

DETERMINANTS OF URBAN HOUSEHOLD VURNERABILITY TO POVERTY IN ETHIOPIAN: EVEDENCE FROM ADAMA



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Declaration

I hereby declare that this MSc thesis entitled “ **Determinants of Urban Household Vulnerability to Poverty in Ethiopia: Evidence from Adama town**” submitted in partial fulfilment of the requirement of masters of science in economics (development economics) to the school of business and economics, Adama University, through the department of economics is my original work and has not been presented for degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

Anwar Ibrahim

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ACCRONYMS

CBN	Cost of Basic Needs
CSA	Central Statistical Authority
EEA	Ethiopian Economic Association
FAO	World Food and Agriculture Organization
FEI	Food Energy Intake
FGLS	Feasible Generalized List Square
FGT	Foster, Greer and Thorbecke
GNI	Gross National Income
HDI	Human Development Index
HDR	Human Development Report
HICES	Household Income, Consumption and Expenditure Survey
HV	Highly Vulnerable
Kcal	Kilo Calorie
LDCs	least-developed countries
MDGs	Millennium Development Goals
MOFED	Ministry of Finance and Economic Development
MPI	Multidimensional Poverty Index
NGOs	Non-Governmental Organizations
OLS	Ordinary Least Square
PRSP	Poverty Reduction Strategy Paper
RV	Relatively Vulnerable
Sd.	Standard deviation
UN	United Nations
UNDP	United Nations Development Program
VEP	Vulnerability as Expected Poverty
VER	Vulnerability as Exposure to Risk
VEU	Vulnerability as Lower Expected Utility
ViF	Variance Inflation Factors
WDR	World Development Report

ABSTRACT

In this study an attempt is made to examine urban households' vulnerability to poverty and its determinant, from a single visit household survey of Adama town. Moreover, the study tries to find out which groups of households are more likely to be poor and to remain poor in the near future. Hence, primary data was collected from 204 households drawn from four selected kebeles using stratified random sampling.

Employing the Cost of Basic Need (CBN) approach, total poverty line of the study area is estimated to be Birr 325 per month per adult equivalent and 30.88 percent of the population is observed to be poor. The 3 step FGLS estimation result shows that the incidence of vulnerability to poverty in the area is 38.72 percent and an additional of 6.3 percent of the population is found to be relatively vulnerable using the observed poverty rate as a threshold. From the descriptive statics a household headed by female, less educated, pensioner and unemployed is relatively more vulnerable to poverty. The OLS estimation result shows vulnerability to poverty is positively influenced by high dependency ratio, low educational attainment of head, age and shock like higher price of goods and services. Conversely vulnerability is negatively associated with: asset ownership, and government employee, NGO employee, transfer receive availability of credit, higher education attainment, ownership of asset and membership of community association. The results suggest a number of policies and programs that can reach the most vulnerable and reduce their probability of becoming poor in the future. These include: appropriate implementation of family planning programs, increasing investments in employment creation and productivity enhancement, and investment in human capital. For those households who lack economic assets, it will be helpful if development policies prioritize the building up of assets through financial services. The study also suggests the importance of policies that protect households from negative impact of shocks and crises.

CHAPTER ONE

INTRODUCTION

1.1 Background of The Study

Poverty is one of the most serious symptoms of human deprivation. As it exists today poverty is an issue of global concern afflicting people all over the world and it is considered one of the symptoms or manifestation of underdevelopment. With its multi-dimensional nature poverty is a world's greatest challenge in the twenty first century. This could be why poverty is a priority target of the Millennium Development Goals (MDGs). According to The United Nations Food and Agriculture Organization estimates that nearly 870 million people of the 7.1 billion people in the world, or one in eight, were suffering from chronic undernourishment in 2010-2012. Almost all the hungry people, 852 million, live in developing countries, representing 15 percent of the population of developing countries. There are 16 million people undernourished in developed countries (FAO, 2012).

The number of hungry grew in Africa over the period, from 175 million to 239 million, with nearly 20 million added in the last few years. Nearly one in four are hungry. And in sub-Saharan Africa, the modest progress achieved in recent years up to 2007 was reversed, with hunger rising 2 percent per year since then (FAO, 2012).

Children are the most visible victims of under nutrition. Children who are poorly nourished suffer up to 160 days of illness each year. Poor nutrition plays a role in at least half of the 10.9 million child deaths each year. Under nutrition magnifies the effect of every disease, including measles and malaria. The estimated proportions of deaths in which under nutrition is an underlying cause are roughly similar for diarrhea (61%), malaria (57%), pneumonia (52%), and measles (45%) (Black 2003, Bryce 2005). Malnutrition can also be caused by diseases, such as the diseases that cause diarrhea, by reducing the body's ability to convert food into usable nutrients.

Ethiopia is among the bottom of the least-developed countries (LDCs). Its per capita income, which is currently estimated to be US\$470, is among the lowest of LDCs, and its reliance on agriculture is among the highest in the group. Poverty in Ethiopia is widespread and multifaceted. Life expectancy at birth is 50 years, infant mortality and child mortality rates are 118 and 173 per 1000 live births, respectively, illiteracy rate is about 75% for females and 55% for males, and gross enrolment ratio at primary level of education is 23%(EEA, 2013).

Although poverty is multi-dimensional, it has always been studied in a world of certainty. Little regard has been given to the implications of exposure to risk, with some exceptions. More often its measurement is undertaken by analysing a monetary welfare indicator such as income or consumption, setting a poverty line and aggregating the poverty data (Jose R. Albert *et al.*, 2007). However, if the aim of studying poverty is not only improving the well-being of households who are currently poor, but also preventing people from becoming poor in the future, a new forward looking perspective must be adopted. From policy perspective, helping out those households who are at risk and households already poor who are likely to stay poor, should also be the primary objective of the policy maker. These households need to be provided social safety nets and other interventions that may minimize the likelihood that they will be poor in the future. The critical need then is to go beyond a grouping of who is currently poor and who is not, to an assessment of households' vulnerability to poverty.

The notion of vulnerability in the development economics literature is introduced in The World Development Report (WDR, 2001). Since then many researchers engaged in assessing vulnerability to poverty, mostly in developing countries, following the definition of that report. According to WDR (2001), vulnerability is defined as "the risk that a household or individual will experience an episode of income or health poverty over time". However, vulnerability can also be understood as the probability of being exposed to a number of other risks such as "violence, crime natural disasters, and being pulled out of school" (World Bank, 2001). Recently conceptual papers in economics dealing with the concept of vulnerability have emerged tremendously (e.g. Dercon, 2001; Chaudhuri *et al.*, 2002; Ligon and Schechter, 2003; Prowse, 2003; Bernd and Hermann, 2009; Dercon and Calvo, 2012)

Measured by any standard Ethiopia is one of the world poorest countries. According to a recent World Development Report, the country has one of the lowest GNI per capita in the world, and its purchasing power parity adjusted GNI per capita (US \$1,017) is ranked 173rd out of 187 countries (World Bank, 2013). Moreover, the Human development indicators of the United Nations Development Program (UNDP) also indicate to the seriousness and extent of poverty in the country. For instance, the Human Development Index (HDI) of Ethiopia is 0.369 for 2012, and this is below the average of 0.466 for countries in the low human development group and below the average of 0.475 for countries in Sub-Saharan Africa (ibid).

The incident of poverty in Ethiopia can be explained in a range of well-being measures of the population. For example, the life expectancy at birth in the country is approximately 59.7 years. According to most recent survey data, in Ethiopia 87.3 percent of the population live in multidimensional poverty (the MPI 'head count') while an additional 6.8 percent are vulnerable to multiple deprivations (UNDP, 2013).

Survey of literature on poverty and vulnerability suggests that most of the related studies conducted so far not only focus on poverty at a point in time but also do they hardly give a comprehensive explanation of the determinants of vulnerability to poverty. Even if there are few studies on the area, they largely focus on rural part of the country and mainly their center of attention is on measuring vulnerability (e.g. Abrham and Siegfried, 2012; Yesuf, 2007; Dercon, 2001; Dercon and Krishnan 2000). Therefore, little is known on the covariates of vulnerability to poverty in urban Ethiopia. The motivation and objectives of the study emanates from the indicated gap in knowledge.

1.2 Statement of the problem

As in many developing countries, poverty reduction is a primary development goal in Ethiopia. The country is committed to the Millennium Development Goals (MDGs), which seek, among other things, to eradicate extreme poverty and hunger. Though there is significant achievement in reducing poverty in the country, many of the indicators remained by far the highest in the world. According to the 2010/11 HICES, the proportion of poor people (poverty head count index) in the country is estimated to be 29.6% in 2010/11, while the proportion of the population below the poverty line stood at 30.4% in rural areas, it was estimated to be 25.7% in urban areas.

Much of the previous analyses on poverty in Ethiopia have generally focused on rural rather than urban areas (Abrham and Siegfried, 2012; Yesuf, 2007; Dercon, 2001; Dercon and Krishnan, 2000 as cited in Abduljelil, 2013). This is due to the fact that nearly 85 per cent of the population lives in rural areas. Though the urban population is assumed to have greater wellbeing, still a significant portion (25.7%) of the population lives below the nationally defined poverty line (HICES, 2010/11). Moreover, vulnerability to shocks is more serious in urban areas than in rural areas. The Government Poverty Reduction Strategy Paper (PRSP) in 1995 and 1999/00 noted without doubt that urban households were more vulnerable than rural households. This was partly due to the fact that urban households lack assets such as land and livestock, which are available in rural areas. Rural people have more social and economic networks and traditional values to mitigate vulnerability compared to urban people.

The notion of risk and its contribution to poverty dynamics is also gaining growing importance in poverty literature. The dynamic conceptualization of poverty is important from both theoretical and policy perspectives. Theoretically, the existence of risks can potentially influence household decision making process. An adequate understating of risk-poverty linkage is also 'beneficial in identifying the most vulnerable ones and the characteristics that correlate with movements in and out of poverty, can yield critical insights for policy makers' (Ajay and Rana, 2005).

Consequently, to address poverty reduction as a goal, public policies should not only highlight poverty alleviation interventions to support those who are identified as the poor ex post, but also the poverty ‘prevention’ interventions to help those who are poor ex ante, that is, prevent those who are vulnerable to shocks not to fall into poverty. Little is studied in urban Ethiopia regarding this. Adama is one of the urban centres in Ethiopia that share the common characteristics’ of urban part of Ethiopia. According to the researcher point of view there is no more study regarding household vulnerability to poverty status in the town. Recognizing this problem, government and policy makers must have updated, sequential and clear information which is important to know major factors that the determinants of urban household vulnerability to poverty in Adama town.

The study specifically tries to answer the following question.

1. What is the extent of vulnerability to poverty of the households in the study area?
2. What are the determinants of urban household vulnerability to poverty in Adama?
3. Which part of the society more vulnerable to poverty in the study area?
4. What are the solutions or the way forward to solve or minimize this problem?

1.3. Objective of the Study

The general objective of the study is to examine the determinants of urban household vulnerability to poverty in Adama town.

1.3.1 Specific objective

More specifically the study focuses on:

- ✓ Measuring the extent of vulnerability to poverty of the households in the study area
- ✓ Identifying the determinants of household vulnerability to poverty in the area
- ✓ Identifying the most vulnerable portion of the society in the study area

1.4. Significance of the study

The purpose of this study is investigating the major factors that determine vulnerability to poverty in Adama. The result of this study will help the government and policy maker to aware about the existence of the problem and try to recommend remedial solution or information for concerned body as the whole. Though there are researchers who attempted to study the dynamic nature of poverty in Ethiopia by including topics like vulnerability, they largely focus on rural part of the country and centre of their attention is on measuring vulnerability. Little is known on the

correlates of vulnerability to poverty in urban Ethiopia. Therefore, this study makes a humble attempt to fill the gap by investigating the determinants of vulnerability to poverty on the study area

Moreover, the study a step forward in developing policies, which help not only the peoples who are identified as poor but also those at the edge of joining the poor. Last but not least, the study will be a stepping stone for those who have interest in conducting further studies on the area.

1.6. Scope of the study

The study focus on the determinant of urban households' vulnerability to poverty using a single visit household survey on Adam town only. Because of various problems such as lack of available information or data and other problem it not be possible to include all potential variable that are expected to have significant effect on vulnerability to poverty. Accordingly, the study was intended to look at only demographic variables that include in the model. Assuming other factor remains constant.

1.7. Limitation of the Study

The main limitation of this study is that it concentrates on only using cross sectional and disaggregates data. This means that there are other potential data as well as method of data analysis that explain the determinant of urban households' vulnerability to poverty This is expected to be a topic of further research and it is not addressed in this study. Studies that analyse more aggregate data and uses secondary data may come up with different result.

Another limitation of the study emerges from the information collected through the questionnaire, i.e. the questionnaire was designed to provide information on the income and consumption pattern of the households in the study area. Hence, the study does not give information on other dimensions of poverty like: health, infrastructural facilities and standard of living. Moreover, during collecting data the researcher has made only single visit to the households. Accordingly, the credibility of the information collected from the households depends on their recall. And. Because of limited time, finance, lack of research document and resources, the study concentrate on the urban kebeles moreover survey not include rural resident.

1.8. Organization of the study

The study is organized to contain five chapters .the first of which is the introduction part, which shows the general feature of the study (background, statement of the problem, objective, significance, limitation and organization of the study). Some relevant literature is presented in the second chapter. Chapter three discusses the data and methodology employed in the study. The fourth chapter is devoted for the analysis and discussion of the findings followed by conclusion and policy implication in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

2.1.1. Defining Vulnerability to Poverty

An attractive definition of vulnerability to poverty is “the propensity to suffer a significant welfare shock, bringing the household below a socially defined minimum level” (Haughton and Khandker, 2005, citing Alwang, Siegel, and Jorgensen 2001). According to Quisumbing (2002) vulnerability is the likelihood that at a given time in future, an individual or household will have a level of welfare below a predetermined line within a fixed time interval. Chaudhuri *et al.*, (2002), on the other hand defined vulnerability within the framework of poverty eradication, as the ex-ante risk that a household will, if currently non-poor, fall below poverty line, or if currently poor will remain in poverty. Vulnerability has also been defined as the uncertainty of future income streams an associated loss of welfare caused by this uncertainty (Ligon and Schechter, 2003). They noted that a household with very low expected consumption expenditures but with no chance of starving may well be poor but still might not wish to trade places with a household having a higher expected consumption risk.

Although much attention has been paid to defining and assessing vulnerability to poverty there is no unique generally accepted definition of vulnerability (Chaudhuri, 2000). Christiansen and Subbarao (2004) define vulnerability as the ex-ante potential of a decline in future well-being, or the ex-ante probability of falling below the poverty line at some point in the future. Along the same line, McCulloch and Calandrino (2003) see vulnerability as the probability of being below the poverty line in any one year. According to Dutta *et al.*, (2010) vulnerability at the individual level can be thought in terms of the uncertainty in the outcomes of different indicators such as income and consumption that the individual faces in the future.

