ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE EFFECT OF FINANCIAL INCLUSION ON HOUSEHOLD INCOME IN ETHIOPIA

BY

TIGIST BIRHANU

JUNE 2019

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE EFFECT OF FINANCIAL INCLUSION ON HOUSEHOLD INCOME IN ETHIOPIA

BY

TIGIST BIRHANU

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for The Degree of Master of Science in Economics specialized in Developmental Economics

JUNE, 2019

ADDIS ABABA, ETHIOPIA

ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

The Effect of Financial Inclusion on Household Income in Ethiopia

By

Tigist Birhanu

Approved by Board of Examiner

_____	_____
Examiner	**Signature**
_____	_____
Examiner	**Signature**

Statement of Certification

This is to certify that this research work ‘‘The Effect of Financial Inclusion on Household Income in Ethiopia ”, undertaken by Tigist Birhanu for the partial fulfillment of Masters of Science in Economics specialized with Developmental Economics, is an original work complies with the regulations of the University and meets the accepted standards with respect to originality.

Signature_____ Date _____

Tadele Ferede (Ph.D.)
(Advisor)

Declaration

I, Tigist Birhanu Deme declare this work entitled “The Effect of Financial Inclusion on Household Income in Ethiopia” is the outcome of my own effort and that all sources of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestions of the research advisor.

This study is an original work complies with the regulations of the University and meets the accepted standards with respect to originality.

By Tigist Birhanu Deme

Signature _____

Date _____

Acknowledgment

I would first like to thank my almighty God for giving me wisdom and courage to successfully complete this research work and the masters program in general. I would also thank my thesis advisor Dr. Tadele Ferede who is the door to his office always open whenever I run into trouble or had a question about my research work. He consistently allowed this paper to be my own work but steered me in the right direction whenever he thought I needed it.

I would also like to thank Addis Ababa University the Graduate Programs office who granted me a full female scholarship to study my masters program in the field of economics.

Finally, I would like to thank my husband Mr. Bekalu Amenu and our family for their encouragement and continuous motivation to complete my work.

Table of Contents

Acknowledgment i
List of Tables iv
List of Figures v
List of Acronyms vi
ABSTRACT vii
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background of the Study 1
2.1 Statement of the Problem 2
1.3 Objective of the Study 5
1.4 Research Hypothesis 5
1.5 Significance of the Study 5
1.6 Scope of the Study 5
1.7 Organization of the Paper 5
CHAPTER TWO 6
LITERATURE REVIEWS 6
2.1 Theoretical Literature 6
2.1.1 Defining Financial Inclusion 6
2.1.2 The Role of Finance in Economic Growth 7
2.2 Empirical Literature 11
CHAPTER THREE 15
FINANCIAL SECTOR DEVELOPMENT IN ETHIOPIA 15
3.1 Overview of the Ethiopian Economy 15
3.2 The Financial Sector in Ethiopia 15
3.2.1 The Formal Sector 16
3.2.2 Informal Finance in Ethiopia 20
3.3 The Ethiopia National Financial Inclusion Strategy 22
CHAPTER FOUR 24
METHODOLOGY 24
4.1 Conceptual Framework 24
4.2 Defining and measuring financial inclusion (Fin) 25
4.3 The Empirical Model 27

4.4 The Quantile Regression Model Estimator 28
4.5 Data 28
CHAPTER FIVE 30
EMPIRICAL RESULTS AND INTERPRETATION 30
5.1 Descriptive Statistics 30
5.1.1 Account Ownership 30
5.1.2 Usage of New Banking Technology 32
5.1.3 Saving 34
5.1.4 Insurance 37
5.1.5 Credit 39
5.2 Analysis of Econometric Results 40
5.2.1 Results from OLS and Quantile Regression 41
5.2.2 Controlling for Endogeneity 44
5.2.3 Results from PSM Regression 45
CHAPTER SIX 47
CONCLUSIONS AND IMPLICATIONS 47
6.1 Conclusions 47
6.2 Implications 48
REFERENCE 49
ANNEXES 56

List of Tables

Table 1: Trends in bank branch expansion, capital and access 17
Table 2: Branch Expansion and capital of Insurance Companies 18
Table 3: Definition and Measurement of Explanatory Variables Included in the Models 25
Table 4: Dimensions, indicators, financial deprivation scores and weighs for Fin 26
Table 5: Different sources of credit by rural and urban households 39
Table 6: Descriptive statistics on all variables 40
Table 7: OLS and Quantile Regressions 42
Table 8: Results from PSM with different matching method 46

List of Figures

Figure 1: The functions of the financial system and the transmission channels from finance to growth 11
Figure 2: Account ownership by rural and urban 30
Figure 3: Account ownership by regions and major cities. 31
Figure 4: Reasons for not having an account book 31
Figure 5: Individuals who have used different banking products from the total survey 32
Figure 6: Information on different banking services 33
Figure 7: Saving practices of individuals in rural and urban areas 34
Figure 8: Saving in financial institutions 35
Figure 9: Informal ways of saving 35
Figure 10: Individuals preference regarding where to save 36
Figure 11: Why individuals save 36
Figure 12: Access to insurance service 37
Figure 13: A reason given by respondents why they are unable to access insurance services 38
Figure 14: Uses of traditional ways of insurance (Iddir) 38
Figure 15: Access to credit 39
Figure 16: Quantile plot 43

List of Acronyms

AFDB	African Development Bank
ESS	Ethiopian Socio-economic Survey
GDP	Gross Domestic \product
GTP	Growth and Transformation Plan
MFIs	Microfinance Institutions
NBE	National Bank of Ethiopia
NFIS	National Financial Inclusion Strategy
OLS	Ordinary Least Square
PSM	Propensity Score Matching
SACCOs	Saving and credit cooperatives
SSA	Sub Saharan Africa
WB	World Bank

ABSTRACT

Financial inclusion is enabling the delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups. It is becoming a core element in economic growth, development, and poverty alleviation. Based on a nationally representative cross-sectional data from the Ethiopian Socio-economic Survey (ESS) carried out in 2015/16, this paper investigates the effect of financial inclusion on household's income in Ethiopia. The study employed both descriptive and econometric approaches to data analysis. In the econometric section, Quantile regression and Propensity Score Matching methods have been used in order to control for endogeneity problem that may exist among financial inclusion and income. The finding indicates that access to finance has a significant positive effect on household's income. Financial inclusion has a larger effect on the lower quantiles of household income. The 10th quantile income of financially excluded households is 37 percent lower than financially included households while the top 90th quantile income of financially exclude households is 17percent lower than of financially included households. This shows financial inclusion benefits more low-income households than high-income households, which supports those findings that argue financial inclusion lowers poverty and income inequality.

Key Words: Financial Inclusion, Household Income, Quantile Regression

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Financial inclusion is becoming a core element in economic growth, development and poverty alleviation. Now a day the interests of policymakers, the financial sector stakeholders, development actors, and researchers are increasing financial services to the vast majority of people. Financial inclusion is enabling the delivery of banking services at an affordable cost to the vast sections of disadvantaged and low-income groups.

The most recent estimates by the World Bank Group shows that about 1.7 billion adults remain unbanked globally. Virtually these unbanked adults live in developing economies where China and India have the largest share of the global unbanked population because of their population size accounting about 225 million adults without an account. China has the largest unbanked population followed by India (190 million), Pakistan (100 million), and Indonesia (95 million). These four economies together with Nigeria, Mexico and Bangladesh account for nearly half of the world's unbanked population. The gender gap is too prominent that about 980 million (56 %) of the world unbanked are women. Worldwide half of the unbanked comes from the poorest 40% of households (Demirguc-Kunt et al, 2018).

Access to finance is considered as one of the first steps in improving the lives of the poor. Therefore, extending well-functioning and inclusive financial services offer an opportunity for the poor to have access to saving, payments, and credits services, which give them the chances to invest in education and small businesses thereby reducing income inequality and poverty (OusmaneSeck et al, 2017).

Despite the recent financial sector growth in Ethiopia, many individuals and firms are still excluded from access to formal financial services. Especially the rural people are the most vulnerable one regarding access and usage of formal financial services since most of the formal banking system concentrated in urban areas specifically in Addis Ababa.

According to the global findex, 2017 bank account ownership increased from 22 percent in 2014 to 35 percent in 2017. Twenty-six percent of adults saved in financial institutions as compared to 14 percent in 2014 and only 7 percent of adults ware borrowed from financial institutions as compared to 11 percent in 2014. People are still relying on informal sources for their financial needs. Out of the total 62 percent saving, 38 percent ware saved informally. Moreover, out of the recorded 41 percent borrowers, only 11 percent of them are borrowed from formal financial institutions[1].

According to Zwedu, 2014 financial inclusion in Ethiopia is on progress, a good improvement is observed with regard to bank branch expansion but less than 8 percent of Ethiopians have a bank account. Microfinance institutions are reached 35 in number with more than 1,500 branches (NBE, 2017). Microfinance institutions are intended to serve the credit needs of the rural poor and small business holders. But studies show that MFIs are serving clients who are not poor. They are not performing their operation, as they are not reaching many poor people living under the poverty line (Ahmed & Batra, 2018).

Generally, in Ethiopia, the financial system is developing and has shown good progress but still, there is much to do to improve financial inclusion in the country. Financial inclusion becomes one of the major strategies in the country's growth and transformation plane (GTP) for bringing growth and ending poverty. For this to be in effect many researches have to be done in the area and this paper is intended to contribute to the research stock by investigating the effects of financial inclusion on household income using household level data.

2.1 Statement of the Problem

Financial inclusion is facilitating access to saving and transfer services and provision of credit and insurance at an affordable cost to unbanked poor people who have no access for formal banking system (Zwedu, 2014). Well-functioning financial systems serve a vital purpose, offering savings, credit, payment, and risk management products to people with a wide range of needs. An Inclusive financial system is considered as one of the first steps in improving the lives of the poor.

[1]http://blogs.worldbank.org/africacan/financial-inclusion-in-ethiopia-10-takeaways-from-findex-2017.

Both economic theory and empirical evidence show that financial depth or in general, financial development has direct and indirect effects on small firms and poor households by making them take advantages of having greater investment opportunities, smoothing their consumption, and insuring themselves from risks (Beck & Demirguc-Kunt, 2008). Studies based on microfinance institutions shows that financial development has positive impacts on poverty, income, gender inequality, child health and education (Zhang, 2017; Zhang & Posso, 2017). Financial inclusion can reduce poverty and income inequality (Demirgüç-Kunt and Levine, 2007; Chibba, 2009; Park et al, 2015 & 2018). Access to finance has a positive effect on consumption and economic self-sufficiency (Karlan, et al, 2010).

Financial development allows for channeling capital to more productive sectors and creating a larger pool of resources available for investment. A better-developed financial system allows for reducing cash and barter transactions, limit the cost of remitting funds, and allows for smoothing income and consumption over time. Insurance services help households and firms to better withstand unexpected shocks and reduce their vulnerability to adverse events (Sahay, 2015).

Therefore, extending well-functioning and inclusive financial services offer the opportunity for the poor to have access to saving, payments, and credits services, which give them the chances to invest in education and small businesses thereby reducing income inequality and poverty. Without inclusive financial systems, poor people must rely on their own limited savings to invest in their education or become entrepreneurs and small enterprises must rely on their limited earnings to pursue promising growth opportunities. This can contribute to persistent income inequality and slower economic growth.

Despite the given recognition and popularity, the literature on financial inclusion is at its infant stage. Financial inclusion is a broad concept and most of the research works are focused on microfinance, which is one of the means of achieving financial inclusion (Zhang & Posso, 2017). In this regard, a more comprehensive investigation that includes all aspects of financial inclusion is important.

Other available research works are done at country or cross-country macro level using the available aggregate data, which is collected, at the individual level. Household level analyses are very much limited as the reason for this could be a scarcity of household level data. In this

regard, this paper aims to contribute to the existing literature by investigating the impacts of financial inclusion on income at the household level.

In Ethiopia, beginning from its financial sector reform in 1994 a good progress has been observed with regard to its financial sector development. At the end of June 2018, there are 18 banks, out of which two of them are state-owned and the total branch reached 4,757 with one branch serving 20,286.5 customers. Out of the total branches, 35.3% of them are located in Addis Ababa. With regard to microfinance institutions, there are 37 microfinance institutions operating in the country in rural and urban areas. These institutions mobilized Birr 33.2 billion saving deposit and total outstanding credit was reached about Birr 45 billion. There are 17 insurance companies in Ethiopia with 532 branches in which 53.6% are located in the capital city (NBE, 2018). There are also over 8,200 SACCOs in the country both in rural and urban areas. These cooperatives are believed to easily reach to the lowest segment of the population and serve as a bridge between the very poor and formal banks (Zwedu, 2014).

Despite the recent development in financial inclusion, Ethiopia lags significantly behind the other Sub-Saharan African countries in all measures of financial access, including number of bank branches and ATMs per 100,000 adults as well as depositors and creditors per 1000 adults were 1.3; 0.241; 136.13; and 2.09, respectively, in 2012 (IMF, 2014). There are various barriers to financial inclusion in Ethiopia. From the recent Global Financial Survey (Findex, 2017) the top main barriers to financial inclusion were insufficient funds given by about 85% of the respondents as a reason for not opening an account. This shows that the financial sectors are not reaching the very poor in the country. Other barriers include distance, access to bank branches and bureaucratic barriers such as difficulty to get credits and saving products by the poor, due to regulations and structure of financial institutions.

Previous studies on access to finance focused on provision of credit, essentially based their analysis on microfinance institutions. Financial inclusion on the other hand, is using financial services by individuals, firms, and households that includes transaction (payment services), saving, credit, and insurance services. Furthermore, other studies of financial inclusion are done at a macro level and they fail to offer pertinent information regarding the income effects of financial inclusion on individuals or households. This paper tries to fill these gabs by

incorporating other indicators of financial inclusion (transaction account, saving, and insurance) in to analysis and contributes to the literature on the impact of financial inclusion on household's income using a household level data.

1.3 Objective of the Study

The general objective of this paper is to investigate the effects of financial inclusion on household's income using household level data. The specific objectives are to:

- Measure financial inclusion and develop an index for it separately, and
- Empirically analyze the relationship between financial inclusion and household income.

1.4 Research Hypothesis

- There is a significance and positive relationship between financial inclusion and household income.

1.5 Significance of the Study

The findings of this research will provide great information on financial inclusion in relation to income for researchers, policymakers, the financial sector stakeholders and development actors who are interested in the area and those who have vest interest in understanding the importance of financial inclusion in improving people's lives.

1.6 Scope of the Study

This research uses household level cross-sectional data, which was collected in 2015/16 on the nine regions of Ethiopia including rural and urban areas. The study is limited to explaining the effects of financial inclusion on household income only.

1.7 Organization of the Paper

This research paper organized into six chapters. Chapter 1presents the introductory part of the paper, chapter 2 discusses the theoretical and empirical literature, chapter 3presentsthe financial sector development in Ethiopia, chapter 4 discusses the methodology of the research, chapter 5 includes results and discussion about the findings, while the conclusion and recommendation are presented in chapter 6.

CHAPTER TWO

LITERATURE REVIEWS

2.1 Theoretical Literature

2.1.1 Defining Financial Inclusion

Financial inclusion is a broad concept and there is no a single definition of it. It can be defined with different dimensions and different countries can define it in a way that meets their own priority.

According to Sarma (2008), financial inclusion can be defined as a process that ensures the ease of access, availability, and usage of the formal financial system for all members of a wide economy. Financial inclusion refers to all initiatives that make formal financial services available, accessible, and affordable to all segments of the population. It gives specific attention to those who excluded from the formal financial sector either because of their income level, gender, location, type of activity, or level of financial literacy (AFDB, 2013).

Financial inclusion refers to the use of financial services that allows individuals and firms to take advantages of business opportunities, invest in their education, save for retirement, and insure against systemic or idiosyncratic shocks (Demirgüç-Kunt et al, 2008).By financial inclusion, we mean the provision of affordable financial services, viz., access to payments and remittance facilities, savings, loans, and insurance services by the formal financial system to those who tend to be excluded (Thorat, 2006).

According to the World Bank, financial inclusion refers to access to useful, affordable financial products and services that meet individual needs for transactions and payments, savings, credit, and insurance services (World Bank, 2017).

The concept of financial inclusion can also be seen in the context of social exclusion of certain groups of people from the mainstream of society. Financial exclusion refers to a process that prevents poor and disadvantaged social groups from gaining access to the formal system of their country (Conroy, 2005).

According to Mohan (2006), financial exclusion refers to the lack of access by certain segments of the society to appropriate, low cost, fair and safe financial products, and services from mainstream providers.

There are also country-specific definitions of financial inclusion, which is included in the financial inclusion strategy of that country, in line with their development goals. For instance, in Burundi the adult population to a set of financial products and services defines financial inclusion as permanent access:

- That offered by formal and sustainable financial institutions, governed by adequate regulations,
- That are diversified, affordable and adapted to the needs of the population, and
- Used by the latter for the purpose of contributing to the improvement of the conditions of their socioeconomic life.

In Nigeria, the central bank of the country (CBN), defined financial inclusion in its national financial inclusion strategy paper as an achievement when adult Nigerians have easy access to a broad range of formal financial services that meet their needs at an affordable cost. The Bank of Tanzania, the country's central bank, has defined financial inclusion as:

"The regular use of financial services, through payment infrastructures, to manage cash flows and mitigate shocks, which are delivered by formal providers through a range of appropriate services with dignity and fairness"[2]

Ethiopia also developed its own national financial inclusion strategy paper in 2016 but it does not put the definition of financial inclusion in a clear and separate way.

