

**Determinants of rural poverty in Ethiopia: A Household level
analysis in the case of Dejen district**

By:

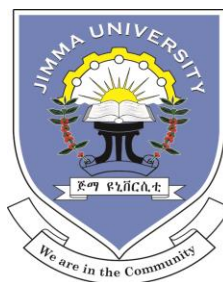
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*A thesis submitted to school of Graduate studies of Jimma University in
partial fulfillment of the requirements for the award of the degree of Master
of Science in Economics (Economic Policy Analysis) (MSc).*

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Declaration

I hereby declare that this thesis entitled “*Determinants of Rural Poverty in Ethiopia: A Household level analysis in the case of Dejen district*”, has been carried out by me under the guidance and supervision of Mr. Muhdin Muhammedhussen and Mr. Eyayaw Teka.

The thesis is original and has not been submitted for the award of any degree of diploma to any university or institutions.

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Certificate

This is to certify that the thesis entitles “Determinants of Rural Poverty in Ethiopia: A Household level analysis in the case of Dejen district”, submitted to Jimma University for the award of the Degree of Masters of Science in Economics and is a record of bona fide research work carried out by Mr. Ermiyas Ademe Melaku, under our guidance and supervision.

Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.

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Abstract

This study examines the main determinants of rural household poverty in the district of Dejen Amhara regional state using primary data collected through questionnaires'. Through multi-stage sampling technique data was collected from a total of 204 sample households through structured questionnaire from rural area of Dejen district in the year 2016. The FGT poverty index (Foster, Greer and Thorbecke) is employed to examine the extent and severity of rural poverty in Dejen. Accordingly, nearly 49% of the sampled rural households' lives below poverty line with an average poverty gap of 0.083 and poverty severity gap of 0.065. The multiple regression analysis was employed to analysis factors determining households' consumption expenditure and age of household heads, household size, proximity to the nearest market center and livestock ownership are the main determinant factors. The probit model was also used to analyze the main determinants of poverty. Based on the probit model analysis output, household size, sex of households, dependency ratio and livestock ownership are found to be the key determinants of rural poverty. Poverty status is negatively correlated with total number of livestock a household owned in tropical livestock unit (TLU) and found to be the most significant determinants of poverty that reduces the probability of a household being in sever rural poverty. On one hand, family size and dependency ratio are positively related to poverty status of households. So, as parts of policy implication this study suggests that promoting and giving awareness about family planning and putting the existing policy in effect and integrated health service with appropriate access would result in curbing the degree of poverty among rural households. And also the government through its policies should address problems relating to higher population in rural areas and try to boost rural household's income by: creating linkage with in the rural under developed agriculture. Accordingly, technical advice and training, how to use their cattle's, should offer from the concerned body in order to strengthen their benefits for the rural poor and help them to exit from poverty. There should be also a need to encourage and give awareness to the population that females are productive and means of development and a way to combat poverty and gender basis development policy measures targeting anti-poverty involvements are useful to curb poverty in rural areas of Dejen.

Key Words: Rural poverty, Livelihoods, Probit, Household Level, Dejen

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Acronyms/Abbreviations

ACSI	Amhara Credit and Saving Institution
ANRS	Amhara National and Regional State
DDOARD	Dejen District Office of Agriculture and Rural Development
DC	District of Colombia
ERHS	Ethiopian Rural Household Survey
EGZFED	East Gojjam Zone Finance and Economic Development
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
FGT	Foster-Greer-Thorbecke
HICES	Household Income Consumption Expenditure Survey
HDR	Human Development Report
IMF	International Monetary Fund
IFAD	International Fund for Agricultural Development
M.a.s.l	Meter above sea level
MoFED	Ministry of Finance and Economic Development
OLS	Ordinary Least Square
NGOs	Non-Governmental Organizations
UNDP	United Nation Development Program
UNICEF	United Nation Children's Fund
US	United State

USD	United States Dollar
WB	World Bank
SDPRP	Sustainable Development and Poverty Reduction Program
SSA	Sub Saharan Africa
Std. Dev	Standard Deviation
TLU	Tropical Livestock Unit
VIF	Variance Inflation Factor
WDR	World Development Report

CHAPTER ONE

1. INTRODUCTION

1.1 Back ground of the Study

Poverty has many manifestations and definitions depending on the view point of different scholars. Usually it refers to lack of resources or qualities needed for decent survival. According to the World Bank's Development Report poverty is "...a pronounced deprivation of well-being related to lack of material income or consumption, low levels of education and health, vulnerability and exposure to risk and weakness (World Bank, 2001). It also reflects "socially perceived deprivation" of basic human needs; its understanding also considers the minimum living standards of the people.

With the start of the third millennium, more than one billion people are living on less than a US dollar a day and another two billion are just little better off in the world. The share of people living on less than US\$1.90 per person per day has been steadily declining (World Development Report; 1990). This has occurred at a rapid average pace of 1.1 percentage points a year. Overall, the total number of poor has also decreased steadily and dramatically throughout the period. As extreme poverty has declined globally, the regional profile of poverty has shifted as a consequence of uneven progress.

World Bank (2007) also indicates that the proportion of the population living in family units with expenditure or income per individual below the poverty line has been on the decrease in the world's regions since 1990. Notwithstanding this decline in poverty, the existence, persistent and incidence of poverty in developing countries and continues to be the main challenge. Three fourths of the poor in the developing world live in rural areas, and rural poverty remains high and persistent-51 percent in SSA-while the absolute number of poor people increased since 1993 (World Bank, 2008). In fact, the burden of poverty in SSA is disproportionately borne by rural dwellers and women (UNECA, 2012). Especially, in rural parts of developing countries like Sub Saharan Africa, poverty persists despite of decades of development efforts. In 2013, Sub-Saharan Africa

accounted for more of the poor, 389 million people, than all other regions combined; the share of the region in the global total was 50.7 percent (World Bank, 2016). This is a remarkable change in the geography of global poverty during the two decades since 1990, when half of the poor were living in East Asia and Pacific. Indeed, Sub-Saharan Africa first overtook East Asia and Pacific in 2005 and then South Asia in 2011 as the region with the largest number of the poor worldwide. In 2013, one-third of the global poor were living in South Asia. The East Asia and Pacific region was home to 9.3 percent, while the Latin America and Caribbean region and the Eastern Europe and Central Asia region reported global poverty shares of 4.4 percent and 1.4 percent, respectively.

From the World Bank 2007, it could also be identified that the incidence of poverty in Africa is by far greater than that of Europe and Central Asia and others. Even within Africa itself, disparities exist between the each parts of Africa, such as Eastern and Western or northern and southern owing to the availability or non-availability of essential resources to improve development (Addae, 2014). As a result, the number of people living below the international poverty line in Sub-Saharan Africa has gradually expanded since the early 1990s, with the exception of 2002–05, and peaked in 2010. Thereafter, the total number of the poor in the region appears to have somewhat declined, from 399 million to 389 million by 2013. In absolute terms, the ability of economic progress to reduce poverty in Sub-Saharan Africa has been partly offset by population growth, and in many cases, an unequal distribution of the benefits of the economic growth (UNICEF (2016); World Bank (2015a)). These days across Sub Saharan Africa rural infrastructure has almost deteriorated, farming has languished, food systems have stagnated, and inequalities have deepened (UNDP, 2012). Though the rapid growth and quick reduction in poverty continue to be witnessed in Eastern Asia, growth in SSA could not be fast enough to eradicate extreme poverty.

In the Ethiopian context, poverty is considered with its multidimensional characteristics such as aspects of human capabilities, assets and activities necessary for sustainable livelihoods and go beyond simple income and food provision (Carney, 1998). These multi-dimensional natures of poverty in Ethiopia are also reflected in many respects, such as impoverishment of assets, vulnerability and human development. However, attempts

to eradicate poverty would require strong assurance on the part of concerned authorities in favor of economic development to make the sustainable livelihood of millions in urban and rural areas of Ethiopia. Poverty in Ethiopia is a longstanding problem affecting a significant portion of its rural and urban population.

In Ethiopia today, the prevalence of poverty, as reflected in the number of poverty stricken population, is determined on the basis of a poverty line that separates the per capita income or consumption below which an individual is considered to be poor. The proportion of people in Ethiopia who are absolutely poor (those whose total consumption expenditure was less than US\$124.28 per year) during the year 1999/00 was 44% (MoFED, SDPRP, 2002). Survey results of HICES indicated that the proportion of population below poverty line in Ethiopia stood at 30.4% in rural areas and 25.7% in urban areas in the 2010 fiscal year (MoFED, 2012). Although there is a declining trend of poverty both at regional and national levels, the highest food poverty was noted in Amhara National Regional State with a head count index of 42.5% according to the regional statistical figures of MoFED (2012). Rural and urban poverty head count index in the region stood at 30.7% and 29.2%, respectively in which the former is above the national head count index of 29.6% during the 2010/11 indicating that rural poverty is a widely spread problem in the region leaving rural households still poor.

According to MoFED (2002) extreme land pressure in some regions of Ethiopia is a critical feature of the agriculture sector that results in adverse effect on the small holder agriculture. That is, leaves them to struggle with their limited land resources available. Thus, the limited area of land available for cultivation as compared to the increase in population growth in the country has, in fact, made it hard to produce enough food to meet household both food and non-food consumption requirements.

Generally, on the globe exploring the characteristics of the poor is a means to understand the circumstances and contexts surrounding poverty.

1.2 Statement of the Problem

Poverty as a public policy concern, whether at the global, national or community level, is now widely considered to be a multidimensional problem. Over the last few decades, new perspectives on poverty have challenged the focus on income and consumption as the defining condition of poor people. Researches on the problems of poor people and communities, and of the obstacles and opportunities to improving their situation, have led to an understanding of poverty as a complex set of deprivations. These alternative perspectives have refocused the concept of poverty as a human condition that reflects failures in many dimensions of human life – hunger, unemployment, homelessness, illness and health care, powerlessness and victimization, and social injustice; they all add up to an attack on human dignity (UNDP, 2006). In Ethiopia the poor are interconnected in a web of interrelationships between the various determinants of poverty. Fundamental deficiencies in the resource base of the productive forces have become critical drawbacks in alleviating the poverty situation. Lack of equity in the access to productive resources and basic services and their consequential benefits as well as lack of access to opportunities to develop skill and human capabilities have impeded the socio-economic development of the poor (Asmamaw, 2004).

According to UNICEF (2016), a large household surveys in 89 developing countries reveals that the global poor are predominantly rural, young, poorly educated, mostly employed in the agricultural sector, and live in larger households with more children. That is about 80 percent of the worldwide poor live in rural areas; 64 percent work in agriculture; 44 percent are 14 years old or younger; and 39 percent have no formal education at all. This calls everybody to study and give focus to rural population. That is why this research deals with the main determinants of poverty (one of the most sensitive issues in the globe) in rural areas.

The issues of poverty, like countries of Africa mainly Sub Sahara Africa, is a daily issue. In due its pervasiveness particularly in the agricultural fed economies of Sub Saharan Africa, of which Ethiopia is among them, needs to be given high attention. Among many researches done in Ethiopia in the area of poverty some of them are done on income

poverty perspectives. Even the available ones are mostly descriptive, focus on explaining the extent of poverty and most are associated with studies that primarily related either on determinant of income poverty or on food entitlement issues (Webb et al., 1992; Webb and Von Braun, 1994). These include: Bigsten and Shiemeles (2003); Ayalneh et al (2005); MoFED (2012); Ahmed (2013); Buom (2013); Muhdin (2015); Mega (2015). Even if there are recent studies done on some household characteristics like rural land holdings, agricultural populations; lacks economic analysis, meaning and interpretation and failed to consider major poverty determining factors in rural areas of Ethiopia in depth. Apart from that determinants of rural poverty in Dejen district East Gojjam Zone is unexploited area of study.