Alwang and Siegel (2000) provide a much broader conceptualization of vulnerability that incorporates the concepts of sensitivity and resilience. According to their analysis vulnerability has four major components. These are risk, exposure, response and outcome. Risk is the probability of an event happening, Exposure may be conceived as the value of the assets at risk or what will be lost from the realization of an

uncertain event. Exposure is a function of decisions and actions taken by households, for example, the choice of employment and the asset portfolio. Response on the other hand is defined as the efforts to mitigate and cope with risk and exposure. This will depend on the assets available to the household or the individual. The type of assets that the household has at its disposal is critical to the nature of the response to the event (Alwang and Siegel, 2000)

2.2. Why measure vulnerability?

The study of poverty focuses on those who are currently poor (or were poor in the past). This is because poverty can be measured only ex post. Such an approach has its merits: for instance, by using actual data one may measure the effects of past public interventions on the extent of poverty; and it allows us to identify whose poverty needs to be alleviated. (Haughton and Khandker, 2009)

But governments and policy makers are typically more interested in the effects that their measures will have in the future. For this it would be valuable to be able to identify those who are expected to be poor ex ante (that is, in the future). Such households are considered to be vulnerable to poverty. As Chaudhuri, Jalan, and Suryahadi (2002) put it, “for thinking about appropriate forward-looking anti-poverty interventions (. . . that aim to prevent or reduce future poverty . . .), the crucial need then is . . . an assessment of households’ vulnerability to poverty.”

A household is vulnerable to poverty if it is likely to be poor in the future. Dercon (2001) defines vulnerability as “ex ante poverty.” Since vulnerability is a forward-looking concept, it measures “exposure to poverty rather than the poverty outcome itself” (Dercon, 2001).

2.3. Approaches of measuring vulnerability

Over the past two decades scholars have tried to measure vulnerability in different ways. As an area of economic research, it has been widely explored by scholars using panel and cross-sectional data in a way that separates the chronically and transitorily poor. However, in many developing countries, serious limitations with respect to availability of reliable panel data have compelled vulnerability analysis from single panel data in a way that utilizes the variance of consumption to estimate

the expected poverty of households. Also, some studies have analysed poverty vulnerability by looking at the poverty incidence, gap and severity among households that are considered to be vulnerable, either due to their geographical location, occupation and socio-economic/demographic characteristics (elderly, orphans, internally displaced populations, landless laborers, rural people, etc. (Hoogeveen *et al.*, 2005, as cited in Abduljelil, 2013).

Ideally the implementation of vulnerability assessment requires panel data, and information on (i) the shocks that affect the households, and (ii) the household ability to with stand those shocks (Holzmann, 2003). However, panel data are rarely found, especially in developing countries. Nevertheless, cross-sectional data have been advised to estimate vulnerability, namely vulnerability as expected poverty (VEP), as a second-best solution (Chaudhuri, 2003; Chaudhuri *et al.*, 2002). Concepts and measurements for vulnerability to poverty that have been developed include Vulnerability as Exposure to Risk (VER), Vulnerability as Expected Poverty (VEP) e.g. Chaudhuri *et al.*, (2002), Pritchett *et al.* (2000), Vulnerability as Low Expected Utility (VEU) e.g. Ligon and Schechter (2003) and an Axiomatic Approach that combines expected poverty with expected poverty depth Calvo and Dercon (2005). Here, some methodologies are discussed in detail.

2.3.1. Vulnerability as expected poverty

In the expected poverty framework, an individual's vulnerability is the prospect of that person becoming poor in the future if currently not poor, or the prospect of him/her continuing to be poor if currently poor (Christiaensen and Subbarao 2004). Thus, vulnerability is seen as expected poverty, while consumption (income) is used as a proxy for well-being. This method is based on estimating the probability that a given shock or set of shocks will move household consumption below a given minimum level (such as a consumption poverty line) or force the consumption level to stay below the minimum if it is already below this level (Chaudhuri *et al.* 2002). This measure is particularly useful when only cross-section data are available. Vulnerability as expected poverty (VEP) of household (or individual) i at time t is defined by:

$$\begin{aligned}
VEP_t^i &= \Pr(C_{t+1}^i \leq Z^*) \\
&= \int_0^Z f(C_{t+1}^i) dC_{t+1}^i
\end{aligned}$$

Where C_{t+1}^i is the per capita consumption (or income) of household i at time $t + 1$, f is consumption distribution of the household and Z is the per capita expenditure (or income) requirement defined as the poverty line. A household (or individual) is then considered as vulnerable to poverty if its VEP is larger than a probability threshold level p :

$$V_i = \begin{cases} 1 & \text{if } VEP > p \\ 0 & \text{if } VEP \leq p \end{cases}$$

Where, V_i is a binary variable indicating whether household i is vulnerable or not. So, while VEP is a probability (between zero and one), being vulnerable is a state indicating the probability that the household's consumption is below the poverty line. In practice, the most common threshold for VEP is 0.5 which indicates that a household whose VEP exceeds 50% is more likely to end up being poor and can thus be considered to be vulnerable to poverty. This threshold has the advantage that if a household is just at the poverty line and expects a mean zero shock it has vulnerability to poverty of 0.5 (Chaudhuri *et al.*, 2002).

One of the disadvantages of this method, however, is that the use of estimations made across a single cross-section requires the strong assumption that the cross-sectional variability captures temporal variability (Hoddinott and Quisumbing 2003).

2.3.2. Vulnerability as low expected utility

The approach takes into account the fact that individuals are risk-averse so that expected utility falls as the uncertainty of income increases. Thus, vulnerability is defined by Ligon and Schechter (2003) as the utility lost due to risk, as the difference between the expected household consumption and the certainty-equivalent consumption. With this approach, the utility function can be decomposed into two distinct components measuring vulnerability: poverty and risk (aggregate and idiosyncratic risk). Thus, analysis of vulnerability helps to investigate sources and forms of risks households face. This helps to design appropriate safety net programs to reduce or mitigate risk, hence vulnerability. Ligon and Schechter (2003) applied

this method to a panel dataset obtained from Bulgaria in 1994, and found that poverty and risk played roughly equal roles in reducing welfare.

However, for this measurement the data requirements are too high to be of much practical use here. Not only are utility function unobservable, but there are just a handful of longitudinal data sets from low-income countries with an adequate time dimension to yield precise measures of household-specific consumption variability (Kamanou and Morduch, 2005). According to Kanbur, (1987) it is difficult to account for an individual's risk preference, given that individuals are ill-informed about their preferences, especially those related to uncertain events, which makes the approach less practical.

2.3.3. Vulnerability as uninsured exposure risk

This method is based on an ex post assessment of the extent to which a negative shock causes welfare loss (Hoddinott and Quisumbing 2003). Here, the shock impact is assessed by using panel data to quantify shock-induced changes in consumption. Skoufias (2003) employed this approach to analyse the impact of shocks on Russia. In the absence of risk-management tools, shocks impose a welfare loss that materializes through reductions in consumption. The amount of loss incurred due to shocks equals the amount paid as insurance to keep a household as well off as it had been prior to any shock.

This approach, which is mainly based on regressions of panel datasets containing the consumption levels of specific households before and after a specific shock, analyse show households manage to smooth their consumptions over time, and categorizes households as vulnerable or less vulnerable.

Ligon and Shechter (2002) correctly point out that in this approach; vulnerability to shocks does not depend directly on the household's level of consumption. Put another way, unlike the 'vulnerability as expected poverty approach', no welfare weights are attached to changes in consumption amongst different households. A ten percent reduction in income of a millionaire and a destitute are treated equally, which is restrictive. In addition, VER employs panel data sets to assess the impact of shocks and in the absence of this data estimates, it is typically impossible to measure the impact of shocks such as droughts, floods and hailstorms, as ex ante and ex post consumption and income data are generally not included in cross-sectional household-

level datasets. Another shortcoming of the approach is the assumption that positive and negative income shocks have symmetric effects. The factors that determine whether one can deal with positive shocks compared to dealing with negative shocks may be quite different in general and between households.

2.4. The poverty line

Once a household's consumption computed, the next step is to determine whether that amount places the household "in poverty", or defines the household as "poor". The threshold that we use for this is the poverty line. The poverty line defines the level of consumption (or income) needed for a household to escape poverty. There are a number of ways that such a poverty line may be identified. The most common approach is to estimate the cost of a consumption bundle for which basic consumption needs will be met. This is known as the cost of basic needs approach. It proceeds by first estimating the food expenditure necessary to attain some recommended food energy intake. This expenditure level can be considered as the food poverty line. Next, an allowance is made for non-food goods (such as clothing and shelter) to arrive at the total poverty line (Ravallion 1994; Lipton and Ravallion, 1995, cited in Abduljalil, 2013).

Deriving the poverty line using the cost of basic needs approach, however, presents some difficulties. For example, setting the food energy requirement may be problematic as there are significant variations among people in physical features and work habits. This renders the task of setting a minimum energy requirement, even for a specific group in a specific region, daunting. Even after a minimum requirement is set, there still remains the problem of choosing a food bundle that meets it (Sen, 1999). A bundle that meets the requirement at minimum cost (given prevailing prices) could be chosen, but such a bundle is of little relevance if it is not in tune with the eating habit of the poor. As Sen (1999) points out, "the actual incomes at which specified nutritional requirements are met will depend greatly on the consumption habits of the people in question". The second difficulty associated with deriving the basic needs poverty line is in making an allowance for non-food goods. This stems from the fact that there is nothing that can serve the same role as food energy requirements in anchoring the non-food component of the poverty line (Ravallion, 1994 cited in Abduljelil, 2013).

Other methods that have been commonly used to derive the poverty line in contemporary poverty analysis are; the ‘food energy intake’ and ‘food share’ methods (Ravallion 1994). Both approaches are based on the assumption that there is a minimum energy requirement for a typical person to keep up normal activities, such as the 2,200 Kcal per day threshold stipulated by the World Health Organization (1985). Thus, the ‘food energy intake’ method attempts to identify the total consumption expenditure at which a person is expected to attain the minimum food energy requirement. This is accomplished by regressing calorie intake on consumption expenditure or income. The poverty line, then, becomes that level of total expenditure at which the minimum energy requirement is met (Greer and Thorbecke 1986; Ravallion 1994). The advantage of this method is that it automatically includes an allowance for non-food goods, circumventing one of the difficulties mentioned above. However, it may lead to an ‘inconsistent poverty comparison across sub-groups or over time since people with the same command over basic consumption needs will not in general be treated the same way’ (Lipton and Ravallion, 1995).

2.5. Empirical literature

2.5.1. Evidence from other countries

Chaudhury *et al.* (2002) applied his methodology to cross-sectional data for Indonesia. The results show that the vulnerable population is generally larger than the fraction of population observed as poor at a given point in time, implying that the true poverty cost of risk is higher than the observed outcome. While 22% of the Indonesian population was observed to be poor in December 1998, however their finding indicated that 45% of the population was vulnerable. The author also found differences between the distribution of vulnerability and poverty across different population characteristics (i.e. regions, educational levels, etc.). More importantly they found a striking difference in the sources of vulnerability for different segments of the population. For rural households and for less-educated households, the main source of vulnerability appears to be low mean consumption prospects; for urban households and for more highly educated households, on the other hand, vulnerability to poverty stems primarily from consumption volatility. This too has important implications for the types of poverty prevention programs that are needed to address the vulnerability of different groups within the population.

Dercon (2001) was conduct research on vulnerability in Indonesia and he came up with the result that 22 percent of those surveyed by the Mini-SUSENAS survey in Indonesia in 1998–99 were poor, fully 45 percent were considered to be vulnerable, of which 8 percent were highly vulnerable to poverty and the other 37 percent somewhat vulnerable. In other words, vulnerability (as defined here) is more widespread than poverty. This finding accords with the results of participatory poverty assessments, which typically show that a substantial part of the population is seriously and legitimately concerned about falling into poverty, even if they are not currently poor. It also makes the targeting of (future) poverty more difficult, since more people have significant potential for falling into poverty and the poor constitute 22 percent of the population, but more than 60 percent of those who are highly vulnerable. Or, to put the same point slightly differently, a poor person is almost six times as likely to be vulnerable to poverty as someone who is not currently poor. At first sight, this suggests that poverty predicts vulnerability quite well.

Alayande and Alayande (2004) applied the Chaudhuri (2000) methodology to assess the level of vulnerability to poverty in Nigeria using national data of 1996. The findings of the study show that 87 percent of Nigerians are vulnerable to poverty. The study further found that while 41.2 percent of the populations fall into chronic poverty, only 18.1 percent of the populations are vulnerable to chronic poverty. Their study also shows that 68.5 percent of the population is highly vulnerable, whereas only 31.5 percent of the population has low mean vulnerability. It was recommended that to reduce vulnerability, pro-poor growth driven by macroeconomic policy environment is required. A study in the same country by Oluwatayo (2004) analysed the impact of income risk on the level of well-being of rural households in Ekiti state, Nigeria. Income risk was defined as the risks associated with variability in income well-being. It was found that household heads' age, years of formal education, household size, size of land cultivated and total expenditure (on food and non-food items) are major determinants of income risks among rural households, while income risk impacts negatively on the well-being of households.

S. Imai *et al.* (2009) studied the impact of taxation on poverty and ex ante vulnerability of households in rural China based on national household survey data in 1988, 1995 and 2002. Their study showed that poverty and vulnerability have reduced

significantly in China during the period from 1988 to 2002 and geographical disparity of poverty and vulnerability is substantial across the period and is increasing. The study by S. Imai *et al.* (2009) concluded that both poverty and vulnerability are associated with household characteristics, such as household head's educational attainment, in which region a household lives, and the infrastructure, such as the access to electricity power supply. However they found few factors associated with not poverty, but vulnerability, such as, farm land size and the share of the farm land irrigated, that is, landholding or access to irrigation is a key to reducing vulnerability. Moreover, they found that highly regressive taxation system not only created a large rural and urban gap but also increased the rural poverty and vulnerability levels indicating the abolishment of agricultural tax in the country.

Jamal, (2009) investigated the extent of household vulnerability to poverty in Pakistan. His study estimated the extent of vulnerability as “expected poverty” using cross-sectional household surveys. The estimates show that about 52 percent population was vulnerable to poverty during 2004-05. The rural headcount ratio in terms of household vulnerability is relatively high as compared to the vulnerability incidence in urban areas. The study found that despite the declined monetary poverty during the period 2001-05, the relative incidence of vulnerability has increased from 50 in 2001 to 52 percent in 2005

2.5.2 Evidence from Ethiopia

Earlier studies analysing the dynamics of poverty in urban Ethiopia are relatively few, reflecting the lack of an appropriate and reliable household survey data that would allow the comparison of welfare across time. Since the early 1990's, however, periodic household surveys have been conducted that have facilitated the analysis of both urban and rural poverty.

One of the earliest attempts to examine urban poverty in Ethiopia was by Tadesse (1996) using the 1994 Ethiopian Urban Household Survey (EUHS). The survey provided, among other things, information on the demographic and consumption behavior of 1,500 households randomly selected from seven urban centres of the country. His study was limited to food poverty in recognition of the fact that satisfaction of basic food requirements remains a major problem for poor households in Ethiopia. The findings proved the hypothesis that there is abject poverty in urban

Ethiopia, with 39 percent of the urban population living below the food poverty line. The analysis indicates that the highest incidence of poverty was recorded for the city of Hawassa, followed by Addis Ababa, Dessie, Mekelle, Jimma, Bahir Dar, and Dire Dawa(cited in Abduljelil,2013).

