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Dynamics of Child Poverty and Its Determinants:
The case of Tigray National Regional State

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Certification

This is to certify that this thesis entitled “Dynamics of child poverty and its determinants: the case of Tigray Regional National State” is a bona-fide work of Freweini Tadesse Asfaw, Id.No.CBE/PE230/03 who carried out the research under my guidance. Certified further, that to the best of my knowledge the work reported here in does not form part of any project report or thesis on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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I declare that this thesis is my work and that all sources of materials used for this thesis have been duly acknowledged. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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Abstract

The purpose of this paper is to study the dynamics of child poverty and its determinants in Tigray Regional National State. In attempting the study, the author analyzes 2 rounds (2002 and 2006) panel data set on 365 sampled children collected through the young lives' project. The central question that this essay address is: What factors account for the pattern of child poverty? That is, which household demographic and socioeconomic variables emerge as determinants of child poverty?

The data analysis techniques involved are both descriptive and econometric models. The specific statistics used includes percentage, mean, and standard deviation in the descriptive statistics and multinomial logit model in the econometrics analysis. To investigate the study area, the author uses anthropometric indicators of weight for age and height/length for age. The results of the study revealed that, the poverty head count ratio of the sampled children, obtained by having the standard cutoff (-2 z score) indicates that over time there is a gradual decrease in the rate of child poverty severity when measured by percentages of both underweight and stunting on the same time between rounds 1 and 2, i.e. from 23 percent (84/365) in 2002 to 13 percent (46/365) in 2006.

The descriptive and econometric evidences indicate that child poverty is associated with sex of the household head, number of children in the household, wealth of the household, household head education and place of residence. While residence in rural areas and wealth of the household are common factors that significantly predict child poverty (poor and extreme), numbers of children in the household and household head education uniquely predict extreme child poverty.

Lastly, the transition matrices reflect that the movements of poor children between two consecutive survey rounds in relation to the standard cutoff (-2 Z score) is significant. Out of the total non poor children in 2002, 30 percent (65/217) entered in to poverty by 2006. The corresponding exit rate from poverty was 40 percent (60/148) over this period.

The result of this study implies that taking into account of these determinant factors policy makers should be mindful on both food aid and investing on non food items, which this may be vital in reducing child poverty.

List of Acronyms

CCF	Christian Children’s Fund
CSA	Central Statistics Authority
FGT	Foster-Greer- Thorbecke
HCR	Head Count Ratio
HFA	Height for age Z- score
IDRC	International Development Research Center
MoFED	Ministry of Finance and Economic Development
NCHS	National Center for Health Statistics
PGR	Poverty Gap Ratio
PSNP	Productive Safety Net Programme
SNNPR	Southern Nations, Nationalities and peoples Region
UNICEF	United Nations Children’s Fund
USAID	United States Agency International Development
WFA	Weight for age Z-score
WHO	World Health Organization

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CHAPTER ONE

1. INTRODUCTION

1.1 Background

Poverty is a universal phenomenon, which poses a main challenge to governments and non government institutions. According to the World Bank development report about 1.3 billion people in the world live on less than \$1.25 a day (World Bank, 2012). Poverty can be said to exist in a given society when one or more individuals do not attain a level of economic well-being deemed to constitute a reasonable minimum by the standard of that specific society (Ravallion, 1994 cited in Ajobush, 2010).

Poverty is therefore, a multifaceted concept capturing material and non-material welfare, the latter includes nutritional, educational and health-related needs and more subjective factors like security and voice. So the poor are on the one hand, those who do not have enough income or consumption to put them above some adequate minimum threshold and on the other hand, those who lack key capabilities (World Bank, 2005).

Child poverty on the same token is the poverty experienced during childhood and has a permanent effect on children (Minujin et al, 2005). It should be understood as a denial of the children's fundamental human rights (economic, material and immaterial), that is if any of their rights are wholly or partially unmet, the child can be said to be in a situation of poverty or relative deprivation (Eurochild, 2007).

Consequently, the younger children are being tracked from infancy to their mid-teens and the older children to adulthood, when some will become parents themselves. When this is matched with the information obtained from their parents, it can be able to reveal much about the intergenerational transfer of poverty, how families on the margins move in and out of poverty and the policies that can make a real difference to their lives (Tassew et al, 2008). According to UNICEF (2012), adults may fall into poverty temporarily, while falling into poverty in childhood

can last a life time and also threatens not only the individual child, but is likely to be passed on to future generations enhancing and even worsening inequality in the society.