From those studies mentioned above; determinants of rural poverty are remaining in question because the arguments for and against the approaches has been many and the results they provide are contradict each other. As such on one hand, no consensus has been reached and on the other they are not explaining the near aspect of poverty status due to the nature of poverty as dynamic phenomena. And, studies with special focus on the extent of poverty, incidence, depth and severity of poverty and demographic and socioeconomic characteristics of poor and non-poor households that affect rural households' are not yet studied in the rural areas of the Dejen district of East Gojjam Zone. This is the motive behind the need to analyze rural poverty at household level in Dejen district.

1.3. Objectivity of the Study

1.3.1. Major Objectivity

The major objectivity of this study is to analyze the main determinants of poverty at the household level in rural areas of Dejen district.

1.3.2. Specific Objectivity

Specifically:

- To examine the incidence, depth and severity of poverty in the rural community in rural areas of Dejen district.
- To analyze demographic and socioeconomic characteristics of poor and non-poor households that affect rural households.
- To provide some policy implications based on the result found.

1.4. Significance of the Study

This study provides information regarding to determinant factors of poverty in rural areas of Dejen District East Gojjam zone, Amhara national regional state to the concerned body.

In addition, a clear understanding of the micro-level determinants and dimensions of rural poverty will give brief insight to government policy makers, NGOs, and others; as it provides an information for further intervention to reduce poverty.

The findings of this study provided concrete evidences regarding to the extent of poverty and the relationship of poverty with each of the household characteristics of rural sample households to point out and understand factor that play a major role in determining rural poverty at household level. And it can be served other researchers as a reference for further, detailed study since there haven't been other similar studies carried out in the district considered in the study.

1.5. Scope and Limitation of the Study

This study tried to examine the effects of various variables on poverty in rural areas of Ethiopia in Dejen district of East Gojjam Zone, Amhara national regional state by collecting a recent data through structured questionnaire. Because dimensions of poverty are so complex and multifaceted as a result it makes poverty research areas to be too broad and diversified and calls for multidisciplinary approach of research activities. But,

this study is concerned with only those of basic necessities of life which are being partially met due to economic issues targeting those rural households who depend mostly on farming system from which they derive their livelihoods. However, vulnerability (exposure to risk) and powerlessness dimensions of poverty were not addressed as they are beyond the scope of this study.

1.6. Organization of the Study

The first chapter of study, is about introduction and the next, chapter two is dedicated to the theoretical and empirical literature reviews, chapter three is about methodology of the study and Chapter four; data analysis and interpretations that is; results and discussion part and the last chapter, present conclusions and policy recommendations of the study based on the result found.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Literature

2.1.1. Poverty: Definitions and Dimensions

Poverty as a multi-dimensional concept generally refers to inability of households to provide sufficient subsistence and to lead a decent economic and social life. Whereas the currently widely used international poverty line of a dollar a day is appealing to capture popular attention, the national poverty line is more commonly used in the discussion of poverty issues within a nation (Deaton, Chen and Ravallion, 2001, 2004, 2007;2001, World Bank, 2004).

Poverty continues to attract global attention particularly in program that concerns development, since it is a lifelong phenomenon that plagued mankind in our efforts on the way to development. Even though it is difficult to define poverty mainly due to its multidimensionality, usually it is taken as the lack of necessities, but what is a necessity to one individual may not be for the other. Necessities are relative to what is possible usually based on social characterization and past experience (Sen, 1999).

Poverty is also a social phenomenon which goes further beyond economic spheres and encompasses inability of individuals to participate in social life and political setting. One way of defining poverty is by letting the poor to explain their own poverty. It is allowing individuals or groups who are practically facing poverty to define what represents their basic requirements in life. However, the most commonly used definition is the one defined by the World Bank (2000) as “the economic condition in which people lack sufficient income to obtain certain minimal levels of health services, food, housing, clothing and education in general recognized as necessary to ensure an adequate standard of living”.

According to the World Bank (2000), poverty is pronounced deprivation in well-being. It is possible to look well-being in three different dimensions: (a) as the command over commodities in general, (b) as an ability to obtain specific type of consumption good, or (c) as a “capability” to function in society (World Bank, 2005). In the first approach of looking poverty (wellbeing), the prime interest is whether households have sufficient resources to satisfy their needs. Accordingly, poverty is measured in monetary terms by comparing household’s income or consumption against specified threshold level below which they are considered as poor. The second approach goes beyond monetary measures to look detail nutrition, health and education of individuals under consideration.

Thirdly, the approach to well-being expressed by Sen. (1987); is lack of key capabilities, inadequate income, inadequate education, poor health, low self-confidence, insecurity, freedom of speech, and sense of powerlessness leads people towards poverty.

Of the three approaches, the money-metric approach (i.e. using income or consumption as welfare indicator) is a dominant approach mainly due to the fact that one can analyze the individual characteristics and other socioeconomic conditions that are correlated with poverty (Bigsten et al.,2005). Particularly, consumption is usually viewed as the better indicator of poverty measurement than income (Ravallion 1994; Lipton &Ravallion 1995; Deaton, 1997).

There are two crucial reasons for preferring consumption to income (Coudouel et al., 2002). First, consumption is considered to be a better indicator of outcome than income. Actual consumption indicates the ability of a household to meet its basic needs, while income is only one of the basic elements (there are others like availability and access) that influence levels of consumption. Therefore, it implies that a standard of living of individuals is better reflected by consumption data than purely by income. Second, consumption data can be better measured than income mainly due to seasonality of income among rural households, and underreporting of their income than their actual consumption. For these reasons, consumption expenditure is the main indicator of welfare to categorize households as poor and non-poor.

Recent literature acknowledges various theories that explain poverty. The following review presents a concise explanation of individualistic, cultural, geographical, structural and cumulative (cyclical) theories of poverty.

2.1.2. Theories of Poverty

Recent literatures on poverty acknowledge different theories of poverty, but these literatures have classified theories of poverty in multiple ways (Ryan, 1976; Schiller, 1989; Goldsmith and Blakely, 1992; Shaw, 1996; Jennings and Kushnick, 1999; Rodgers, 2000; Blank, 2003; Rank, 2004). Almost all authors distinguish between theories that basis the cause of poverty in individualistic (conservative) and theories that lay the cause on broader social phenomena (liberal or progressive). These various theories are divergent, and each results in a different type of community development intervention strategy. In the following five major contemporary poverty theories are briefly explained.

Individualistic theory, the first theory of poverty, is rooted in American values and belief in the free market system, a system thought to provide opportunity for all. The belief in individualism places much emphasis on individual hard work and responsibility to acquire basic needs including food, shelter and health care services (Rank, 2004). And this theory of poverty is a large and comprehensive set of explanations that focus on the individual as responsible for their poverty situation. It explains poverty as a result of the characteristics that are intrinsic in the individual and that consists the personal ability like intelligence and the character of the person.

The individualistic sources of poverty are reinforced by neo-classical economics (Bradshaw, 2006). The core premise of this dominant paradigm for the study of the conditions leading to poverty is that individuals seek to maximize their own well-being by making choices and investments, and that (assuming that they have perfect information) they seek to maximize their well-being. When some people choose short term and low-payoff returns, economic theory holds the individual largely responsible for their individual choices. In this theory, the neoclassical economist advocates that because

of their decisions the poor are poor. This is due to the fact that individuals want to maximize their utility (wellbeing) through their own choices and investments.

Cultural theory of poverty, second theory of poverty, which is developed by an anthropologist Lewis in 1959 based on his experience of Mexico. This theory advocates that poverty is caused by the spread over generations of a set of skills, values, and beliefs that are socially created but individually held (Lewis, 1959). The culture of poverty is a syndrome that develops in some specific situations. It occurs in an economic setting with low wages, high rate of unemployment, and people with low skills. In the absence of deliberate support from the government, the low-income populations have a tendency to build up the culture of poverty against the prevailing ideology of expanding the middle class. The poor understand that they have a negligible position within an individualistic and highly stratified capitalistic society, which does not give them any hope for upward mobility (Lewis, 1959). As a result, the poor create survival strategy by developing their own subculture and institutions, and finally come to embody a common pattern of behavior, norms and values.

However, the cultural theory of poverty is applied to society was not far from flaws and criticisms. The main critics comes due to that cultural theory of poverty takes for granted culture itself and is unchanging and relatively fixed, i.e. once a population falls within the culture of poverty, poverty alleviation interventions will not change the behaviors and cultural attitudes embodied in that population. Thus state support and public welfare assistance to the poor cannot eliminate poverty for the reason that poverty is intermixed in the culture of the poor.

Because of this, the cultural theory of poverty shifts the blame for poverty from economic and social conditions to the poor people themselves (Bourgois, 2001). Though the theory explains the basic factors that led to the initial state of poverty (such as lack of sufficient social services, substandard living and education, persistent racial discrimination, and lack of job opportunities), it primarily focuses on the cause of current poverty as the attitudes and behaviors of the poor.

The third theory; **geographical theory of poverty**, is corresponds to spatial characterization of poverty. This theory suggests that poverty is severe in certain areas than in the other due to the fact that individuals, cultures, and institutions in some areas are deficient in objective resources that are essential to generate income and sustain wellbeing. Explanations include: proximity to natural resources, disinvestment, density, and other similar factors (Morrill and Wohlenberg, 1971). The theoretical perspective on geographical theory of poverty arises from the economic theory of agglomeration. The economic theory of agglomeration is used to characterize the emergence of industrial clusters, the concentration of firms in proximate area so as to benefit from internal and external economies (Bradshaw, King, and Wahlstrom, 1999). Similarly, geographical theory of poverty describes that the proximity of poverty and favorable conditions leading to poverty generate more poverty. For example, the poor usually live in areas where there is more crime and inadequate social services. These places have commonly low housing prices and this attracts more poor individuals to the area.

The other theoretical insight of geographical theory of poverty is from central place theory that traces the flows of capital as well as knowledge. For example, rural areas are most of the time the last stop of technologies, and competitive pricing and low wages dominate production (Hansen, 1970). Lack of social infrastructure could also limit economic activity and places left behind experience of largest competitions (Lyson and Falk, 1992). Therefore, privileged areas stand to grow more than underprivileged areas even during the time of general economic growth with some “trickle-down” but not lead to equalizing effects as classical economists assert (Rural Sociological Society, 1990; cited in Bradshaw, 2007). The geographical theory of poverty explains that responses need to be focused to solving the key dynamics that create deprivation and economic decline in disadvantaged areas while other areas are growing (Bradshaw, 2007).

The fourth theory of poverty, **structural theory**, is a progressive social theory that does not censure the victim for his/her own poverty as individualistic and cultural theories do, but it look to the social, political, and economic system which causes individuals to have inadequate resources with which to take in their income and wellbeing. The standards of living and social relations of individuals in a society are created by educational facilities,

labor market opportunities, and economic growth. Inherent structures in the society including social relations such as gender, race, power and class determines the fate of individuals (Bradshaw, 2007). This implies that it is the breakdown of the structures that causes poverty in the society. Therefore, with structural theory in explaining poverty help to target on factors that affects poverty. It can be made without changing the poor themselves, rather by changing the condition of the poor by means of adjusting the restrictive socioeconomic structures that aggravate poverty.

The Fifth and the final theory, **cumulative (cyclical) theory of poverty**, is the most complex and to some degree builds on components of each of the other theories in that it looks at the individual and their community as caught in a spiral of opportunity and problems, and that once problems dominate they close other opportunities and create a cumulative set of problems that make any effective response nearly impossible (Bradshaw, 2000). The cyclical explanation explicitly looks at individual situations and community resources as mutually dependent, with a faltering economy, for example, creating individuals who lack resources to participate in the economy, which makes economic survival even harder for the community since people pay fewer taxes.

This theory has its origins in economics in the work of Myrdal (1957) who developed a theory of “interlocking, circular, interdependence within a process of cumulative causation” that helps explain economic underdevelopment and development. Myrdal notes that personal and community well-being are closely linked in a cascade of negative consequences, and that closure of a factory or other crisis can lead to a cascade of personal and community problems including migration of people from a community. Thus the interdependence of factors creating poverty actually accelerates once a cycle of decline is started.