Abduljelil(2013)examine urban households' vulnerability to poverty and its determinant, from a single visit household survey of Hawassa city by Employing the Cost of Basic Need (CBN) approach, total poverty line of the study area is estimated to be Birr 318.7 per month per adult equivalent and 30.5 percent of the population is observed to be poor. The 3 step FGLS estimation result shows that the incidence of vulnerability to poverty in the area is 37.9 percent and an additional of 11.33 percent of the population is found to be relatively vulnerable using the observed poverty rate as a threshold. From the descriptive statics a household headed by female, less educated, pensioner and unemployed is relatively more vulnerable to poverty. The OLS estimation result shows vulnerability to poverty is positively influenced by high dependency ratio, low educational attainment of head, and pensioner headiness. Conversely vulnerability is negatively associated with: age of head, asset ownership, and government employee headiness. Observing by the type of negative shocks experienced by households; theft of asset, head illness and head loss of job increases the probability of falling below the poverty line in near future.

Endale (2011), which explored the extent of vulnerability to poverty from urban residents of Arbaminch town, using a single visit cross sectional data from 224 households. To construct the poverty lines he used the cost of basic needs (CBN) approach, the procedure used by Ravallion and Bidani (1994). Besides he employed Chaudhury *et al.* (2002) and Chaudhury, (2003) methodology to estimate the vulnerability level of households. He also used OLS model for analysis of determinants of household vulnerability to poverty against a series of independent variables.

In his study, 44.6 % of the population in the area was highly vulnerable to poverty. He made a distinction between LM-vulnerability (vulnerability caused by a low level of resources), and HV-vulnerability (vulnerability caused by the inability to smooth consumption in the presence of negative shocks). Accordingly he found that about

one fourth of the population is vulnerable due to low level of resources, while for 20 percent of the population vulnerability to poverty stems from high volatility of consumption. The study also indicated that households with small family size, more employed adults, privately owned house, good access to services, high social capital is less likely to fall in to poverty in the near future. On the other hand, households headed by older people, less educated, female and small number of close relatives in the area are relatively more vulnerable to poverty

CHEPTER THREE

Data and Methodology

3.1. Description of the study area

The study is conducted in Adama town which is located in the Oromia regnial state and a city in central Ethiopia and the previous capital of the Oromia Region. Adama forms a Special Zone of Oromia and is surrounded by MisraqShewa Zone. It is located at **8°32'N 39°16'E** **8.54°N 39.27°E** at an elevation of 1712 meters, 99 km southeast of Addis Ababa. The city sits between the base of an escarpment to the west, and the Great Rift Valley to the east.

The city name Adama may have been derived from the Oromo word *adaamii*, which means a cactus or a cactus-like tree. More specifically, *adaamii* means *Euphorbia candelabrum*, a tree of the spurge family, while *hadaamii* would mean Indian flag. Following World War II, Emperor Haile Selassie renamed the town after Biblical Nazareth, and this name was used for the remainder of the twentieth century. In 2000, the city officially reverted to its original Oromo language name, Adama, though "Nazareth" is still widely used.

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this city has 14 kebeles and a total population of 220,212, an increase of 72.25% over the population recorded in the 1994 census, of whom 108,872 are men and 111,340 women. With an area of 29.86 square kilometres, Adama has a population density of 7,374.82; all are urban inhabitants. A total of 60,174 households were counted in this city, which results in an average of 3.66 persons to a household, and 59,431 housing units. The four largest ethnic groups reported in Adama are the Oromo (39.02%), the Amhara(34.53%), the Gurage (11.98%) and the Silte (5.02%); all other ethnic groups made up 9.45% of the population. Amharic is spoken as a first language by 59.25%, 26.25% spoke Oromiffa and 6.28% spoke Guragiegna; the remaining 8.22% spoke all other primary languages reported. The majority of the inhabitants said they practiced Ethiopian Orthodox Christianity, with 63.62% of the population reporting they observed this belief, while 24.7% of the population were Muslim, and 10.57% were Protestant

3.2. Data type and source

To analyse the incidence and determinants of vulnerability to poverty, the study use primary data using a structured questionnaire. The questionnaire was design to provide statistical information on households' demographic composition, income and consumption expenditure, human capital variable, idiosyncratic and covariate shocks that the household is exposed to in the past five years and other important socio-economic variables. For this, the unit of observation is the household (defined as a group of persons eating and living together for more than six months of the year). The survey in this study was conducted between March and April of 2015 using a sample of 204 households from 4 urban kebeles of Adama town.

Secondary data was collected from Adam city Administration Finance & Economic office, the central statistics authority and selected kebeles administrations.

3.3. Sampling techniques and sample size

After determining the total sample size the study employed Stratified sampling technique and appropriately allocated the sample to the strata of interest. At the first stage kebeles were categorized in to two categories based on their heterogeneous characteristics. There are 14 Kebeles in Adama town consisting of 62259 estimated households and a total population of 220212 (CSA, 2007).

Under this technique, the population or 14 kebeles were divided into two classes or sub-population depends on the kebeles that have more commercial center and that have more resedential areas. This makes individually more homogeneous than the total population. The different sub-populations are called strata. 4 kebeles two from each group were selected from the classes by simple random sampling technique. Since each stratum is more homogeneous than the total population, relatively representative sample elements are obtained from the target population.

The total number of households in the four selected kebeles is used to determine the sample size. Using published table by Glenn D., (1992) at 7% acceptable error (precision), the sample size is determined to be 204 (Table 3.1).

Table 3.1 Sample Size by Kebeles					
S.no		Kebele	Population	Proportion	Sample Proportion
1	Kebeles with More commercial center	07	3037	20.2%	31
		12	3147	20.93%	43
2	Kebeles with more resedential areas	02	3750	24.9%	51
		11	5100	33.9%	69
Total			15034		204

As it was mentioned above, the sample sizes were determined based on published tables, which provide the sample size for a given set of criteria. As presented in table 3.2.

Table3.2. Sample Size for $\pm 3\%$, $\pm 5\%$, $\pm 7\%$, and $\pm 10\%$ Precision Levels where Confidence Level is 95% and $P=.5$.

Size of Population	Sample Size (n) for Precision (e) of:			
	$\pm 3\%$	$\pm 5\%$	$\pm 7\%$	$\pm 10\%$
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

Source: (Glenn D. Israel, 1992). This document is PEOD6, one of a series of the Agricultural Education and Communication Department, UF/IFAS Extension. Original publication date November 1992 Revised April 2009. Reviewed in June 2013.

The desired a confidence level of 95%. Furthermore, a plus or minus 7 % precision level is desired. The study area consisting of 62259 estimated households. The sample sizes determined to be 204 household. Finally 204 households were randomly selected from each representative kebeles.

3.4. Method of data analysis

The method of analysis used in this study is discussed in two parts. The first part deals with the measurement of vulnerability to poverty in urban part of the town. To this end the study used three steps Feasible Generalized Least Squares (FGLS) method as suggested by Amemiya, (1977).The second part discuss the determinants of vulnerability to poverty. The OLS model is employed for assessing the determining factors of vulnerability to poverty. A brief description is provided below on the respective models employed in this study.

3.4.1. Model specification and estimation technique

Ideally, the assessment of vulnerability to poverty requires panel data, i.e., records of the same households over several years. However, for many developing countries, reliable panel data's are scarce and only cross-sectional survey data are available (e.g. Azam and Imai, 2009). Due to the inexistence of longitudinal data in developing country, assessing vulnerability to poverty became difficult. However, different scholars have tried to adopt different methodologies of measuring vulnerability. Among others, (Chaudhuri, *et al.*, 2002: Ligon and Schechter, 2003: Bernd and Hermann, 2009: Dercon and Calvo, 2012) are some of the pioneering individuals in the field. Particularly, the works of (Chaudhuri *et al.*, 2002) came up with a method of measuring vulnerability from a cross-sectional data. Accordingly, the study employed the methodology proposed by Chaudhuri *et al.*, (2002) by assuming vulnerability as Expected Poverty (VEP), an *ex-ante* measure. The method has advantage in terms of its ability to identify households exposed to risks but who are not poor (e.g. Adepoju and Yusuf, 2012). In this approach vulnerability is defined as the probability of being poor in the future and basically can take on two forms. It is either the *ex- ante* risk that a household that is currently not poor will fall below the poverty line or the risk that a household that is currently poor will remain poor.

3.4.1.1. Vulnerability as expected poverty

The model can be formally expressed as follows: The vulnerability level of a household h at time t is defined as the probability that the household will find itself poor at time $t + 1$:

$$V_{ht} = \Pr (C_{ht+1} \leq Z^*) \dots\dots\dots 3.1$$

Where C_{ht+1} is the household's per-capita consumption level at time $t + 1$ and Z^* is the absolute consumption poverty line.

In this framework, the level of vulnerability at time t is defined in terms of the household's consumption prospects at time $t+1$. This implies that the probability that a household will find itself poor depends on its expected (i.e. mean) future consumption, and on the volatility of its consumption stream (i.e. variance). Hence, to determine the ways in which certain household characteristics are associated with vulnerability, we need to estimate not only how the expected consumption level of a

household varies with these characteristics, but also how these characteristics affect the variance (and possibly higher moments) of consumption.

Following the works of (Chaudhuri, *et al.*, 2002), the stochastic process generating the Consumption of a household h is given by:

$$\ln C_h = X_h \beta + e_h \dots \dots \dots 3.2$$

Where C_h is per capita consumption expenditure, X_h represents a bundle of observable household characteristics; such as household size, location, educational attainment of the household head, etc., β is a vector of parameters, and e_h is a mean-zero disturbance term that captures idiosyncratic factors (shocks) that contribute to different per capita consumption levels for households that are otherwise observationally equivalent. The variance of the disturbance term e_h is given by the following function:

$$\delta^2_{e, h} = X_h \theta \dots \dots \dots 3.3$$

To estimate β and θ in equation (3.2) and (3.3) Amemiya (1977) suggested a three-step feasible generalized least squares (FGLS) procedure (Chaudhuri, *et al.*, 2002).

First, the parameters β in equation (3.2) were estimated using ordinary least square (OLS) procedure. Then, the estimated residual from equation (3.2) were used to estimate:

$$\delta^2_{e, h} = X_h \theta + \mu_h \dots \dots \dots (3.4)$$

Equation 3.4 is estimated using OLS and the predictions from this equation are used to transform the equation as follows:

$$\frac{\hat{\sigma}^2_{OLS}}{X_h \hat{\theta}_{OLS}} = \left(\frac{X_h}{X_h \hat{\theta}_{OLS}} \right) \theta + \frac{\mu_h}{X_h \hat{\theta}_{OLS}} \dots \dots \dots 3.5$$

This transformed equation is estimated using OLS to obtain an asymptotically efficient FGLS estimate $\hat{\theta}_{FGLS}$. Note that $X_h \hat{\theta}_{FGLS}$ is a consistent estimate of $\delta^2_{e, h}$, and the variance of the idiosyncratic component of household consumption.

The estimates:

$$\hat{\sigma}_{e, h} = \sqrt{X_h \hat{\theta}_{FGLS}}, \text{ then used to transform equation (3.2) as follow:}$$

$$\frac{\ln C_h}{\hat{\sigma}_{e, h}} = \left(\frac{X_h}{\hat{\sigma}_{e, h}} \right) \beta + \frac{\varepsilon_h}{\hat{\sigma}_{e, h}} \dots \dots \dots 3.6$$

OLS estimation of equation (3.6) yields a consistent and asymptotically efficient estimate of β . Once we get the estimates of $\hat{\beta}$ and $\hat{\theta}$ we will be able to estimate expected Log consumption equation (3.7) and variance of Log consumption (3.8) for each household h :

$$E[\ln C_h | X_h] = X_h \hat{\beta} \dots \dots \dots 3.7$$

And the variance of log consumption:

$$\hat{V}[\ln C_h | X_h] = \hat{\sigma}_{e,h}^2 = \hat{X}_h \theta \dots \dots \dots 3.8$$

Assuming that consumption is log-normally distributed (i.e., that $\ln C_h$ is normally distributed), we are able to use these estimates to form an estimate of the probability that a household with the characteristics, X_h , will be poor, i.e, of the household's vulnerability level. Letting $\Phi(\cdot)$ Denote the cumulative density of the standard normal; this estimated probability will be given by:

$$\hat{Vh} = \hat{Pr}(\ln C_h < \ln Z | X_h) = \Phi\left(\frac{\ln Z - X_h \hat{\beta}}{\sqrt{X_h \hat{\theta}}}\right) \dots \dots \dots 3.9$$

Where $\hat{Vh}$ denotes vulnerability to poverty, that is the probability that the per capita consumption level (C_h) will be lower than the poverty line (Z) conditional on household characteristics X_h . Meanwhile, $\Phi(\cdot)$ denotes the cumulative density of the standard normal distribution and $\sqrt{X_h \hat{\theta}}$ is the standard error of the equation (3.2). Whereas $\ln Z$ is the log of the minimum consumption income level beyond which a household would be called vulnerable.

3.4.2. Poverty line Determination

Once information is gathered on consumption expenditure of households a poverty line (define as the level of consumption or income needed for a household to escape poverty) should be determined for further aggregation and analysis of poverty and vulnerability to poverty. To this end, the study used the cost of basic needs (CBN) approach and the procedure used by Ravallion & Bidani (1994). Hence, CBN approach can better explain urban poverty because urban poverty mostly characterized by monetized economy and lack of basic services and the problem is not Only related with food poverty but also cost of non-food items like housing rent, education fees, transport and others are substantial to be considered. In the CBN approach, first households are ordered ascendingly according to their consumption

expenditure and the poorest 40% of the sample population identified as a reference group. Consideration is also given for household size in constructing poverty line by dividing household consumption expenditure to adult equivalence.

The steps followed in construction of CBN method following Revallion and Bidani (1994) are:

- ✚ The food consumption behaviour of the reference group is accessed to determine average quantities per adult equivalent of basic food items that make up the required food basket.

- ✚ The value of food consumed per adult equivalent is derived by dividing the total value of food by household adult equivalent

$$Y_i = X_i / H_i \dots\dots\dots 3.10$$

Where Y_i : total value of food consumed per adult equivalent units, X_i : total value of food, H_i : adult equivalent for j^{th} household

- ✚ The different types and quantities of foods consumed by different households should be converted to calories C_j using the calorie equivalent scale.

- ✚ The average quantity per adult of each food item is scaled up and down by a constant value (ration of recommended calorie of per day per adult to the total calorie obtained by individual adult from consuming the average quantities) so as to provide the recommended calorie per adult per day. In this case the study will use 2200 calories as recommended calorie per day.

- ✚ Finally, each food item is multiplied by the retail price and summed up to get a food poverty line.

3.4.2.1. Allowance for non-food items

The study adopts the procedure suggested by Ravallion and Bidani (1994) to calculate the non-food poverty line. It is the Cost of Basic Need Method, which answers the question of what fraction of their budget those households which could in principle have meet their food needs if they had devoted their entire expenditure to food items (i.e. whose total expenditure are just equal to the food poverty line), actually devote to non-food items? The study estimated the demand function for food by running a regression of food shares against a linear food poverty line.