2.1.2 The Role of Finance in Economic Growth

The importance of financial development has been recognized back in the early nineties. Schumpeter (1911), in his work, indicated that financial development can bring economic growth. His main argument was that financial institutions and entrepreneurship are the necessary and sufficient condition for economic growth and development. Hence, he concluded that if the financial structure of an economy is able to mobilize funds to its best use and user, which leads to accelerated economic growth of a country.

[2] Alliance for Financial Inclusion (afi), Defining Financial Inclusion, Guideline Note No. 28 July 2017

Other leading economists also emphasized the role of finance in economic growth and development though they have divergent views regarding on the degree of relevance. Some leading development economists did not give much attention and or a diminutive opinion on the role of finance as a determinant of economic growth (Robinson, 1952; Meier and Seers, 1984; and Lucas, 1988). On the other hand, others stressed the important role of finance in economic growth (Schumpeter, 1911; Gurley and Shaw, 1955; Goldsmith, 1969; McKinnon, 1973; Miller, 1998). With these different views and conclusions regarding the role played by the financial sector, the recent financial crisis brought back the argument that finance plays a key role in driving economic growth and poverty reduction.

Finance provides important functions through which it stimulates resource allocation and hence economic growth. The main "function of any financial system is to facilitate the allocation and deployment of economic resources, both across borders and across time in an uncertain environment" by reducing transaction and information costs (Levine, 1997).

According to Levine (1997 & 2005), the functions of the financial system can be classified in five categories as facilitating exchange, mobilizing savings, information about investment and allocating resources, monitoring managers and exerting corporate control and facilitating risk amelioration. Merton and Bodie (1995) classify them into six:

- To provide ways of clearing and settling payments to facilitate trade
- To provide a mechanism for pooling of resources and subdividing of shares in various enterprises
- To provide ways of managing risks
- To provide ways to transfer economic resources through time, across borders and among industries
- To provide price information to help coordinate decentralized decision making in various sectors of the economy.
- To provide ways of dealing with the incentive problems created when someone to a transaction has information than the other party does not or when one party acts as an agent for another.

On the other hand, Peachey and Roe (2006) categorizes them more concisely into three as (i) efficient allocation of resource, (ii) mobilizing savings, and (iii) risk mitigation.

Investment decisions involve a great deal of background analysis to evaluate the firms, managers, and exiting market conditions. These involve collecting, processing and producing all relevant information required before making an investment decision. These processes are usually costly for individual investors. In this regards, high information costs may keep away capital from flowing to projects with best possible returns. Therefore, financial intermediaries emerge due to motivations being created by the costs of information creation (Boyd and Prescott 1986; Levine, 1997). Financial intermediaries help in selecting good firms and managers that encourage efficient allocation of capital and thus improve growth (Greenword and Jovanovic, 1990; Levine 1997).

The strength of the allocation function of the financial system depends on its ability to mobilize savings. The degree of effectiveness of the financial system to mobilize saving determines the rate of return on new investments and therefore, the rate of economic growth (Peachey and Roe, 2006). Mobilization of savings also enhances resource allocation through diversification of risks, liquidity, and size of feasible firms (Levin, 1997; Sirri and Tufano, 1995). Therefore, weak access to financial services can constrain economic growth because of the deficiency of the system to mobilize and channel resources to the appropriate projects. That is why countries that have a financial system with weak mobilization functions are mostly low-income countries.

Risk mitigation is a key function of the financial system that positively contributes to economic growth. This function helps investors to mitigate the various risks involved in production and trade thereby helping in increasing production and trade, thus enhancing economic growth. Financial institutions such as banks take deposits from their customers on short maturities and transform them to capital investors on longer maturities.

Levine (2005) classifies the risk mitigation function of financial institutions into three:

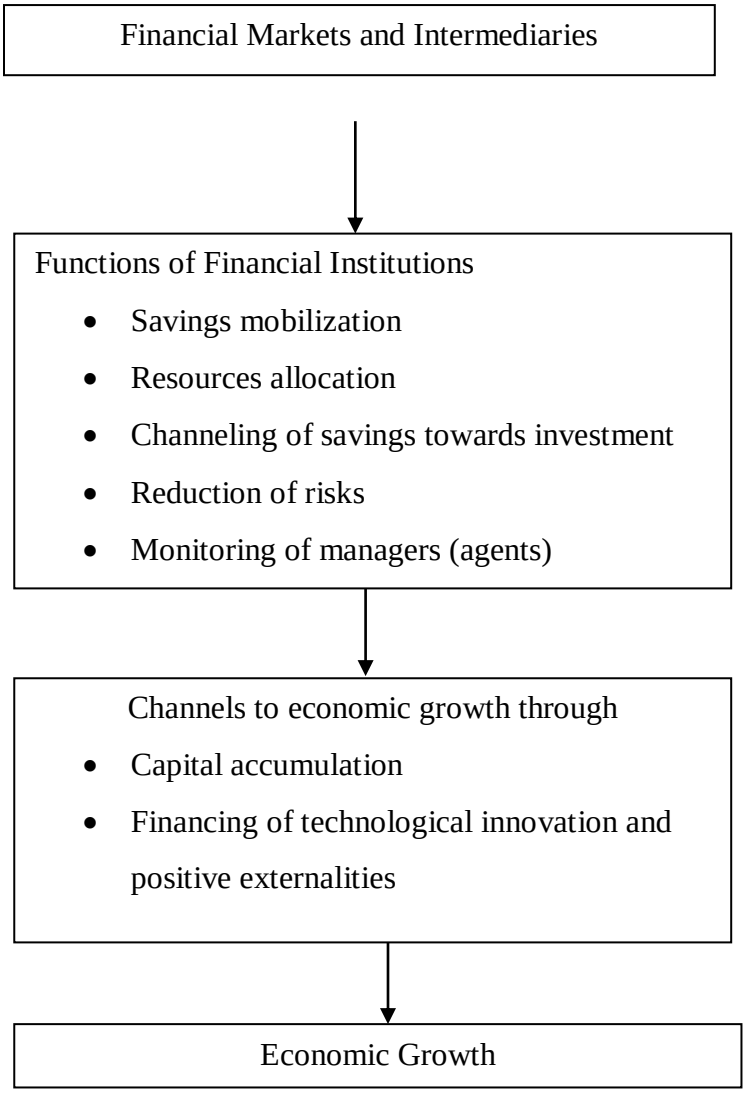
- cross-sectional risk diversification, which refers to the ability of the financial system to make people easily diversify risks to projects with high return, which are normally riskier,

- intertemporal risk sharing, which focuses on the role of financial intermediaries in easing intertemporal risks, and
- Liquidity risk, which reflects the cost and ease of converting financial instrument into liquid form

According to Hicks (1969), the industrial revolution in England was caused because of the improvements in the capital market, which facilitated liquidity risk mitigation. In other words, technological innovation did not on itself triggered growth; rather most of the inventions had to wait for the capital market to inject large capital required for long-run growth. Thus, capital market liquidity enables savers to hold assets they can easily convert to cash when they wish and at the same time transforms these liquid instruments into investment capital for long-term production (Levine, 1997).

Moreover, these credit constraints also impede the efficiency of capital allocation by restricting the flow of capital to the poor people who have high-expected return investments (Beck, Demirguc-Kunt, and Levine 2007; Galor and Zeira, 1993; Aghion and Bolton, 1997; Galor and Moav, 2004; Banerjee and Newman 1993, Banerjee 2004). In contrast, some theorists predict that financial development benefits the rich first at early stages of development (Greenwood and Jovanovic 1990; Braverman and Guasch 1986).

Figure 1: The functions of the financial system and the transmission channels from finance to growth



2.2 Empirical Literature

The empirical investigations regarding the nexus between access to finance and economic growth, and on many aspects of financial inclusion, are growing starting with using country-level aggregate data both cross-section and time series to more recent studies using firm and household level data.

An impact analysis on Indian social banking program which is a great rural branch expansion providing state-led credit program for the rural poor in India showed that poverty significantly reduced among the control groups whose who have access to the program. Financial development can increase the income of the poor faster than the overall per capita GDP growth which intern leads to income inequality (Beck, et al, 2007).

Based on data for 37 Asian countries, Park and Mercado also found that financial inclusion has a strong effect on poverty reduction and reducing income inequality (Park and Mercado, 2015).

An investigation based on a natural experiment on an establishment of a bank called Banco Aztera in Mexico, which opened over 800 branches in short time, targeting on providing saving and credit services mainly to low income individuals and informal business owners found that there was an improvement in the incomes of individuals who have benefited from the bank. Moreover, access to finance has a great effect on labor market activity and income levels especially for low income individuals those located in remote areas where formal financial institutions are limited (Bruhn and Love, 2009).

Burgess et al, 2005 also found that branch expansion and penetration into unbanked locations could reduce poverty. Another study by Sarojit indicates that after the launching of financial inclusion in India poverty has been declined (Sarojit, 2015).

Zhang and Posso (2017), based on a nationally representative cross-sectional household finance survey covering 6,200 households in China, they have investigated the relationship between financial inclusion and household income. In their empirical analysis, they found that financial inclusion has a strong positive effect on household income levels. They also showed that low-income households could benefit more from financial inclusion than high and middle-income households.

Using two rounded household-level panel data from Living Standards and Demographic Survey in Nigeria, Seck, et al (2017) found that financial inclusion has a great positive effect on household consumption. Another study by Mwangi and Atieno (2018) based on repeated household panel data and applying a dynamic panel regression method also concluded that financial inclusion raises household welfare in Kenya.

The Case of Ethiopia

Most of the studies regarding access to finances and those economic indicators at household level in Ethiopia are based on microfinance institutions especially focusing on access to credit that is one of the indicators for financial inclusion. Financial inclusion, which is defined above in many ways, has many dimensions and indicators, which enable us to measure access to

financial services in a comprehensive way. Microfinance institutions are one of the means by which financial inclusion can be achieved. Studies in Ethiopia on financial inclusion at both macro and micro level are scarce.

Utilizing a household level panel data that covers from 1994 to 2000 both in rural and urban areas of Ethiopia and by applying parsimonious-poverty-finance model Geda et al (2008) made an assessment on access to finance and poverty in Ethiopia focusing on access to credit service. The results from their analysis show that access to credit absolutely reduces poverty and helped in consumption smoothing of the households.

Berhane & Gardebroek (2011), using a household level panel data from northern parts of Ethiopia, tried to analyze the impacts of access to microfinance institutions on poverty emphasizing on household consumption and house improvement as poverty indicators.

Applying fixed effect and random trend models in the data, they found that access to credit has a positive effect on a household's consumption. Households with access to microfinance institutions and credit opportunities have increased income and showed improvements in their houses.

Using cross-sectional data from the fourth round of the Ethiopian Rural Household Survey 2009 and Endogenous Regime Switching model, Bocheret al (2017) investigated how access to credit affects household welfare. The empirical findings indicated that household with access to credit has more consumption expenditure than those without credit access. Another study based on 188 sample households and applying propensity score matching model Geleta et al (2018) analyzed the impacts of microfinance on household income. According to their findings, the mean yearly income of households who have participated in microfinance services was higher than that of non-participants.

Generally, both economic theory and empirical evidence indicate that financial development or financial inclusion has a positive impact on households by making them take the advantage of having greater investment opportunities, smoothing their consumption, and insuring themselves from risks.

Previous empirical studies regarding access to finance essentially focused on microfinance institutions and access to credit. Microfinance institutions are one of the means toward achieving financial inclusion and provision of credit is among the main indicators of financial inclusion. Financial inclusion, on the other hand, is using financial services by individuals, firms, and households that include transaction (payment services), saving, credit, and insurance services. In this regard, a comprehensive study, which includes all those elements, is important. This paper tries to fill this gap by incorporating other indicators of financial inclusion (transaction account, saving, and insurance) in to analysis.

Furthermore, other studies of financial inclusion are done at a macroeconomic level. Although these studies are important in order to see the overall effect of financial development in a country, they fail to offer pertinent information regarding the income effects of financial inclusion on individuals or households in general and rural households in particular. This paper contributes to the literature on the impact of financial inclusion on household income using household level data.

CHAPTER THREE

FINANCIAL SECTOR DEVELOPMENT IN ETHIOPIA

3.1 Overview of the Ethiopian Economy

Ethiopia is one of the least developed and the second most populated country in Africa with an estimated population of more than 104 million according to the World Bank estimate. The country is registered as low human development which ranked 173 out of 189 countries on the United Nations Development Program's 2018Human Development Index[3].According to the World Bank estimate for the year 2017, the Ethiopian economy is growing annually at 10.2% and the annual inflation rate 6.3 percent[4]. For the fiscal year 2017/18, the growth of the country was 7.7 percent with GDP per capita USD 883. The service sector has the highest share in contributing to GDP 38 percent followed by agriculture 34.9 percent and industry 27 percent, respectively. Ethiopia's major exports include coffee, oil seeds, gold, chat, flowers, pulses, and live animals. Coffee is the leading export, constituting29.5% of total exports by value in the year 2018 (NBE, 2018).

3.2 The Financial Sector in Ethiopia

The financial sector in Ethiopia consists of formal and informal institutions. The formal financial systems are those institutions that are set up legally and engaged in the provision of credit and mobilization of savings. This comprises of financial institutions such as banks, insurance companies, microfinance institutions that are regulated and controlled by the National Bank of Ethiopia (NBE). In addition, saving and credit cooperative (SACCOs) supervised and controlled by the Federal Cooperative Agency of Ethiopia (FCA).The informal financial sector in the country consists of unregistered traditional institutions such as *Iqub* (Rotating Savings and Credit Associations) *Idir* (Death Benefit Association) and moneylenders (Aderaw and Manjit, 2016).The financial sector in Ethiopia is largely dominated by banks followed by microfinance institutions and insurance companies.

[3]Human Development Indices and Indicators 2018 Statistical Update
[4]https://data.worldbank.org/?locations=ET-ZG

3.2.1 The Formal Sector

The major formal financial institutions operating in Ethiopia are banks, insurance companies, and microfinance institutions.

(i). Banks

The formal banking system in Ethiopia started in 1905 with the establishment of Bank of Abyssinia. The government of Ethiopia in partnership with the National Bank of Egypt opened it. However, a well-structured bank in Ethiopia has established in 1942, which has owned by the government under the name State Bank of Ethiopia. During this time, a number of foreign banks and a private bank have allowed to operate and compete with the government-owned commercial bank until they have nationalized and merged into one government-owned bank in 1976 under the Derg regime.

After the change of government in 1991 with a market-oriented economic system, different measures have taken regarding the financial system in the country including liberalizing and deregulating of the previous financial system of the country. The financial sector was deregulated and to make it in effect a proclamation number 84/94 has issued and liberalized the financial sector. Following the proclamation, a number of private banks and insurance companies were established.

Currently, there are 18 banks operating in the country two of which are state-owned banks. Total branches reached 4,757 with a branch to population ratio 1:20286.5. About 35.3 percent of the total bank branches operating in Addis Ababa, the capital city of Ethiopia. The state-owned banks have 31.2 percent share in total branch network while the rest 68.8 percent is the share of private banks (NBE, 2018).

Table 1: Trends in bank branch expansion, capital and access

Year	No. of Banks		Branch Network					Capital			Branch per pop[n]
	Public	Private	Public	Private	Region	A.A	Total	Public	Private	Total	
2008/09	3	10	273 (42.9)	363 (57.1)	241	395	636	7,037 (63.5)	4,045 (36.5)	11,082	1:126,258
2009/10	3	12	273 (40)	408 (60)	416	265	681	7,730 (59.8)	5,203 (40.2)	12,933	1:117,474
2010/11	3	14	483 (49.8)	487 (50.2)	621	349	970	8,718 (54.7)	7,231 (43.6)	15,949	1:82,474
2011/12	3	14	675 (52.4)	614 (47.6)	859	430	1,289	9,134 (50.7)	8,876 (49.3)	18,010	1:62,064
2012/13	3	16	866 (50.2)	858 (48.8	1,134	574	1,724	12,046 (52.2)	11,024 (47.8)	23,070	1:49,826
2013/14	3	16	1,003 (45.4)	1,205 (54.6)	1,455	753	2,208	11.821.9 (44.7)	14,615 (55.3)	26,437.3	1:39,402
2014/15	3	16	1,129 (41.9)	1,564 (58.1)	1,736	957	2,693	13,716.7 (43.5)	17,822.8 (56.5)	31,539.5	1:33,448
2015/16	2	16	1,260 (39.5)	1,927 (60.5)	2,090	1,097	3,187	21,058.3 (48.9)	22,002.5 (51.1)	43,060.8	1:28,932
2016/17	2	16	1,420 (33.4)	2,837 (66.6)	2,857	1,400	4,257	50,174.7 (64.4)	27,788.1 (35.6)	77,962.8	1:22,164
2017/18	2	16	1,482 (31.2)	3,275 (68.8)	3,080	1,677	4,757	51,528.3 (60.1)	34,222.8 (39.9)	85,751.2	1:20,287

Source: National Bank of Ethiopia, Annual Reports Note: The numbers in prentices are percentage shares

The above table shows trends in bank branch expansion and population per branch as well as capital of the banking sector for the last ten years. One important aspect of the trend is that the progress achieved in the coverage of bank services. Banks have increased their branches and area of coverage from 636 in 2008/09 to 4,757 in 2017/18 by more than 700 percent increase within ten years. The number of people to a single branch has declined significantly from 1:126,258 in 2008/09 to 1:20, 287 in 2017/18.