Thus, the cycle of poverty shows how people become disadvantaged in their social context which then affects psychological abilities at the individual level. The various structural and political factors in the cyclical theory reinforce each other, with economic factors linked to community and to political and social variables. Perhaps its greatest value is that it more explicitly links economic factors at the individual level with

structural factors that operate at a geographical level. As a theory of poverty, the cyclical theory shows how multiple problems cumulate, and it allows speculation that if one of the linkages in the spiral was broken, the cycle would not continue.

From the discussion of different poverty theories above conclusion has to be drawn, all poverty theories are deviating from and do not add to a single reliable theory that explaining poverty.

2.2. Empirical Literature

Some of the empirical works done in rural parts of developing countries are explained in the following.

Apata (2010) examined the determinants of rural poverty in Nigeria using probit model on a sample of 500 smallholder farmers to establish factors that influences probability of households' escaping chronic poverty. Results show that access to micro-credit, education, participation in agricultural workshops/seminars, livestock asset, and access to extension services significantly influencing the probability of households' existing chronic poverty. On the other hand, female headed households' and distance to the market increases the probability of persistence in chronic poverty.

Arif and Shujaat (2012) using the three rounds of the panel datasets conducted in 2001, 2004 and 2010 and examine the poverty dynamics in rural Pakistan through multivariate analysis and found out that demographic variables, household size and dependency ratio have a significant positive association with chronic poverty as well as falling into poverty. Economic variables such as the ownership of land and livestock, housing structure (*pacca*) and availability of room have a significant and negative association with the chronic poverty. Both, the inflationary and natural shocks are likely to keep households either in chronic poverty or push them into the state of poverty. As a policy implication they suggested that improvement in human capital as well as the employability of working age population; creating assets for the poor, with provision of microfinance being one source; lower the dependency ratio by reducing fertility; and minimize the risks associated with shocks are a way to overcome chronic poverty.

Yang (2014) analyzed the determinants of the poverty status at the household-level Vulnerability in Small-scale Fisheries Communities in Vietnam and found out households vulnerable to poverty depends on their primary activities to gain income and their location and the households with high vulnerability have an evenly possibility to be poor and non-poor, but those with relatively lower vulnerability are highly possible to be better off.

Arjun et al (2014) analyze the major determinants of rural poverty in Nepal through two stages sampling method which applied to generate cross sectional data and randomly selecting 279 households from one Village Development Committees of six districts of Western Development region of Nepal. They found that thirty three percent of households were lying below poverty line as per the poverty scoring method. And also by employed binary logistic regression, they identified age of household head; size of land holding, female's involvement in service, family occupation and caste as major determinants of rural poverty. Contrary to general view, remittance does not show any significant effect on rural poverty as per this study. They also concluded that poverty in rural parts of Nepal is entangled in structural and cultural web, and the remittance sent by migrant family members to rural households might have been siphoned off to urban areas.

In Ethiopia poverty studies show that the poor are extremely vulnerable and the chances of remaining into poverty both in rural and urban areas following shocks such as drought or the death of the head of the household are very high. The level of poverty would have dropped nearly by half had it not been for risks associated with vulnerability of households. This vulnerability and the associated persistence of poverty is often related to the lack of structural transformation that is in turn related to lack of technical progress in agriculture, lack of strong institutions, access to markets, as well as low asset accumulation in the country (Alemayehu and Kedier (2014). Bevon and Joireman (1997) adopt a sociological approach towards measurement of poverty, with a focus on the meaning and use of different measurements, rather than on the real poverty, which they are claiming to measure. They emphasize that in rural Ethiopia non-economic forms of capital, such as social and human capital, are extremely important in determining life

chances. Moreover, entitlement norms which include things as right to access to productive resources, political voice, right to leisure, inheritance rules and access to community support are crucial in determining household poverty.

Dercon and Krishnan (1998) assess changes in poverty levels between 1989 and 1995 and tested the robustness of measured changes to the problems of choice of poverty lines and impact of uncertainty in measured inflation rates. They found that poverty declined between 1989 and 1994 but remained virtually unchanged between 1994 and 1995 and that households with substantial human and physical capital and better access to roads and towns have both lower poverty levels and are more likely to get better off overtime. They have also observed that human capital and access to roads and towns reduce the fluctuations in poverty across the seasons.

Furthermore Dercon (2001) using micro-level panel data from villages in rural Ethiopia and analyzes the determinants of growth and changes in poverty during the initial phases of the economic reform (1989-1995) are making use of a standard decomposition of income and poverty changes. Even though he observed that the reforms do not deliver similar benefits to all the poor, overall, consumption grew and poverty fell substantially during the period under consideration. He further found that the main factors driving income changes are relative price changes, resulting in changes in the returns to land, labor, human capital and location. Empirical results also indicate that the poor have benefited on average more from the reforms than the non-poor households.

Bigsten and Shiemeles (2003) use Ethiopian Rural Household Survey (ERHS) from 1994-1997 and employ approach that used to analyze the dynamics of poverty in Ethiopia. They noticed that transient poverty dominating rural households and found a modest decline in poverty for the rural areas. They also found that factors that affect the probability of moving into poverty are dependency ratio and age of the household head. Besides, factors that significantly reduce the likelihood of falling in to poverty are education of the household head, size of cultivated land, type of crops planted, value of crop sales, and access to local markets.

Mahammad (2009) using the 1997 round of household survey data from the Ethiopian rural household survey analyzes rural poverty in Ethiopia through FGT Model and estimating consumption based two-step procedure and found that household head who has at least completed primary school suffers from most incidence of poverty. On the other hand, households consisting of household heads with higher age and available of farm land are relatively less poor.

Muhdin (2015) analyzes Determinants of Rural Income Poverty in Ethiopia by considering a sample of 217 household heads from two rural areas Dodola district, Oromia Regional State, using binary logistic model and find out that family size is positively related to poverty. On the other hand Poverty status and number of income sources of the household, livestock and farm land ownership are negatively related. Nega (2015) by employing the same methodology with Muhdin but in different study area and carried out using cross-sectional household survey data of 191 sample households and examine determinants of rural poverty at Gulomekeda Wereda of Tigray National Regional State and found that family size and dependency ratio have positive association with poverty of the household. But farm size, total livestock owned, value of asset, educational status of the household head, access to credit and access to off farm income have strong negative association with poverty status of households. Both Muhdin and Nega (2015) using Binary logit model found that family size and poverty status of households have positive relationship, and livestock, farm land ownership and income are negatively related.

What the above studies have in common is that poverty in rural areas of developing countries are persistent needs further governments involvement through its policies and requires further researchers attention.

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

3.1 Data source and Data Collection Techniques

The study area is located in Dejen district East Gojjam zone, Amhara national regional State, Ethiopia. Dejen is one of the fourteen districts in East Gojjam Administrative Zone of Amhara National Regional state (ANRS). It is located north of Girajerso district (Oromiya region), south of Enemay and Debay Tilatgin, south west of Shebel Berenta and east of Awabal woreda. The district, which is bordering Dejen town, is located 318 kilometers south east of Bahir Dar, the capital city of Amhara National Regional State (EGZFED, 2011). Of the total area of 62,743 ha, 37,023 hectares are cultivated and 95.02% Woiyana Dega (1500-2500 m.a.s.l), and 4.98% are kola (500-1500 m.a.s.l) agro-ecological zones, respectively (DDOARD, 2015/16).

The district is composed of 22 rural kebeles and 1 town administration (Dejen town). The total population of the district is estimated to be 95,483 persons among the 45,952 are males and the rest 49,531 are females (EGZFED, 2015/16).

In the district of Dejen the populations' livelihood mainly depends on mixed-farming system, where crop and livestock production undertaken in an integrated way.

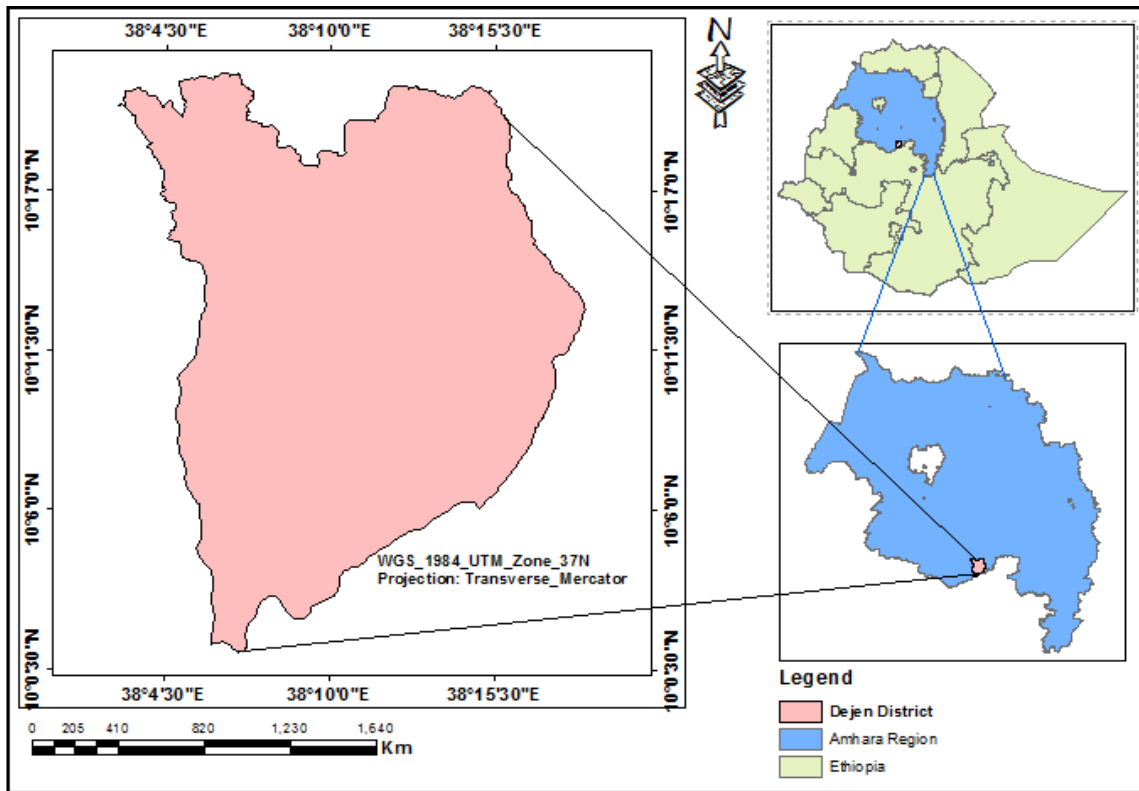


Fig.1 Location of Amhara National Regional State and the study area (Dejen district)

In order to get the required information on poverty in rural areas of Dejen district, both primary and secondary sources of information were used. Primary data were collected through interviews and structured questionnaires. The structured questionnaires were posed to a total of 204 randomly sample rural household heads in Dejen district East Gojjam Zone, and data on demographic characteristics (age, sex, marital status, and family size), physical assets including cultivated land holdings and number of livestock a household owned, income sources and access to infrastructure, credit and loans and consumption expenditures were collected. Apart from structured questionnaires, qualitative data collected from key informants within the district through interview. In the interview information about population consumption patterns, people ways of living and distinct products produced in the district with two Agro-ecological zones, Woiyna Dega and Kola. Secondary sources include unpublished materials and pertinent published documents such as previous reports, and checklists of facts and figures.

3.2. Sample Size and sampling Techniques

There are three criteria usually need to be specified to determine the appropriate sample size, in addition to the purpose of the study and population size,,: the level of precision, the level of confidence or risk, and the degree of variability in the attributes being measured (Miaoulis and Michener, 1976). The **level of precision**, sometimes called sampling error, is the range in which the true value of the population is estimated to be. This range is often expressed in percentage points, (e.g., ± 5 , ± 7 , and ± 10 percent).

The **confidence or risk level** is based on ideas encompassed under the Central Limit Theorem. The key idea encompassed in the Central Limit Theorem is that when a population is repeatedly sampled, the average value of the attribute obtained by those samples is equal to the true population value. Furthermore, the values obtained by these samples are distributed normally about the true value, with some samples having a higher value and some obtaining a lower score than the true population value.