Denoting S_{ij} as the share of total expenditure devoted to food by household i , Y_i as the total expenditure (food plus non-food), Z^f food poverty line, the regression equation is given by:

$$S_i = \alpha + \beta \log\left(\frac{Y_i}{Z^f}\right) + \varepsilon \dots \dots \dots 3.11$$

Where, S_i denotes the share of food items from the total household's expenditure Y_i ; Refers household's total consumption expenditure, Z^f is the food poverty line, β is Regression coefficient, α typifies intercept of the food share. i run through the sample households in the reference population. Z^f

Let $\hat{\alpha}$ be the estimate of the intercept α . Since $\log\left(\frac{Y_i}{Z^f}\right) = 0$ when $Y_i = Z^f$, it follows that $\hat{\alpha}$ provides an estimate of the food share among households whose total expenditures match the food poverty line. Conversely, $1 - \hat{\alpha}$ estimates the essential non-food share. Hence, as suggested by Ravallion and Bidani (1994), the total poverty line is derived as

$$Z^G = Z^f(2 - \hat{\alpha}) \dots \dots \dots 3.12$$

Once the poverty line is determined, a person who spends less than food poverty line is considered as food poor and less than general poverty line is considered as general poor. Moreover, the study calculate poverty indices using the most widely used class of decomposable poverty measures by Foster, Greer and Thorbecke (FGT). The formula for FGT class of poverty measure is given as:

$$P_\alpha = \frac{1}{N} \sum_{i=1}^q \left(\frac{Z - Y_i}{Z}\right)^\alpha \dots \dots \dots 3.13$$

Where z is the poverty line, Y_i is the value of poverty indicator; household's per capita Consumption expenditure; q is the number of poor people in the population of size N , and α is the poverty aversion parameter that takes values of zero, one or two. By setting the value of α to zero, one, two respectively, the FGT poverty measure formula delivers a set of poverty indices. Setting α equal to zero will give us by far the most widely-used measure of the incidence of poverty i.e. the headcount index, which simply measures the proportion of the population that is counted as poor, often denoted by P_0 and given the formula:

$$P_0 = \frac{q}{N}$$

Setting α equal to one, P_1 , is the poverty gap measuring the depth of poverty, i.e., on average how far the poor is from the poverty line. Formally the equation for the index is given by:

$$P_1 = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - Y_i}{z} \right)$$

Setting α equal to two, P_2 is the squared poverty gap measuring the severity of poverty among households, i.e. the depth of poverty and inequality among the poor. The equation it is given by

$$P_2 = \frac{1}{N} \sum_{i=1}^q \left(\frac{z - Y_i}{z} \right)^2$$

3.5. Selecting the vulnerability threshold

Following Chaudhuri *et al.* (2002), two threshold measures were used in this study. The first is the relative vulnerability (i.e., those households who have an estimated vulnerability level greater than the observed incidence of poverty in the population but less than 0.5), and second is the high vulnerability of households or population (households that have an estimated vulnerability coefficient greater than 0.5). The choice of 0.5 is justified in that it makes intuitive sense to say that a household is vulnerable if it faces a 0.5 (50%) or higher probability of falling into poverty in the next period.

3.6. Determinants of vulnerability

Following the works of Azam & Imai (2009), Linear regression model and Ordinary least square (OLS) estimation procedure were used to examine the determinants of vulnerability to poverty in urban Ethiopia using the value of VEP estimated for each household (from equation 3.9) as the dependent variable. Due to the fact that the dependent variable is continuous the study used OLS estimation procedure (Gujarati, 2004). The Model is expressed as:

$$\hat{V}_i = \beta_i X_i + u_i \dots \dots \dots 3.14$$

Where;

$\hat{V}_i$: Estimated vulnerability level as expected poverty indices

X_i : Vector of explanatory variables,

β_i : Vector of respective parameters,

u_i : the error term

3.7. Definition of variables

Based on theoretical expositions and previous empirical studies, the following explanatory variables are hypothesized to influence the vulnerability of households as follows. Monthly real consumption expenditure per adult equivalent is the dependent variable in the suggested three steps feasible generalized least squares (FGLS) procedure of estimating vulnerability to poverty index while the estimated vulnerability index is a dependent variable in the linear regression model.

Age of the household head (age-head), Age (a proxy for experience) is expected to negatively associate with vulnerability of households. As the age of the household head increases the individual acquire more skill and experience and accumulates assets which will be used in times of adverse shocks that the household might face in the future and thereby minimize the household's vulnerability incidence.

Age squared of the household (age2-head): age squared (a proxy for old age) is expected positively associate with vulnerability of households. Age squared of the household assumed to affect vulnerability because, as age increases the head face a decline in labour supply and decision making capability (diminishing return).

Sex of household head (sex_ head): The gender of household heads is vital in the context of poverty and vulnerability analysis, since access to vital resources and decision making capabilities are highly biased against female household heads. Accordingly this variable assumes a value of "1" if the head of the household is male and "0" otherwise. Hence, this variable is expected to be negatively correlated with vulnerability of households.

Family size (family_ size): Family size refers to the total number of household members who are living and eating together for at least six months in a year. Empirical literatures indicate that the impact of family size on the welfare of households is mixed. It is expected to affect the dependent variable either ways depending on the demographic composition of the household. Large sized households are assumed to be more vulnerable to poverty as more individuals to share the limited resource of the family. Nonetheless, the scale economies and labor force advantage of large family size tend to change the causal relationship between vulnerability to poverty and family size. Therefore, the net effect depends on the magnitude of the two

effects. For this study however, the variable is expected to have a positive effect on vulnerability of the household.

Dependency ratio (dependency_ ratio): The dependency ratio is calculated as the ratio of the number of family members not in the labor force (<15years and 65+) to those in the labor force in the household. The more dependent members in the household the more the household will be vulnerable to poverty and vice-versa. Therefore, this variable is expected to have a positive effect on the vulnerability of the household.

Education (edu-head): The variable indicates the maximum level of education achieved by the head of the household. Education is assumed to have a positive impact on welfare of the household therefore reduce poverty and vulnerability to poverty as more educated people are more likely to get job, are more productive and earn more. Accordingly, the higher the level of education achieved by the head of the household the less vulnerable to poverty.

Occupation of household Head (occup-head): The variables indicate in which sector of the economy is the household head currently working. The household head is considered to be engaged in one of the following occupation: civil servant, daily labourer, informal business activity, formal business activity, NGOs, pensioner, student and no source of livelihood (e.g. begging). All these variables are dummy variables. Households headed by civil servant, formal business activity and NGO worker are less likely to be vulnerable as their consumption expenditure were expected (hypothesized) to be less volatile and/or their mean consumption expenditure is relatively high.

Shocks experienced in the past five years (shock-exp) A number of idiosyncratic and covariate shocks can affect the welfare of a household. This may include: death and serious illness of the head, loss of employment of the head, large rise in food price, and others. These variables assume the value of zero and one: 1- if the household were affected by the shock and 0- otherwise. A household severely affected by one or more of these shocks is expected to be more vulnerable to poverty as it can reduce the mean

consumption expenditure of the household and increase consumption volatility. Therefore this variable is hypothesized to have positive sign.

Membership of community associations (member_ community)

It is also a dummy variable taking 1 for members of community based institutions such as, 'Idir', 'Iquib', 'Mahber' and other, and 0 for non-members. (Moser, 1998) suggested that social institutions are an important means of perpetuating reciprocity of households in their microeconomic life and increase negotiation power and political lobbying of members. Moreover, saving helps households to accumulate more money for further investment and as provident in times of needs hence is hypothesized to have negative correlation with vulnerability to poverty.

Availability of credit (credit-avail)

It is a dummy variable taking a value of 1 for those that take credit in the last 12 months and 0 otherwise. Availability of credit helps households as a possible coping mechanism in times of shocks. Accordingly, it is expected to be negatively associated with vulnerability to poverty.

Transfers received (transfer-rec): It takes 1 if the household received transfers in the last 12 months and 0 otherwise. It captures both private transfers (remittances) and government direct transfers in both forms (cash and in kind). Empirical evidences show mixed impacts of transfers on the welfare of households. Transfers are advantageous in helping households get out of deprivation in the short run. On the other hand some evidences show the negative impact of transfers by creating dependency syndrome and hence making household decrease labor supply. However, in this study the variable is expected to have a negative effect on vulnerability to poverty as it helps a household to mitigate temporary shocks.

Household assets: More household asset is expected to positively influence the welfare of households to poverty as it serves as coping mechanism in the time of risk. Accordingly, in this study the variable is expected to have a negative effect on vulnerability to poverty as it helps a household to mitigate temporary shocks. The

study used estimated value of valuable assets to capture its effect on household's vulnerability level.

Ownership (home_ own): This variable indicates whether the household owns a house or not. It represents the value 1-if the household owns a house and 0-otherwise.

CHAPTER FOUR

RESULT AND DISCUSSIONS

4.1 Descriptive statistics

The general description of the survey as presented in appendix table 1.7 indicates that about 28.92% (59) of the sample households are female headed while 71.8% (145) are male headed households. The vulnerability status of the sex indicates that 49.15% female and 34.48% of male head household highly vulnerable to poverty¹. The average age of the household head is 44.98 and ranges from 23 to 90. The average age of poor people is higher than non-poor. Average household size is 5.22 and average adult equivalence of sample respondents is 4.4. Dependency ratio (the ratio of economically inactive household members with the age of below 15 years and above 64 years to the number of economically active household members) is found to be 0.8. Accordingly, each active member of the household supports 0.8 people on average from household. Both family size and dependency ratio are higher for poor household.²

Result on marital status of the household indicates that 71.08% of the household heads are married where as 7.35%, 3.92% and 17.65% are single, divorced and widowed respectively. Female headed household are more likely to be divorced or widowed. This is supported by the findings of the survey that 13% and 38% of divorced and widowed household heads are females.

According to the survey 16.67% of heads of the household are illiterate (unable to even read and write) while the remaining 83.33% of the heads are literate i.e. able to read and write at minimum. The study also found that 20.59%, 25.49 and 5.39% of the household heads can read and write, attain primary and secondary education respectively. Whereas 31.86% have diploma and above. Moreover, sex wise comparison indicates that female heads of households have low level of educational attainment as compared to their male counter parts. The result shows that only 15.25%

¹ See table 4.11 for detail

² See table 4.7 for detail

of female household heads have educational attainment above primary education. The more the education attainment of the household the less the probability of being poor.³

Owning a valuable asset is one of the most important ways to cope up with shocks. Accordingly, the survey tried to assess status of asset ownership. The result shows that mean value of asset by the household is birr 137789.7 with large standard deviation of 420641.3 and wide range (Table 4.1). The finding indicates high inequality in asset ownership among households. Female headed households are found to own birr 102774.6 worth of asset on average. Whereas, 152037.2 is to their male counterparts.

Average monthly income of heads of the household is birr 3716.721 and standard deviation of 4047.874 (Table 4.1). Female headed households earn less income as compared to male headed households. The respective figure is birr 2342.22 for female and birr 4276 for male heads. Status of saving and borrowing of the household is assessed in the survey. Accordingly the result shows that on average households saved birr 5026.186 and borrowed birr 2038.235

Table 4.1 Summary of income and asset ownership					
Sex head	Income	Asset value	Monthly saving	Total saving	Total borrowing
Female Mean	2342.22	102774.6	236.1017	673.9322	50.84746
Sd.	1817.599	270524.9	556.4203	3423.387	390.5667
Min.	600	1200	0	0	0
Max.	8000	1500000	3500	25000	3000
Male Mean	4276	152037.2	319.0444	6797.103	2846.897
Sd.	4547.42	468242.9	773.5647	13036.1	10527.01
Min.	400	400	0	0	0
Max.	40000	4000000	5000	60000	110000
Total Mean	3716.721	137789.7	294.9379	5026.186	2038.235
Sd.	4047.874	420641.3	716.8981	11473.55	8959.262
Min.	400	400	0	0	0
Max.	40000	4000000	5000	60000	110000

Source: computed based on own survey data, 2015

A household with other source of income can easily cope-up with welfare shocks and less vulnerable to poverty. High risk can also force households to diversify their income sources, perhaps at the cost of lower returns. This is explained by the finding

³ See the detail in table 4.8

that 39.41% of the respondents have access to one or more sources of income. Considerable portions (55.13%) of households generate their income from renting a house while about 21.79%, 15.38% and 7.69% earn from private business, remittance and other sources respectively.⁴

Home ownership status of household's show that 38.42% of the households live in their own house. Nearly 61.58% of the household live in rented houses either from Kebele or private. The average number of room per household is 2.98 with a standard deviation of 2.14.

In terms of employment status of household heads, 85.29%, 3.92% and 10.78% of heads are employed, unemployed and pensioners respectively. The employment type of the household head shows that 58.05% of the heads are self-employed while 23.56%, 13.79% and 4.6% are government employee, private employee and NGO employee respectively. Among self-employed heads 60.39% of them involved in petty-trade (Gulit), metal and wood work and handicraft. And only 32.67% are engaged in high income generating business like trade and hotel services.

A strong community association is the one that stands out in times of shocks and disasters. In practice there are well known community associations in Ethiopia which helps people in times of disaster. These community associations include 'Idir', 'Iquib', and 'Mahber'. In line with this, the survey tried to assess membership status of households in community association and found that 67.64% of the respondents are members of more than one community association. The remaining portions are not member of any community association

Exposure to shocks is one of the many ways in which households will end up in poverty. It is a major reason for assessing vulnerability of households to poverty. The study made effort to assess major shocks experienced by household over the past five years. According to the findings, households are affected severely by different shocks (Table4.2). Results show that 58.87% of sample respondents in the study have reported negatively affected by large rise in food price. A considerable portion of the respondents also reported that they were negatively affected by household illness,

⁴ See appendix table 1.7 for detail

death, loss of job, and theft accounting for 53.42%, 25.48%, 30.38% and 41.51% respectively.

Table 4.2 Major shocks						
Welfare shocks	Frequency			Percent %		
	Female	Male	Total	Female	Male	Total
Household head death	21	31	52	10.29	15.19	25.48
Household head illness	44	65	109	21.58	31.86	53.42
Household head loss of job	29	33	62	14.21	16.17	30.38
Theft of any valuable asset	35	49	84	17.15	24.01	41.51
Large price increase in food items	44	72	116	21.58	35.29	58.87

Source: computed based on own survey data, 2015

Consumption expenditure on different food and non-food items is generally used as a main yardstick for measuring the standard of living in developing nations. There is also a long history of measuring consumption expenditure in Ethiopia as indicator of welfare. In line with this the study tried to measure household consumption expenditure on food and non-food items. The survey shows that the mean monthly consumption expenditure per adult equivalence is birr 804.22 (Table 4.3). Intra household variation is found to be large (SD=986.1). It implies the existence of high variability of consumption between households in the area. The mean monthly food consumption expenditure per adult equivalence (birr 547.05) is relatively higher than the mean monthly non-food consumption expenditure, birr 257.1667.

Table 4.3 Consumption expenditure per adult equivalence					
Sex of head	Food	Non-food	Total	Share of food	Share of non-food
Female (Mean)	305.4285	155.569	460.9975	.6693125	.3306875
Sd.	207.8932	121.2682	329.2	.1209117	.1209117
Min.	95.41985	31.54574	126	.4468085	.0833333
Max.	1116.071	537.037	1652.108	.9166666	.5531915
Male (Mean)	645.3704	298.5067	943.88	.6788353	.3211647
Sd.	694.0792	427.2038	1121.279	.1266018	.1266018
Min.	47.16981	0	47.169881	.25	0
Max.	3389.831	4464.286	7854.117	1	.75
Total (Mean)	547.0538	257.1669	804.2207	.6760812	.3239188
Sd.	614.7783	371.3257	986.104	.1247614	.1247614
Min.	47.16981	0	47.16981	.25	0
Max.	3389.831	4464.286	7854.117	1	.75

Source: computed based on own survey data, 2015

Sex wise comparison indicates that male headed households enjoy relatively higher welfare than female headed households, which is supported by the finding that the average monthly consumption expenditure per adult equivalence by female headed household is birr 460.99 while it is birr 943.88 for male headed households. Moreover, the share of non-food consumption (33.04%) for female headed household is a little bite higher than their male counterpart, (32.12%).

