4.995	13.180	.000	2.600	1012
Std. Predicted Value	-7.375	2.362	.000	1.000	1012
Std. Residual	-1.914	5.050	.000	.996	1012

a. Dependent Variable: Q5.40 What is the average total income for your household from all sources in a

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Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of q540

chi2(1) = 3.61

Prob > chi2 = 0.0574