The third criterion, the **degree of variability** in the attributes being measured refers to the distribution of attributes in the population. The more heterogeneous a population, the larger the sample size required to obtain a given level of precision. The less variable (more homogeneous) a population are, the smaller the sample size have.

The population from which the samples were taken is rural households of the district who depend on mixed farming system as their major source of livelihood. Taking into account that there are tradeoffs between cost and accuracy in every research, the total number of samples was determined by applying a simple formula (Yamane, 1967) although there are many options to do so. Because of its simplicity for this study Yamane is preferred from others. Multi-stage sampling procedure was used to select the total number of samples. The first stage involved stratification of the district consisting of 22 rural kebeles in to two agro-ecological zones (*Woiyna Dega and kola*) for representativeness of the sample households. All rural kebeles within each stratum were listed out with the help of district extension experts. Then, a total of 11 kebeles (Kurar, Kol, Minji Yibza, Gelgelie, Muyan Teskare Mariyam, Tik, Shebshengo Alekitam, Woblat Getem, Hagere Selam, Enajima Yeziba and Koncher Sasabere) representing the aforementioned agro

ecological zones were selected randomly in proportion to the area coverage of the agro-ecologies. Finally, after identifying the sampling frame which contains the complete list of all households within each selected kebele with kebele leaders, a total of 204 sample rural households were randomly selected from the selected kebeles in proportion to their total number of households (see Table 3.1).

Table 3.1 Lists of sampled household heads in respective kebeles and agro-ecological zones

Agro-ecological zone	Total rural kebeles per agro-ecological zone	Selected rural kebeles per agro-ecological zone	Total number of household heads in each selected rural kebele	Sampled rural household heads
Kola	8	Kurar	6772	18
		Kol	4135	12
		Minji Yibza	7282	22
		Gelgelie	6844	20
Woiyna Dega	14 kebeles	Muyan Teskare Mariyam	6424	19
		Tik	9926	24
		Shebshengo Alekitam	7357	21
		Woblat Getem	5859	17
		Hagere Selam	6725	19
		Enajima Yeziba	5373	16
		Koncher Sasabere	5959	16
		Total	22 kebeles	11 kebeles

Source: own survey, 2017

Even though there are several approaches to determine the sample size, due to their simplicity, cost effectiveness for large populations and lower error committed bias both published tables and simplified formula which provide the sample size for a given set of criteria are used. Note two things during using published tables: First, these sample sizes reflect the number of obtained responses, and not necessarily the number of surveys mailed or interviews planned (this number is often increased to compensate for non-response). Second, the sample sizes presume that the attributes being measured are distributed normally or nearly so. If this assumption cannot be met, then the entire population may need to be surveyed.

Table 3.2 Sample size (n) for (e) Levels precision

Size of population	Sample Size (n) for Precision(e) of:			
	±3%	±5%	±7%	±10%
500	a	222	145	83
600	a	240	152	86
700	a	225	158	88
900	a	277	166	90
1,000	a	286	169	91
2,000	714	333	185	95
...
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
...
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100
a = Assumption of normal population (Yamane, 1967).				

Source: Based on Yamane, 1967 Calculation

Therefore, 72,656 total rural populations of the Dejen from 11 rural kebeles in the district at 95% of confidence interval with $\pm 7\%$ level of precision (e) the sample size as shown above from the table (3.2) is 204 sample populations.

In the case of formulas Yamane (1967:886) provides a simplified formula to calculate sample sizes. The formula is written as: $n = \frac{N}{1+N(e^2)}$

Where n is the sample size, N is the population size, and e is the level of precision.

Using the simplified formula at 95% of confidence interval with 72,656 total populations (N) considered under the study the sample size (n) at 7% level of precision (e) 204 samples are drawn.

3.3. Method of Data Presentation and Analysis

This section of the study focused on modeling the main determinants of rural poverty in the district under the study. The study used cross-sectional data that involves both quantitative and qualitative methods of data and used both descriptive and inferential statistics. Descriptive statistics such as frequency distribution tables, mean, and standard deviation were used to analyze the socioeconomic characteristics of the respondents. The collected survey data through structured questionnaire would go through, manipulate and analyze using MS-Excel and STATA software.

3.4. Model Specification

3.4.1. F-G-T Measures of Poverty

In the process of modeling determinants of rural poverty, there are identification and quantification of variables that determine rural poverty at household level. In order to identify the main determinants of rural poverty at household level, consumption based measures rather than income based measures were employed. Because of less fluctuate character, consumption based measure of poverty is the common preferred indicator of welfare than income. Income may fluctuate and are more volatile in an unpredictable manner, making it a noisy measure of welfare of the society or at an individual level.

Consumption tends to be less volatile than income, because of consumption smoothing opportunities such as borrowing, saving, and community based risk diversification and risk sharing opportunities are available for the poor. In many least developing countries in general and in Africa in particular income is either unreported or under reported to isolate them from tax and to include themselves in food security programs. From the above we can infer that current consumption, rather than current income, is a better indicator of both current and long term standards of living and welfare (Ravallion 1994).

Measuring poverty requires defining a threshold (line) that distinguishes the poor from the non-poor. Every individual or household in the population with a measure below the line (threshold) were considered as poor. Due to poverty lines are country specific and governments ultimately define what is meant by poverty in each country, almost all countries in the world have their own national poverty lines to identify citizens whose income falls below a level necessary to maintain a minimum acceptable standard of living.

Even though Ethiopia has not developed any official poverty lines, for the purpose of this study the absolute poverty line which is the value of income of 3781 ETB per year (HICES, 2010/11 absolute poverty line) was used. On one hand this poverty line is the highest poverty line considering other studies in Ethiopia. Or it is the highest poverty line when compared with the threshold used by other researchers in Ethiopia. For example, Muhdin (2015) used ETB 2606 per year, Tsegaye (2014) ETB 3650.75 per year, Dercon and Krishnan (1998) ETB of 1075 per year, Hagos and Holden (2003) ETB of 1033.45 per year, etc. On the other deflating this poverty line (3781 ETB per year) with the current price level does not have effect on the study. Because of the optimal inflation level in Ethiopia are between 8 to10 percent (Emrit, 2013) and the actual inflation rate in Ethiopia from 2006-2017 is about 8.7% (source), it is not required to deflate the poverty line used in this analysis (3781 ETB/year) by current average price level.

This study used the most popular Foster-Greer-Thorbecke (FGT) measures of poverty.

FGT poverty measure for a given population is defined by:

$$P_{\alpha} = \int_0^q \left(\frac{Z - Y_i}{Z} \right)^{\alpha} dy$$

Which Foster Greer and Thorbecke in Discrete terms is written as

$$P_{\alpha} = \frac{1}{N} \sum_{i=1}^q \left[\frac{Z - Y_i}{Z} \right]^{\alpha} \quad (\alpha \geq 0)$$

Where α is a measure of the sensitivity of the index to poverty and the poverty line is Z , the value of expenditure per capital for the i^{th} person's households Y_i (i.e. the variable of interest) and the poverty gap for individual i is $G_i = Z - Y_i$ (with $G_i = 0$ when $Y_i > Z$).

Here the parameter α reflects the policymaker's degree of aversion to inequality among the poor. Based on this, three poverty measures are calculated based on the values of α .

If $\alpha = 0$, there is no concern about the depth of poverty and the corresponding poverty index is called the headcount index (P_0). Hence P_0 corresponds to the fraction of individuals falling below the poverty line. The head-count index is easily understood and communicated, but it is insensitive to differences in the depth of poverty. It fails to capture the extent to which individual income (or expenditure) falls below poverty.

If $\alpha = 1$, the poverty index is called the poverty gap index (P_1) and it measures the aggregate poverty deficit of the poor relative to the poverty line; we also call it poverty gap ratio. Poverty gap ratio can also be interpreted as an indicator of potentials for eliminating poverty by targeting transfers to the poor. The minimum cost of eliminating poverty using targeted transfer is the sum of all poverty gaps in a population $(Z - \bar{Y}_0) \times q$. The drawback of the poverty gap measure is that it does not capture the differences in the severity of poverty among the poor, that is, it does not capture the transfer of income among the poor. If income is transferred from the poor to the least poor, the poverty gap index will be unaffected.

When $\alpha > 1$, the P_{α} calculation gives more weight to the average income shortfall of the poorest of the poor. Thus P_{α} (where $\alpha = 2$) measures the squared proportional shortfalls from the poverty line, which is commonly known as poverty severity index. However, it

is not easy to interpret. More precisely, when $\alpha = 1$, the index is the poverty gap index P_1 , and when $\alpha = 2$, P_2 is the poverty severity index. For all $\alpha > 0$, the measure is strictly decreasing in the living standards of the poor (the lower your standard of living, the poorer you are deemed to be).

Furthermore, for $\alpha > 1$, the increase in measured poverty due to a fall in one's standard of living will be deemed greater than poorer ones. The measure is then said to be "strictly convex" in incomes (and "weakly convex" for $\alpha = 1$). Another convenient feature of the FGT class of poverty measure is that they can be disaggregated for population sub groups and the contribution of each sub group to national poverty can be calculated.

3.4.2. Multiple Regressions

There are two approaches that can be well-known in modeling the determinants of poverty. The first approach in modeling the determinants of poverty could be described as a two-step procedure, with the first step involves modeling the determinants of log of consumption at house hold level. The simplest specification of such mode could be given as follows:

$$\ln(C_i) = \beta'X_i + E_i \text{-----} (3.1)$$

Where

C_i : per capita consumption expenditure of household i ,

X_i : denotes a vector of household characteristics of other determinants of Consumption, and

E_i : is a random disturbance term, which is assumed to be normally, independently and identically distributed with mean zero and variance δ^2 .

The second step defines poverty in terms of the house hold per capita consumption level, where the poverty measure for households i can be estimated by:

$$P_{\theta, i} = \left[\max \left[\frac{Z - C_i}{Z}, 0 \right], 0 \right] \theta \text{-----} (3.2)$$

Where,

$P_{\theta, i}$: is the estimated poverty measured of household i.

Z: represent the poverty line

θ : is a nonnegative parameter ($\theta > 0$) taking values of 0, 1 and 2.

Aggregate poverty of a given population is simply the weighted mean of the above poverty measure, where the weights are given by households' size. When θ takes a value of zero, the aggregated poverty measure corresponds to the incidence of poverty or head-count index. Similarly, when θ assumes value of 1 and 2, the aggregate poverty measure corresponds to the poverty gap and the squared poverty gap indices, respectively. The second approach, which is known as the direct modeling of the household poverty measure is given by:

$$\rho_{\theta, i} = \beta_{\theta}' X_i + E_i \text{-----} (3.3)$$

There are several reasons why modeling household consumption is preferable to model household poverty levels directly. Among them the following four reasons are explained as follows:

- a. Multivariate associations between welfare and other variables can identify connections that appear to be strong and suggest causations, or at least priorities for further analysis; hence when discussing multivariate analysis of determinants of poverty modeling household consumption is proposed.
- b. Using data only $\rho_{\theta, i}$; is insufficient in the sense that it involves a loss of information, as information on households living above the poverty line is internationally suppressed. This means that all non-poor households' are treated alike, as censored data.
- c. There is an inherent arbitrariness about the exact level of absolute poverty line. Hence, different poverty line would imply that the household

consumption data would be censored at different levels, and the estimated parameters of poverty model would change with the level of poverty line used. As consumption model estimates are independent of the chosen poverty line, it is potentially attractive to model household consumption level and the link to household poverty level in the subsequent step, rather than modeling household poverty levels directly.

- d. Estimation of the consumption model avoids strong distributional assumption that may be required by the Probit or logit model of estimation which is commonly used in modeling household poverty level directly.