Table 4.4 Consumption expenditure by poverty status					
Poverty status	Food cons. per adult eq.	Non-food cons. per adult eq.	Total cons. per adult eq.	Share of food items	Share of nonfood items
Non poor (mean)	813.1568	320.6946	1133.851	.6933568	.3066432
Sd.	685.3648	404.0186	1089.383	.1212006	.1143542
Min.	252.5253	76.14214	328.667	.2857143	.0909091
Max.	3389.831	4464.286	7854.117	1	.75
Poor (mean)	166.9067	50.70182	217.608	.6514017	.2440635
Sd.	47.94139	17.05872	65	.1263357	.0863305
Min.	47.16981	0	47.17	.25	0
Max.	244.898	74.73842	319.636	.8333334	.4
Total (mean)	547.0538	257.1669	804.2207	.6760812	.3239188
Sd.	614.7783	371.3257	986.104	.1247614	.1247614
Min.	47.16981	0	47.16981	.25	0
Max.	3389.831	4464.286	7854.117	1	.75

Source: computed based on own survey data, 2015

There is also high variability in consumption expenditure by poverty status. The mean monthly consumption expenditure per adult equivalence of poor household is birr 217.6 while non-poor household has spent birr 1133.85 (Table 4.4). Furthermore, non-poor households spend more on non-food items (30.66%) as compared to poor households (24.4%).

4.1.1. Poverty in the study area

The study set food and total poverty line to identify the poor from the non-poor. To arrive at the food and general poverty line the study made use of CBN (cost of basic needs) approach. First, the food poverty line was defined by choosing a bundle of food typically consumed by the households in the area. The quantity of the bundle of food was determined in such a way that the bundle supplies the predetermined level of minimum caloric requirement (2200 calorie). This bundle was scaled up and valued at retail prices which were obtained from CSA (Central Statistics Agency) to get a consistent poverty line across different groups. The research gave an allowance for non-food items following the suggestion of Ravallion and Bidani (1994).

Accordingly, based on the CBN method the food and general poverty line in the city was estimated to be birr 250 and 325 per month per adult equivalence. After giving an allowance the poverty line for non-food item is calculated to be birr 75 per month per adult equivalence. Hence, households who can spend no more than 250 per month per adult equivalence are deemed to be food poor and those households who spend less than 325 on both food and non-food consumption per month per adult equivalence are considered as generally poor.

Table 4.5. Poverty line in the study area	
Poverty line	Value at current market price
Food	250
Non-food	75
Total	325

Source: computed based on own survey data, 2015

4.1.2 Poverty profile in the study area

After setting the poverty line, an attempt was made to analyse the various measures of poverty. The study used the well-known family of poverty measures proposed by Foster, Greer and Thorbecke (1984). The three indices of poverty include: the head

count index, poverty gap and the severity gap. The head count index (P_0) is the proportion of households below the poverty line. The poverty gap index (P_1) is the total proportion of income required to enable poor household below the poverty lines to acquire the minimum recommended daily calorie allowance or their basic needs, thus moving the poverty line. The P_2 captures the sensitivity of poverty by squaring and averaging the gap between the consumption of the poor and poverty line. All three measures together are presented in the Table 4.6 below for food and total poverty. These indexes are presented as per adult equivalent.

Table 4.6 Poverty profile		
Poverty index	Food poverty	General poverty
Head count (P_0)	22.55	30.88
Poverty gap (P_1)	3.8	10.08
Poverty gap square (P_2)	1.99	4.19

Source: computed based on own survey data, 2015

The poverty profile on Table 4.6 indicates that 22.55% and 30.88% of households in the study area are deemed poor using the estimated food poverty and general poverty line. This shows high incidence of poverty in food as well as total poverty. The relative higher general poverty head count index as compared to the food poverty head count index should not be surprising given the study area is urban in which monetized economy predominantly characterizes society's life. The former index comprises both food and non-food cost of consumption instead of having only cost of food items. Moreover, in urban poverty, the problem is not only for food poverty rather the non-food consumption also has considerable proportion in total consumption of households.

The poverty gap (deficit)- P_1 reflects the total proportion of income required(per adult equivalent) to enable poor households below the poverty line moving to the poverty line in addition to indicating the total deficit of all the poor households relative to the poverty line. The result from the survey shows that the poverty gap (deficit) in Adama is 3.8% and 10.8% for food and general poverty respectively. Theoretically it means, if the city mobilizes resources equal to 3.8% (for food poverty) and 10.08% (for total poverty) of the poverty line for every adult equivalent individuals and distribute these resources to the poor in the amount needed so as to moving each per adult equivalent to poverty lines. Hence, other things remain constant, at least in theory; poverty could

be mitigated. The result from the survey also shows that the severity of poverty (P_2) in the city is 1.99 % for food and 4.19 % for total poverty respectively.

4.1.2.1. Demographic characteristics of the poor

Critically evaluating the characteristics of poor household gives better insights as which policies to adopt to eradicate poverty. The findings indicate that there is a considerable variation across households according to their characteristics. It is observed that the mean head age of non-poor households is less than the mean age of poor household heads (Table 4.7). The mean family size (7.03) and dependency ratio (1.16) of poor households are found to be higher than non-poor households which is 4.7 and 0.67 respectively. The result clearly proves that, poor households on average have high dependency ratio and large family size. Moreover, the econometric result show that family size and dependency ratio negatively correlated with consumption per adult equivalency which is the proxy of welfare and result is significant at 1% and 10% respectively.⁵

Table 4.7 Demographic Characteristics of the Poor			
Poor	Age head	Family size	Dependency ratio
Non poor (Mean)	40.70922	4.702128	.6770922
Sd.	11.36821	3.665953	.4772204
Min.	23	2	0
Max.	90	4	3
Poor (Mean)	54.55556	7.031746	1.165524
Sd.	14.12134	2.717733	.9065971
Min.	26	3	0
Max.	85	14	4
Total (Mean)	44.98529	5.22549	.8279314
Sd.	13.82597	2.308292	.6776901
Min.	23	2	0
Max.	90	14	4

Source: computed based on own survey data, 2015

⁵ The detail presented in table 4.13 in econometric part

4.1.2.2. Decomposition of poverty by some socio-economic characteristics

Poverty decomposition by different demographic and socioeconomic variables enables to answer the question of “who are the poor?” in the study area. Accordingly, an effort is made here to decompose poverty over selected segments like: sex, educational attainment, occupation in the study area. The result of the survey shows that, among the total poor, female headed households account for 36.5% of the sample respondents. Of all the total female headed households included in the survey 45.76% of them found to be poor, while only 27.58% of the male headed households are deemed poor (Table 4.8). Additionally, even though the coefficient is insignificant sex household head positively related with vulnerability poverty.⁶

Decomposition of poverty by educational level shows that households with higher educational attainment household heads have low level of poverty. Relatively, households with illiterate heads are considerably found to be poor. The level of Poverty declines as one moves from households headed by illiterate heads to household heads with diploma and above educational level (Table 4.8).

Table 4.8: Decomposition of Poverty by Sex and Educational Level						
Socio-demographic of characteristics of household heads	Poor		Non-poor		Total	
	Number	%	Number	%	Number	%
Sex of household head: Male	40	19.7	105	51.48	145	71.09
Female	23	11.18	36	17.64	59	28.91
Total	63	30.88	141	69.12	204	100.00
Educational level : Illiterate	27	13.23	7	3.43	34	16.69
Read and Write	21	10.29	21	10.29	42	20.58
Primary	11	4.4	41	20.098	52	25.49
Secondary	0	0	11	5.4	11	5.4
Diploma and above	4	1.96	61	29.9	65	34.86
Total	63	30.88	141	69.12	204	100.00

Source: computed based on own survey data, 2015

⁶ See the detail in table 4.14 in econometric part

Another important characteristic assumed to have distinction between the poor and the non-poor is occupation of the head. Of the total households headed by self-employed persons account for 17.16% of the poor population followed by pensioner heads which constitute about 7.35% of the poor. Relatively households headed by NGO and government employees found to have low incidence of poverty in the sample. Moreover, households whose heads are pensioner and self-employed, have relatively high incidence of being poor. Among sample households included in the survey 65.22% and 34.22% of households headed by pensioners and self-employed persons respectively found to be poor⁷.

4.1.3 Vulnerability in the study area

After generating estimates of the probability of being poor in the future, it is then important to choose a vulnerability threshold. Following Chaudhuri *et al.*, (2002), the study considered two natural thresholds for the vulnerability estimates as discussed in the methodology part: the observed national poverty rate and the threshold 50%. The rationale for choosing a threshold of 50% has to do with considering a household having at least an even chance of being poor in the next time period. Employing a vulnerability threshold equal to the national poverty rate, i.e., the average vulnerability to poverty means that a household is more likely than the typical household to be poor in the next period. Two threshold measures were used in this study. The first is the relative vulnerability (RV) (i.e., those households who have an estimated vulnerability level greater than the observed incidence of poverty in the population (30.88%) but less than 0.5), and second is the high vulnerability (HV) of households or population (households that have an estimated vulnerability coefficient greater than 0.5). The choice of 0.5 is justified in that it makes intuitive sense to say that a household is vulnerable if it faces a 0.5 (50%) or higher probability of falling into poverty in the next period.

The overall picture of household poverty and vulnerability in Adama town is shown on Table 4.9. Although 30.88% of households were poor, the incidence of household vulnerability is found to be 38.72%. Of the total non-poor households, 33.3% were highly vulnerable to poverty and additional 7.09 % households were found to be relatively vulnerable. Among the poor, about 50.79% of households are more likely to

⁷ See table A1.5 poverty incidence by occupation of heads in the appendix

end up in poverty next year. An additional of 4.76% of the poor households will enter the vulnerable group using the relative vulnerability threshold. As the result indicates vulnerability to poverty is more widespread than poverty. One implication is that targeting of vulnerable households is certainly more difficult, as more households have a significant likelihood of falling into poverty.

Table 4.9 Vulnerability status				
Poverty status	Non vulnerable	Highly Vulnerable	Relatively Vulnerable	Total vulnerable
Non poor (freq.)	84	47	10	141
<i>Between (%)</i>	59.57	33.3	7.09	100
<i>Overall (%)</i>	41.2	23.04	4.9	69.46
Poor (freq.)	28	32	3	63
<i>Between (%)</i>	44.44	50.79	4.76	100
<i>Overall (%)</i>	13.73	15.68	1.47	30.88
Total (freq.)	112	79	13	204
<i>(%)</i>	54.91	38.72	6.37	100.00

Source: computed based on own survey data, 2015

4.1.4 The Vulnerability Profile

4.1.4.1. Demographic Characteristics of the Vulnerable

There is a considerable variation on demographic characteristics among vulnerable and non-vulnerable households. As shown by Table 4.10, the mean age and dependency ratio is higher among vulnerable households than non-vulnerable households. The result clearly indicates that vulnerability to poverty increases with the increase in age and dependency ratio. Relatively, family size of the household is slightly higher for non-vulnerable households, showing the relative decline of vulnerability to poverty as productive family size increases.

In general we can conclude that vulnerability to poverty is high among households with high age and high dependency ratio. The econometrics part also shows that both age and dependency ratio positively correlate with vulnerability to poverty and the coefficients are significant at 5% and 10% respectively.⁸

⁸ See the detail at table 4.14. the OLS result of vulnerability

Table 4.10 Demographic characteristics of the vulnerable			
Vulnerability status	Age head	Family size	Dependency ratio
Non vulnerable (Mean)	45.02679	5.678571	.7855804
Sd.	13.14744	2.501222	.5652659
Min.	23	2	0
Max.	90	14	3.5
Vulnerable(Mean)	45.07595	4.772152	.9207975
Sd.	14.89344	1.96083	.8227488
Min.	28	2	0
Max.	85	12	4
Total(Mean)	44.98529	5.22549	.8279314
Sd.	13.82597	2.308292	.6776901
Min.	23	2	0
Max.	90	14	4

Source: computed based on own survey data, 2015

4.1.4.1.1 Vulnerability by Sex of Head

When we look at vulnerability incidence by sex of the household head, female headed households appear to be more vulnerable than their male counterparts (Table 4.11). Nearly 49.15% of female headed households are highly vulnerable to poverty while only 34.48% of male headed households are highly vulnerable. As the vulnerability threshold is lowered to the observed level of poverty an additional 10.17% of the female headed households will end up poor as opposed to only 4.83% male headed households. The result is in line with the hypothesis of the study.

Table 4.11 Vulnerability incidence by sex of head				
Sex head	Non vulnerable	Highly vulnerable	Relatively vulnerable	Total
Female (freq.)	24	29	6	59
<i>Between (%)</i>	40.68	49.15	10.17	100.00
<i>Overall (%)</i>	11.76	14.22	2.94	28.92
Male (freq.)	88	50	7	145
<i>Between (%)</i>	60.69	34.48	4.83	100.00
<i>Overall (%)</i>	43.14	24.51	3.43	71.08
Total(freq.)	112	79	13	204
(%)	54.91	38.72	6.3	100.00

Source: computed based on own survey data, 2015

4.1.4.1.2 Vulnerability by educational level of the head

Education is an important variable in explaining incidence of poverty and vulnerability to poverty as people with a higher level of educational attainment have a higher chance of getting better and higher paying jobs. Education can affect people's standard of living through a number of channels: it helps skill formation resulting from higher marginal productivity of labor. Furthermore, if people acquire skills through education, then a higher level of educational attainment is associated with higher marginal productivity of labor. Hence, it is expected that education is negatively correlated with poverty and vulnerability to poverty, i.e. the higher the education level, the lower the poverty and vulnerability rate (Table 4.12).

Table 4.12 Decomposition of vulnerability by Educational attainment of the head				
Education head	Non vulnerable	Highly Vulnerable	Relatively vulnerable	Total
Illiterate (freq.)	14	18	2	34
<i>Between (%)</i>	41.2	52.94	5.88	100.00
<i>Overall (%)</i>	6.86	8.82	.98	16.67
Read and Write(freq.)	15	25	2	42
<i>Between (%)</i>	35.71	59.52	4.76	100.00
<i>Overall (%)</i>	7.35	12.25	.98	20.588
Primary edu. (freq.)	25	20	7	52
<i>Between (%)</i>	48.07	38.46	13.46	100.00
<i>Overall (%)</i>	12.25	9.8	3.43	25.49
Secondary edu. (freq.)	7	4	0	11
<i>Between (%)</i>	63.64	36.36	0	100.00
<i>Overall (%)</i>	3.43	1.96	0	5.39
Diploma and abov(freq.)	51	12	2	65
<i>Between (%)</i>	78.46	18.46	3.8	100.00
<i>Overall (%)</i>	25	5.88	.98	31.86
Total (freq.)	112	79	13	204
(%)	54.91	38.72	6.3	100.00

Source: computed based on own survey data, 2015

Vulnerability categories differentiated by educational level of the heads of a household are presented on Table 4.12 above. The highest concentration of vulnerability is observed in households headed by read and write followed by illiterate and heads attained primary education. In general, people who live in households headed by individuals having lower education are more vulnerable to poverty. For

example, 52.94% of the total population that lives in households headed by illiterate individuals are vulnerable to poverty. The figure decreases as one move up the education ladder.