Moreover, child poverty is highly related to the well-being of women, who are also key players in the growth and development of a child. In enhancing the quality of care and nutritional status of children, the role of mothers' well-being is widely recognized (Berhane, 2010). That means, if children do not receive adequate nutrition, they grow smaller in size and intellectual capacity, are more vulnerable to life, threatening diseases, perform worse in school and ultimately are less likely to be productive adults.

As human development in general is a multidimensional, interdepartmental process, the biological consequences of childhood poverty have a direct effect on brain development and thus cognitive development and achievement (Hardgrove et al, 2011).

Therefore, poverty reduction has become a central feature of the international development agenda that the 21st century starts with vast asymmetries in terms of income, access to food, water, health, education, housing, or employment for families. However, governments and the international community are still far from fulfilling children's right and creating a world fit for all poor children. Half of the world's children are below the international poverty line of \$2 a day and suffer from multiple deprivations and violations to basic human rights. More than eight million children die each year (some 22,000 per day), and most of their deaths are preventable. Hunger, malnutrition and lack of safe drinking water contribute to at least half of child mortality (UNICEF, 2012). This continues to be a major challenge for many African countries. According to Minujin et al (2005), approximately 306 million children of Sub Saharan Africa live under absolute poverty.

Ethiopia is one of the poorest countries in the world and ranks among the lowest for most human development indicators. Out of the total population in 2006, 44% were living under the absolute poverty line (consuming less than 2200 kilocalories per adult per day and not having enough to spend on essential non food items) (Tassew et al, 2011). Under one and five age child mortality, which is remarkable, was also 68 and 106 per 1000 births respectively (Susuman, 2012). Only

34% of children aged 7-12 were enrolled in primary school in 2000 despite the fact that close to half the population is younger than 15 years of age (Tassew et al, 2008). Most of these children also suffer from hunger, malnutrition and disease.

To overcome the above mentioned problem, Ethiopia started the fight against poverty and to reduce it from very high levels with close to 49.5% of the total population under the poverty line in 1994/95. Following the implementation of the comprehensive poverty reduction strategy, poverty levels have declined steadily reaching 38.7 percent in 2004/05, and are estimated to further decline to 29.2 percent in 2009/10 (MoFED, 2010). According to Tassew et al (2011), the poverty head count index for the young live household is declining from 72% to 68% from the year 2006 to the year 2009. During the last seven years (2003-2010), the economy in general shows a trend of sustained economic growth of 11% on average (MoFED, 2011).

But, the economy is still largely dominated by agriculture, which is highly sensitive to rainfall and has been exposed to weather induced challenges (Tassew et al, 2008). A climate change is also a key emerging factor with adverse effects on the ecological, social and economic fabric of the society (MoFED, 2011). In this regard, child poverty is still significant and as a result most people make their living as subsistence farmers and dependent on food aid (Tassew et al, 2008).

Tigray is also one of the poorest regions in the country, which is suffering from severe poverty faced with multifarious economic and social problems. It is a drought-prone and food insecure with a multiple of social problems. Currently, the regional government together with other development partners is working to reverse this situation. Multifaceted efforts are being undertaken to improve the living conditions of the people in the region and the nation as a whole with the assistance of donor agencies and international communities to minimize the food insecurity situation and improve socioeconomic development of the region. However, there is still a gap in financial, skill and management, which are the major development challenges of the region (UNICEF, 2009).

As a result poverty is aggravated and from the total population of the region, 58% of it lives below the absolute poverty line (earning less than a dollar a day) and the average per capita income is only birr 1000.38 (UNICEF, 2009). In the same way, child poverty in the region is also

predominantly chronic (kelemewerk, 2011). Consequently, the mortality rate for under one and under five age is 97/1000 births and 101/1000 births respectively (Gebreselassie et al, 2006).

This paper in general examines changes in the prevalence and severity of child poverty in the region using Anthropometric measure and it also explores the determinants of child poverty.