For the reasons mentioned above, the approach employed in this study is that the logarithm of household consumption levels. In simplest way the independent variables which will be included in the model are the following:

Con = constant term

Sex = Sex of the household a male dummy

Age = Age of the household head

HHS = Household (family) Size

Maritalstatus = Marital status of household heads

Deprinaeu = Dependency ratio in Adult Equivalent

Edu = Education level of household heads

Tlhs = Total cultivated land holdings of the household in hectares

Ptmc = Proximity to the nearest market center

Acu = Access to Credit and Credit utilization

TLU = Total number of livestock a household owned in tropical livestock unit

Hoinc = Household off-farm income

Conexp

= $f(\text{age, sexh, hhs, maritalstatus, Edu, tlhs, Deprinaeu, Tlu, ACU, Ptmc, Hoinc})$

Multicollinearity and Heteroscedasticity tests: these tests are two important tests for this analysis. In the case of multicollinearity, prior to the estimation of the probit model, it is by far logical to verify whether there is a problem of multicollinearity among explanatory variables included in the model. The rationale behind this is that the existence of multicollinearity between variables in the model affects seriously a parameter estimates which in turn leads to estimation bias and wrong statistical inference. To overcome this problem VIF technique is employed (Gujarati, 1995). For that reason, each variable is regressed up on all the other explanatory variables with their respective coefficient of multiple determinations (R_j^2) to be constructed in each case. If a linear relationship exists among them it would result in a large value of R_j^2 in at least one of the test regressions. A rise in the value of R_j^2 implies an increase in the degree of multicollinearity that leads to an increase in the variances and standard errors of the OLS estimates. The most familiar measure used to detect the problem of multicollinearity using VIF is as follows:

$$\text{VIF}(x_i) = (1 - (R_j^2))^{-1} \text{-----} (3.3)$$

Considering the above equation, a value of $\text{VIF} > 10$ (if R_j^2 exceeds 0.90) is a sign for the existence of severe multicollinearity (Gujarati, 2004).

The presence of heteroscedasticity problem would result in inconsistent estimates of the parameters in the model. In short, if we persist using the usual testing procedures despite heteroscedasticity, whatever conclusions we draw or inferences we make may be very misleading. Hence, the presence of heteroscedasticity is tested using the usual and most appropriate Breusch-Pagan test for heteroscedasticity (Gujarati, 2004).

3.4.3. Probit Regression

In this study the probit model was used to identify the determinants of household rural poverty in Dejen district. For the purpose of this study due to the reason that logit models

are vulnerable to overconfidence that is, the model can appear to have more predictive power than they actually do and tobit model applicable only in the cases where the latent variable (basic variable) can in principle take negative values and observed zero values, probit model is preferable from other binary models. To specify the relationship between the dependent variable and the independent variables, the study considers a household with per adult consumption expenditure "Y" and characteristics "X", where X is an mx1 vector. Denote the poverty line by "Z", and then it is defined by $Y^* = Z - Y$ and assumes that consumption is determined by the model.

$$Y^* = \beta X + \varepsilon$$

Where: β a 1xm is vector of returns to characteristics and ε is stochastic error term with zero mean. With representative sample of the population, X can be used to predict poverty. The dependent variable is household's poverty status represented in the model as poor ($Y=1$) if it's total consumption per adult equivalent per year is less than the poverty line or non-poor ($Y=0$) if its consumption short fall is greater than or equal to zero.

Consider an econometrics model

$$Y^* = \beta_0 + \sum_{j=1}^n \beta_j X_{ij} + \varepsilon_i$$

Where Y^* is not observed, it is commonly called a "latent" variable. What we observe is dummy variable Y_i defined by

$$Y_i = \begin{cases} 1 & \text{if } Y^* > 0 \\ 0 & \text{Otherwise} \end{cases}$$

Y^* is the probability of a person being poor,

$$P_i = \text{prob}(Y_{i=1}) \text{prob} \left[\varepsilon_i > -(\beta_0 + \sum_{j=1}^n \beta_j X_{ij}) \right]$$

$$= 1-F[-(\beta_0 + \sum_{j=1}^n \beta_j X_{ij})]$$

Where; F is the cumulative distribution function of ε . If the distribution of ε is symmetric, since $1-F(-Z) = F(Z)$, we can write

$$P_i = F(\beta_0 + \sum_{j=1}^n \beta_j X_{ij}) \dots \dots \dots (3.4)$$

As the observed Y_i are just realization of a binomial process with probabilities given by equation (3.4) and varying from trial to trial (depending on X_{ij}), then we can write the likelihood function as:

$$L = \prod_{y_i = 1} P_i \prod_{y_i = 0} (1 - P_i).$$

3.4.4 Definition of Variables and Expected Sign

After the variables collected through questionnaire from rural sedentary populations in Dejen district East Gojjam zone, Amhara regional state certain explanatory variables used for OLS and Probit model estimation to determine factors that affecting consumption expenditure and status of a household either poor or non-poor. In the study different independent variables are hypothesized to determine consumption expenditure and status of a household. The variables include household characteristics, asset and other variables.

Among the asset variables that can be included in this model total area of cultivated land owned by a household are the main means of production that is expect to reduce the likelihood of poverty and increase consumption per adult equivalent. Among household characteristics age, sex, household size and educational level are included in model.

Age is expected to help the household to get out of poverty since it is supposed to represent accumulated work experience. The opposite can also be true if members become dependent as their age increase their consumption level is also expected to increase as age in the household increase. **Sex** is also expected to affect poverty level; male headed households are expected to have a better chance to escape poverty than female headed households. There are a number of reasons for this to happen: first, female

headed households, in most cases are those whose husband are deceased, widowed, or living elsewhere making them more vulnerable to poverty than male headed households. Secondly, due to traditional and religious beliefs, female in rural Ethiopia are usually denied access to and participation in productive resources or assets. Because of these two mentioned reasons, male headed households are expected to have a higher level of consumption per adult equivalent.

Education level, the other household characteristics, is expected to affect poverty negatively because education increases the ability to better utilization of modern agricultural technologies and increase consumption per adult equivalent. **Household size** is another household characteristics which is hypothesized that larger families have a higher probability of being poor than small families. However, it can also reduce poverty if most of the family members are working; reflecting the presence of economies of scale; consumption per adult equivalent is expected to decline as the family size increases since the consumption items are going to be divided among large number of families.

The other rural poverty determinant variable is **Dependency ratio**, the ratio of the sum of children below age of 15 and old age of above 65 to active labor (15-64) expressed in terms of adult equivalent. The existence of large number of children under age of 15 and old age of 65 and above in the family could affect the poverty status of the household. This is due to the fact that the working age population (active labor force between 15-64 years) supports not only themselves, but also additional dependent persons in the family. Because of high dependency burden a household with large number of dependent members tends to be poorer than those households with small family size (Semere, 2008). Thus, a household with relatively large number of dependent members is expected to have a positive relation with poverty status.

Proximity to the nearest market center: refers to the proximity of the household house to the nearest district market measured in kilometers. Proximity to market centers creates access to additional income by providing opportunities of engaging in non-farm employment as well as selling different agricultural products, better chance to reduce household's poverty. Households who have proximity to market center have better

chance to improve their income (Semere, 2008). For this reason, distance to the nearest market center is expected to be positively related to poverty status.

Access to Credit and Credit utilization: is another rural poverty determining variable measured in Birr. Theoretically, access to credit and credit utilization is expected to reduce poverty through investment in different productive activities and to generate better income and even for consumption smoothing. Credit utilization and poverty status are negatively related (Alemayehu *et al.* 2006). Thus, it is expected that households who have access and make use of credit are less likely to be poor.

The other variable that determines poverty in rural areas is **total number of livestock a household owned**; which is the total number of livestock holding of the household measured in Tropical Livestock Unit (TLU). Livestock are the sources of livelihood of the rural households in general and large size livestock owners are expected to be non-poor. Indeed, possession of livestock serves as a hedge against food insecurity, source of cash income, principal form of saving and investment (Hilina, 2005). On the other hand livestock of the households are the major source of draught power for the majority of rural households who use traditional cultivation (Ayalneh *et al.* 2005). Based on this, the total number of livestock a household owned is expected to have a negative effect on rural household's poverty.

The last variables that can be included in this model are **total area of land owned and cultivated** by the household and **household off-farm income**. The total area of land owned and cultivated measured in hectare is, one of the livelihood capitals available for food production thereby ensuring household entitlement to food (Alemayehu *et al.*, 2006; Adugna and Sileshi, 2013). Households with larger cultivated land have better options to diversify and increase production. Thus, it is hypothesized that the larger the endowment of cultivated land, the less the probability of being poor. And household off-farm income signifies the amount of income received from various off-farms or non-farm income sources through rural household head or any of the household members in the year 2008 measured in Birr. Various income sources of off-farm or non-farm income generating activities are common practices of most rural households. In this regard, households who

engaged in such activities or receiving incomes from remittances and other informal businesses would be better endowed with additional income to meet their food and non-food requirements. Even these incomes once generated, apart from consumption they will use in production activities. Such income generating activities determines the poverty status of the rural household negatively (Semere, 2008). So, household off-farm income is expected to have a negative relationship with poverty and positively related to consumption expenditure (because the more income they have, the higher their expenses in order to increase consumption level) of the rural households.

Finally in this study the researcher going to put other determinant variables that have a little impact on rural poverty in to the stochastic error term ε_i . In simplest way definitions and measurements of variables for probit and OLS models including their codes and expected sign are briefly explained in the table 3.3 below.

Table 3.3 Definitions and Measurements of Variables for Probit and OLS models

Model s	Variable codes	Types of variables	Measurements & definition of variables	Expected sign	
	<u>Dependent variable</u>			Probit	OLS
OLS	Lnconexpp eraeu	Continuous	Ln total consumption expenditure per AEU per year		
Probit	Povstat	Dummy	Poverty status of households; 1 if poor, 0 otherwise		
	<u>Independent variables</u>				
	Age	Continuous	Age of the household head	+/-	-
	Sex	Dummy	Sex of the household a male dummy	-	+
	Hhs	Continuous	Household (family) size	-	+
	Maritalstatus	Dummy	Marital status of household head	+/-	+/-
	Edu	Continuous	Education level of household in years	-	+
	Deprinaeu	Continuous	Dependency ratio in Adult Equivalent	+	+
	Tlhs	Continuous	Total cultivated land of the household in	-	+

		hectare		
TLU	Continuous	Total livestock a household owned in TLU	-	+
Ptmc	Continuous	Proximity to the nearest market center	+/-	+/-
ACU	Dummy	Access to credit and credit utilization	-	+
Hoinc	Continuous	Household Off-farm Income	-	+

Source: own definitions, 2017

3.5. Ethical Issues

The researcher genuinely asked and collected the data that undergone in to this research paper from rural household areas of Dejen district, East Gojjam zone using structured questionnaire.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

This chapter has two sub sections: the first tries to explain households' poverty status descriptively based on different household and community characteristics and the second is about FGT measures of aggregate poverty and factors determining households' consumption expenditure and poverty at household level analyzed econometrically.

4.1 Descriptive Analysis

This section of the study deals with descriptive analysis of households' poverty status based on different household and community characteristics.

4.1.1 Socio-Economic Backgrounds of the Respondents

In this analysis a data collected from rural areas of Dejen district, a total 204 rural households were considered under the study. Out of the total samples taken 150 were male household heads and the 54 are female headed households. The mean ages of the respondents in the sample taken are 50.85 and the maximum and minimum ages under the sample taken are 79 and 27 respectively.

As shown in the table (4.1) below, the maximum and minimum numbers of household sizes under the study are 12 and 3 respectively with the average mean of 5.74 households.