4.1.4.1.3. Vulnerability across Occupational groups of the head

Based on the results of FGLS estimation an effort is made to show the dynamics of vulnerability across some occupational groups that household heads belong. The self-employed occupational group accounts for 50% of the sample population and it contributes for 47.06% and 8.82 % of the highly vulnerable and relatively vulnerable portion of population respectively. Pensioner head households registered the highest incidence of vulnerability in the sample. A considerable highest proportion (100%) of households headed by NGO employees are expected to escape poverty in near future⁹.

4.2 Econometrics Results and Discussion

4.2.1 The Consumption Model

The study presented socio-demographic and economic characteristics of the poor and the vulnerable portion of households in the study area. The descriptive analysis in the previous section has already identified some distinct characteristics of vulnerable and non-vulnerable households. However, to investigate this more carefully we need a more advanced method of analysis. Accordingly, in the next section the study tries to identify some correlates of vulnerability using regression analysis.

The result of the estimated consumption model is presented in Table (4.13). The coefficient of determination (R-squared) with value 0.7533 implies that nearly 75.3% of the total variation in the household expenditure per adult equivalence is accounted for by all the explanatory variables in the regression model. The significance of the F-value implies that, all explanatory variables jointly have significant influence on household welfare (as proxy by household expenditure per adult equivalence). Moreover, a diagnostics test is made to satisfy the assumptions held in the regression of the model under investigation¹⁰. A set of socio economic explanatory variables such as household characteristics, human capital, and household asset holding are

⁹ For detail See Appendix Table A1.6 Vulnerability by occupation of the head

¹⁰ The result of the diagnostic tests is presented in detail in the appendix

used in the regression model. The Variable age squared, self-employee and illiterate are dropped due to the possibility of severe multicollinearity among independent variables.

The regression result shows that household size has negatively correlated with household consumption expenditure measured by per adult equivalent. It is statistically significant at 1% significance level, implying that households with a large household size have a lower welfare than the households with a small family size. Dependency ratio exhibit a negative impact on household welfare, suggesting that increases in dependency ratio would result in reduction in the income resources available to provide for the needs of each household member. The decline in the per capita income availability is an indication of declined living condition of the members in the household. The coefficient of dependency ratio is statistically significant at 10% significant level.

Table 4.13 OLS Estimation Result for Correlates of Log Consumption per Adult Equivalence																																		
Log con. Per. Eq.	Coef.	Robust Std. Err.	t	P>t																														
Sex head	.0854858	.0826615	1.03	0.302																														
Age head	-.0073419*	.0039092	-1.88	0.062																														
Family size	-.0984894***	.0188369	-5.23	0.000																														
Dep. Ratio	-.0032871*	.0571191	0.06	0.095																														
Transfer rec.	.1875209**	.0953663	1.97	0.051																														
Community Assoc.	.0291378	.1159417	0.25	0.802																														
Credit availability	.1678426*	.0907032	1.85	0.066																														
Head read write only	.0596555	.0566857	1.05	0.294																														
Head primary	.079512**	.0402724	1.97	0.050																														
Head secondary	.0823108*	.0462191	1.78	0.077																														
Diploma and above	.1673799***	.028249	5.93	0.000																														
Head gov. employee	-.1720864***	.0517579	-3.32	0.001																														
NGO_employee.	.0343833	.047026	0.73	0.466																														
Dummy own house	.0941143	.0932951	1.01	0.314																														
Head pensioner	-.0555435	.1389284	-0.40	0.690																														
Unemployed	-.0167435	.0440169	-0.38	0.704																														
hh_death	-.1705043*	.0941229	-1.81	0.072																														
hh_illness	-.2953302***	.0978288	-3.02	0.003																														
hh_lossofjob	-.0363162	.114478	-0.32	0.751																														
hh_largepr~e	-.2584676***	.0876201	-2.95	0.004																														
_cons	7.015003***	.2905848	24.14	0.000																														
<table> <tr> <td>Source </td><td>SS</td><td>df</td><td>MS</td><td>Number of obs = 204</td></tr> <tr> <td>-----+-----</td><td></td><td></td><td></td><td>F(22, 181) = 25.13</td></tr> <tr> <td>Model </td><td>114.300814</td><td>22</td><td>5.19549154</td><td>Prob > F = 0.0000</td></tr> <tr> <td>Residual </td><td>37.4259722</td><td>181</td><td>.206773327</td><td>R-squared = 0.7533</td></tr> <tr> <td>-----+-----</td><td></td><td></td><td></td><td>Adj R-squared = 0.7234</td></tr> <tr> <td>Total </td><td>151.726786</td><td>203</td><td>.747422592</td><td>Root MSE = .45472</td></tr> </table>					Source	SS	df	MS	Number of obs = 204	-----+-----				F(22, 181) = 25.13	Model	114.300814	22	5.19549154	Prob > F = 0.0000	Residual	37.4259722	181	.206773327	R-squared = 0.7533	-----+-----				Adj R-squared = 0.7234	Total	151.726786	203	.747422592	Root MSE = .45472
Source	SS	df	MS	Number of obs = 204																														
-----+-----				F(22, 181) = 25.13																														
Model	114.300814	22	5.19549154	Prob > F = 0.0000																														
Residual	37.4259722	181	.206773327	R-squared = 0.7533																														
-----+-----				Adj R-squared = 0.7234																														
Total	151.726786	203	.747422592	Root MSE = .45472																														
Source: computed based on own survey data, 2015; “*, ** and *** indicates that the variable is significant at 10%, 5% and 1% significance level respectively																																		

Compared to other categories households headed by lower level of education have lower welfare as measured by consumption per adult equivalence. The more educational attainment of house hold head the better the welfare will be. This shown in the regression result of the coefficient for secondary school heads is significant at 10% and other thing remain constant the education of household improved to

secondary school the welfare the household improved by 0.082 factor. It is widely agreed that educational attainment enhances human capital and participation in labor market and has been widely accepted as a genuine tool for poverty reduction and improving peoples' welfare.

A number of idiosyncratic and covariate shocks can affect the welfare of a household. This may include: death and serious illness of the head, large rise in food price, and others. A household severely affected by one or more of these shocks is expected to be more vulnerable to poverty as it can reduce the mean consumption expenditure of the household and increase consumption volatility. As shown in the regression result in table 4.13 above the coefficient for death, illness and large rise in food price is negative and significant at 10%, 1% and 1% respectively.

Availability of credit helps households as a possible coping mechanism in times of shocks. Accordingly, the regression result of consumption model shows that availability of credit positively correlate with log consumption which is the proxy of welfare. And its coefficient is significant at 10% significant level.¹¹

Transfers received are one source of income for household and positively influence the welfare of the house. Empirical evidences show mixed impacts of transfers on the welfare of households Transfers are advantageous in helping households get out of deprivation in the short run. On the other hand some evidences show the negative impact of transfers by creating dependency syndrome and hence making household decrease labor supply. However, the result of this study shows that transfer received positively correlate with log consumption per adult equivalence and its coefficient significant at 5 % significance level.¹²

4.2.2 Determinants of Vulnerability to Poverty

In any developing country poverty alleviation is widely acknowledged as the crucial policy objective of development. The assessments of poverty, grouping who is poor, who is not, and the characteristics of those who are, have been the focal point of development scholars. However, in thinking about suitable forward-looking anti-

¹¹ See table 4.13 OLS result of Log Consumption for detail

¹² See table 4.13 OLS result of Log Consumption for detail

poverty policy interventions, there is a need to identify the vulnerable to poverty and through which anti-poverty policy will be effective up on implementation. Accordingly the study made an attempt to find the determinants/correlates of vulnerability to poverty in the study area. OLS regression analysis is employed to identify the factors, which affect household's vulnerability to poverty. The dependent variable is the vulnerability level of each household estimated using three step FGLS as described in the methodology part.

As it is evident from the table R-square of the model is 0.6338 indicating that, the explanatory variables included in the model explained 63.38% of the variation in the dependent variable. The F statistics also shows that the variables are jointly significant. Moreover, a diagnostic test is made to check if the result obtained qualifies the assumption of the model under consideration. Accordingly, test results are all fine where there is no hetroschedasticity problem, very small multicollinearity with mean vif of only 2.01 for vulnerability model and 2.09 for consumption model and the result of visual inspection model tell as validity of all test (p,t and f) . However, variables such as age squared, self-employee and head illiterate are dropped due to high multicollinearity. ¹³

The explanatory variables used in the model include socio economics characteristics of a household head like: sex, age, family size, dependency ratio, educational attainment, asset holding, and household level shocks. The OLS estimation result of regression is presented in Table (4.14) below

¹³ See for detail in appendix table A1.8 to A1.13

Table 4.14 OLS Estimation Result for Correlates of Vulnerability to Poverty

Vulnerability	Coef.	Std. Err.	t	P>t
sex_head	.0532369	.0405378	1.31	0.191
Agehh	.003826**	.0015939	2.40	0.017
family_size	-.0581628***	.0095621	-6.08	0.000
dep_ratio	.0176519**	.0278035	0.63	0.052
Transferrec	-.2501562***	.0442193	-5.66	0.000
hh_death	.0499609	.0465264	1.07	0.284
hh_ilnes	-.0835798*	.0479271	-1.74	0.083
hh_lossofjob	-.3478691***	.0569814	-6.10	0.000
hh_theft	-.2620511***	.047018	-5.57	0.000
hh_largepr~e	.075555*	.0440491	1.72	0.088
Creditavail	-.2545035***	.0442205	-5.76	0.000
communitya~o	-.2473997***	.0561416	-4.41	0.000
read_and_w~e	.0537447**	.0272393	1.97	0.050
primary_sch	-.0248858	.0193382	-1.29	0.200
secondery_~h	-.0213784	.0223918	-0.95	0.341
diploma_an~e	-.010211**	.0139134	-0.73	0.046
govern_emp~e	-.0950833***	.0260909	-3.64	0.000
private_or~e	-.1044142***	.0198957	-5.25	0.000
NGO_employee	-.0612414***	.0232295	-2.64	0.009
Logasset	-.0213536*	.0129058	-1.65	0.100
_cons	1.297512	.1583283	8.20	0.000

Source	SS	df	MS	Number of obs =	204
-----+-----				F(20, 183) = 15.84	
Model	16.1717594	20	.808587968	Prob > F	= 0.0000
Residual	9.34205143	183	.051049461	R-squared	= 0.6338
-----+-----				Adj R-squared = 0.5938	
Total	25.5138108	203	.125683797	Root MSE	= .22594

Source: computed based on own survey data, 2015 “*, ** and *** indicates that the variable is significant at 10%, 5% and 1% significance level respectively

Household level characteristics

As can be noted from the above Table (4.14) there is no significant difference between sexes of the head. Though a considerable proportion of female headed households found to be vulnerable in the descriptive part, the result of OLS estimates does not tell anything about the relative probability to vulnerability between the two

sexes. There are also large empirical findings which support the above result. For example, Chaudhuri *et al.*, (2002), a study in Indonesia found that, households headed by female are as likely to be poor and vulnerable as male-headed households. (Jah and Tu Dhang, 2008) in their study “Vulnerability to poverty in Papua New Guinea”, they can’t find any significant evidence that gender of household heads are associated with future probability of vulnerability to poverty.

Perhaps the only difference they found is that higher fraction of female headed households was estimated to be highly vulnerable. As noted by Szekely cited in Abduljelil (2013) gender should be viewed with care because female-headed households could be under represented in the sample because there are cultural reasons to believe that many of the households that declared to be headed by males are in fact headed by women.

Age of household head: A closer look at the above OLS estimation result, it is evident that, age of the household head is positively correlated with vulnerability level. The variable is highly significant at 5% level of significance. Accordingly, the more elder like pensioner household are more vulnerable to poverty in near future. This is due to the fact that as age increases the head face a decline in labour supply and hence money making or income generating capability (diminishing return).

Family size of the household: The impact of family size, on vulnerability level of a given household better understood with other composition of a household like dependency ratio of that household. That means the household with more dependent family size become more vulnerable to poverty. But the household with more productive family size become less vulnerable to poverty and in this case large family size consider as a resource. The OLS result in table 4.14 above shows that the coefficient of family size is negative this may be the second condition (expecting family size as resource) holds true. And the coefficient is significant at 1% significant level.

Dependency ration: There is significant association between dependency ratio and vulnerability level of a household. The more dependent members in the household the more the household will be vulnerable to poverty and vice-versa. This means that high dependency ratio in the household is followed by high vulnerability incidence. The

OLS result in table 4.14 shows that dependency ratio positively correlated with vulnerability and its coefficient is significant at 10% significant level. Similar result also found by (Oyekale, 2004)

Asset ownership: There is plain evidence from Table (4.14) that ownership of valuable asset is negatively associated with vulnerability level of a household. Controlling for all other variables, a 1% increase in asset value decreases the risk of ending up poor in near future by 0.0213 factors. The result provides an empirical support for the existing literature, for example, Moser (1998)¹⁴

Education attained by head of the household: The education level and literacy of head of household is an important determinant of vulnerability (as well as poverty). As it is noticeable from the Table (4.14), the coefficients on different level of educational attainment reflect the prime role that human capital plays in determining poverty. Controlling for all other determinants, high educational attainment significantly reduces the risk of household vulnerability to poverty. It is observable from the regression result clearly shows that households with diploma and above education heads have lower probability of vulnerability to poverty (Table 4.14). Similar results also found by Jamal (2009), Chaudhuri *et al.*, (2002), Azam and K. Imai. (2009)

In fact, education is an important dimension of poverty itself, when poverty is broadly defined to include shortage of capabilities and knowledge deprivation. It has important effects on the poor children's chance to escape from poverty in their adult age and plays a catalytic role for those who are most likely to be poor. Education is expected to lead to increased earning potential and to improve occupational mobility; hence, it deserves an important place in formulating any poverty reduction strategies.

Occupation of head: The occupation of the household head is another important determinant of the vulnerability status of a family. A family whose head involved in an activity that is low paid and/or highly volatile flow of income is probably more

¹⁴ Asset value is calculated for durable (including house) items of the household at their estimated current price, this is done due to the fact that assets must be liquid, i.e. readily changed into cash at minimum cost and must not lose value in the face of the potentially poverty reducing event in order to mitigate risk and exposure effectively.

vulnerable to poverty than a head engaged in high paid and/or less volatile activity Chaudhuri, (2003) and Chaudhuri *et al*, (2002). The incidence of vulnerability is understandably lower for salaried workers in the public sectors than it is for those in other employment categories. As expected, the vulnerability to poverty is negatively correlated with the household headed by a government employee (Table 4.14). Being a household headed by government employee reduces the likelihood of vulnerability to poverty by 0.095 factors. This is due to the fact that the income and consumption flow of a government employee is relatively stable.

Membership of community association: There is a logical deduction that being a member of local community association reduces vulnerability of households in times of shocks. It is indicated by (Moser, 1998) that social institutions are an important means of perpetuating reciprocity of households in their microeconomic life. The regression result shows that member of community association negatively correlated with vulnerability to poverty and the coefficient is significant at 1% significant level.

Availability of credit: Availability of credit helps households as a possible coping mechanism in times of shocks. Accordingly, the regression result shows that availability of credit negatively associated with vulnerability to poverty and the coefficient is significant at 1% significant level.