Regarding deposit mobilization, the total money mobilized by the banking system in the form of deposit, borrowing and loan collection reached 289.2 billion birr by the end of the 2017/18 fiscal year. This is a stunning change backed by a significant bank branch expansion when we compare the figure for the year 2008/09, which was 27.4 billion birr. The share of private banks in deposit mobilization is 37.8% while 62 percent of the total deposit mobilized by the leading public bank (CBE) which has 28.9 percent share in total branch networking of the banking system.

(ii). Insurance Companies

Before liberalization, the command economy including political instability had been the obstacle for the growth of the financial sector in Ethiopia. The 1990's, ushered in economic liberalization that led to the revival of private sector participation in the financial sector. This has led to the formation of a number of private insurance companies. The following table shows the status of the current insurance companies in Ethiopia

Table 2: Branch Expansion and capital of Insurance Companies

Insurance Companies	Branch			Capital
	2017/18			2017/18
	Addis Ababa	Regions	Total	
Ethiopian Ins. Cor.	25	60	85	1530.0
Awash Ins.Com.S.C	27	17	44	439.0
Africa Ins.Com S.C	15	13	28	294.0
National Ins. Co. of Eth.	19	15	34	166.0
United Ins.Com. S.C	25	12	37	368.0
Global Ins. Com.S.C	8	8	16	148.0
Nile Ins.Com.S.C	20	20	40	436.0
NyalaIns.Com.S.C	15	16	31	516.0
Nib Ins. Com.S.C	26	13	39	313.0
Lion Ins. Com.S.C	16	15	31	131.0
Ethio-Life Ins.Com.S.c	15	5	20	112.0
Oromia Ins.Com.S.c	18	20	38	295.0
Abay Insurance	13	12	25	260.0
Berhan insurance S.C	9	4	13	112.0
Tsehay Insurance S.C	12	7	19	119.0
Lucy Insurance S.C	11	4	15	129.0
Bunna Insurance S.C	11	6	17	108.0
Total	285	247	532	5,476.0

Source: Author computation from National Bank of Ethiopia, Annual Reports

According to the National Bank of Ethiopia (2018), there were 17 insurance companies with 532 branches operating in the country. In terms of ownership, all insurance companies except the Ethiopian Insurance Corporation (EIC), has privately owned.

Private insurance companies accounted for 72 percent of the total capital; while the remaining share has taken up by the single public owned enterprise, the Ethiopian Insurance Corporation.

Of the total insurance branches, 53.6 percent are concentrated in Addis Ababa. Private insurance companies owned about 84 percent of the total branches.

According to Gebreyes (2011), the insurance market is undeveloped, uncompetitive and there exists lack of information on the kind of life insurance that is currently present. The current practice of bulk of insurance coverage and business in Ethiopia is targeting the corporate market and focuses mainly on general insurance with very limited coverage in life insurance. The insurance sector is dependent on the banking sector for much of its new business. Most Ethiopian insurance companies have sister banks and its common for these banks to refer their clients to their sister insurance companies, but this is largely restricted to credit life insurance products. Moreover, insurance companies tend to derive a large portion of their total income from investments in banks (Smith and Chamberlain, 2010).

(iii). Microfinance Institutions

The emergence of Microfinance institution is a recent phenomenon in Ethiopia compared to other developing countries. The first microfinance service in Ethiopia has introduced as an experiment in 1994 when the Relief Society of Tigray (REST) attempted to rehabilitate drought and war affected people through the rural credit scheme. It has inspired by other countries' experiences and adapted to the conditions of the Tigray region (the northern part of Ethiopia). In the second half of the 1990s, because of its success, the microfinance service has gradually replicated in other regions (Berhanu and Thomas, 2000).

Currently, there are 35 microfinance institutions (MFIs) operating in Ethiopia. Among these MFIs, Amhara, Dedebit, Oromiya, Omo and Addis credit and savings institutions have the largest share. For instance, at the end of 2015/16, these five institutions accounted for 83.6 percent of the total capital, 92.9 percent of the savings, 88.3percent of the credit and 89.2 percent of the total assets of MFIs (NBE, 2018).

The total capital of the MFIs reached 13.8 billion birr at the end of 2017/18. This figure was 1.7 billion birr with 28 MFIs in 2008/09. At the end of the 2017/18 fiscal year, the total asset of the MFIs was 67.3 billion birr. Ten years back their total asset was 6.6 billion birr that shows that

there is 693 percentage increases in the total asset of MFIs over the last ten years (ibid.). MFIs registered 33.2 billion savings deposit and credit to their clients 43 billion at the end of 2017/18.

(iv). Saving and Credit Cooperatives

In Ethiopia, there are three types of saving and credit cooperatives, namely Institution based SACCOs; Community based SACCOS; and SACCOs sponsored by NGOs. Savings and credit cooperatives are the type of organizations providing financial services to the poor in rural areas of Ethiopia. These include multi-purpose credit and saving cooperatives.

Unlike other formal financial institutions (banks and microfinance institutions), saving and credit cooperatives are owned, controlled and capitalized by their members. This implies that the savings and credit cooperatives have not subjected to supervision and regulation of the National Bank of Ethiopia. The ministry of cooperatives is responsible for the coordination of their activities. One of the principles of SACCOs is that lending is limited to only members of the cooperatives and the amount of loan depends on the level of individual saving deposits. Many rural saving and credit cooperatives provide loan services for agricultural inputs, animal fattening and in some cases for off-farm activities. Loan disbursement policies are prudent, only those with sufficient savings and collateral can lend. The majority of loans has provided for a period of one year or less.

According to the Federal Cooperative Agency of Ethiopia (2016), there were 74, 458 primary cooperatives and 354 unions, with 14,054,015 individual members, approximately birr 16.1 billion shared capital and birr 7.14 billion total saving in the country.

3.2.2 Informal Finance in Ethiopia

Informal ways of financial services has been practicing in both rural and urban areas of Ethiopia. It is informal because law does not regulate the provisions of such services; rather it relies on self-regulating mechanisms. In most community's membership in traditional community associations such as iddir, iqqub, mehabers are very common in the country (Aderaw & Manjit, 2016).

(i). Iddir

It is one of the informal local institutions in Ethiopia established voluntarily by the community and involved in self-help and other social activities. Iddirhas established primarily to provide mutual aid in burial matters but also to address other community concerns (Pankhurst & Mariam, 2000). It is an association established by a group of persons united by ties in families, friendship, neighborhood, or belonging to the same job (Teshome, 2008). It organizes people according to gender, generation, wealth, education, religion, kinship, ethnicity, and some other special relations. To mention some of the associations the Iddir formed: *Iddirs* based on professions like the teachers' *Iddirs,* on gender such as women's *Iddirs,* or on ethnicity or clanship such as those formed by migrants from specific areas. However, with regard to the membership structure, iddirs are the most democratic and egalitarian social organizations which people are free to join and become a member regardless of their differences in religion, sex, and ethnic affiliation (Pankhurst & Mariam, 2000).

(ii). Mahbers

Mahbers are voluntary and mutual aid community (religious) associations peculiar to Orthodox religion followers. The members gather together at church or in one of the member's house to pray together to get a blessing from God and saint and discuss their problems and further share information. In doing so, the members bring food and drinks to church to feed the poor and themselves and discuss matters of common interest (Moges, 2006 sited in Aderaw & Manjit, 2016). Mahbers are also very crucial informal institutions involved in various community activities such as risk coping, provision of information, addressing manpower and traction force and conflict resolution.

(iii). Iqqubs

Iqqubs have played a significant role especially for the informal sector in Ethiopia. An *iqqub* is a traditional saving and credit association (Rotating Saving and Credit Association), of which its purpose is to pool the savings of their members in accordance with the rules established by the group. Members usually deposit contributions on a weekly or monthly basis, and lots have drawn by turns so that the one who wins the chance gets the total sum. This process continues on a regular basis until the last member receives his or her share or what she/he has been saving through the months and the whole process starts again (Aredo, 1993).

3.3 The Ethiopia National Financial Inclusion Strategy

Given the growing literature and recognition about financial inclusion as a way of achieving inclusive growth and development in a way tackling the existing poverty problem, the National Bank of Ethiopia launched the national financial inclusion strategy in 2016. It is believed that financial inclusion can contribute to financial and monetary stability, helps to combat anti money laundering risks, brings inclusive economic growth and supports in greater social development. Therefore, the strategic framework is designed to accelerate financial inclusion in a manner that supports the country's development priorities.

In doing so the Ethiopian government has set up National Council for Financial Inclusion with responsibility for designing the National Financial Strategy and promoting financial inclusion through coordinating various financial inclusion initiatives. The council has formed Steering Committee for Financial Inclusion and Financial Inclusion Secretariat under the National Bank of Ethiopia.

The strategy has formulated by the Secretariat with full technical and financial support from the World Bank. The strategy is formulated starting from assessing the current state of the financial sector and financial inclusion of the country, focusing on the development priorities and socio-economic direction of the country. It takes in to account the vision statement of the country that becoming a middle-income economy by 2025 and the targets of the second GTP plan.

Vision

Achieving universal access and use of a range of affordable high quality financial products and services by the year 2025

Mission

Promote access and use of a range of suitable (quality and affordable) financial products and services provided by regulated financial institutions by all individuals and enterprises, through innovative and convenient channels, to promote economic growth, poverty

reduction, and financial stability.

Main Strategies

1. Strengthen (Financial and Other) Infrastructure
2. Ensure the Supply of an Adequate Range of Suitable Products, Services, and Access Points
3. Build a Strong Financial Consumer Protection Framework
4. Improve Financial Capability levels

Target for 2020

Under the supply-side impact indicators, different targets have been set in the strategic paper for the year 2020. Accordingly, number of transaction account per 100 adults aged 18 and above to reach 90 while active accounts as a percent of total deposit and transaction account to be 80 percent. Regarding access point per 100,000 adults (number of commercial bank branches 8.8, MFI branches 19.6, Insurance branches 1.5, ATM 120.4, and agents 229.4) are to be achieved in 2020. The targeted number of saving and credit account per 100 adults 18^{+} are 70 and 40, respectively. Number of insurance policies believed to reach 5 per 100 adults 18^{+}.

In the demand-side there have been set a target for 2020 for six indicators. In the year 2020, 60 percent of adults 18^{+} will report that they own a transaction account; 80 percent adults report within 5km of a financial access point; 40 percent of adults will report saving at a regulated financial institutions; 5 percent of adults will report they have used insurance products; 40 percent of adults will use electronic payments and 80 percent of them will report that are aware of account opening.

CHAPTER FOUR

METHODOLOGY

4.1 Conceptual Framework

The main determinants of household income in the literature includes, size of the household, age of the household head, gender, dependency in the family, education, asset and endowments, employment status and location among others (Lanjouw and Ravalion, 1995; Miles, 1997; Simler et al., 2004; Janson et al, 2006; Tuyen et al., 2014 and Tuyen, 2015).

Financial inclusion (access to financial services) which is the focus of this paper is one of the main determinants of household income. Access to finance positively affects the level of household income. Households with access to different financial products showed improved welfare measured by income (Demirgüç-Kunt et al, 2008; Karlanet al, 2010; Pande et al, 2012; Sarojit, 2015; and Zhang and Posso, 2017).

The general specification of the model is given as:

$Y_i = \beta F_{in} + \gamma X_i + \epsilon_i,$

$F_{in}(bank\ account, saving, credit, insurance)$

Where

Y_i , indicate the dependent variable, which refers to income for household *i*

F_{in}, is a measure of financial exclusion which is defined and measured separately below based on four dimensions namely, bank account, saving, access to credit and insurance.

X_i, are other explanatory variables that can influence the dependent variable which includes household size, age, agribus (whether the household is engaged in agriculture or business), rururb (whether the household lives in rural or urban), marriage, education, employment and dependency ratio.

ϵ_i, is normally distributed error term

Table 3: Definition and Measurement of Explanatory Variables Included in the Models

Explanatory variables	Definition and measurement	Expected sign
Financial Inclusion(F_{in})	A measure of financial inclusion (1 if the household is financially included 0 otherwise)	(+)
Age	Age of household head (years)	(+/-)
Household size	Total household members in number	(+)
Dependency ratio	The proportion of dependents in the households	(-)
Agriculture/Business	Whether the household engages in agriculture or business (agriculture=1; business=0)	(+/-)
Gender	Sex of the household head (male=1; female=0)	(-)
Marriage	Whether the household head is married or not (married=1; otherwise=0)	(+)
Rural/Urban(rururb)	Dummy whether the household lives in rural or urban (rural=1; urban=0)	(-)
Employed	Proportion of employed people within the household	(+)
Education	highest education level with in the household (Illiterate or primary school, secondary school, post secondary, andcollage degree or above)	(+)

Two types of data analysis have been used, namely descriptive statistics and econometric analysis. The descriptive analysis includes quantitative analysis using percentages and frequencies on the sampled data. In the econometric analysis, Quantile Regression model and Propensity Score Matching methods are employed using the software STATA 14.

4.2 Defining and measuring financial inclusion (F_{in})

According to the definition by the World Bank (2017), financial inclusion is defined as access to useful and affordable financial products and services that meet individuals needs for transactions and payments, savings, credit and insurance. Here from the definition, we have four dimensions of financial inclusion (transaction, saving, credit and insurance).

As most available measures of financial inclusions are found at a macro level (Sarma, 2008 &

2010; Ang, 2009) and Massara and Mialou 2014), Zhang and Posso (2017) have developed a new measure of financial inclusion based on the four dimensions and six indicators. They followed the procedure same as the measure for the household level multidimensional poverty index by Alkire and Santos (2010), Dotter and Klasen (2014).

In this paper, I have developed a measure for financial inclusion in an identical way. Four dimensions and one indicator for each dimension are identified. One of the four dimensions is transaction with its indicator whether anyone in the household owns a bank book or not. The second one is saving and deposit is considered as its indicator. The third dimension is credit where credit access by the household taken as an indicator. The fourth one is insurance with its indicator of whether a household has commercial insurance or not.
Equal weights have been given for each of the four dimensions and indicators accordingly which gives a deprivation score of 0.25 for each dimension and for those indicators.

Finally, to compute financial deprivation for a household, a deprivation score assigned to each person according to their household deprivation in each of the four components. A cut-off 50 percent (equivalent to 0.5 of the weight indicators) is used to separate between financially excluded and included households. If the household deprivation score is higher than 0.5, that household (and everyone in it) is considered as financially excluded and vice versa.

Table 4: Dimensions, indicators, financial deprivation scores and weighs for $\boldsymbol{F_{in}}$

Dimension (Weight)	Indicator (Weight)	Financially deprived if...
Transaction (0.25)	Account book (0.25)	Household does not have account book
Saving (0.25)	Deposit account (0.25)	Household does not have any deposit
Credit (0.25)	Access to credit (0.25)	Household does not access any credit
Insurance (0.25)	Commercial insurance (0.25)	Household does not have a commercial insurance

Source: Adapted from Zhang and Posso, 2017

4.3 The Empirical Model

Given the general model:

$$Q(y_i) = b_q Fin_i + \gamma_q x_i + e_i$$

The standard linear regression model minimizes the average relationship between a set of repressors and outcome variables based on the conditional mean function$E(y|Fin, x)$. This provides only a partial view of the relationship that exists between dependent and independent variables. If we are interested in describing the relationship at different points in the conditional distribution of the dependent variable, the quantile regression will provides that capability. In quantile regression, the relationship between the repressors and outcome variable can be seen using the conditional median function$Q_q(y|Fin, x)$, where the median is the 50th percentile or quantile q of the empirical distribution. The quantile (q) assumes values between 0 and 1 and divides the data in to different quantiles (percentiles).

The quantile $q\epsilon(0,1)$ is that y which splits the data into proportions q below and 1-q above where $F(y_q) = q$ and $y_q = F^{-1}(q)$.Given that ϵ_i as the model prediction error, the median regression also known as least absolute deviation (LAD) regression minimizes$\sum_i |e_i|$.Quantile regression minimizes a sum that gives asymmetric penalties (1 - q) $|e_i|$for overprediction and $q|e_i|$for under prediction. If the quantile q differs from 0.5(the median), there is an asymmetric penalty, with increasing asymmetry as q approaches 0 or 1.Although its computation requires linear programming methods, the quantile regression estimator is, asymptotically and normally distributed.

Quantile regression provides an alternative to ordinary least square (OLS) regression and related methods that typically assume that association between dependent and independent variables are the same at all levels. Quantile regression method allows the analyst to relax the common regression slope assumption. In OLS regression, the goal is to minimize the distance between the values predicted by the regression line and the observed values. Whereas in quantile regression differentially weights the distance between the values predicted by the regression line and the observed values, and then tries to minimize the weighted distance.

The advantage of quantile regression is that while OLS can be inefficient if the errors are highly non-normal, it is more robust to non-normal errors and outliers.

Quantile regression also provides a richer characterization of the data, allowing us to consider the impact of a covariate on the entire distribution of *y*, not merely its conditional mean (Baum, 2013).

I have motivated to use quantile regression method because of its power in analyzing relationships that exhibit inherent heterogeneity in the dependent variable. In quantile regression, one can observe the effects of the independent variable at different points of the dependent variable. In this paper, this method gives the opportunity for assessing the effects of financial inclusion at different points of household income.