Table 4.1 Socio-Economic Variables and their Mean values

Variables	Mean	Std. Dev.	Min	Max
Age of household heads	50.85	11.76	27	79
Household size	5.74	2.05	3	12
TLU	3.91	1.21	0.5	9.2
Proximity to nearest market	4.23	1.56	1	7
Total cultivated land holdings	2.85	1.19	1	7.5
Household off-farm income	5241.51	3238.9	250	15600
Dependency ratio in AEU	35.55	17.95	8.6	90
Total Food consumption expenditure per AEU	4892.57	1830.03	1915	9349
Non-food consumption expenditure per AEU	1148.22	999.63	240	4779.67
Consumption expenditure per AEU	5663.71	2038.95	1948	9890

Source: own survey and calculation, 2017

Literacy is defined as the ability to read and write in any language. This information was collected on household heads. The respondents were not tested for their ability to read or write. Therefore, the percentages presented in (Table 4.2 below) are based on self-reported ability to read and write. So among 204 household heads about 47% are illiterate and the persons who can read and write is about 35%. A small percentages about 6.4% and 11.3% are attained by secondary, and primary and junior levels respectively.

Table 4.2 Education level and sex of household heads

Education level of household heads	Sex of household heads				Total	
	Male		Female			
Illiterate	66	33.35	30	14.71	96	47.06
Read and Write	54	26.47	18	8.82	72	35.29
Primary and Junior	18	8.82	5	2.45	23	11.27
Secondary and Above	12	5.88	1	0.49	13	6.37
Total	150	73.53	54	26.47	204	100.00

Pearson chi2 (3) = 3.8264 Pr. = 0.281

Source: own survey and calculation, 2017

There is substantial gender inequality in literacy in area under the study. About 33.4 percent of male household heads and 14.7 percent of females are illiterate and the least percentage of secondary and higher grade enrollments are covered by female headed households .i.e. about 0.49 percent.

Table 4.3 Marital status and sex of household heads

Marital status	Sex of households				Total	
	Male		Female			
Married	129	63.24	21	10.29	150	73.53
Divorced	13	6.37	14	6.86	27	13.24
Widowed	13	6.37	14	6.86	27	13.24
Total	155		49		204	100.00

Pearson chi2 (2) = 20.9637 Pr. = 0.000

Source: Own survey and calculation, 2017

From the total of 204 total sampled populations considered under the study the largest percentage (about 73.5%) are covered by married household heads and the least percentage are recorded both in the divorced and widowed household heads.

Table 4.4: Total number of cultivated land holdings of household heads by gender

Sex of household heads	Total number of cultivated lands in hectare	Total number of cultivated lands per household head
Male	435.5	2.81
Female	135.5	2.77
Total	571	5.58

Pearson chi2 (20) = 18.8168 Pr. = 0.534

Source: Own survey and calculation, 2017

Agriculture is the main occupation for both the male and female headed households in rural areas of Dejen district. Rural households are more likely to own the land they cultivate than urban areas. From those sampled populations in the district under the study, household heads have a minimum of one hectare and a maximum of 7.5 hectares of total cultivated land holdings that are both rented and owned. On average 2.8 hectares of land cultivated both by female and male headed households. Totally male headed household heads cultivated 435.5 hectares of land and female headed household are also cultivated 135.5 hectares of land. In the district, the most cultivated crops are teff, maize, millet (sorghum), wheat, beans, peas, and oilseeds such as linseed, sesame and nuts are the dominant crops grown in the district of Dejen. In the kola agro-ecological zones of the district different types of vegetables and fruits like mango, avocado, banana, orange, peach and lemon are grown. Other cash crops and vegetables like pepper, onion, potatoes, tomato and pimento are also largely cultivated in the district.

In addition to agriculture both cattle and equine are the major sources of their livelihood. Other occupations such as buying and selling are also common activities. Livestock information is collected from those households in the sample where at least one member of the household is a livestock holder. The most common types of livestock holdings in district of Dejen are cattle, sheep, horses, goats, mules, poultry and beehives are dominant. Cattle are primarily used for milk, drought power, and breeding. Slaughtering cattle is not common for household consumption. Cattle are slaughtered in rare

celebratory events such as wedding or funeral related religious events. As shown from the table the total number of livestock a household owned; which is the total number of livestock holding of the household measured in Tropical Livestock Unit (TLU) has a mean of 3.91 and the households owned a minimum of three and a maximum of 9.2 livestock's measured in tropical live units (TLUs).

4.1.2 Poverty and Major Socio-economic factors

The major socioeconomic factors collected from rural areas of Dejen district are Age of household heads, sex, marital status, household size, education background, dependency ratio, total number of livestock a household owned, proximity to the nearest market center, access to credit and credit utilization and household off-farm income.

Table 4.5 poverty and Age of household heads

Age	Poor		Non Poor	
	Frequency	Percentage	Frequency	Percentage
27-37	12	50.00	12	50.00
38-48	27	43.55	35	56.45
49-59	26	41.27	37	58.73
60-69	19	50.00	19	50.00
70-79	15	88.24	2	11.76
Total	99		105	

Pearson chi2 (4) = 12.7286 Pr. = 0.013

Source: own survey and calculation, 2017

The age of the households, under this study, are grouped in five age categories starting from 27 up to 79. Relatively small percentage of households, about 41.27%, is found poor out of the households who are in the age 49-59 and the percentage of poor households in the age 70-79 are much higher i.e. about 88.24%. But, at the age of 27-37 and 60-69 the percentage of poor and non-poor households are 50%.

Table 4.6 Poverty and household size

Family size	Poor		Non Poor	
	Frequency	Percentage	Frequency	Percentage
<5	28	41.79	39	58.21
5-8	46	46.94	52	53.06
>8	25	64.10	14	35.90
Total	99		105	

Pearson chi2 (2) = 35.1038 Pr. = 0.038

Source: own survey and calculation, 2017

Large household sizes tend to be associated with poverty (Lanjaw and Ravallion, 1994). The effects of household size on household wellbeing very much depends up on the degree of rivalry in consumption among household members. From the table above, in the case of Dejen district, out of the total of 204 sampled households 99 people are poor and 105 are non-poor, that is almost 48.5% are poor households. The table also shows that as the household size increase the percentage of poor households also increase in all family categories and on the other hand the percentage of non-poor households are decline as the number of family (household) size increases. The highest percentage of poor households about 64.1% are recorded in the third family category (i.e. between 8 and 12). The statistical result shows that household size of household heads is statistically significant at 5% level of significance and as the number of families in the household increases the probability of being poor also increases.

From the table (4.7) below among the total 54 female headed households in the data, 63% are poor and the other 37% are non-poor household heads. And among a total 150 sampled male headed households 43% are poor and 57% are non-poor household heads. This shows that the percentage of poor female headed households are higher than the counter poor male household heads and the percentages of poor male headed households are smaller and is about 43%.

Table 4.7 Poverty and Sex of household heads

Gender (Sex) of household heads	Poor		Non-poor		Total
	Frequency	Percentage	Frequency	Percentage	
Male	65	43.33	85	56.67	100.00
Female	34	62.97	20	37.03	100.00
Total	99		105		204

Pearson chi2 (1) = 3.1251 Pr. = 0.613

Source: own survey and calculation, 2017

So, from the above table (4.7) we infer that female headed households are poorer than male headed households and statistical analysis shows that sex of households was statistically insignificant.

Table 4.8 Poverty status and household head's education level

Poverty status of households heads	illiterate	Read and write	Primary and junior	Secondary and higher	Total
Poor	49	31	9	5	55
	51.04	43.06	39.13	38.46	
non-poor	47	41	14	8	149
	48.96	56.94	60.87	61.54	
Total	96	72	23	13	204

Pearson chi2 (3) = 1.7238 Pr. = 0.632

Source: own survey and calculation, 2017

The percentages of poor households, in general, decrease as the head of households education level increasing and the percentage of poor increase in illiterate society is

higher i.e. about 51%. Among the poor households who can read and write and who completed their education levels in primary and in junior are 43% and 39% respectively, which is higher than from those who completed their education in secondary and higher levels. In general, the percentage of non-poor household heads increase as education level of household head increases and those household heads who's completed their education level in secondary and higher levels is about 61.5%. And also the statistical result showed that the level of education of household head statistically insignificant.

Table 4.9 Poverty and Marital status of Household heads

Marital status of household heads	Poverty status of household heads				Total
	poor		Non-poor		
	in no.	in %	in no.	in %	
Married	64	45.39	77	54.61	141
Divorced	19	59.38	13	40.62	32
Widowed	16	51.61	15	48.39	31
Total	99		105		204

Pearson chi2 (2) = 2.1813 Pr. = 0.336

Source: own survey and calculation, 2017

In poverty analysis, marital status of the household head is a vital component of the demographic variables. On one hand economic theory and most empirical literatures support the notion that the chance of falling into poverty increases as one is married. This is due to when people get married household size will increase as new children are born and expenditures increase which in turn leads to searching for mechanisms of fulfilling additional needs and necessities for the family.

On the other hand as one is married the probability of falling into poverty decreases, as there would be more labor forces in the household. The above table (table 4.9 above) explains this situation as: among the total of 99 of poor households, the highest percentage (about 59 and 51) are those household heads that are divorced and widowed

respectively. On the other hand the highest percentages of non- poor household heads (about 55%) are married.

4.2 Econometrics Analysis

Prior to parameter estimation of probit model, tests for multicollinearity using variance inflation factor and Breusch-Pagan test for heteroscedasticity were performed for validation of the estimated model. Variance Inflation Factor (VIF) was computed to test the degree to which all the 11 explanatory variables are correlated to one another. The computed values of VIF (Appendix 2) were small and all of the values were less than 10 (i.e. about 1.26). As per the results of VIF, there was no problem of Multicollinearity among all explanatory variables of the model so that, all of the 11 explanatory variables were retained within probit regression model for analysis. To better determine the best predictors of the dependent variable, 11 explanatory variables (8 continuous variables and 3 dummy variables) were included in the model to estimate the parameters of all the variables using probit regression analysis. The inclusion of the variables was based on theoretical expectations and empirical studies done before.

4.2.1 Poverty Indices

Given the information on welfare measures such as consumption and poverty line, the only remaining problem is deciding on appropriate measures of aggregate poverty. Even though, there are a lot of aggregate poverty measures, the most widely used poverty indices are the percentage of the poor (headcount index), the aggregate poverty gap (poverty gap index), and the distribution of income among the poor (poverty severity index). In Ethiopia, the methods described above were first applied in the context of the 1995/96 Poverty Analysis Report.

In the case of this analysis using poverty line FGT classes of aggregate poverty measures (P_{α}) are computed. Accordingly, 0.49, 0.083, and 0.065 are the computed head count index, poverty gap and poverty severity, respectively.

Table 4.10 Poverty Indices of Sample Households

Poverty indices	Index values
Head count index ($\alpha=0$)	0.49
Poverty gap/ depth index ($\alpha=1$)	0.083
Squared poverty gap/index ($\alpha=2$)	0.065

Source: own survey and Computation, 2017

Generally, the FGT measures of poverty developed by Foster et al. (1984) are used to explain the extent of poverty in the study area. As shown in the table above, the head count index ($\alpha=0$) is about 0.49, shows the percentage of poor people measured in absolute head count index is about 49%. This figure indicates that 49% of the sampled households in Dejen district are below absolute poverty line 3781 ETB and implies that these proportions of sample households are unable to meet their minimum amount of consumption expenditure per adult equivalent per year. The poverty gap index ($\alpha=1$), is a measure of poverty which captures the mean aggregate consumption shortfall relative to poverty line across the whole population and is found to be 0.083, and implies that the percentage of total consumption needed to bring the whole population to the poverty line is about 8.3%. As a final point, the FGT severity index ($\alpha=2$) in consumption expenditure indicates that 6.5% fall below the poverty line, implies that existence of severe inequality (high degree of inequality) in the district of Dejen compared to the 2010/11 national poverty severity index of 3.2% in rural areas of Ethiopia.

4.2.2 Multiple Regression Analysis

In the multiple regressions analysis the dependent variable is Ln of total consumption expenditure per Adult Equivalent Unit and the result of the regression analysis are described in the table (4.11) below.