Welfare Shocks: Exposure to risks, whether idiosyncratic or covariate is a major reason for assessing vulnerability of households to poverty (Christiaensen and Subbarao, 2004). According to Holzmann and Jorgensen (1999), a high percentage of households move into poverty due to temporary shocks (such as death or higher price) that are reversed just one or two years later. Accordingly, the study made effort to see the relative importance of shocks on the vulnerability level of a household. Among the five variables included in the first vulnerability model only one variable (larg price) is found to have a positive and significant association with vulnerability of a household (Table 4.14).

CHAPTER FIVE

Conclusion and Policy Recommendation

5.1 Conclusion

The study provided an assessment of urban household vulnerability to poverty in Ethiopia using single visit cross sectional data from Adama town for the year 2015. The cost of basic needs (CBN) approach is employed to find the poverty line as proposed by Ravallion, M. (1994). Vulnerability is defined at the household level, within the framework of poverty eradication, as the probability that a household will be consumption poor in the near future. Accordingly, the methodology proposed by Chaudhuri *et al.* (2002) was used for estimating household-level vulnerability using cross-sectional data. Following the estimation of vulnerability for each household, OLS regression is employed to find the correlates of vulnerability to poverty in the study. Based on the results obtained from the survey the following main conclusions are drawn.

Regression result of the welfare (consumption) model shows that, household's welfare significantly associated with: family size, dependency ratio, educational attainment, credit availability, transfers receives and age of the head. But the direction of association is different in which; large family size, age and high dependency ratio are negatively correlated with welfare, while educational attainment, credit availability and transfer receive are positively correlated with welfare of households,

Parallel to other similar studies the vulnerable population in the study area is found to be considerably larger than the number of currently observed poor. Although 30.88% of households were observed to be poor, the FGLS estimation result indicates that 38.72% of household were highly vulnerable. Substantial proportion households, who are observed to be non-poor, also entered the vulnerable category. It is logical to conclude that vulnerability is more widespread than poverty.

From the findings of the study, education is found to be a key element in reducing poverty. Poverty and vulnerability was the highest among households headed by lower educational attainment persons; whereas households headed by person having

more than secondary level education were observed to have low incidence of poverty and vulnerability.

By the same token econometric analysis; the OLS estimation result has shown that dependency ratio is one of the contributors to high probability being vulnerable to poverty.

Moreover, the study concludes that credit availability is one of the most important variables in determining vulnerability level of a household.

5.2 Policy Recommendation

Poverty alleviation is widely acknowledged as the ultimate objective of development Policy. And poverty assessments, a cataloguing of who is poor, who is not, and the Characteristics of those who are, have been the main analytic tools for structuring Discussions of poverty policy. However, poverty is a stochastic phenomenon. The Poor today may or may not be tomorrow's poor, and some of the non-poor today may Well end up poor tomorrow. In this study, the researcher has argued that in thinking about appropriate forward-looking anti-poverty policy interventions, we need therefore, to look at, not just who is poor today, but also who is likely to be poor in the future. In other words, we need to identify who is vulnerable to poverty.

The descriptive statistics clearly indicated that female headed households were more poor and vulnerable to poverty. Hence the study suggests implications for gender policies. A study by Belyaneh, (2004) showed that, given other characteristics of households, female-headed households allocate their available resources in such a way as to obtain higher welfare than their counterpart male-headed households. Hence, supporting female headed households to overcome poverty and vulnerability will most probably yield better results in terms of improving the welfare status of households.

Households with large family size and high number of dependents were found to have significant positive association with the probability of being poor in near future. The result is fair enough to indicate the need to ensure appropriate implementation of family planning programs. In addition, creating awareness on the negative impact of

large family size through all means of Medias might produce significant reduction on household's vulnerability incidence. To reduce the positive effect of dependency on household vulnerability level, policies like: increasing investments in employment creation and productivity enhancement to mobilize the idle labor can be potential remedy.

In this study, education was found to be a key variable in explaining vulnerability of households. Poverty and vulnerability to poverty were the highest among households headed by low educational attainment headiness; whereas households headed by person having more than secondary level education were significantly better poised to cope with risk and uncertainty. So, investment in human capital along with other means of social protection and promotion could help for poverty reduction.

It is also found that households with limited asset are more susceptible to vulnerability. Hence, for those household who lack economic assets, it will be help full if development policies prioritize the building up of assets through a combination of protective and promotional programs. Access to financial services, for example, through micro credit programs, might help poor households build up assets as it smooths income and consumption. It also enables the purchase of inputs and productive assets, and provides protection against crises. Moreover, vulnerable non-poor households are most likely to benefit from some combination of prevention, protection, and promotion (for example through insurance programs) which would give them a more secure base to diversify their activity into higher return, high risk activities.

This study further suggests the importance of coming up with a profile of vulnerability in Ethiopia. It is highly recommended that the Ethiopian Statistical System to adopt ways to institutionalize vulnerability measurement and measure trends in vulnerability, aside from providing ex-ante on the incidence of poverty. Producing exclusive information at national level might increases the efficiency and effectiveness of measures used to tackle poverty. It is not expected to give the whole picture of the problem by studying vulnerability at one place

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APPENDIXES

Appendix Table A1.1 Summary Statistics for Household Characteristics (partial)

Variable	Observation	Mean	Std. Dev.	Min	Max
Sex head	204	.7107843	.4545136	0	1
Age head	204	44.98529	13.82597	23	90
Age head2	204	2213.897	1398.235	529	8100
Head marital	204	2.318627	.8489031	1	4
Head religion	204	2.740196	1.337652	1	5
Head ethnicity	204	2.911765	1.625553	1	5
Family size	204	5.22549	2.308292	2	14
Dep. ratio	204	.8279314	.6776901	0	4
Ad, equivalence	204	4.40049	2.065146	1.42	13.38
Education head	204	3.151961	1.479397	1	5
Employment status	204	1.25	.6365315	1	3
Asset value	204	137789.7	420641.3	400	4000000
Head income	204	3716.721	4047.874	400	40000
Extra income	204	.3921569	.4894324	0	1
Transfer rec.	204	.3137255	.4651477	0	1
Ownership of house	204	.3823529	.4871576	0	0
Food con. Per Ad eq	204	547.0538	614.7783	47.16981	3389.831
Non-food con. Per Ad. eq	204	257.1669	371.3257	0	4464.286
Total expenditure per Ad.eq	204	804.2207	882.8327	78.61636	6250
Share of food items	204	.6760812	.1247614	.25	1
Share of none food items	204	.3239188	.1247614	0	.75
No. community associations	204	.6764706	.4689736	0	1
Credit availability	204	.3431373	.4759248	0	1
Amount saved	204	5026.186	11473.55	0	60000
Amount borrowed	204	2038.235	8959.262	0	110000
Head death	204	.254902	.4368782	0	1
Head illness	204	.5343137	.5000483	0	1
Head loss of job	204	.3039216	.4610807	0	1
Theft of asset	204	.4117647	.4933637	0	1
Large rise in food price	204	.5686275	.4964863	0	1

Source: computed based on own survey data, 2015

Appendix Table A1.2 Energy content per 100 gm. of edible portion of food items

Item	Food/drink Items	Calorie per 100g	Item	Food/drink Items	Calorie per 100g
1	Teff (Kg)	355	15	Butter	736
2	Wheat (Kg)	351	16	Egg	152
3	Maize (Kg)	378	17	Edible Oil (Litter)	896
4	Barely (Kg)	354	18	Dabo	22
5	Rice	335	19	Coffee	110
6	Beans (Kg)	354	20	Salt	0
7	Lentil (Kg)	370	21	Sugar	400
8	Chickpea	341	22	Cabbage	20
9	Peas (Kg)	352	23	Tomato	31
10	Sweet potato	136	24	Onion	71
11	Potato	100	25	Banana	88
12	Chicken	140	26	Berbere	360
13	Meat	235	27	Mac/pasta	352
14	Milk	73			

Source: EHNRI (1998) Food composition Table used in Ethiopia

Appendix Table A1.3 Calorie Based Nutrition Adult Equivalence Scales

Age	Male	Female
0_1	0.33	0.33
1_2	0.46	0.46
2_3	0.54	0.54
3_5	0.62	0.62
5_7	0.74	0.7
7_10	0.84	0.72
10_12	0.88	0.78
12_14	0.96	0.84
14_16	1.06	0.86
16_18	1.14	0.86
18_30	1.04	0.8
30_60	1	0.82
60+	0.84	0.74

Source: Dercon and Krishnan, 1998

Appendix Table A1.4 Determining the Poverty Line (CBN) Approach

Food items	Mean consumption per adult per month/Kg of Food items (x)	Calorie value of each food (y)	Total calories per adult eq. per month($z=x*y*10$)	Scaling up of X by $1.24=(66000/53413.73)=D$	Median price (E)	Food poverty Line per month (Birr) $F=D*E$
Teff	4.513462183	355	16022.79075	5.596693107	11	61.56362418
wheat	2.217629315	351	7783.878896	2.749860351	6	16.4991621
maize	0.786504301	378	2972.986259	0.975265333	6	5.851592001
Barley	0.388783376	354	1376.293152	0.482091386	5	2.410456932
Rice	0.475924478	335	1594.347	0.590146352	14	8.262048933
Beans	0.165344654	354	585.320076	0.205027371	7	1.435191599
Lentil (Kg)	0.68707407	370	2542.174059	0.851971847	13	11.07563401
Chickpea	0.087141102	341	297.1511563	0.108054966	9	0.972494693
Pea	0.484862027	352	1706.714334	0.601228913	8	4.809831304
Sweet potato	0.058094068	136	79.00793207	0.072036644	4	0.288146576
Potato	0.955200536	100	955.2005363	1.184448665	4	4.73779466
chicken	0.035750196	140	50.05027371	0.044330242	60	2.659814546
meat	0.350798793	235	824.3771646	0.434990504	80	34.79924031
milk	0.453580606	73	331.113842	0.562439951	10	5.624399508
butter	0.137414814	736	1011.373031	0.170394369	60	10.22366216
Egg	1.351804268	152	2054.742487	1.676237292	2	3.352474584
edible oil	0.73958217	896	6626.65624	0.91708189	20	18.34163781
bread	3.220869177	22	708.5912189	3.993877779	1	3.993877779
coffee	0.151938331	110	167.132164	0.18840353	50	9.420176517
salt	0.029047034	0	0	0.036018322	4	0.144073
sugare	0.4868729	400	1947.4919	0.603722489	14	8.452114848
cabbage	0.17651659	20	35.30331807	0.218880572	6	1.313283432
Tomato	0.712769523	31	220.9585521	0.883834208	7	6.186839459
onion	0.748519718	71	531.4490001	0.928164451	8	7.425315607
Banana	0.174282203	88	153.3683387	0.216109932	10	2.161099319
peper	0.293821919	360	1057.75891	0.36433918	30	10.9301754
spagetti i/macaroni	0.504971512	352	1777.499721	0.626164674	12	7.513976092
total			53413.73031			250

Source: computed based on own survey data, 2015

Appendix Table A1.5 Poverty incidence by occupation of the head

Occupation of the head	Non poor	Poor	Total
Self employed	67	35	102
<i>Between</i>	65.68	34.32	100.00
<i>Overall</i>	32.84	17.16	50
Government employee	38	3	41
<i>Between</i>	92.68	7.32	100.00
<i>Overall</i>	18.63	1.47	20.09
Private employee	17	7	24
<i>Between</i>	70.83	29.17	100.00
<i>Overall</i>	8.3	3.43	11.76
NGO employee	7	1	8
<i>Between</i>	87.5	12.5	100.00
<i>Overall</i>	3.43	0.5	3.93
Un employed	4	2	6
<i>Between</i>	66.67	33.3	100.00
<i>Overall</i>	1.96	0.98	2.94
Pensioner	8	15	23
<i>Between</i>	34.78	65.22	100.00
<i>Overall</i>	3.92	7.35	11.27
Total	141	63	204
	69.12	30.88	100.00

Source: computed based on own survey data, 2015

Appendix Table A1.6 Vulnerability by occupation of the head

Occupation of head	Non vulnerable	Highly Vulnerable	Relatively vulnerable	Total
Self employed	45	48	9	102
<i>Between</i>	44.12	47.06	8.82	100.00
<i>Overall</i>	22.06	23.53	4.41	50
Government employee	23	10	3	41
<i>Between</i>	56.09	23.39	7.32	100.00
<i>Overall</i>	25.62	4.9	1.47	20.09
Private employee	18	6	0	24
<i>Between</i>	75	25	0	100.00
<i>Overall</i>	8.82	2.94	0	11.76
NGO employee	8	0	0	8
<i>Between</i>	100	0	0	100.00
<i>Overall</i>	3.92	0	0	3.92
Un employed	4	1	1	6
<i>Between</i>	66.67	16.67	16.67	100.00
<i>Overall</i>	1.96	.49	.49	8.37
Pensioner	9	14	0	23
<i>Between</i>	39.13	60.87	0	100.00
<i>Overall</i>	4.41	6.86	0	11.27
Total	112	79	13	204
	54.91	38.72	6.73	100.00

Source: computed based on own survey data, 2015

Appendix Table A1.7 cumulative statics of household characteristics

Summary of sex of household head

sex_ head	Freq.	Percent	Cum.
female	59	28.92	28.92
male	145	71.08	100.00
Total	204	100.00	

Summary of marital status of household head

Head_marita	Freq.	Percent	Cum.
single	15	7.35	7.35
marreid	145	71.08	78.43
divorced	8	3.92	82.35
wedowed	36	17.65	100.00
Total	204	100.00	

Summary of household education level

edu-head	Freq.	Percent	Cum.
Illiterate	34	16.67	16.67
read and write	42	20.59	37.25
primary school	52	25.49	62.75
secondary school	11	5.39	68.14
diploma and above	65	31.86	100.00
Total	204	100.00	

Summary of household sex over marital status

sex_head	Head_marital				
	single	married	Divorced	wedowed	Total
female	7	21	8	23	59
male	8	12	40	13	145
Total	15	1458		36	204

Summary of status of extra income

Extra_income	Freq.	Percent	Cum.
No	123	60.59	60.59
Yes	80	39.41	100.00
Total	203	100.00	

Summary of educational level of household over sex

sex of HH Head	Illiterate	Read and write	Primary school	Secondary school	Diploma and above	Total
Male	22	21	35	11	56	145
Female	12	21	17	0	9	59
Total	34	42	52	11	65	204

Summary of source of extra income

Source of Extra income	Freq.	Percent	Cum.

Rental income	43	55.13	55.13
Privet business	17	21.79	76.92
Remittance	12	15.38	92.31
Others	6	7.69	100.00
Total	78	100.00	

Summary of house ownership

Owner of housing unit	Freq.	Percent	Cum.
Privately owned	78	38.42	38.42
Rent from kebele	60	29.56	67.98
rent from privet	65	32.02	100.00
Total	203	100.00	

Source: computed based on own survey data, 2015

Appendix Results of the diagnostic test for consumption and vulnerability model

Appendix Table A1.8 Test result of Multicollinearity for the vulnerability model

It is observed from Table (A1.8) below the vulnerability model has a mean Vif of 2.01, which indicates Mulicollinearity is not a problem in the model.