1.2 General Overview of Tigray Region

Tigray Regional state is the northerly region in Ethiopia. It borders Eritrea to the north, the Sudan to the west, Amhara region to the south and Afar region to the east. It covers an area of approximately 54,572 sq. km and comprises a total of 34 rural districts, 12 urban districts and 660 villages (sub-districts) (CSA, 2005 Cited in Kelemewerk, 2012).

Figure 1: Map of Tigray Region

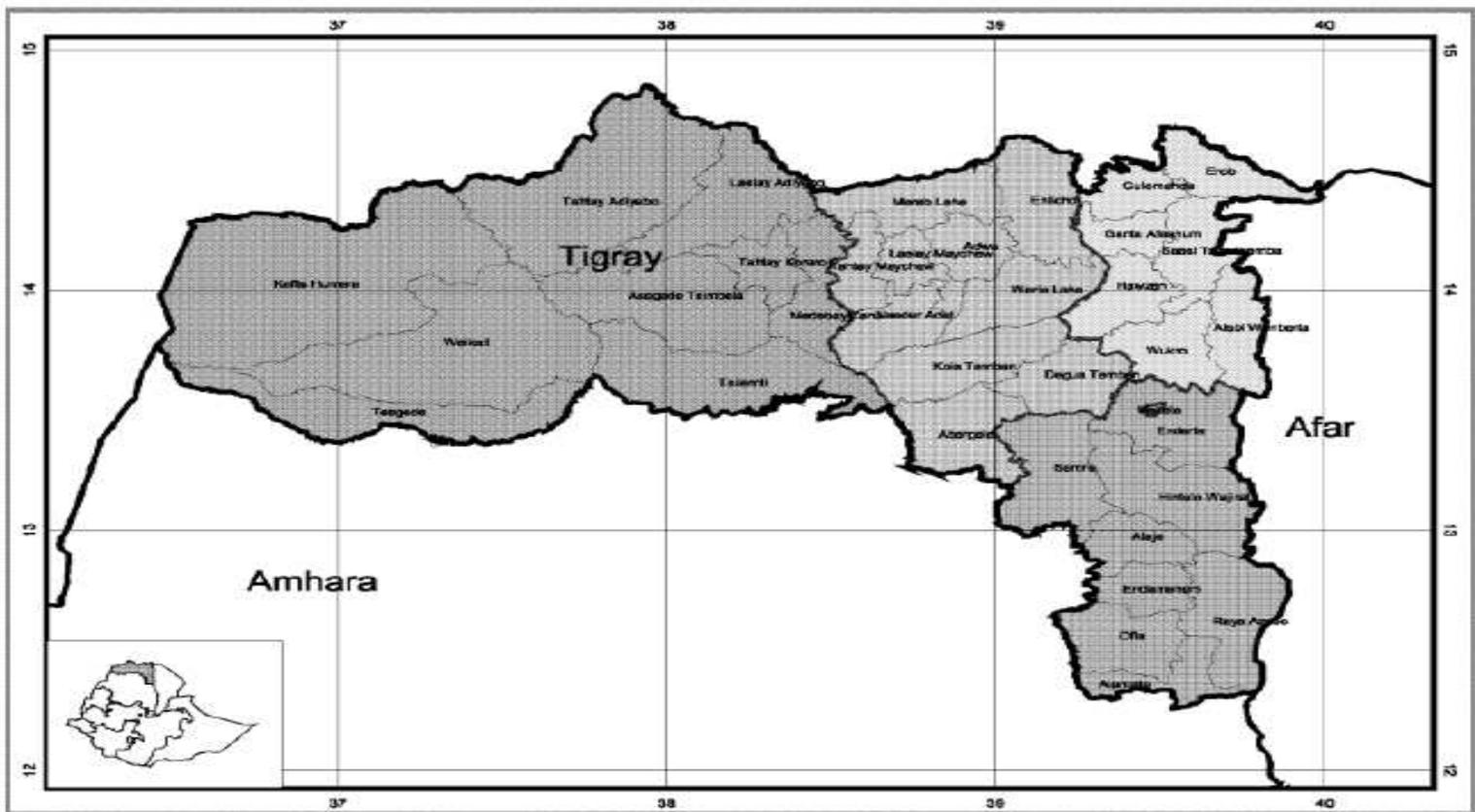


Figure 1. Map of Tigray Region, Ethiopia (DPPA, 2010).