4.4 The Quantile Regression Model Estimator

The quantile regression estimator for quantile q minimizes the objective function: (Baum, 2013)

$$Q(b_q, \gamma_q) = \sum_{i:y_i \geq Fin_i' b}^{N} q|y_i - Fin_i' b_q| + \sum_{i:y_i \geq x_i' \gamma}^{N} q|y_i - x_i' \gamma_q| + \sum_{i:y_i < x_i' \gamma}^{N} (1-q)|y_i - x_i' \gamma_q| + \sum_{i:y_i < Fin_i' \gamma}^{N} (1-q)|y_i - Fin_i' b_q|$$

Where: $Q(b_q, \gamma_q)$ Are the coefficients produced under different quantiles q

y_i- The dependent variable (logincome) for each observation i

Fin_i- The variables financial inclusion for each observation i

x_i- Other independent variables for each observation i

q- Quantiles, which assumes values between 0 and1

N- Number of observations

4.5 Data

The data used in this paper is collected from the World Bank database, which is the third wave of the integrated surveys on Agriculture (LSMS), or Ethiopian Socio-economic Survey (ESS) carried out in 2015/16. The Ethiopian Socio-economic Survey is implemented in collaboration with the World Bank Living Standards Measurement Survey (LSMS) team as part of the Integration Survey on agriculture program. The data sample includes 27, 991 individuals in 4,955 households from the 9 regions of Ethiopian urban and rural areas. The data includes

information on the household's demographic characteristics, education, health, agriculture, employment, agriculture, asset, and housing characteristics, income, consumption, and finance.

CHAPTER FIVE

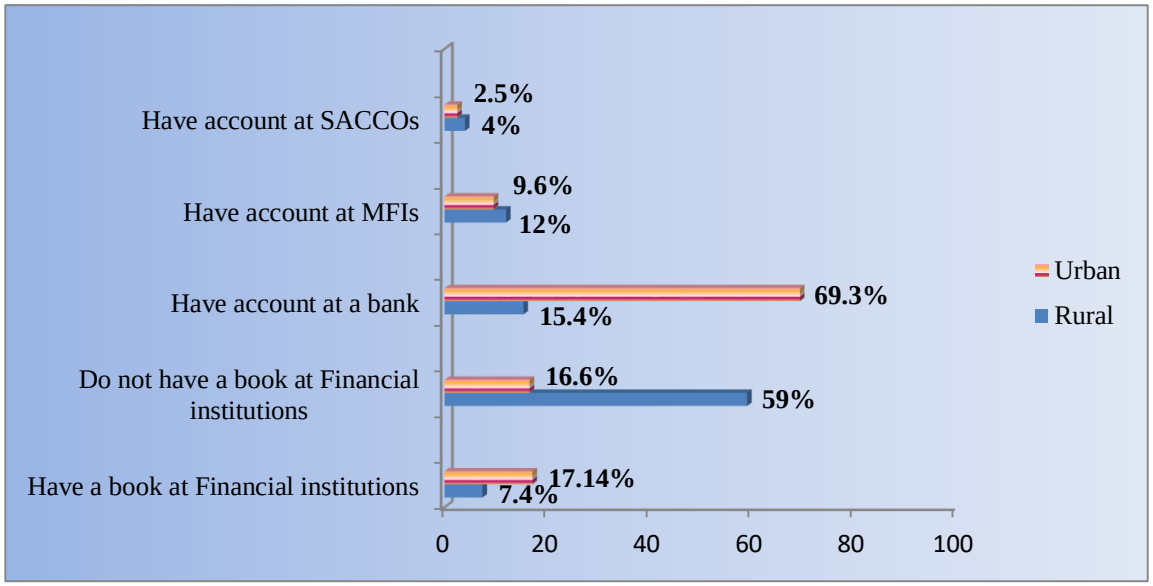
EMPIRICAL RESULTS AND INTERPRETATION

5.1 Descriptive Statistics

5.1.1 Account Ownership

From the total surveyed individuals of 11,810 whose age 18 and above only 24.51 percent of them have registered for an account book at bank, microfinance institutions and saving and credit associations (SACCOs). 69.84 percent of account owners live in urban areas, which indicates that financial institutions are more concentrated in urban areas and access to them, are higher for urban users. The latest Global Findex data on financial inclusion shows that account ownership in rural Ethiopia accounts for only 32 percent (Demirguc-Kunt et al, 2018).

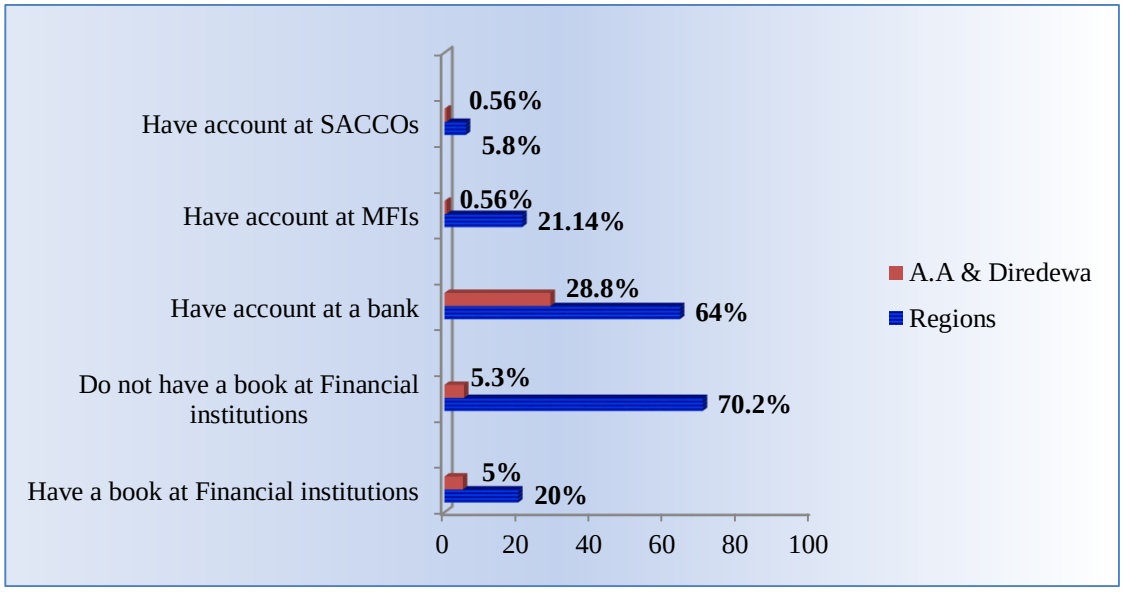
Figure 2: Account ownership by rural and urban



Source: Computed from World Bank ESS data 2015/16

From total surveyed individual in urban areas who have a bank account, 27.45 percent are from the capital city. This implies that banks and their branches in Ethiopia are more located in major cities especially in Addis Ababa.

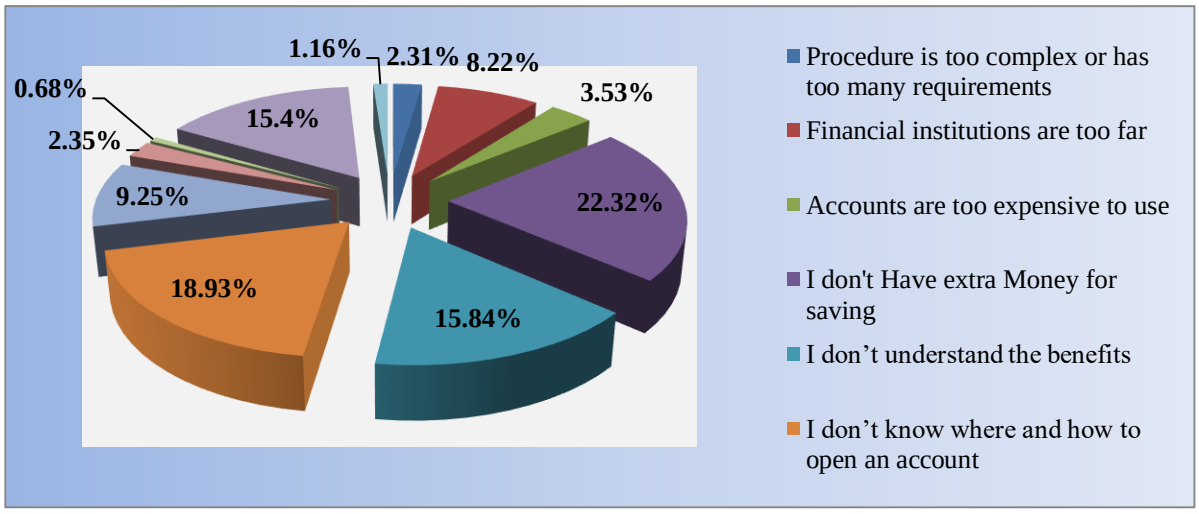
Figure 3: Account ownership by regions and major cities.



Source: Computed from World Bank ESS data 2015/16

One of the main reasons given by those respondents who do not have an account book is that they do not have extra money for saving. This reason was also given as the main obstacle for account ownership in Ethiopia in the recent Global Findex survey (56 percent) and it is also the number one reason given by more than 80 percent of adults without formal account in Sub Saharan Africa (Demirgüç-Kunt & Klapper, 2012). The other most cited reasons were "I do not know where and how to open an account (18 percent)"and "I don't understand the benefits (15.8 percent)".

Figure 4: Reasons for not having an account book

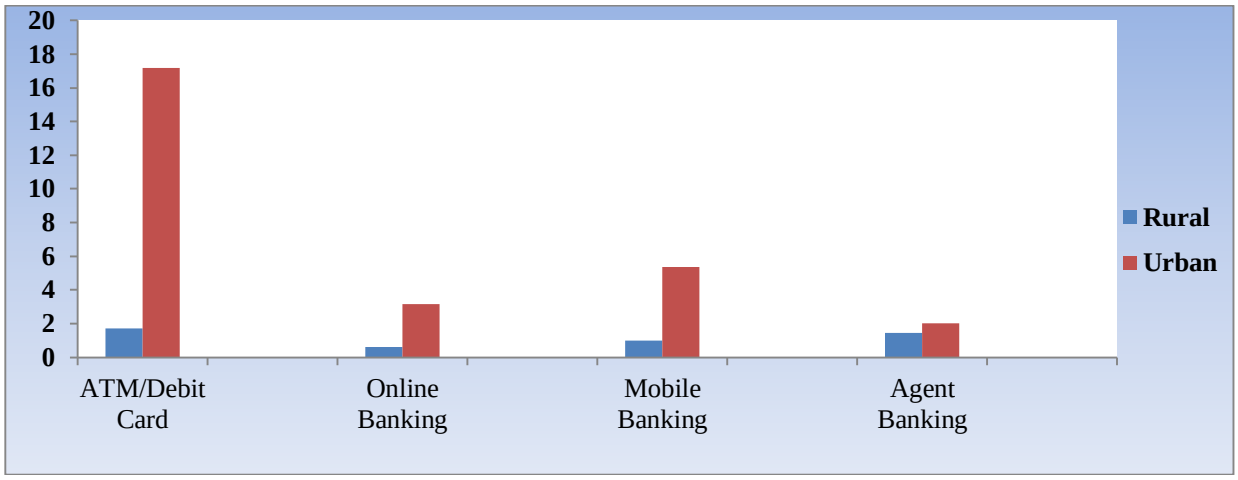


Source: Computed from World Bank ESS data 2015/16

5.1.2 Usage of New Banking Technology

Adoption of new technologies in the financial sector like digital banking, online banking and mobile banking systems can bring greater productivity; profitability and efficiency; faster service and customer satisfaction; convenience and flexibility; large space coverage and cost saving; and in the overall promotes financial inclusion[5].The sampled data shows here (Figure 7) that there is very little development in such technologies in Ethiopia.

Figure 5: Individuals who have used different banking products from the total survey

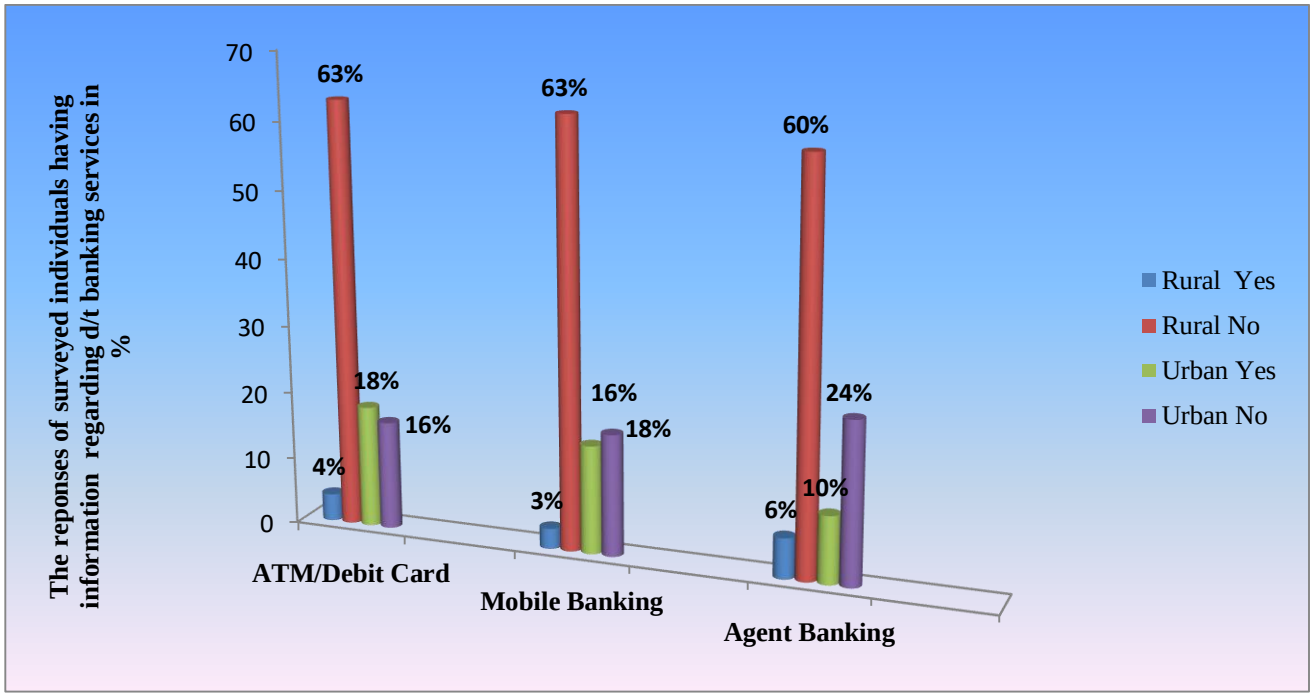


Source: Computed from World Bank ESS data 2015/16

From sampled individuals who have access to financial institutions and have an account book only 17.2 percent have used ATM (debit card) and 62.7 percent of the sampled individuals have not any information about the product or service ATM. Most of the users of ATM are from urban areas and the urban individuals have more chances of getting the information as well as access to the service. The rural peoples are far from using the product (only 1.7 percent in the sample) and they do not have the information and knowledge about the product.

[5]https://www.ictworks.org/ethiopia-digital-financial-inclusion/#.XLbqBTAzZxA

Figure 6: Information on different banking services



Source: Computed from World Bank ESS data 2015/16

Regarding online banking, there is no access or very much few customers are there which needs a modern device and access to internet services. It seems most customers are aware of mobile banking despite the fact that its usage is very much low (about 6.35 percent). There were about 40.4 million mobile subscribers in Ethiopia in the year 2017/18 but according to the Global Findex data 2017 in Ethiopia those aged 15 and above who used the mobile phone or internet to access an account was only 0.4 percent which is even very far from Sub-Saharan Africa standard (20.8 percent).

Now a day's mobile based agent banking is growing in both rural and urban areas of Ethiopia. Multiple financial institutions with known brands such as Hello cash, M-Birr and CBE Birr with multiple languages, offline capabilities and multilingual service centers offer agent-banking services[6].

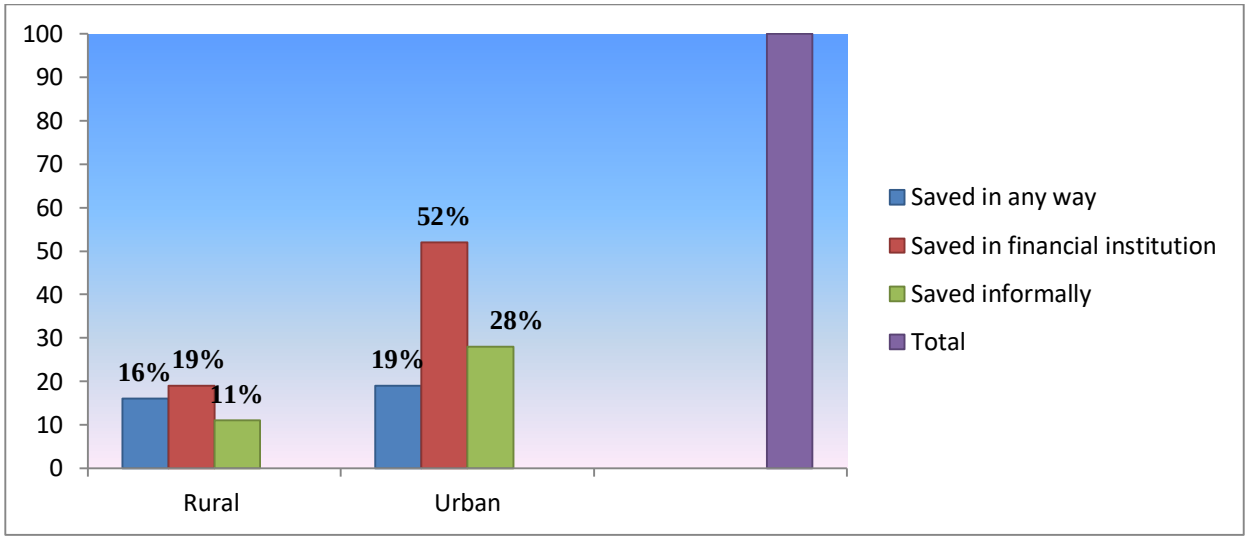
[6]https://www.ictworks.org/ethiopia-digital-financial-inclusion/#.XLbqBTAzZxA

5.1.3 Saving

Saving is the amount of money left after spending or it is an income not spent. The ways of saving include a deposit account, pension account, an investment fund and saving in the form of cash.