. estat vif		
variable	VIF	1/VIF
diploma_an~e	4.20	0.238171
communitya~o	2.76	0.362768
hh_lossofjob	2.74	0.364314
primary_sch	2.55	0.391470
hh_ilnes	2.28	0.437833
hh_theft	2.14	0.467339
read_and_w~e	1.94	0.515708
family_size	1.94	0.516192
agehh	1.93	0.517818
hh_largepr~e	1.90	0.525783
logasset	1.79	0.557327
creditavail	1.76	0.567768
govern_emp~e	1.75	0.572284
transferrec	1.68	0.594414
hh_death	1.64	0.608660
secondary_~h	1.64	0.611468
private_or~e	1.48	0.676672
dep_ratio	1.41	0.708326
sex_head	1.35	0.740766
NGO_employee	1.30	0.769265
Mean VIF	2.01	

Appendix Table A1.9 Test result of Multicollinearity for the consumption model

It is evident from Table (A1.9) below that the consumption model has a mean Vif of 2.09, indicating that Mulicollinearity is not a problem in the model.

. vif

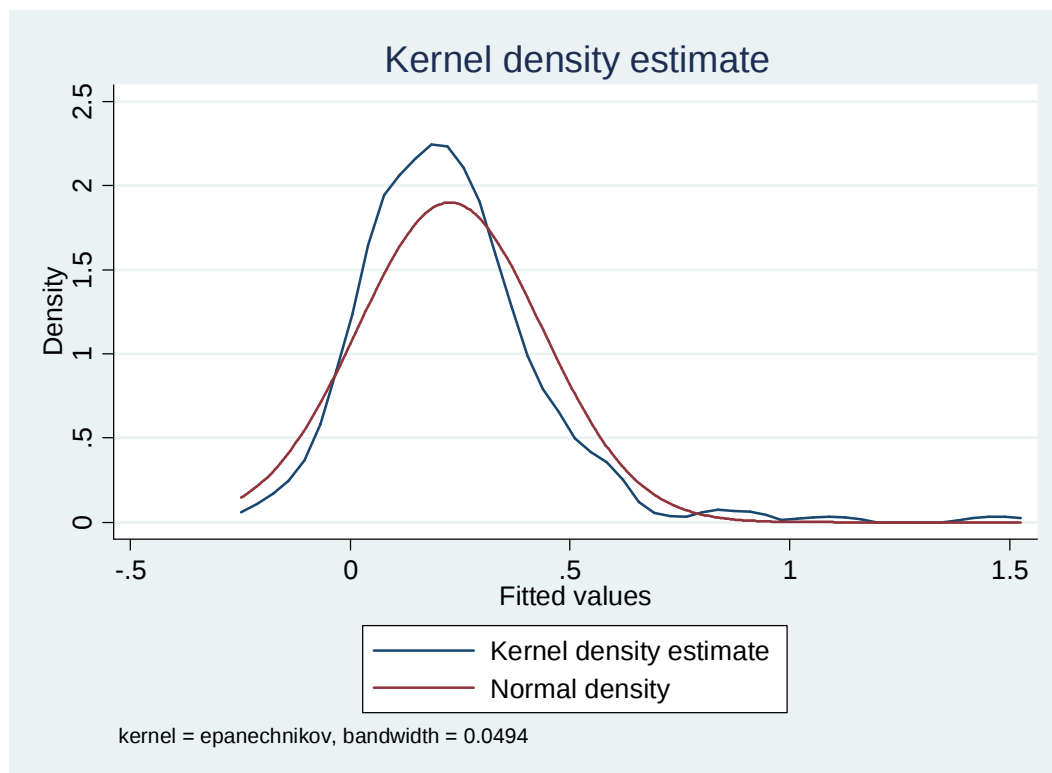
Variable	VIF	1/VIF
diploma_an~e	3.98	0.251047
communitya~o	2.86	0.349096
agehh	2.75	0.364196
hh_lossofjob	2.72	0.367004
primary_sch	2.70	0.370937
hh_theft	2.20	0.455380
read_and_w~e	2.07	0.482872
hh_ilnes	2.06	0.485355
dummyownho~e	1.99	0.502323
pensioner	1.89	0.529054
hh_largepr~e	1.85	0.539241
transferrec	1.82	0.549846
creditavail	1.79	0.557715
family_size	1.75	0.572156
secondery_~h	1.70	0.586740
dep_ratio	1.46	0.684314
sex_head	1.36	0.735126
unemploy	1.34	0.745172
govern_emp~e	1.33	0.751071
Mean VIF	2.09	

Detecting normality for the vulnerability model

Appendix Figure A1.1 Visual inspection method

Another assumption of the regression model (OLS) that impact the validity of all tests (p, t and F) is that residuals behave 'normal'. Residuals are the difference between the observed values vulnerability level (V) and the predicted values of vulnerability (Vhat): $r = V - V_{\text{hat}}$.

If residuals do not follow a 'normal' pattern then you should check for omitted variables, model specification, linearity, functional forms. As can be seen from the figure below the residuals looks to follow a 'normal' pattern



Appendix Table A1.10 Test for heteroskedasticity for the vulnerability model

Breusch-Pagan / Cook-Weisberg test the null hypothesis that the error variances are all equal. In this case, insignificant F value indicates that, heteroskedasticity was probably not a problem

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of v

chi2(1) = 0.39

Prob > chi2 = 0.5325

Appendix Table A1.11 Test for model spesfecation

The result of linke test below that there is no model specifecation problem in the model

. linktest

Source	SS	df	MS	Number of obs =	204
Model	15.0498063	2	7.52490314	F(2, 201) =	144.54
Residual	10.4640045	201	.052059724	Prob > F =	0.0000
				R-squared =	0.5899
				Adj R-squared =	0.5858
Total	25.5138108	203	.125683797	Root MSE =	.22817

v	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
_hat	.925018	.1307197	7.08	0.000	.6672601	1.182776
_hatsq	.0939882	.1463058	0.64	0.521	-.1945029	.3824794
_cons	.0079037	.0293394	0.27	0.788	-.0499488	.0657562

Appendix Table A1.12 Test result of Multicollinearity for dummy variable

The study use Contingency coefficient test for dummy variable to test the existence of multicollinearity among dummy variables. As a rule of thumb variable with contingency coefficient below 0.75 shows weak association and value above it indicate strong association problem. Accordingly, the result of correlation test below shows that only there is multicollinearity problem between age and age square. As the result of this, age square omitted from the model.

. correlate sex_head transferrec hh_death hh_ilnes hh_lossofjob hh_theft hh_largeprice creditavail dummyownhouse communityasso
> age2head agehh
(obs=204)

	sex_head	transf~c	hh_death	hh_ilnes	hh_los~b	hh_theft	hh_lar~e	credit~l	dummyo~e	commun~o	age2head	agehh
sex_head	1.0000											
transferrec	0.1750	1.0000										
hh_death	-0.1479	-0.3470	1.0000									
hh_ilnes	-0.2704	-0.4065	0.4784	1.0000								
hh_lossofjob	-0.2602	-0.3779	0.3472	0.5314	1.0000							
hh_theft	-0.2352	-0.3296	0.3106	0.5015	0.6382	1.0000						
hh_largepr~e	-0.2281	-0.3923	0.3050	0.5560	0.4679	0.4069	1.0000					
creditavail	0.2105	0.4237	-0.1858	-0.4223	-0.4102	-0.4788	-0.4337	1.0000				
dummyownho~e	0.1904	0.5550	-0.2519	-0.4788	-0.4102	-0.3918	-0.4756	0.3874	1.0000			
communitya~o	0.2291	0.4676	-0.3649	-0.5196	-0.7049	-0.5711	-0.4966	0.4557	0.4579	1.0000		
age2head	-0.0363	-0.0720	0.2819	0.3179	0.3807	0.2677	0.2679	-0.1746	-0.0403	-0.2735	1.0000	
agehh	-0.0336	-0.0498	0.2706	0.3047	0.3639	0.2565	0.2660	-0.1527	0.0199	-0.2628	0.9858	1.0000

Appendix Table A1.13 Test for omitted variable

The result of Ramsey reset test for omitted variable below shows that there is no such problem in the model

. ovtest

Ramsey RESET test using powers of the fitted values of v

Ho: model has no omitted variables

F(3, 197) = 1.27

Prob > F = 0.2855

Adama University
School of Graduate Studies
Development Economics Program

Objective: Hello, my name is **Anwar Ibrahim** I am a post graduate student at Adama University. Currently I am conducting research entitled “Determinants of urban household vulnerability to poverty in Ethiopia: the case of Adama Town” in partial fulfillment of Masters of Science degree in development economics. So, the prime objective of this questionnaire is to gather information that can assist me to accomplish my research project.

Your answers will not be released to anyone and will remain anonymous. Your name will not be written on the questionnaire or be kept in any other records. The study is entirely academic and all responses you provide for this study will remain confidential. Only the researcher will have access to view any data collected during this research. Your participation is voluntary and you may withdraw from this research any time you wish or skip any question you don't feel like answering. Your participation will help me to finalize my thesis and receive award of Masters of Science degree in development economics. I am grateful for your kind cooperation.

General Directions

1. You are kindly requested to give genuine responses.
2. Put “√” mark in the box in front of your responses choice.
3. Put the numbers you agree with to those questions which are not multiple choices.
4. Feel free to respond.

General information of study area

1. Name of town -----
2. Name of Keble-----
3. Household code (ID).....

A. Demographic characteristics

1. Age of household head? _____

2. Sex

☐ 1. Male

☐ 2. Female

3. Marital Status

☐ 1. Single

☐ 3. Divorced

☐ 2. Married

☐ 4. Widowed

4. Religion Denomination

☐ 1. Orthodox

☐ 2. Catholic

☐ 3. Protestant

☐ 4. Islam/Muslim

☐ 5. Others _____ (specify)

5. Ethnic Group

☐ 1. *Oromo*

☐ 2. Amahera

☐ 3. *Gurage*

☐ 4. *Silte*

☐ 5. other _____ (specify)

6. Household Size _____

7. Number of economically active (productive) family members _____

8. Number of dependents in the household _____

9. Number of dependents outside the household _____

10. Number of household dependents in the ranges of

1. 0-14 yrs old _____

2. 15-64 yrs old _____

3. 65 yrs old & above _____

11. Household head highest educational level

☐ 1. Illiterate

☐ 4. Secondary (9-12)

☐ 2. Read and Write

☐ 5. Diploma & above

☐ 3. Primary (1-8)

B. Employment /Occupation

12. Status of employment

☐ 1. Employed ☐ 2. Unemployed ☐ 3. Pensioner

If "employed" to Q.12, inquire

13. What is your main occupation?

☐ 1. Self-employed/Self-account ☐ 3. Private employee
☐ 2. Government employee ☐ 4. NGO employee

If "Self-employed" to Q.13, inquire

14. Which type of own-account/self-employed are you engaged in?

☐ 1. Petty-trade/*Gulit* ☐ 4. Service _____ (Specify)
☐ 2. Metal /Wood Work ☐ 5. other _____ (Specify)
☐ 3. Handicraft (embroidery, pottery)

15. How many economically active (productive) individuals are there in your household unemployed? _____

C. ASSETS

16. Quantify the following assets in Birr, if you have.

	Type of Asset	Value in Birr
1	House	
2	Cycle	
3	Motor cycle	
4	Car	
3	Refrigerator	
5	Television	
6	Tape Recorder	
7	Radio	
8	Video (DVD) player	
9	Stove	
10	Furniture	
11	Other _____ (specify)	

D. Income

17. How much is your average monthly income? _____ Birr.

18. If you have extra income other than the permanent one, what is its source?

☐ 1. from renting house ☐ 3. Remittance from others

- ☐ 2. Private business ☐ 4. Other _____ (Specify)

E. Consumption, Expenditure and Saving Expense

19. How much is your household average monthly expenditure? _____ Birr.
 20. How much does your family on average spend to food per month? _____ Birr.
 21. How much for the non-food do you spend in a month? _____ Birr.
 22. How much is your household monthly expenditure on education? _____ Birr.
 23. How much does your family save per month? _____ Birr.

If your answer to Q.23 is nothing/ Zero, inquire,

24. What is your reason not to save?

- ☐ 1. Lack of surplus income ☐ 3. Other _____ (specify)
☐ 2. Investment

25. Quantify the following items with the appropriate units of measure. For the items specified below expenditures will be expressed monthly.

Item	Food/Drink Items	Amount in Kilograms, Liters and Birr
1	Teff (Kg)	
2	Wheat (Kg)	
3	Maize (Kg)	
4	Barely (Kg)	
5	Rice	
6	Beans (Kg)	
7	Lentil (Kg)	
8	Chickpea	
9	Peas (Kg)	
10	Sweet potato	
11	Potato	
12	Chicken	
13	Meat	
14	Milk	
15	Butter	
16	Egg	
17	Edible Oil (Litter)	
18	Dabo	

19	Coffee	
20	Salt	
21	Sugar	
22	Cabbage	
23	Tomato	
24	Onion	
25	Halako	
26	Banana	
27	Berbere	
25	Mac/pasta	

How much does the household spend for the following non-food items?

	Non-food Expenditure	Expenditure
1	Clothing	
2	Medication	
3	School fees	
4	Ceremonial Expense	
5	Social Obligations(Edir, <i>for church</i> , wedding, funeral, etc)	
6	Contribution to Associations(women, Youth and farmers)	
7	Energy Consumption(Kerosene, match etc)	
8	Transportation	
9	Transfer to others	
10	Soap	
11	Repayment to credit Other specify----- --	

F. Housing

26. Who is the owner of your housing unit?

☐ 1. Own occupied

☐ 3. Rented from privates

☐ 2. Rented from Kebele

☐ 4. Other_____ (Specify)

If 1 to Q. 26, inquire

27. How many rooms does this house have? _____ Rooms

If “two” to Q. 26, ask

28. How much do you pay monthly? _____ Birr

If “three” to Q. 26, inquire

29. How much do you pay monthly? _____ Birr

G. Household shock experience for last five years

30. is there any death accident occurred in your family within 5 years?

☐ 1. Yes

☐ 2. No

☐ 3. I don't remember

If your answer for question 30 is yes,

31. for how many times? _____

32. Did any of your family members got sick within 5 years?

☐ 1. Yes

☐ 2. No

☐ 3. I don't remember

If your answer for question no. 32 is yes,

42. for how many times? _____

33. Did your family head have been UN employed or got fired from work within 5 years?

☐ 1. Yes

☐ 2. No

☐ 3. I don't remember

If your answer for question no. 33 is yes,

34. for how many times? _____

35. Did you family highly affected by food price inflation within 5 years?

☐ 1. Yes

☐ 2. No

☐ 3. I don't remember

If your answer for question no. 35 is yes,

36. for how many times?_____

37. is there any theft or robbery occurred in your family within 5 years?

☐ 1. Yes ☐ 2. No ☐ 3. I don't remember

If your answer for question no. 37 is yes,

38. for how many times?_____

H. Membership of Community Association

39. Is your family participating at any social micro and saving community or any nongovernmental organizations?

☐ 1. Yes ☐ 2. No

If your answer for question no. 39 is yes,

40. at which community or organization?_____

☐ 1. Eider ☐ 2. Ekub ☐ 3. Mahaber
☐ 4. NGO ☐ 5. Other_____

41. is your family a member of saving and micro organizations at current time?

☐ 1. Yes ☐ 2.no

42. Have you been saving your money at micro lending and saving organization within 5 years?

☐ 1. Yes ☐ 2. No

If your answer for question no. 42 is yes,

43. How much money?_____

44. Have you borrowed money from micro saving organizations within 5 years?

☐ 1. Yes ☐ 2. No

If your answer for question 44 is yes,

45. How much money_____

Thank you very much for your time and patience!

APPENDIXES