The ethnic groups of the region include Tigrigna, the majority and the Irob and Kunama the minority. Tigrigna is the widely spoken language. In terms of religious faith, the region is a predominantly Christian where the overwhelming majority are the followers of Coptic Orthodox Christian. However, there are also small number of Muslims, followers of Catholic and other Christian denominations (Gebreselassie et al, 2006).

The census report of 2007 released by the Ethiopian population and housing agency shows the region's population size is 4,314,456, with more or less equal size of male and female population of 2,124,853(49.2%) and 2,189,603(50.8%) respectively. As is the case in most of Africa and the other regions of the country, the population structure represents a conical shape i.e. larger size at the bottom age group, and decreasing with increasing age. The population of children under age of 14 in the region reaches 1,885,390, which accounts to 44% of the total population size. The population grows by 2.5% per year (CSA, 2008). Below is a summary table of the size of children in the region by age group.

Table 1: Population size of children by age group

Age group	Population size		
	Male	Female	Total
Under one	59,775	58,532	118,307
1-4	259,796	251,414	511,210
5-9	324,407	316,894	641 301
10-14	315,241	299,331	614,572
15-19	244,674	251,827	496,501

Source: CSA 2008

The crude density of the region is estimated at 79.06 people per square kilometer. In the entire region, there are about 985,654 households which results in average for the region of 4.4 people

per household, with urban households having on average 3.4 and rural households 4.6 people (CSA, 2008).

Like most parts of the country it is an agrarian economy where over 82% of the population lives in the rural area on subsistence farming and rain feed practices (CSA, 2008). Livelihoods in the region are significantly dependent on agriculture income options supported by off farm income generation such as labor trading and petty trade (Kelemewerk, 2012). But, agricultural production and diversification remains low and as a result food shortage is aggravated and initiated.

The main causes of food shortage in particular and poverty in general is therefore, shortage of rain, environmental degradation such as deforestation (which is directly linked with poverty), the decrease of soil fertility, the increase of environmental warming and ground water reduction (Bureau of Plan and Finance, 2010/11). As a result the vulnerable sections especially children and women are victims and suffering from poverty and malnutrition.

1.3 Statement of the Problem

Ethiopia is one of the poorest countries in the world and ranks among the lowest for most human development indicators (Tassew et al, 2008). The economy has experienced a trend of sustained economic growth following the reform programmes implemented since 1991 when the military government was thrown out (Tassew et al, 2008). However, it is still largely dominated by agriculture and most Ethiopian children continue to live below the absolute poverty line. Tigray region is also one of the regions in Ethiopia with high rate of child poverty. This issue is therefore, a concern to the Federal and regional government.

Most of the time, poverty experience by youth is linked to childhood deprivation and parental poverty: that in one way or another , the older generation has been unable to provide the assets required by the younger generation such that they are unable to effectively meet challenges faced during childhood (Moore, 2004).

Tackling intergenerational poverty would involve the provision of support and opportunities essential to a person's sound development, since life cycle development is cumulative, the earlier the compensatory intervention takes place, the less will be the impact of deprivation on the development of a child (Muyanga and Mueni, 2007). As a result, social protection and cash transfer mechanisms are increasingly common in lower- and middle income countries, and have been more or less universal in higher-income countries for many years. It is used to include policies which help to reduce extreme poverty or vulnerability and by increasing cash or food resources can improve nutrition (Porter and Dornan, 2010).

The Ethiopian Productive Safety Net Programme (PSNP), which is being implemented in the region, designed as a social protection provides both public work and direct support for those unable to work, intended to be allocated on needs-based principles and results a positive outcome. The income gained from the programme was helping families send children to school rather than to paid work (Tassew et al, 2011). But, so far there is a problem in rearing children and takes the responsibility to guide them through both the guardian and the government and as a result under nutrition is still common and damaging children's development (Gebreselassie et al, 2006).

Child poverty has been also the focus of both cross-sectional and longitudinal studies in the national literature. In Tigray regional state, however, the author has never come across with longitudinal studies.

Cross-sectional data based studies give us the answers to a number of fundamental important questions. For example, they tell us how many children are poor? They tell us who these poor children are and where they live? But they also leave a number of very important questions unanswered. Do all children spend a short time in poverty or are there a few groups of children who spend their entire childhoods in poverty? What happens to children when their parent's education increased? What happens to children when their families expand or shrink the consumption expenditure? To study these types of important questions one must adopt a dynamic approach and make use of longitudinal data (Matthew and Gabriella, 2008).