The domestic saving rate in Ethiopia is improving over time from 7.6 percent of GDP in 2002/03 to 24.3 percent of GDP in 2017/18 (NBE, 2018). Despite this improvement, much of the investments are financed from foreign sources. The saving culture of the society and the saving rate is very much low due to low income level, lack of incentives to save and lack of appropriate saving products (Hailesellasie et al, 2013; Ebissa and Kassie, 2017).

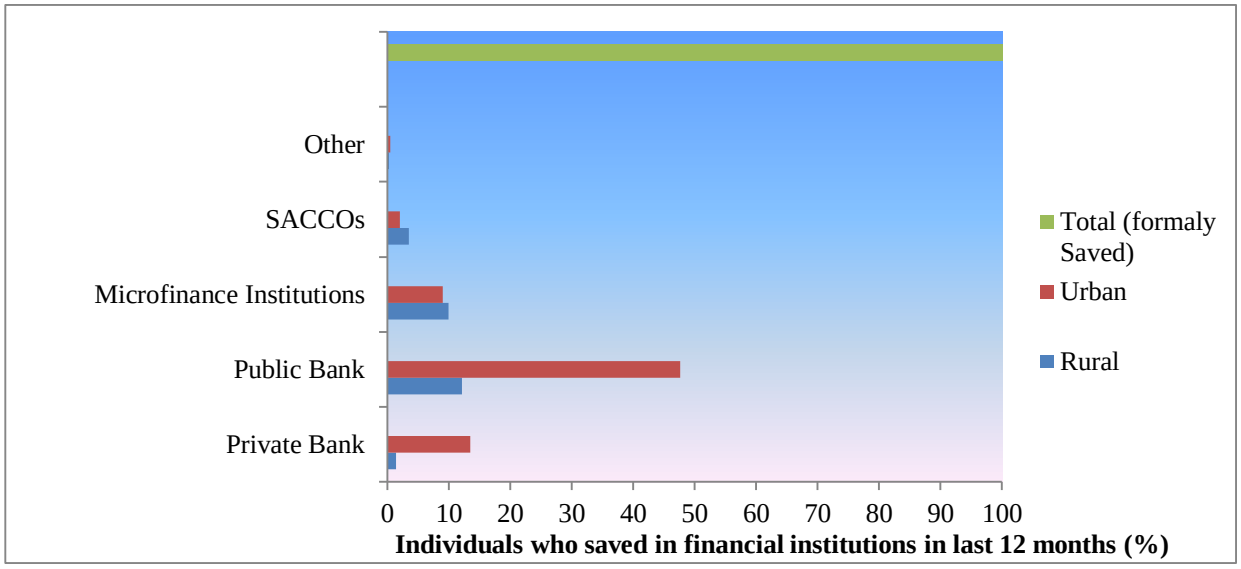
Figure 7: Saving practices of individuals in rural and urban areas



Source: Computed from World Bank ESS data 2015/16

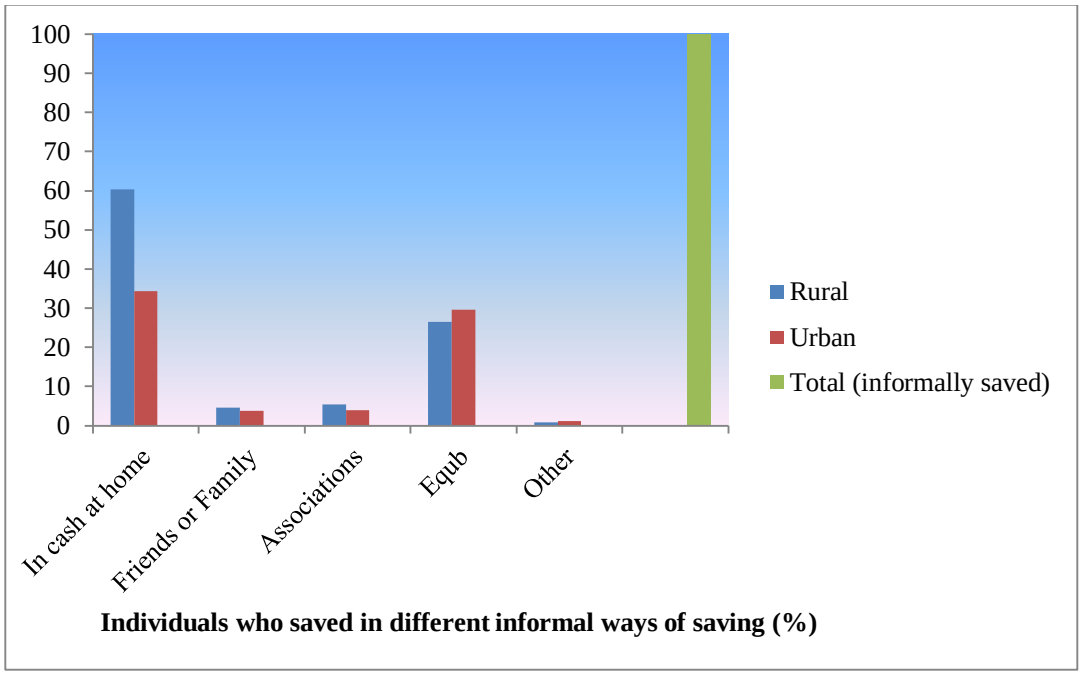
Figure9shows that from the total surveyed individuals aged 18 and above 35 percent of them are saved in any ways which means both formally and informally. Among the total savers, about 71 percent of them are saved in formal financial institutions (Banks, MFIs, and SACCOs) and 39 percent of individuals saved informally through cash, friends or family, equb and other.

Figure 8: Saving in financial institutions



Source: Computed from World Bank ESS data 2015/16

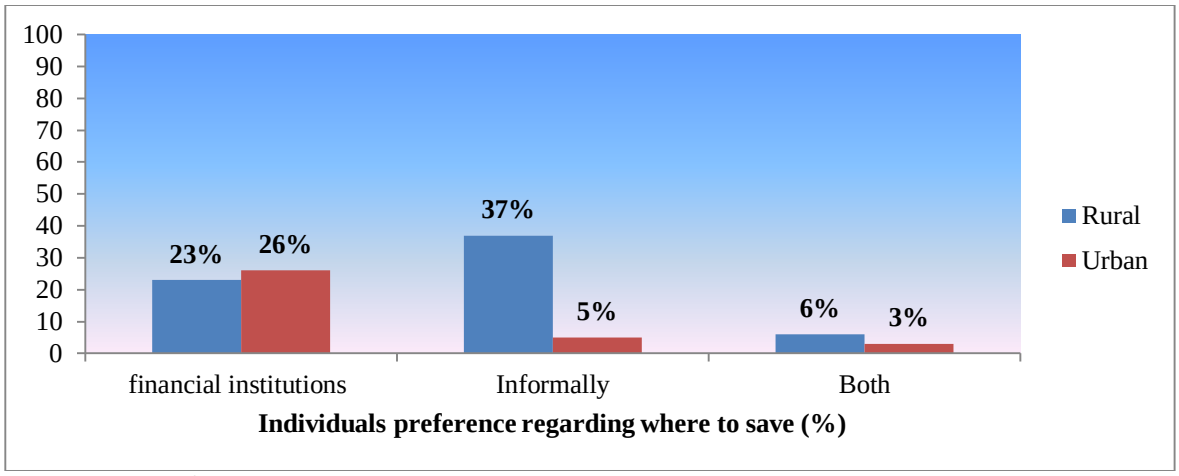
Figure 9: Informal ways of saving



Source: Computed from World Bank ESS data 2015/16

From surveyed individuals 49 percent prefer saving in formal financial institutions, 42 percent informally and the remaining 8 percent in both ways.

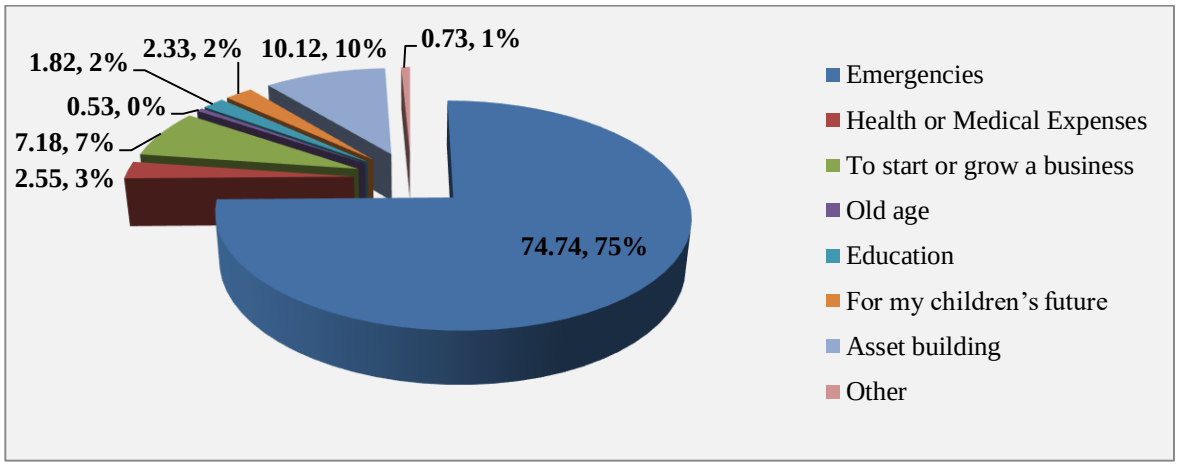
Figure 10: Individuals preference regarding where to save



Source: Computed from World Bank ESS data 2015/16

The number one reason given for saving or putting money aside is to cope up with emergencies (75 percent) followed by asset building (10.12 percent) and to start a new one or grows a business (7.2 percent).

Figure 11: Why individuals save



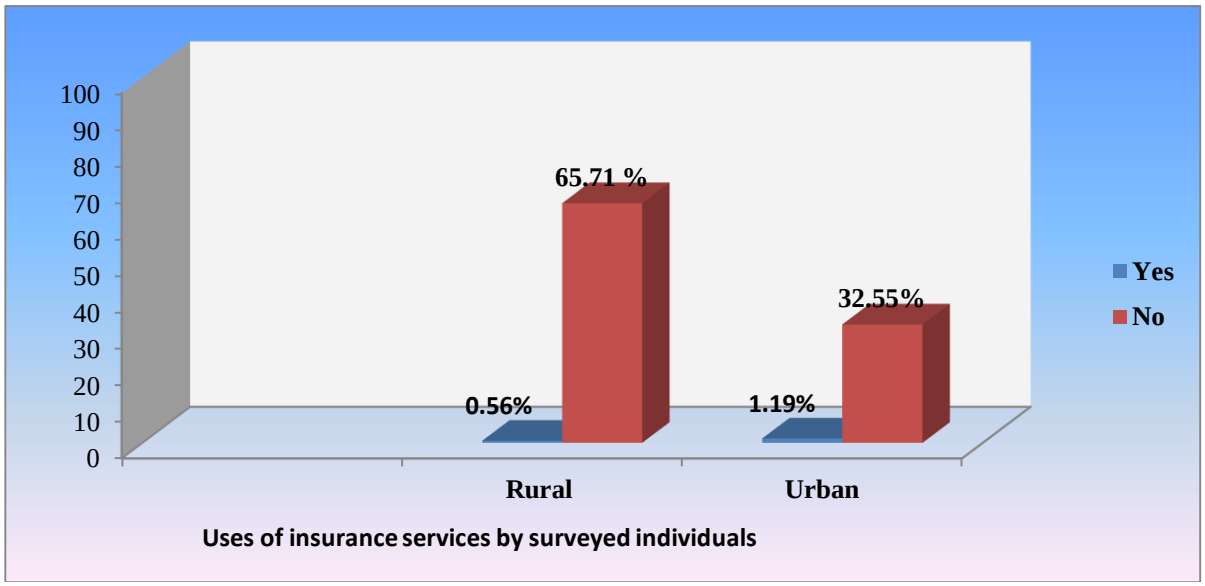
Source: Computed from World Bank ESS data 2015/16

5.1.4 Insurance

Insurance is a risk transfer mechanism that ensures full or partial financial compensation for the loss or damage caused by an event.

The insurance market and practice in Ethiopia is not developed especially its practice in rural areas are very much limited. Among the surveyed individuals, only 1.74 percent of them used a formal insurance service that is provided by financial institutions. Most of the users are from urban areas where from the total insurance users 68 percent found in urban areas.

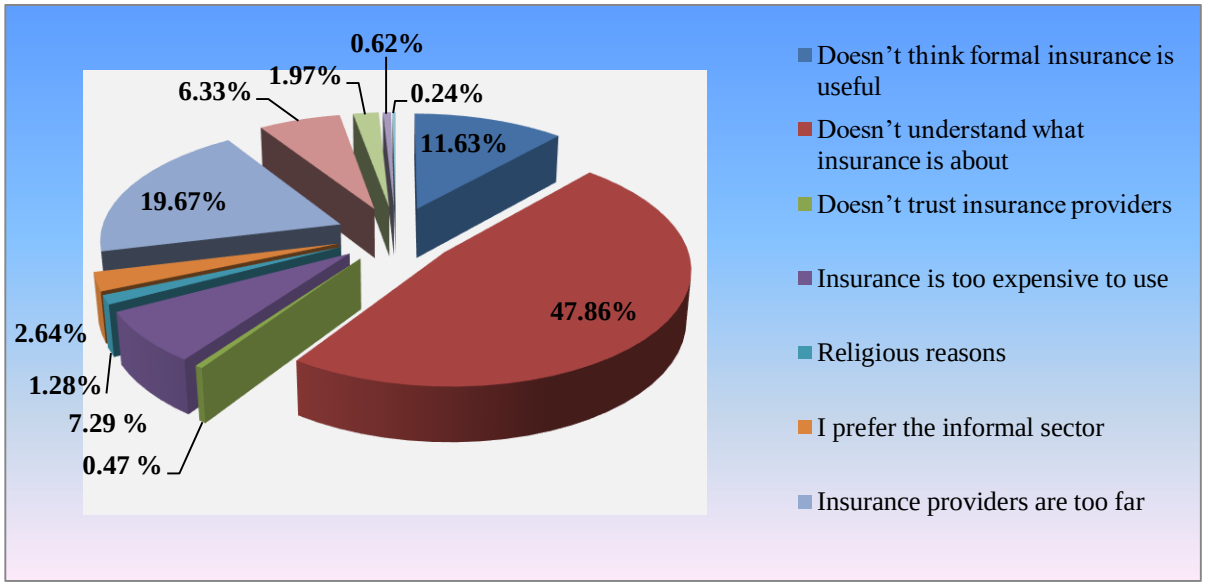
Figure 12: Access to insurance service



Source: Computed from World Bank ESS data 2015/16

Information gap (I do not understand what insurance is about and I don't think insurance services are important 59.49 percent), unable to access (insurance service centers are too far away 19.67 percent) and insurance service is too expensive (10 percent) are among the provided answers by the respondents, when they are asked why they unable to use a formal insurance service. This shows that suitable insurance products and access are very much limited. There are no awareness and knowledge about the importance as well as the services of insurance among individuals (see figure 15).

Figure 13: A reason given by respondents why they are unable to access insurance services

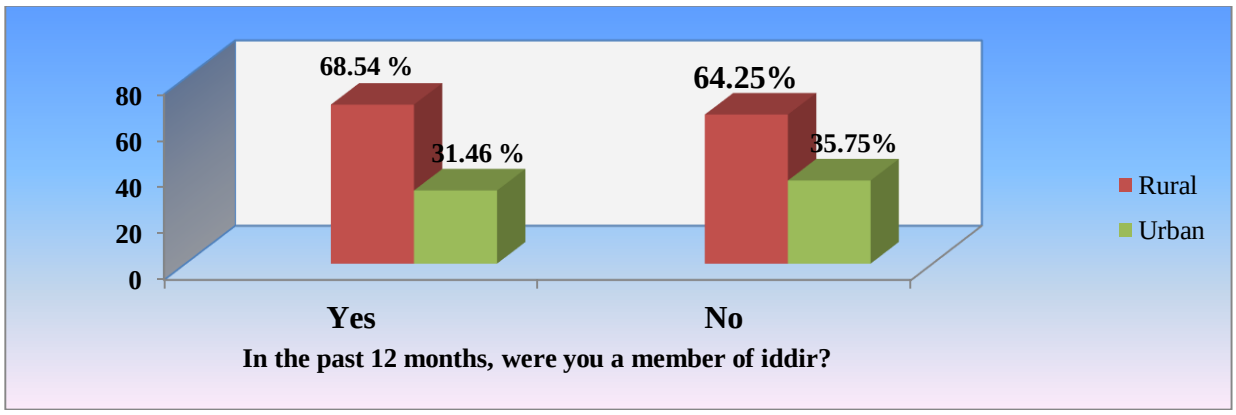


Source: Computed from World Bank ESS data 2015/16

There is an informal way of insurance practice in Ethiopia both in urban and rural areas that called Iddir. It is an association made up by a group of persons united by ties of family and friendship, by living in the same district, by jobs, or by belonging to the same ethnic group, and has an objective of providing mutual aid and financial assistance in certain circumstances. It is a sort of insurance program run by the community or a group to meet emergency situations (Mauri, 1987 sited in Aredo, 2010).