Table 4.11 Ordinary Least Square (OLS) regression Results

Independent variables	Coefficients	standard error	t	p>t
Age	-0.0043631	0.0021164	-2.06	0.041**
Sexh	-0.0298676	0.0426824	-0.70	0.485
Marital status	-0.0337649	0.0256824	-1.31	0.190
Edu	-0.0247384	0.0202993	-1.22	0.224
Hhs	0.0641582	0.0121806	5.27	0.000*
Tlhs	-0.0064051	0.0148275	-0.43	0.666
Acu	0.0241855	0.0354828	0.68	0.496
Ptmc	0.034551	0.0112539	3.07	0.002*
Deprinaeu	-0.0012162	0.000983	-1.24	0.218
Tlu	0.032087	0.0145985	2.20	0.029**
Hoinc	6.33e-06	5.47e-06	1.16	0.248
Constant	9.822981	0.1505149	65.26	0.000*
Number of obs. = 204 R² = 0.2541 prob > F = 0.0000				
F(11, 192) = 5.95 Adjusted R² = 0.2114				

Source: own survey and estimation, 2017

Note: ** and *** indicate that the coefficients are statistically significant at 1% and 5% level of significance.

As observed from the above table in the estimation even if age of household heads is significant at 10% level of significance, it has negative relationship with consumption level of household heads. This might be due to the fact that consumption level of household heads is increasing at decreasing rates; because consumption level respective to their expenditure is small in their lower age as compared to in the adult stage and starts to decline in their old age. According to key informants of Dejen district, there are

homogeneous patterns of consumption across age groups of the household, when age is increasing starting from the adult stage to 60s and 70s, consumption expenditure is falling. On the other hand, the ages considered in study (i.e. 27-79) has a significant effect in consumption expenditure.

There is a significant relationship between family size and consumption expenditure of households. As the number of family in the households increase, their expenditure on consumption increase, because the larger the number of families, the more they consume and the smaller their numbers the less they spent on consumption. From the table (4.11) above household size is highly significant at 1% level of significance. Holding all other variables constant, on average, a 1 unit increase in household size per adult equivalent increases total consumption expenditure by 6% per adult equivalent.

The consumption level of households is also affected by proximity to the nearest market center. This variable is significant at 1% level of significance and the estimation result shows that consumption expenditure per adult equivalent increases by 3.5% for a unit kilometer distance increases in from the nearest market center for each household in the district. The last most significant variable that determines consumption expenditure positively is the total number of livestock in TLU and significant at 5% level of significance. Though livestock in developing countries are a major source of income generation, households spent a lot of income to feed their cattle's, for medical purposes and hence consumption expenditure is positively related with the total number livestock's a household owned in the rural districts under the study.

4.2.3 Probit Analysis

In the probit analysis a dummy variable, poverty status of household heads (1 if poor and 0 if non-poor) were used as a dependent variable in the regression analysis and the result is described below in the table (4.12).

Sex of household heads is one of the determinant demographic variables of poverty in rural areas and statistically significant at 10% and in general compared to female headed households the probability of male headed households being poor is lower. This result confirms Apata; 2010. This is due to the issue of Feminization of poverty. Numerous studies have discussed the issue of feminizing poverty which assumed that the prevalence of poverty is higher to female headed households the male headed households. This could be because of the presences of discrimination against woman in social life, or it might be due to women tends to have lower education than men do and they are in general deprived the opportunities of exercising when compared to men in many aspects. In this thesis finding the gap between male and female-headed households in the above poverty line is relatively significant in that most of the male-headed households have escaped from the status of being in the below poverty line while the females are experiencing more poverty. This result is in conventionality with most literatures, which assume that the probability of falling into poverty is higher to females headed households. The study found out that being in a household of female-headed one is more vulnerable to the prevalence of poverty in the district of Dejen than those of male headed ones.

The other significant variable, **household (family) size** is related with rural household's poverty status positively and highly significant at 5% level of significance. This shows that larger family size implies more dependent persons and hence a higher burden on the family for adequate food and non-food basic needs. The average marginal effect, holding all other variables constant, tells us that the probability of being non-poor decreases on average by nearly 0.7% if household family size increases by 1 adult equivalent. As the numbers of families that are not belonging in their production age grow in number, the higher the probability of the household being poor.

The other determinants of poverty in rural areas are dependence ratio, and total livestock a households owned in (TLU). **Dependence ratio** in adult equivalent unit has negative relationship with poverty status of household heads and is significant at 5% level of significance in the estimation result above. The result shows that the variable is found to have positive impact on the probability of being poor in the study area. In other words, the probability that a household will be poor increases as the household size increases due

to an increase in the number of dependents. The marginal effect of 0.005 implies that, *ceteris paribus*, the probability of being poor increases by 0.1% as dependent adult equivalent increases by one. The possible explanation can be that those households with many dependent family members could be poor because of high dependency burden. This shows that those households with large economically non-active members tend to be poorer than those with small family size.

As hypothesized the **livestock owned by the household** has significant and negative relationship with the poverty level of the household. The logic behind is that livestock rearing and possession of livestock on the one hand increases the wealth of the rural household and raises the income earning potential, on the other serves the poor in many ways such as source of cash income (income from sale of products, emergency cash requirements), insurance against drought, tenancy for share cropping, household nutrition, fuel for cooking, manure for crops, drought power for farming, store of value and principal form of saving and investment etc. *Ceteris paribus*, the marginal effect tells us that the probability of being poor decreases on average by nearly 0.6% if the total number of livestock increases by 1 tropical livestock unit.

CHAPTER FIVE

5. CONCLUSION AND POLICY RECOMMENDATION

5.1 Conclusion

The purpose of this study is to find out factors affecting rural poor and the main determinants of rural poverty and its levels in rural households of Dejen district in East Gojjam Zone from different dimensions and draw key policy implications for public policy. The causes of rural poverty are complex and multidimensional, involving forces of nature, markets, and public policy (IMF, 2000). This study tried to estimate poverty and consumption level using OLS estimation model and probit model that helped to compare and contrast the results under the study.

In this study starting from household characteristics age seems to be significant determinant determinants of consumption expenditure but in the case of determining the status of rural poverty in Dejen, age had insignificant effect. The other demographic variable, sex, is also found as the main determinant of poverty showing that the probability of female headed households being poor are relatively higher than male heads households. In determining consumption level of households in rural Dejen district sex of household seems to be insignificant.

Among the main causes of poverty at the household level in rural areas of Ethiopia, family size, dependency ratio in adult equivalent unit (AEU) and total number of livestock's a household owned in tropical livestock unit (TLU) are significant determinants of poverty status of household heads in Dejen. While, age, marital status, education, access to credit and credit utilization, household off-farm income and total cultivated land holding a households owned are insignificant. On the other hand, age of household heads, family (household) size per adult equivalent, proximity to the nearest market center and total number of livestock's a household owned in tropical livestock unit (TLU) are the main determinants of consumption expenditure in rural areas under the study.

5.2 Policy Recommendation

Even if the concept and extent of poverty is a very complex and multi-dimensional issue that involve among other things, climate, culture, markets, and public policy, which cannot be effectively determined with in such quick observation and likewise, the rural poor households are quite diverse both in the problems they face and the possible solutions to these problems, essential implications can be derived from the study which will be helpful and indicative.

Thus, this study has tried to analyze the covariates of rural poverty using a sample of 204 representative households taken from the rural kebeles of Dejen district and based on the findings of this, the following recommendation was made.

Promoting and giving awareness about family planning and putting the existing policy in effect and integrated health service with appropriate access would result in curbing the degree of poverty among rural households. And also the government through its policies should address problems relating to higher population in rural areas and try to boost rural household's income by: creating linkage with in the rural under developed agriculture and the urban industrial sector, stabilizing agricultural product prices, and giving subsidy to those highly venerable sections of the society.

There should be a need to focus on gender-based poverty interventions (UNDP, 2005), especially among female headed households in the district of Dejen. This can be explained by low access to capital, inadequate inputs, and lack of access to modern techniques both in the farm and non-farm activities. Thus in rural areas of Dejen, gender basis development policies measure targeting anti-poverty involvements are useful. There is also a need to encourage and give awareness to the population that females are productive and means of development and a way to combat poverty.

Technical advice and training how to use cattle should offer from the concerned body in order to strengthen their benefits for the rural poor and make them to exit from poverty.

At last, this study has concerned with only those of basic necessities of life which are being partially met due to economic issues targeting those rural households and attempted

to examine the incidence, depth and severity of poverty in the rural community, analyzed demographic and socioeconomic characteristics of poor and non-poor households that affect rural households and provided some policy implications based on the result found; however there are a lot remained to be unanswered. These include the social, political and environmental dimensions of determinants and patterns of rural poverty, and vulnerability (exposure to risk) and powerlessness dimensions of poverty and their management mechanisms were not addressed as they are beyond the scope of this study and needs further researchers' attention.

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APPENDICES

Survey Questionnaire Format

Objective: The purpose of this questionnaire is to gather information about *Determinants of Rural Poverty in Ethiopia: A household level Analysis the case of Dejen district* for the partial fulfillment of the Master of Science in Economic Policy Analysis, College of Business and Economics Department of Economics, Jimma University.

General Directions:

- A. You are kindly requested to give genuine responses.
- B. You don't need to write your identification.
- C. Feel free to respond.
- D. Circle the corresponding number of your choices from the given alternatives.
- E. The study is completely academic and all responses are confidential.
- F. Fill the numbers you agree with to those questions which are not multiple choices.

Thank You!

Identification Information

1. District/Wereda _____ 2. Kebele _____ 3. Enumerator's name _____
4. Supervisor's name _____ 5. Date _____ 6. Signature _____

1. Demographic Characteristics of household head & members'

1.1. Indicators of household head data

1. Age of Household Head _____
2. Sex
1. Male 2. Female
3. Marital Status
1. Never Married 2. Married
3. Divorced 4. Widowed
4. Religion Affiliation
1. Orthodox Christian 2. Catholic Christian 3. Protestant
4. Islamic/Muslim 5. Others _____ (specify)
5. Educational level of household head
1. Illiterate 2. Read and Write
3. Primary and junior 4. Secondary 5. Tertiary
6. Ethnic Group
1. Amhara 2. Tigrie
3. Oromo 4. Other _____ (specify)
1.2. Household members/ family size _____

Age	Male	Female	Age	Male	Female
[≤1-5)			[35-40)		
[5-10)			[40-45)		
[10-15)			[45-50)		
[15-20)			[50-60)		
[20-25)			[60-65)		

[25-30)			≥65		
[30-35)					
Total number in the Household: _____					

Number of family members below age of 14 _____ Male _____ Female _____

Number of family members between 15 & 64 _____ Male _____ Female _____

Number of family members 65 and above _____ Male _____ Female _____

2. Cultivated land holding & fertility status

1. Do you have cultivated land? 1. Yes 2. No

2. Please identify your production and farming type for the year 2015/16

Rain fed = 01 Irrigated = 02 Both = 03	Total cultivated land holdings in hectare	Ownership Owned = 01 Rented = 02	Crops grown per hectare	Produced per hectare in quantity	Land Fertility: 1. very fertile 2. Medium 3. slightly fertile 4. slightly infertile 5. very infertile

3. Do you utilize all your family labor for farm activities? 1. Yes 2. No

4. If no, where do surplus labors go?

1. Go to neighbor for labor selling 2. Go to town for labor selling

3. Stay at village for nothing 4. Others (specify)

3. Physical Assets of Households

3.1. Livestock resource (indicate the number & source of livestock owned currently in 2016/17)

Livestock Type	Numbers	Value	Total (TLU)	Source of Ownership			
				Parent	Gift	Purchased	Others
Oxen							
Cows							
Calf							
Bull							

Heifer							
Sheep							
Goat							
Mule							
Horse							
Donkey							
Poultry							
Others							

4. Agricultural, Business and other productive Assets

4.1. Agricultural Assets

4.1.1 Do you utilize agricultural equipment's? If yes, which equipment's?

1. Water pump 2. Tractor
3. Plough plows 4. Tillers 5. Others _____ (Specify)

4.1.2 How much it Costs now (Value) in Birr? _____

4.2. Business Assets

4.2.1 Do you have business assets? 1. Yes 2. No

If yes, which business assets you have owned? 1. Shops 2. Café 3. Mill (Wofcho)