About 47 percent of individuals were a member of iddir out of which 68.54 percent from rural and 31.46 percent from urban areas.

Figure 14: Uses of traditional ways of insurance (Iddir)

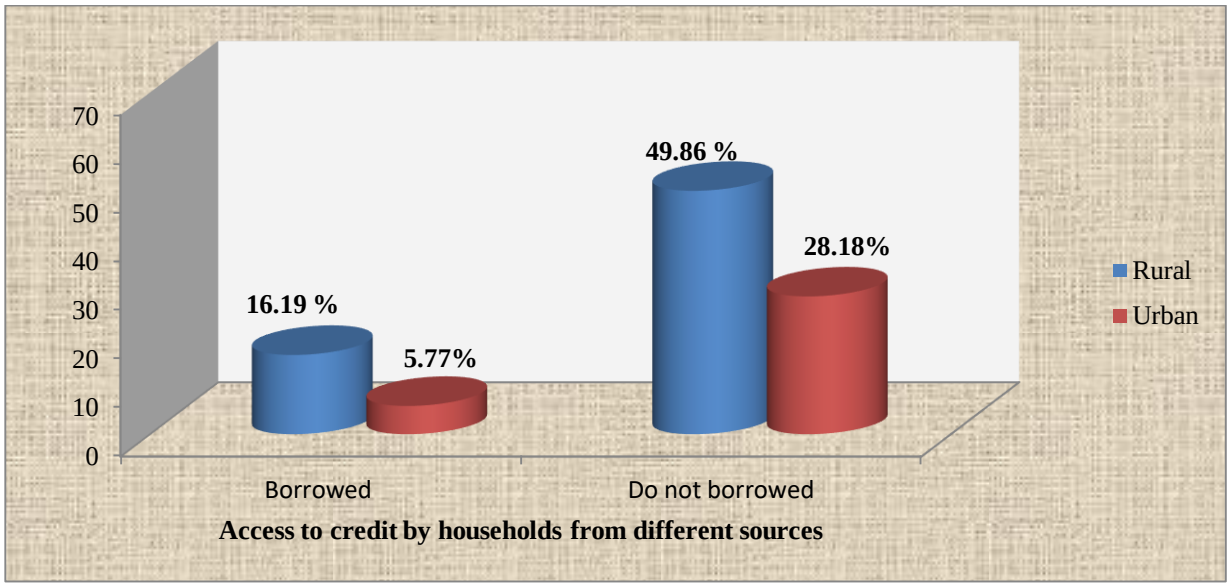


Source: Computed from World Bank ESS data 2015/16

5.1.5 Credit

Credit is a contractual agreement in which a borrower receives something of value now and agrees to repay the lender later with consideration and generally with an interest. The following section discusses credit access and sources of credit for both rural and urban households.

Figure 15: Access to credit



Source: Computed from World Bank ESS data 2015/16

As can be seen from the above figure, from total survey households only 21.96 percent of them were borrowed from different sources (16.19 percent rural and 5.77 percent urban households).With regard to sources of credit, from the total borrowers, 25.87 percent borrowed from financial institutions and 74.13 percent borrowed informally from different sources like relatives and neighbors, local merchants and from other sources (see figure7).

Table 5: Different sources of credit by rural and urban households

Sources of Credit	Rural	Urban	Total
Borrowed formally (from financial institutions)	210 (17.75)	96 (8.11)	306 (25.87)
1.Banks	4	9	13
2.MFIs	192	78	270
3.NGOs	14	9	23
Borrowed informally	676 (57.14)	201 (17.0)	877 (74.13)

1. Relative and neighbour	470	140	610
2. Local merchant	105	19	124
3. Money Lander	21	4	25
4. Employer	2	7	9
5. Religious institutions	14	0	14
6. Other	64	31	95
Total	886 (74.89)	297 (25.11)	1,183 (100.0)

Source: Own computation from the sampled data, fingers in () indicate percentages

5.2 Analysis of Econometric Results

In the empirical analysis, the model is estimated using both OLS and Quantile regression methods. The OLS regression is done as a baseline result. The dependent variable is household income (log) which is continuous and there are about ten independent variables included in analysis. The detailed descriptions of all variables can be seen in the following table.

Table 6: Descriptive statistics on all variables

F*in* (Inancial Inclusion)	4,717	0.799	0.4	0	1
rururb(Whether household lives in rural or urban)	4,717	0.655	0.475	0	1
Gender	4,717	0.685	0.465	0	1
Age	4,696	46.45	15.29	13	99
Household _size	4,717	4.73	2.37	1	16
household _size Squared	4,717	27.94	26.11	1	256
Dependecy ratio	4,529	1.02	0.972	0	9
Employed	4,717	0.561	0.264	0	1
Agrbus (Whether the hh engages in Agricature or business)	4,717	0.612	0.487	0	1
Marriage	4,697	0.694	0.461	0	1
Highest educational level with in the household					
Never attened School	4,717	0.14	0.37	0	1
Primary school (1-8)	4,717	0.52	0.5	0	1
Scondary school (9 and 10)	4,717	0.15	0.36	0	1
Scondary school (11 and 12)	4,717	0.07	0.25	0	1
Post secondary and above	4,717	0.537	0.499	0	1

5.2.1 Results from OLS and Quantile Regression

The estimates from OLS and quantile reversions are presented in table 9. Most of the coefficients are significant under OLS and over the five quantiles. The variables financial inclusion (Fin), household size, employment, marital status, and education positively and significantly affect household income. Whereas, squared household size, dependency ratio, location, and economic activity (Agrbus) negative and significant determinants of household income.

Household income is affected positively and significantly by the size of the household. the result from OLS shows other things being constant as the number of the household members increases, the income level of that household will increase. However, after some point it will have a diminishing effect as can be shown from the squared household size result, which is negative. Again, in the quantile regression, both variables are significant over all quantiles. Marriage can increase household income significantly for those who are married as can be observed from both OLS and quantile regression results. In addition, it affects household income significantly at different levels of income groups. Dependency ratio, which is the proportion of the number of dependents aged 0 to 14 and over age 65 to the number of family members whose age between 15 and 64 inclusive, negatively affects household income. However, in the quantile regression it's not significantly affect whose households whose income in the 75th and 90th quantile.

A household who resides in rural areas has less income than households who are located in urban areas. Furthermore, a household whose main economic activity depends on agriculture generates less income as compared to those households who are engaged in business.

Regarding education, it has a strong positive effect on household income under both OLS and quantile regression results. As the educational attainment of the family moves from the bottom (never attended school) to the higher (post-secondary and above), the income of the household will increase accordingly.

Table 7: OLS and Quantile Regressions

	OLS (1)	Q_10 (2)	Q_25 (3)	Q_50 (4)	Q_75 (5)	Q_90 (6)
F*in*(financially included=1)	**0.30*** [13.99]**	**0.37*** [9.68]**	**0.35*** [13.39]**	**0.31*** [12.12]**	**0.25*** [9.40]**	**0.17*** [4.36]**
Location (Rural=1)	-0.15*** [-5.21]	-0.10** [-2.47]	-0.10** [-2.72]	-0.16*** [-4.08]	-0.20*** [-5.86]	-0.20*** [-3.88]
Gender (Male=1)	0.02 [0.82]	0.08 [1.60]	0.06 [1.41]	-0.004 [-0.16]	-0.005 [-0.15]	0.02 [0.56]
Age of household head	0.001 [1.18]	0.003* [2.20]	0.001 [0.96]	0.003 [0.38]	-0.001 [-0.69]	0.02 [1.53]
Household size	0.27*** [17.15]	0.30*** [8.87]	0.29*** [14.22]	0.27*** [15.34]	0.24*** [11.27]	0.23*** [8.35]
Squared Hh_size	-0.01*** [-10.45]	-0.02*** [-6.21]	-0.02*** [-9.39]	-0.01*** [-9.93]	-0.01*** [-5.98]	-0.009*** [-4.67]
Dependency ratio	-0.03** [-3.24]	-0.05* [-2.11]	-0.05** [-3.46]	-0.004** [-2.40]	-0.02 [-1.07]	-0.04 [-2.07]
Employed	0.08** [2.62]	0.17** [2.62]]	0.13** [2.41]	0.08** [2.42]	0.04 [0.78]	0.06 [1.01]
Agrbus (Agriculture=1)	-0.25*** [-9.46]	-0.31*** [-5.53]	-0.29*** [-7.47]	-0.25*** [-7.02]	-0.19*** [-4.78]	-0.16*** [-3.55]
Marriage (Married=1)	0.17*** [5.97]	0.18*** [3.15]	0.16*** [4.88]	0.16*** [5.44]	0.12*** [3.36]	0.15*** [2.96]
Education						
Never attend (Baseline group)						
Primary school (1-8)	0.24*** [7.45]	0.33*** [5.10]	0.33*** [7.33]	0.23*** [7.12]	0.17*** [3.75]	0.13*** [2.62]
Secondary school (9-10)	0.36*** [9.49]	0.50*** [6.31]	0.45*** [8.37]	0.34*** [7.87]	0.30*** [5.47]	0.23*** [3.93]
Secondary school (11-12)	0.43*** [9.13]	0.64*** [7.44]	0.54*** [9.50]	0.39*** [7.38]	0.35*** [4.89]	0.31*** [4.35]
Post secondary & above	0.62*** [15.14]	0.78*** [10.07]	0.70*** [12.69]	0.56*** [12.85]	0.51*** [8.86]	0.57*** [7.52]

Q_10 to Q_90 implies quantiles from 10 to 90. The numbers in brackets show robust t-values and ***, **, * represent significance at 1%, 5%, 10% level, respectively.

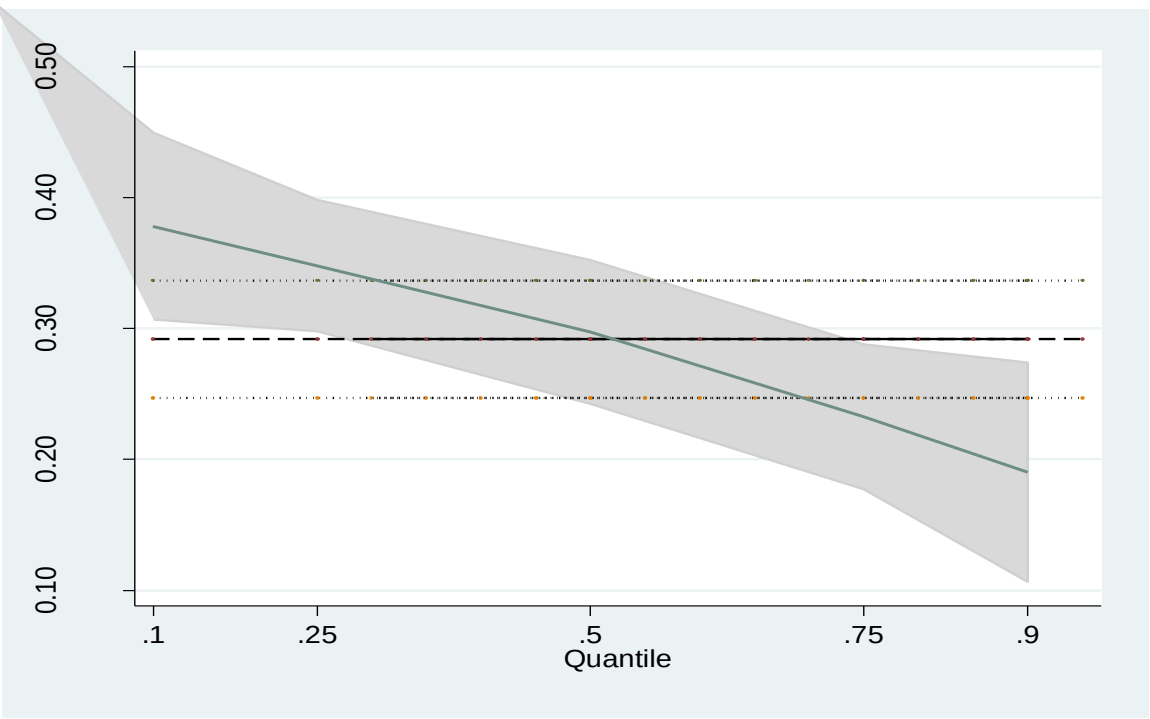
Fin (for financial inclusion): is the main variable of interest in this analysis which is a binary variable equal to 1 if the household deprivation score is greater than 50 percent and equal to 0 otherwise.

Author computation from ESS data

The relationship between financial inclusion (Fin) and income from column one to six shows that financially included households have more income than of financially excluded households. The coefficient (Fin) is positive and significant under OLS and for all quantiles. In column one financially included households have 30 percent more income than financially excluded one. This confirms the hypothesis that financial inclusion will have a positive impact on income.

The results from the 10th to 90th quantile shows that financial inclusion has a larger effect on the lower quantiles of household income. The 10th and the 25th quantile of income of financially excluded households are 37 and 35 percent lower than of financially included households, respectively. This result is also consistent with previous studies (OusmaneSeck et al, 2017 and Quanda Zhang and Alberto Posso, 2017) from household level analysis and (Burgess et al., 2005; Dev, 2006; Dupas & Robinson, 2013; Bruhn & Love, 2014) from macroeconomic studies.

Figure 16: Quantile plot



Author computation from ESS data

Figure 18plots the relationship between financial inclusion and household income (coefficient of Fin), by quantile with 95 confidence interval bands. The coefficient of Fin declines as the

quantile increases. This indicates that financial inclusion benefits poorer households than the richer one. Furthermore, working on financial inclusion that focused on the lower income groups can lower poverty and income inequality

As can be shown from the quantile regression result financial inclusion has a positive and statistically significant effect on the household's income and this effect can be found across all households with different income levels.

Excluding the poor from accessing financial services will limit them from participating in profitable economic activities that can increase their income and make them contribute to economic growth in general. Financial inclusion could help in alleviating poverty and bringing a high standard of living when economically active poor and disadvantaged sections of the population are able to save, borrow and reinvest in the economy (Beck et al, 2007).

5.2.2 Controlling for Endogeneity

There is a possibility of an endogeneity problem that can exist in the above equation due to the potential causal effect exists between income and the financial inclusion variables. In this paper, there has been hypothesized financial inclusion can lead to a higher income. However, it is possible that an increase in household's income enables them to have more access to financial services. Hence, endogeneity problem may arise because of the simultaneity issue that exists among the dependent variable (income) and the independent variable (Fin) in the model. As a result, the conventional linear regression model might be biased.

To address this problem I have conducted Propensity Score Matching (PSM) estimation under different matching methods to see the effects of financial inclusion on the outcome variable under such problem and compare the results with other estimates used in the paper.
PSM is defined as an estimation method that allows us to study the probability of participants receiving a treatment based on observed characteristics using propensity scores and matching algorithm to calculate the causal effect (Li, 2013).

The most prominent evaluation parameter in a treatment estimation is the average treatment effect on the treated (ATT) which provides the expected effect on the outcome variable if individuals in the population were assigned to treatment (Caliendo and Kopeinig, 2008). And it is defined as:

$$ATT_{\tau} = \mathrm{E}(\tau|D = 1) = \mathrm{E}[\mathrm{Y}(1)|\mathrm{D} = 1] - \mathrm{E}[\mathrm{Y}(0)|\mathrm{D} = 1$$

There are different matching methods in PSM estimation. In This paper Nearest Neighbor Matching, Radius Matching (Caliper Matching) and Local Linear Matching methods are applied.

Nearest Neighbor Matching: In this matching method, individuals from the comparison group have chosen as a matching partner for a treated individual that is closest in terms of the propensity score.

Radius Matching (Caliper Matching): under radius matching, individuals from the comparison group has chosen as a matching partner for treated individuals that lies within the caliper ('propensity range') and is closest in terms of the propensity score. All untreated observations within the specified radius of the treated observation are used, and they all receive the same weight (regardless of how close they are to the treated observations value).

Local Linear Matching and Kernel matching: are another a non-parametric matching estimators that use weighted averages of all individuals in the control group to construct the counterfactual outcome.

5.2.3 Results from PSM Regression

In the propensity score matching (PSM) regression, four types of matching methods have been used to obtain the average effect of being excluded from financial services on households income (ATT). The observed coefficients from all estimation methods are significant at one percent and positive showing that financially included households have a higher income than those without access to finance.

The results, summarized in Table 10, show that ATT (average treatment effect on the treated) is 0.334 with significance level at 1 percent for one to one nearest neighbor matching meaning that the income of households who are financially included will be greater by 33 percent than financially excluded. This is close to the coefficient from OLS (0.292).Furthermore, in all other

estimations, the ATT is roughly 0.30 with the same significance level at 1 percent and its also close to the baseline result.

In general, the estimates under PSM indicate that household income will be roughly 30 percent higher for financially included households than financially excluded one.

Table 8: Results from PSM with different matching method

ATT (average treatment effect on the treated)		
Matching method	Coefficient	Standard Error
Nearest Neighbour (one-to-one)	0.334***	0.042
Kernel	0.324***	0.022
Radius	0.295***	0.024
Local linear regression	0.291***	0.021
Baseline result		
OLS	0.292***	0.023
*** represent significance at the 1 percent level.		

Author computation from ESS data

CHAPTER SIX

CONCLUSIONS AND IMPLICATIONS

6.1 Conclusions

Using nationally representative household-level data that covers 4594 households in rural and urban areas of Ethiopia, this paper analyzes the effects of financial inclusion on household's welfare measured by income. Financial inclusion is measured based on multiple deprivations at the household level in four dimensions: transaction, saving, credit, and insurance to identify between financially included and excluded households in the analysis.

First descriptive method was used to give some general overview on sampled individuals and households. From total surveyed individuals aged $18^{+,}$ only 24.5 percent of them have registered for bank account. The remaining are who do not have a bank account in any of the financial institutions. About 78 percent of individuals who have not own a bank account are from rural areas. One of the main reasons given by the respondents why they unable to register for a bank account is because they do not have extra money for saving. From the total surveyed individuals 35 percent of them saved both formally and informally.

From total households included in the survey, about 22 percent are able to borrow from different sources. Out of those households who have got access to credit 26 percent borrowed from financial institutions (banks, MFIs and SACCOs) whereas the remaining 74.13 percent borrowed informally from various sources including relatives, local merchants and money lender. With regard to insurance, only 2 percent of the surveyed households have used a formal insurance service provided by financial institutions. This shows that the insurance market and practice in Ethiopia is at its infant stage especially in rural areas.

Second, the effect of financial inclusion on household's income was examined using an econometric model. In doing so quantile, regression analysis and OLS regression as a baseline model were used. Furthermore, propensity score matching analysis was used in order to solve the endogeneity problem that may exist.

Taking in to account the potential endogeneity problem between income and financial inclusion, the finding indicates financial inclusion has a strong positive effect on household's income. And this effect can be found across all households with different income level. Results from quantile regression also show that low-income households can benefit more from financial inclusion than high-income households.

6.2 Implications

The results of the analysis showed that there is a strong correlation between financial inclusion and income. Therefore, policymakers must implement policies that will tackle barriers to financial inclusion. In this regard, they should design policies in such a way that promotes inclusive growth that possibly enables the participation of all sections of the society. The study also indicated that financial inclusion benefits more lower income groups. If lower income groups have access to financial services, especially the provision of credit services, this will enable them to undertake productive activities and raise their income.

This paper used cross-sectional data because more variables are included regarding finance only in the third wave of the Ethiopian Socio-economic Survey (ESS) and I hope the fourth round of ESS is upcoming with more information regarding financial inclusion. Therefore, establishing a more clear causal relationship between financial inclusion and household income with more advanced data is left for future research.

REFERENCE

African Development Bank (2013). Financial inclusion in Africa. Annual report, 15, avenue du Ghana.

Aghion, P., & Bolton, P. (1997). A theory of trickle-down growth and development. The Review of Economic Studies, 64(2), 151-172.

Ahmed, A. &Dr.Batra, G.S (2018). Performance Analysis of Microfinance Institutions in Ethiopia. International Journal of Business and Management Invention (IJBMI), 7(4), 55-66.

Alkire, S., & Santos, M. E. (2010). Acute multidimensional poverty: A new index for developing countries. United Nations development programme human development report office background paper, (2010/11).

Ang, J. B. (2009). Financial development and the FDI-growth nexus: the Malaysian experience. Applied Economics, 41(13), 1595-1601.

Aredo, D. (1993). The informal and semi-formal financial sectors in Ethiopia: a study of the iqqub, iddir, and savings and credit co-operatives.

Banerjee, A. V., & Newman, A. F. (1993). Occupational choice and the process of development. Journal of political economy, 101(2), 274-298.

Bauer, P. T., Meier, G. M., & Seers, D. (1984). Pioneers in development: Second series. Oxford University Press.

Baum, C.F. (2013), "Quantile regression", available at: http://fmwww.bc.edu/EC-C/S2013/823/EC823.S2013.nn04.slides.pdf (accessed 28 February 2019). [Google Scholar]

Beck, T., &Demirgüç-Kunt, A. (2008). Access to finance: An unfinished agenda. The world bank economic review, 22(3), 383-396.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. Journal of

economic growth, 12(1), 27-49.

Berhane, G., &Gardebroek, C. (2011). Does microfinance reduce rural poverty? Evidence based on household panel data from northern Ethiopia. American Journal of Agricultural Economics, 93(1), 43-55.

Berhanu, D. & Thomas, Y. (2000). MIS and MFIs in Ethiopia: Proceeding of the conference on Microfinance development in Ethiopia. (BahirDar)-AEMFI.

Bocher, T. F., Alemu, B. A., &Kelbore, Z. G. (2017). Does access to credit improve household welfare? Evidence from Ethiopia using endogenous regime switching regression. African Journal of Economic and Management Studies, 8(1), 51-65.

Boyd, J. H., & Prescott, E. C. (1986). Financial intermediary-coalitions. Journal of Economic theory, 38(2), 211-232.

Braverman, A., &Guasch, J. L. (1986). Rural credit markets and institutions in developing countries: Lessons for policy analysis from practice and modern theory. World development, 14(10-11), 1253-1267.

Bruhn, M., & Love, I. (2009). The economic impact of banking the unbanked: evidence from Mexico. The World Bank.

Burgess, R., Pande, R., & Wong, G. (2005). Banking for the poor: Evidence from India. Journal of the European Economic Association, 3(2-3), 268-278.

Caliendo, M., &Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. Journal of economic surveys, 22(1), 31-72.

Chibba, M. (2009). Financial inclusion, poverty reduction and the millennium development goals. The European Journal of Development Research, 21(2), 213-230.

Conroy, J. (2005). APEC and financial exclusion: missed opportunities for collective action?. Asia Pacific Development Journal, 12(1), 53-80.

Demirgüç-Kunt, A., &Klapper, L. (2012). Financial inclusion in Africa: an overview. The World Bank.

Demirgüç-Kunt, A., Honohan, P., & Beck, T. (2008). Finance for all?: Policies and Pitfalls in Expanding Access. World bank.

Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. The World Bank.

Dotter, C., &Klasen, S. (2014). The Multidimensional Poverty Index: Achievements. Conceptual and Empirical Issues, UNDP Human Development Report Office, 3.

Ebissa, T. T., & Kassie, G. W. (2017). Determinants of Households Saving Behavior: Case of East Gojjam Zone, Ethiopia.

Galor, O., &Moav, O. (2004). From physical to human capital accumulation: Inequality and the process of development. The Review of Economic Studies, 71(4), 1001-1026.

Galor, O., &Zeira, J. (1993). Income distribution and macroeconomics. The review of economic studies, 60(1), 35-52.

Gashayie, A. &Dr.Singh, M. (2016). Development of Financial Sector in Ethiopia: Literature Review. Journal of Economics and Sustainable Development, 7(7), 9-20.

Gebreyes, R. (2011). Determinants of Life Insurance Demand in Ethiopia. Addis Ababa University.

Geda, A., Shimeles, A., &Zerfu, D. (2008). Finance and poverty in Ethiopia: A household-level analysis. In Financial Development, Institutions, Growth and Poverty Reduction (pp. 61-86). Palgrave Macmillan, London.

Geleta, T. E., Mengistu, A. A., &Gesese, S. A. (2018). Analysing the Impact of Credit on Rural Households' Income in the Case of Cheliya District, West Shoa Zone, OromiaNational

Regional State, Ethiopia. J Glob Econ, 6(304), 2.

Goldsmith, R. W. (1969). Financial structure and development. Yale University Press. New Haven, CT (No. HG174 G57).

Greenwood, J., &Jovanovic, B. (1990). Financial development, growth, and the distribution of income. Journal of political Economy, 98(5, Part 1), 1076-1107.

Gurley, J. G., & Shaw, E. S. (1955). Financial aspects of economic development. The American Economic Review, 45(4), 515-538.

Hailesellasie, A., Abera, N., &Baye, G. (2013). Assessment of saving culture among households in Ethiopia. Assessment, 4(15).

Hicks, J. (1969). A theory of economic history (Vol. 9). Oxford: Oxford University Press.

Jansen, H. G., Pender, J., Damon, A., Wielemaker, W., &Schipper, R. (2006). Policies for sustainable development in the hillside areas of Honduras: A quantitative livelihoods approach. Agricultural economics, 34(2), 141-153.

Karlan, D., McConnell, M., Mullainathan, S., &Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. Management Science, 62(12), 3393-3411.

Karlan, D., McConnell, M., Mullainathan, S., &Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. Management Science, 62(12), 3393-3411.

Lanjouw, P., &Ravallion, M. (1995). Poverty and household size. The economic journal, 105(433), 1415-1434.

Levine, R. (1997). Financial Development and economic growth: Views and Agenda. Journal of Economic Literature, 35, 688-726.

Levine, R. (2005). Finance and growth: theory and evidence. Handbook of economic growth, 1, 865-934.

Li, M. (2013). Using the propensity score method to estimate causal effects: A review and

practical guide. Organizational Research Methods, 16(2), 188-226.

Lucas Jr, R. E. (1988). On the mechanics of economic development. Journal of monetary economics, 22(1), 3-42.

Massara, M. A., &Mialou, A. (2014). Assessing countries' financial inclusion standing-A new composite index (No. 14-36). International Monetary Fund.

Merton, R. C., &Bodie, Z. (1995). A conceptual framework for analyzing the financial system. The global financial system: A functional perspective, 3-31.

Miles, D. (1997). A household level study of the determinants of incomes and consumption. The Economic Journal, 107(440), 1-25.

Miller, M. H. (1998). Financial markets and economic growth. Journal of Applied Corporate Finance, 11(3), 8-15.

Mohan, R. (2006). Economic growth, financial deepening, and financial inclusion. Dynamics of Indian Banking: Views and Vistas, 92-120.

Mwangi, I., &Atieno, R. (2018). Impact of Financial Inclusion on Consumption Expenditure in Kenya.

National Bank of Ethiopia (2016) . Ethiopian: Financial Inclusion Strategy (NFIS), Addis Ababa.

National Bank of Ethiopia . Annual report Various Issues from 2008/09 to 2017/18, Addis Ababa.

Pande, R., Cole, S., Sivasankaran, A., Bastian, G., &Durlacher, K. (2012). Does poor people's access to formal banking services raise their incomes. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Pankhurst, A., & Mariam, D. H. (2000). The" Iddir" in Ethiopia: Historical Development,

Social Function, and Potential Role in HIV/AIDS Prevention and Control. Northeast African Studies, 35-57.

Park, C. Y., & MERCADO JR, R. O. G. E. L. I. O. (2018). Financial inclusion, poverty, and income inequality. The Singapore Economic Review, 63(01), 185-206.

Park, C. Y., & Mercado, R. (2015). Financial inclusion, poverty, and income inequality in developing Asia. Asian Development Bank Economics Working Paper Series, (426).

Peachy, S., & Roe, A. (2006). Access to finance: What does it mean and how do savings banks foster access. Bruxelas: WSBI, World Savings Banks Institute.

Robinson, J. (1952). The Generalization of the General Theory In: ROBINSON, J.(ed.): The Rate of Interest, and Other Essays pp. 67–142.

Ronald I. McKinnon. (1973). Money and capital in economic development. Brookings Institution Press.

Sahay, M. R. (2015). Financial inclusion. International Monetary Fund.

Sarma, M. (2008). Index of Financial Inclusion, Indian Council for Research on International Economic Relations (ICRIER). Working Paper 215.

Sarma, M. (2010). Discussion papers in economics: index of financial inclusion. Retrieved August, 3, 2013.

Sarojit, M. (2015). Financial inclusion: a step towards eradicate poverty. American Journal of Theoretical and Applied Business, 1(2), 21-26.

Schumpeter, J. (1911). The theory of economic development. Harvard economic studies, vol. XLVI.

Seck, O., Naiya, I. I., & Muhammad, A. D. (2017). Financial inclusion and household consumption: Case of Nigeria (No. 2017-3).

Simler, K. (Ed.). (2003). Rebuilding after war: Micro-level determinants of poverty reduction

in Mozambique (Vol. 132). Intl Food Policy Res Inst.

Sirri, Erik and Tufano, Peter (1995). The Economics of Pooling. In: Bodie, Zvi, Crane, Dwight B., Froot, Kenneth, Mason, Scott, Merton, Robert C. and Perold, André F., (eds.) The Global Financial System: A Functional Perspective. Harvard Business School Press, pp. 81-128.

Smith, A., & Chamberlain, D. (2010). Opportunities and Challenges for Micro insurance in Ethiopia. An analysis of the supply, demand and regulatory environments. International Labor Organization and United Nations Capital Development Fund. Oxfam America: Boston. MA.

Thorat, U. (2006). Financial inclusion and Sustainable Development. RBI Bulletin.

Tuyen, T. Q. (2015). Socio-economic determinants of household income among ethnic minorities in the North-West Mountains, Vietnam. Croatian Economic Survey, 17(1), 139-159.

Tuyen, T. Q., Lim, S., Cameron, M. P., &Huong, V. V. (2014). Farmland loss and livelihood outcomes: a microeconometric analysis of household surveys in Vietnam. Journal of the Asia Pacific Economy, 19(3), 423-444.

World Bank. (2017). Financial Inclusion [Web page]. Retrieved from http:// www.worldbank.org/ en/topic/financialinclusion/ overview

Zhang, Q. (2017). Does microfinance reduce poverty? Some international evidence. The BE Journal of Macroeconomics, 17(2).

Zhang, Q., &Posso, A. (2019). Thinking inside the box: A closer look at financial inclusion and household income. The Journal of Development Studies, 55(7), 1616-1631.

Zwedu, G. A. (2014). Financial inclusion, regulation and inclusive growth in Ethiopia. Overseas Development Institution, Addis Ababa.

ANNEXES

STATA 14 RESULTS

Annex A: OLS Regression output

```
. regress logincome fin1 rururb gender age hh_size hh_size2 dr agrbus employed mariage b1. E
> ducation, vce(hc2)

Linear regression                               Number of obs     =      4,512
                                                F(14, 4497)       =     199.06
                                                Prob > F          =     0.0000
                                                R-squared         =     0.3824
                                                Root MSE          =     .58012
```

logincome	Coef.	Robust HC2 Std. Err.	t	P>|t|	[95% Conf.	Interval]
fin1	.2945748	.0210575	13.99	0.000	.2532918	.3358578
rururb	-.1478804	.0283611	-5.21	0.000	-.2034821	-.0922786
gender	.0216609	.0264741	0.82	0.413	-.0302414	.0735631
age	.0011423	.000631	1.81	0.070	-.0000948	.0023794
hh_size	.2669751	.0155691	17.15	0.000	.2364521	.2974981
hh_size2	-.0130567	.0012496	-10.45	0.000	-.0155065	-.0106069
dr	-.0344358	.0106181	-3.24	0.001	-.0552526	-.013619
agrbus	-.2482636	.0262344	-9.46	0.000	-.2996958	-.1968314
employed	.0844012	.032206	2.62	0.009	.0212617	.1475408
mariage	.1683604	.0282122	5.97	0.000	.1130505	.2236702
Education						
Post secondary+	.6247473	.0412586	15.14	0.000	.5438601	.7056345
Primary	.2397284	.0321682	7.45	0.000	.1766629	.3027939
Seondary	.3602151	.0379721	9.49	0.000	.2857711	.434659
Seondary (11 & 12)	.4254569	.0466136	9.13	0.000	.3340713	.5168425
_cons	8.692114	.0558584	155.61	0.000	8.582605	8.801624

Annex B: Correlation Coefficients of the variables

```
. pwcorr logincome fin1 rururb gender age hh_size hh_size2 dr agrbus employed mariage
```

	loginc~e	fin1	rururb	gender	age	hh_size	hh_size2
logincome	1.0000						
fin1	0.2933	1.0000					
rururb	-0.2458	-0.2524	1.0000				
gender	0.2088	0.0156	0.1701	1.0000			
age	-0.0954	-0.0597	0.1317	-0.0747	1.0000		
hh_size	0.4118	0.0206	0.2319	0.3676	0.0156	1.0000	
hh_size2	0.3459	0.0086	0.2081	0.3138	0.0408	0.9572	1.0000
dr	0.0289	-0.0782	0.2547	0.1059	-0.0202	0.3773	0.3067
agrbus	-0.1842	-0.2004	0.7503	0.2224	0.1290	0.2943	0.2488
employed	0.0244	0.0110	-0.0065	0.0184	0.0162	-0.0126	-0.0086
mariage	0.2902	0.0301	0.1732	0.6954	-0.1302	0.4689	0.3776

	dr	agrbus	employed	mariage
dr	1.0000			
agrbus	0.2658	1.0000		
employed	-0.0216	-0.0050	1.0000	
mariage	0.2135	0.2378	0.0012	1.0000