4. Carts 5. Others _____ (specify)

4.2.2 How much it Costs now (Value) in Birr? _____

4.3. Other Productive Assets

4.3.1 Do you have other productive Assets? 1. Yes 2. No

If yes, which assets do you have? 1. Refrigerator 2. Bicycle (Motor cycle)/Car 3. TV/Radio

4. Others ____ (specify)

4.3.2 How much it cost (Value) in Birr currently? _____

5. Economic characteristics of households

5.1. Income Sources

5.1.1. From where do you generate household income? What are the contributions of major sources of livelihood?

1. Please mention the source and amount of income you obtained? Year Oct 2011/12 – Oct2016/17

No.	Income sources from on farm and off-farm/non-farm activities	Participated? yes=1 No= 0	Priority of income generation	If yes, annual income (Birr)	Remark
1	Sale of livestock				
2	Sale of animal products (butter, cheese, milk, egg, Yoghurt, etc.)				
3	Sale of cash crops produces (species, chat, buckthorn, oil seeds, sugarcane, etc.)				
4	Sale of cereal crops (wheat, teff, barley, peas, maize, beans, lentil,etc.)				
5	Sales of vegetables and fruits (Potato, tomato, onion, cabbage, kosta, pepper, etc.)				
6	Sales of forest products (fuel wood, charcoal, pole, etc.)				
7	Land rent out				
8	Sale of labor in neighbor				
9	Sale of labor in city				
10	Handicrafts				
11	Rents from agricultural equipments (machinery, water-				

	pump, tractor, etc.)				
12	Revenue from business assets (shops, café, house rent in the near city, etc.)				
13	Remittances and aids				
14	Others: healing, carpentry, etc.				
Total					

5.1.2 Does your household annual income cover your expenditure?

1=Yes _____ 2= No _____

If "No" to Q 5.1.2 how do you fill your household annual income and expenditure gap?

1=Sale of assets _____ 2=No option except leading meager life _____

3=Support from relatives _____ 4=others ____ (specify)

6. Household Consumption expenditures components

6.1. Household food consumption expenditure

1. What are your staple foods? _____

2. From where do you get these food stuffs? (More than one answer is possible)

1. Own produce 2. Purchased

3. Borrowed from relatives 4. other specify

3. Fill the type and quantity of each food items and value in the past 30 day's consumption?

Food item	Unit	Quantity	Kcal	Market value	Remark (purchased/produced)
Teff					
Wheat					
Maize					
Barley					
Bean					

Filed pea					
Cowpea (guaya)					
Potato					
Milk					
Meat					
Oil					
Dry paper					
Salt					
Others (vegetable, spices)					

4. What is the monthly produce from animals that used for food?

Food type	Unit	Produced	Consumed	Market value	Kcal	Remark
Meat	Kilogram (kg)					
Milk	Litter (Lt)					
Butter	Kilogram (kg)					
Cheese						
Eggs						
Poultry	Kilogram (kg)					

5. Do you produce enough food for your household consumption? 1. Yes 2. No

6. If no, how do you cope up it?
1. Purchase food
 2. Sale of livestock
 3. Borrow from neighbors/relatives
 4. Others specify
7. Which months are in food shortage this year? Year Oct. 2015/16 – Oct. 2016/17
8. What were the causes of food shortage? (More than one answer is possible)
9. How many times you eat per day this year? Year Oct. 2015/16 - Oct. 2016/17
1. Once
 2. Twice
 3. Trice
 4. More than 3 times

6.2. Household non-food consumption expenditure

1. What are your family non-food expenditures? Year Oct. 2015/16 - Oct. 2016/17

No.	Non-food item	Yearly amount (Birr)	Remark
1	Clothes/shoes/fabrics		
2	House utensils/Kitchen equipments		
3	Fertilizers and improved seeds		
4	Linens (sheets/towels/blankets)		
5	Grinding mill cost		
6	Kerosene (fuels) and Lamps		
7	Building materials		
8	Veterinary services		
9	Tax and levies		
19	Social and religious expenses: funeral expenses, Ceremonial expenses, wedding, public dues, voluntary contributions, etc.		
11	Education (School fees, educational materials, etc.)		
12	Health care service Expenses:		
	Modern medical treatment and drugs		
	Traditional medicine and healers		
13	Alcohol drinks/Cigarette/Chat		

14	Compensation and penalty		
15	Specify others		

7. Credit utilization and Access to Credit and Loans

1. Have you ever taken credit service during the last cropping season? 1. Yes 2. No
2. If yes, what was the amount of credit you obtained (in Birr) _____
3. If no, what is the reason for not taking credit?
 1. Fear of repayment 2. High interest rate on credit
 3. No interest for credit 4. Fear of defaulters in group collateral
4. From which agency did you borrow credit?
 1. ACSI 2. Cooperatives
 3. Friends 4. Others specify
5. For what purpose did you use credit?
 1. for farm input 2. For fattening 3. For animal breeding
 4. for food purchase 5. Others specify

8. Access to public infrastructure

1. Where do you obtain food and non-food items you want to purchase?
 1. nearby central market 2. Village level market 3. Others
2. Did you sell farm and non-farm products during the last cropping season? 1. Yes 2. No
3. If yes, did you receive reasonable prices for your products sold? 1. Yes 2. No
4. Where is the nearest market place for selling them? _____
5. How far is your house from the nearby central market _____ (km)
6. Does the market distance encourage farmers producing marketable products? 1. Yes 2. No
7. Do you have the access for market information from your village? 1. Yes 2. No
8. If yes, what is/are your basic source of market price information?
 1. Radio 2. Traders
 3. Development Agents 4. Neighbors/friends/relatives
9. How do you transport farm products to market from your village?
 1. by animals 2. On human back 3. Other specify

Appendix 1: OLS Regression Analysis Result

```
. reg lnconexpper~u age sexh maritalstatus edu hhs tlhs acu ptmc deprinaeu tlu hoinc
```

Source	SS	df	MS	Number of obs =	204
Model	3.98954084	11	.362685531	F(11, 192) =	5.95
Residual	11.7097379	192	.060988218	Prob > F =	0.0000
				R-squared =	0.2541
				Adj R-squared =	0.2114
Total	15.6992787	203	.077336348	Root MSE =	.24696

lnconexpper [~] u	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
age	-.0043631	.0021164	-2.06	0.041	-.0085375 -.0001886
sexh	-.0298676	.0426824	-0.70	0.485	-.1140542 .0543191
maritalstatus	-.0337649	.0256824	-1.31	0.190	-.0844209 .0168911
edu	-.0247384	.0202993	-1.22	0.224	-.0647767 .0152999
hhs	.0641582	.0121806	5.27	0.000	.0401333 .0881832
tlhs	-.0064051	.0148275	-0.43	0.666	-.0356508 .0228406
acu	.0241855	.0354828	0.68	0.496	-.0458005 .0941716
ptmc	.034551	.0112539	3.07	0.002	.0123538 .0567482
deprinaeu	-.0012162	.000983	-1.24	0.218	-.003155 .0007226
tlu	.032087	.0145985	2.20	0.029	.003293 .060881
hoinc	6.33e-06	5.47e-06	1.16	0.248	-4.45e-06 .0000171
_cons	9.822981	.1505149	65.26	0.000	9.526105 10.11986

Appendix 2: Test for Multicollinearity

```
. vif
```

Variable	VIF	1/VIF
hhs	2.09	0.479526
age	2.06	0.485307
maritalstatus	1.22	0.820545
sexh	1.19	0.843127
edu	1.08	0.924055
acu	1.05	0.949820
tlhs	1.04	0.958021
hoinc	1.04	0.958231
tlu	1.04	0.958695
deprinaeu	1.04	0.965002
ptmc	1.02	0.978525
Mean VIF	1.26	

Appendix 3: Test for Heteroscedasticity

```
. hetttest age sexh maritalstatus edu hhs tlhs acu ptmc deprinaeu tlu hoinc
```

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
```

```
Ho: Constant variance
```

```
Variables: age sexh maritalstatus edu hhs tlhs acu ptmc deprinaeu tlu hoinc
```

```
chi2(11) = 5.16
```

```
Prob > chi2 = 0.9229
```

Appendix 4: Result of Probit Regression Analysis

```
. probit povstat age sexh maritalstatus edu hhs tlhs acu ptmc deprinaeu tlu hoinc
```

```
Iteration 0: log likelihood = -141.31378
Iteration 1: log likelihood = -129.95527
Iteration 2: log likelihood = -129.92194
Iteration 3: log likelihood = -129.92193
```

```
Probit regression                               Number of obs   =          204
                                                LR chi2(11)    =          22.78
                                                Prob > chi2    =          0.0190
Log likelihood = -129.92193                    Pseudo R2      =          0.0806
```

povstat	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	-.0041791	.0110915	-0.38	0.706	-.025918	.0175598
sexh	-.3777987	.2247161	-1.68	0.093	-.8182341	.0626367
maritalstatus	-.0355365	.1339831	-0.27	0.791	-.2981386	.2270656
edu	.0741345	.1072269	0.69	0.489	-.1360263	.2842954
hhs	.1670406	.0679091	2.46	0.014	.0339411	.30014
tlhs	-.0067761	.0772822	-0.09	0.930	-.1582464	.1446943
acu	.0859038	.1861415	0.46	0.644	-.2789269	.4507344
ptmc	.0100809	.0586539	0.17	0.864	-.1048785	.1250404
deprinaeu	.0122902	.0052439	2.34	0.019	.0020122	.0225681
tlu	-.1528668	.0768642	-1.99	0.047	-.3035179	-.0022158
hoinc	.0000216	.0000284	0.76	0.446	-.000034	.0000772
_cons	-.558418	.7848313	-0.71	0.477	-2.096659	.979823

Appendix 5: Results of Marginal Effects

. mfx compute

Marginal effects after probit

y = Pr(povstat) (predict)
= .49051065

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
age	-.0016668	.00442	-0.38	0.706	-.010337 .007003	50.8529
sexh*	-.1495148	.08735	-1.71	0.087	-.320716 .021686	.735294
marita~s	-.014173	.05344	-0.27	0.791	-.118908 .090562	2.46078
edu	.029567	.04277	0.69	0.489	-.054252 .113386	1.76961
hhs	.0666207	.02709	2.46	0.014	.013522 .11972	5.7598
tlhs	-.0027025	.03082	-0.09	0.930	-.063113 .057708	2.84926
acu*	.0342504	.07417	0.46	0.644	-.111121 .179621	.5
ptmc	.0040206	.02339	0.17	0.864	-.041828 .04987	4.23397
deprin~u	.0049017	.00209	2.34	0.019	.000802 .009001	35.5527
tlu	-.0609678	.03066	-1.99	0.047	-.12106 -.000876	3.9076
hoinc	8.61e-06	.00001	0.76	0.446	-.000014 .000031	5241.5

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Appendix 5: Conversion Scales

TLU Conversion		OECD Modified AEU conversion scale
Species	TLU Con	
Camel	1	Household head
Cattle	0.7	
Sheep	0.1	Other Adults
Goats	0.1	
Horses	0.8	Children
Mules	0.7	
Asses	0.5	
Pigs	0.2	
Chickens	0.01	

Appendix 6: Determining the Sample Size

In East Gojjam Zone, Dejen district, there are 95,483 total populations, (EGZFD, 2015/16). Among them in the case of this study 72,656 rural inhabitants from the representative eleven kebeles in the district of Dejen are considered. Using the above simplified formula at 95% of confidence interval with 72,656 total populations (N) considered under the study the sample size (n) at 7% level of precision (e) can be calculated as follows:

$$\begin{aligned}n &= \frac{72,656}{1+7,2656(0.07^2)} \\ &= \frac{72,656}{1+356.0144} \\ &= \frac{72,656}{357.0144} \\ &= 203.5 \\ &\approx 204\end{aligned}$$

Therefore, in this study among the total sampled 11 rural kebeles of 72,656 rural population of Dejen district 204 samples are drawn.