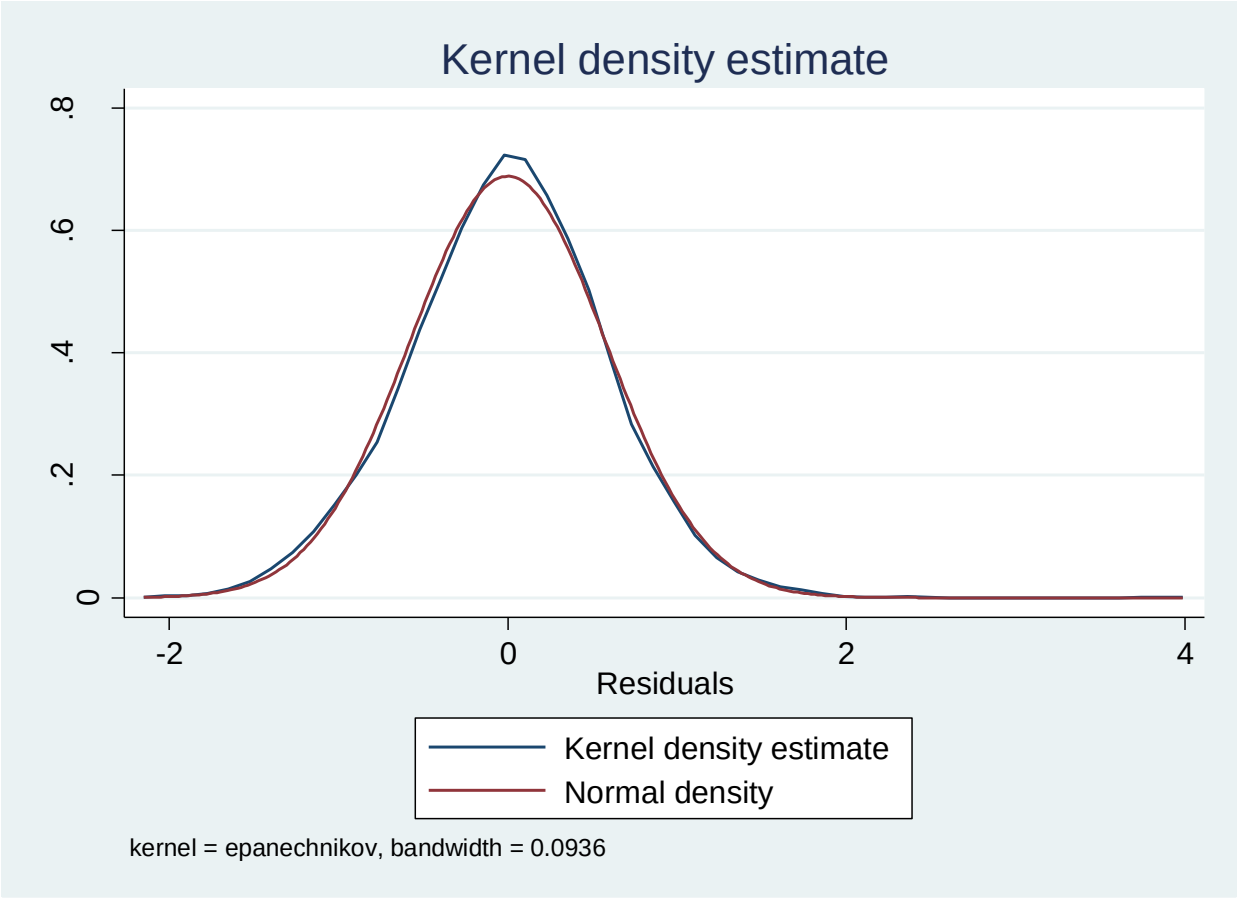
```
. vif
```

Variable	VIF	1/VIF
fin1	1.11	0.897751
rururb	2.71	0.368337
gender	1.94	0.515129
age	1.07	0.930938
hh_size	17.11	0.058445
hh_size2	14.46	0.069170
dr	1.36	0.735807
agrbus	2.57	0.389653
employed	1.00	0.996756
mariage	2.25	0.444045
Education		
2	2.41	0.414599
3	2.94	0.339649
4	2.29	0.436035
5	1.79	0.557263
Mean VIF	3.93	

```
. sktest res
```

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
res	4,512	0.2722	0.0000	39.67	0.0000



Annex B: Quantile Regression Result

- Simultaneous quantile regression with 200 bootstrap replications

```
. sqreg $ylist $xlist, nolog q(0.10 0.25 0.5 0.75 0.9) reps(200)

Simultaneous quantile regression                  Number of obs =      4,512
  bootstrap(200) SEs                              .10 Pseudo R2 =     0.2357
                                                  .25 Pseudo R2 =     0.2206
                                                  .50 Pseudo R2 =     0.2182
                                                  .75 Pseudo R2 =     0.2095
                                                  .90 Pseudo R2 =     0.1926
```

logincome	Coef.	Bootstrap Std. Err.	t	P>|t|	[95% Conf.	Interval]
q10						
fin1	.3595943	.0371343	9.68	0.000	.2867927	.4323959
rururb	-.103946	.0604852	-1.72	0.086	-.2225269	.0146348
gender	.0824356	.0515556	1.60	0.110	-.0186388	.18351
age	.0026157	.0011912	2.20	0.028	.0002803	.004951
hh_size	.3002585	.0338574	8.87	0.000	.2338813	.3666358
hh_size2	-.0173055	.0027857	-6.21	0.000	-.0227668	-.0118442
dr	-.0469143	.0221964	-2.11	0.035	-.0904301	-.0033986
employed	.1678763	.0641205	2.62	0.009	.0421685	.293584
agrbus	-.3131777	.0566677	-5.53	0.000	-.4242742	-.2020812
mariage	.1820579	.0578063	3.15	0.002	.0687291	.2953867
Education						
Post secondary+	.7852993	.0780153	10.07	0.000	.632351	.9382475
Primary	.3247571	.0637287	5.10	0.000	.1998176	.4496967
Seondary	.505649	.0801367	6.31	0.000	.3485417	.6627563
Seondary (11 & 12)	.6439125	.0865946	7.44	0.000	.4741446	.8136804
_cons	7.649691	.0970075	78.86	0.000	7.459509	7.839874

q25						
fin1	.3540072	.0264458	13.39	0.000	.3021605	.4058539
rururb	-.1008334	.0371351	-2.72	0.007	-.1736364	-.0280304
gender	.0450783	.032064	1.41	0.160	-.017783	.1079396
age	.0008309	.0008618	0.96	0.335	-.0008586	.0025204
hh_size	.2852552	.0200558	14.22	0.000	.245936	.3245745
hh_size2	-.0149239	.0015895	-9.39	0.000	-.0180401	-.0118078
dr	-.0463445	.0134046	-3.46	0.001	-.0726242	-.0200648
employed	.1254212	.052067	2.41	0.016	.0233443	.2274981
agrbus	-.2877224	.0385148	-7.47	0.000	-.3632304	-.2122144
mariage	.1558845	.031972	4.88	0.000	.0932038	.2185652
Education						
Post secondary+	.7029929	.0554185	12.69	0.000	.5943454	.8116403
Primary	.3283594	.0448075	7.33	0.000	.2405146	.4162042
Seondary	.4481227	.0535339	8.37	0.000	.3431701	.5530754
Seondary (11 & 12)	.5442292	.0572967	9.50	0.000	.4318996	.6565589
_cons	8.177326	.0777426	105.18	0.000	8.024912	8.329739

q50						
fin1	.3104842	.0256091	12.12	0.000	.2602778	.3606907
rururb	-.1607158	.0393982	-4.08	0.000	-.2379557	-.0834759
gender	.0043547	.0271288	0.16	0.872	-.048831	.0575404
age	.0003291	.0008771	0.38	0.708	-.0013905	.0020487
hh_size	.2655276	.0173091	15.34	0.000	.2315933	.2994619
hh_size2	-.0130493	.0013142	-9.93	0.000	-.0156258	-.0104728
dr	-.0352218	.0146513	-2.40	0.016	-.0639455	-.006498
employed	.0802117	.0331345	2.42	0.016	.0152517	.1451717
agrbus	-.2476364	.0352786	-7.02	0.000	-.3167998	-.178473
mariage	.1642021	.0301863	5.44	0.000	.1050222	.223382
Education						
Post secondary+	.5594934	.0435406	12.85	0.000	.4741324	.6448544
Primary	.2320114	.0325832	7.12	0.000	.1681322	.2958906
Seondary	.3402083	.0432368	7.87	0.000	.255443	.4249736
Seondary (11 & 12)	.3875084	.0525242	7.38	0.000	.2845351	.4904817
_cons	8.785751	.0593928	147.93	0.000	8.669312	8.90219
q75						
fin1	.2476748	.0263435	9.40	0.000	.1960286	.2993209
rururb	-.2040781	.039766	-5.13	0.000	-.2820391	-.1261171
gender	.0053574	.0353852	0.15	0.880	-.0640151	.0747299
age	.0005989	.000864	0.69	0.488	-.0010951	.0022928
hh_size	.2439029	.0216354	11.27	0.000	.2014869	.2863188
hh_size2	-.0104805	.0017517	-5.98	0.000	-.0139147	-.0070462
dr	-.0148657	.013878	-1.07	0.284	-.0420733	.0123419
employed	.0370344	.0474895	0.78	0.436	-.0560683	.1301372
agrbus	-.1873557	.0391552	-4.78	0.000	-.2641191	-.1105922
mariage	.1208445	.0359311	3.36	0.001	.0504019	.1912872
Education						
Post secondary+	.5122361	.0578006	8.86	0.000	.3989184	.6255538
Primary	.1690412	.0450291	3.75	0.000	.0807619	.2573204
Seondary	.3020308	.0551909	5.47	0.000	.1938295	.410232
Seondary (11 & 12)	.3492765	.0714003	4.89	0.000	.2092967	.4892562
_cons	9.262202	.073668	125.73	0.000	9.117776	9.406627
q90						
fin1	.1734113	.0397877	4.36	0.000	.0954079	.2514146
rururb	-.2002654	.0515531	-3.88	0.000	-.3013349	-.0991959
gender	.0241923	.0435389	0.56	0.578	-.0611653	.1095499
age	.001772	.0011588	1.53	0.126	-.0004998	.0040438
hh_size	.2273675	.0272285	8.35	0.000	.1739863	.2807487
hh_size2	-.0094595	.0020256	-4.67	0.000	-.0134307	-.0054883
dr	-.0397664	.0191752	-2.07	0.038	-.0773592	-.0021736
employed	.0628195	.0623547	1.01	0.314	-.0594263	.1850654
agrbus	-.1638305	.0461664	-3.55	0.000	-.2543394	-.0733215
mariage	.1485973	.0501747	2.96	0.003	.0502302	.2469645
Education						
Post secondary+	.5560569	.0739483	7.52	0.000	.4110818	.701032
Primary	.1281669	.0488554	2.62	0.009	.0323863	.2239476
Seondary	.2324409	.0592041	3.93	0.000	.1163718	.3485099
Seondary (11 & 12)	.3140229	.0721664	4.35	0.000	.1725413	.4555046
_cons	9.591384	.0825395	116.20	0.000	9.429566	9.753202

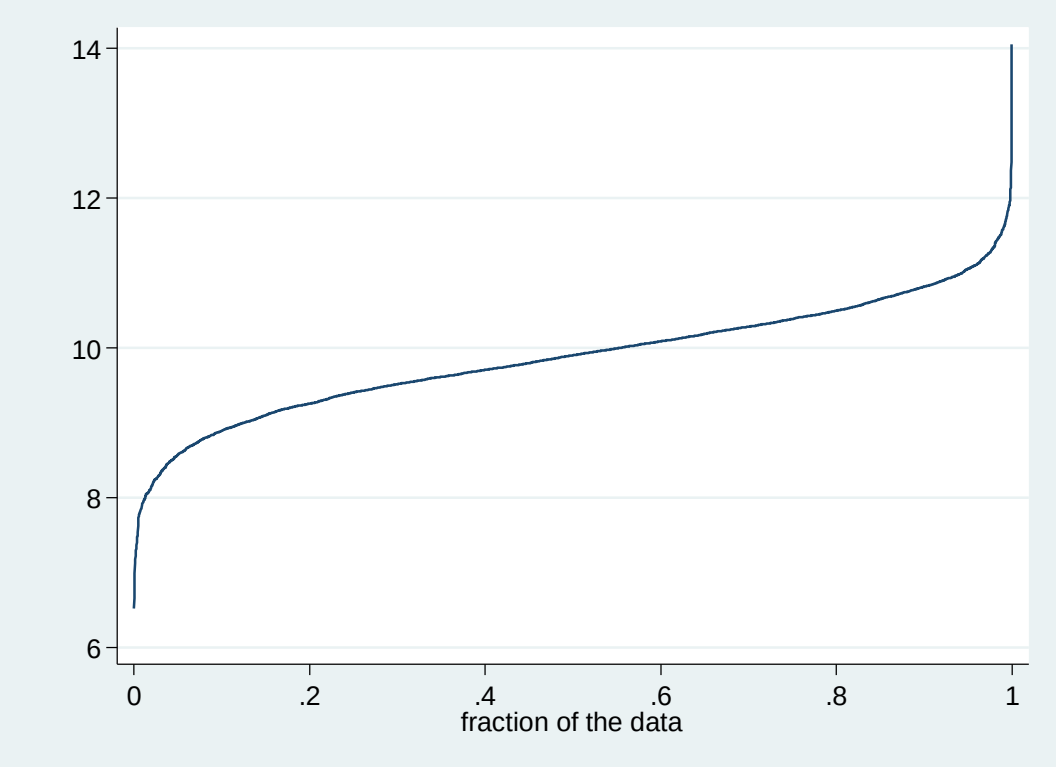
- Test of overall significance of financial inclusion (Fin) in all quantiles

```
. test [q10=q25=q50=q75=q90]: fin1

 ( 1)  [q10]fin1 - [q25]fin1 = 0
 ( 2)  [q10]fin1 - [q50]fin1 = 0
 ( 3)  [q10]fin1 - [q75]fin1 = 0
 ( 4)  [q10]fin1 - [q90]fin1 = 0

       F(  4,  4497) =    4.71
            Prob > F =    0.0009
```

- Quantile plot for household income (logincome)



Annex C: Propensity Score Matching (PSM) Result

➢ Nearest Neighbour Marching Method

```
. attnd logincome fin1 rururb Gender Age Agrbus hh_size Mariage HHEduc Ilitrate DR employed , logit b
> oot reps(200)


 The program is searching the nearest neighbor of each treated unit.
 This operation may take a while.


ATT estimation with Nearest Neighbor Matching method
(random draw version)
Analytical standard errors

------------------------------------------------------------------------------
n. treat.   n. contr.         ATT    Std. Err.          t
------------------------------------------------------------------------------

      945         900       0.334        0.042      7.962

------------------------------------------------------------------------------
Note: the numbers of treated and controls refer to actual
nearest neighbour matches



Bootstrapping of standard errors

command:      attnd logincome fin1 rururb Gender Age Agrbus hh_size Mariage HHEduc Ilitrate DR employ
> ed , pscore() logit
statistic:    attnd      = r(attnd)
note: label truncated to 80 characters

Bootstrap statistics                              Number of obs    =      4717
                                                  Replications     =       200

------------------------------------------------------------------------------
Variable       |  Reps  Observed      Bias  Std. Err. [95% Conf. Interval]
---------------+--------------------------------------------------------------
       attnd   |   200  .3340308 -.0411645   .040417   .2543302   .4137314   (N)
               |                                      .2192155   .3776439   (P)
               |                                      .2941571   .3970057  (BC)
------------------------------------------------------------------------------
Note:  N   = normal
       P   = percentile
       BC  = bias-corrected


ATT estimation with Nearest Neighbor Matching method
(random draw version)
Bootstrapped standard errors

------------------------------------------------------------------------------
n. treat.   n. contr.         ATT   Std. Err.          t
------------------------------------------------------------------------------

      945         900       0.334       0.040      8.265

------------------------------------------------------------------------------
Note: the numbers of treated and controls refer to actual
nearest neighbour matches
```

➢ Kernel Matching Method

```
Bootstrapping of standard errors

command:      attk logincome fin1 rururb Gender Age hh_size Agrbus Mariage HHEduc Ilitrate DR employe
> d , pscore() comsup bwidth(.06)
statistic:    attk       = r(attk)
note: label truncated to 80 characters

Bootstrap statistics                              Number of obs    =      4717
                                                  Replications     =       200

------------------------------------------------------------------------------
Variable       |  Reps  Observed      Bias  Std. Err. [95% Conf. Interval]
---------------+--------------------------------------------------------------
        attk   |   200  .3242784  -.003326  .0219238   .2810457   .3675112   (N)
               |                                      .2807145   .3661551   (P)
               |                                      .2896315   .3677523   (BC)
------------------------------------------------------------------------------
Note:  N   = normal
       P   = percentile
       BC  = bias-corrected


ATT estimation with the Kernel Matching method
Bootstrapped standard errors

------------------------------------------------------------------------------
n. treat.   n. contr.         ATT   Std. Err.           t
------------------------------------------------------------------------------

      932        3568       0.324       0.022      14.791

------------------------------------------------------------------------------
```

➢ Local Linear Matching Method

```
. bs "psmatch2 fin1 $xlist, llr outcome(logincome)" "r(att)"

command:      psmatch2 fin1 rururb Gender Age hh_size DR Agrbus employed Mariage HHEduc Ilitrate , ll
> r outcome(logincome)
statistic:    _bs_1      = r(att)
note: label truncated to 80 characters

Bootstrap statistics                              Number of obs    =      4512
                                                  Replications     =        50

------------------------------------------------------------------------------
Variable       |  Reps  Observed      Bias  Std. Err. [95% Conf. Interval]
---------------+--------------------------------------------------------------
       _bs_1   |    50  .2910946  .0003564   .019815   .2512749   .3309142   (N)
               |                                      .2543978   .3226202   (P)
               |                                      .2543978   .3239374   (BC)
------------------------------------------------------------------------------
Note:  N   = normal
       P   = percentile
       BC  = bias-corrected
```

- **Radius Matching Method**

```
. bs "psmatch2 fin1 $xlist, radius caliper(0.01) outcome(logincome)" "r(att)"

command:      psmatch2 fin1 rururb Gender Age hh_size DR Agrbus employed Mariage HHEduc Ilitrate , ra
> dius caliper(0.01) outcome(logincome)
statistic:    _bs_1      = r(att)
note: label truncated to 80 characters

Bootstrap statistics                            Number of obs    =      4512
                                                Replications     =        50
```

Variable	Reps	Observed	Bias	Std. Err.	[95% Conf.	Interval]	
_bs_1	50	.2856868	-.0112511	.0238089	.2378411	.3335325	(N)
					.2301939	.319046	(P)
					.2409287	.3233525	(BC)

```
Note:  N   = normal
       P   = percentile
       BC  = bias-corrected
```