Moreover, in most researches, which conducted in the region, children have generally been considered as part of poor households, or never as a unit of analysis, while children experience poverty differently from adults that they have specific and different needs. Taking in to account the stated problems, this research paper is an attempt to fill the gap in the field so as to assist child poverty alleviation endeavors of the country in general and the region in particular.

1.4 Objective of the study

This study is carried out with a general objective of assessing the dynamics of child poverty in relation to the associated socio-economic variables in Tigray National Regional State.

The specific objectives are:

- To examine the child poverty situation
- To investigate factors associated with child poverty;
- To assess the magnitude of children who move into and out of poverty.

1.5 Research Questions

In achieving the objectives outlined above the study answers the following research questions

- What is the situation and changes in child poverty in Tigray?
- What are the major determinant factors playing a great role in child poverty?
- What are the movements in to and out of child poverty?
- What interventions and policy options are to be made to mitigate the problem of child poverty?

1.6 Significance of the study

As indicated above the country in general and the study area in particular has been facing with severe child poverty. Identifying and understanding factors that affects and/or influence the problem also deserve precise empirical research. In this regard, results from the study will provide policy related information that help to prioritize among many possible variables depending on the relative extent of influences of its determinants. Consequently, the concerned

bodies based on the analysis could put their efforts to formulate policies and develop interventions either to alleviate or minimize the problem of the study area.

Moreover, the study is expected to serve as an input for researchers who may be interested to undertake further research, analyze and develop appropriate child poverty reducing and preventing mechanisms.

1.7 Scope and Limitation of the Study

This study is conducted in some selected sentinel sites of Tigray region. Given different demographic, socioeconomic and ethnicity conditions, the sites selected are not fully representative of all the children in the region.

Besides, even if poverty is a multifaceted phenomenon, which can be measured by both unidimensional and multidimensional measurements; the scope of this paper is limited to the dimension of poverty that can be expressed in terms of nutritional status of the child measuring by the Anthropometric measure. As data is being taken from the particular individual however, this measurement is the most and appropriate tool in measuring the nutritional and health status and at the same time the poverty situation of the child over the other dimensions.

Based on this measurement, the study uses only a two rounds data (2002 and 2006) in order to investigate the dynamics of child poverty, as data for prior periods is not available. As a result, the study may not give a brief understanding on long term child poverty dynamism. As can be discussed in the literature review part, even though malnutrition as well as poverty can be measured by three Anthropometric indicators (weight for age, height for age and weight for height), the study focuses only on two anthropometric measures (weight for age and height for age) because of two reasons: 1) the author uses the calculated data of young lives, while weight for height is not calculated properly and fully by this project and 2) the author is unable to calculate the data as the soft ware on hand (the WHO igrowup stata) is able to calculate data for children aged less than five, while the study focuses on children aged less than six. However, the

result of the study based on the two anthropometric measures can efficiently detect the magnitude and severity of child poverty (Roelen and Camfiel, 2012).

On top of this, according to the National Center for Health Statistics (NCHS) and World Health Organization (WHO), a child is any human being whose age is below 18 (cogill, 2001). But this study gives an emphasis only on those children whose age is less than 6 years old as anthropometric measures are more able to capture under nutrition for younger children rather than older ones (Roelen and Camfiel, 2012).

Given the overall stated limitations, however, the research finding could be used to give some awareness among different stakeholders and also serve as background information for others who seek to do further related research in the region and would help in formulating and revising children related strategies.

1.8 Organization of the paper

The paper is organized into five major parts. The first part includes background of the study, general overview of Tigray region, statement of the problem, objectives of the study, research questions, significance of the study, scope and limitations of the paper. The second part presents review of theoretical and empirical literature in the field. Chapter three explores the research methodologies employed in the study. In chapter four the results obtained from the descriptive statistics and econometric models are discussed. Finally, in the last part conclusion, recommendation and policy implications is forwarded.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Theoretical Literature

In the Analysis of poverty there are two bodies of literatures. One is the literature on the concepts of poverty and well-being and the second is on the measurements of poverty.

2.1.1 Concepts of child Poverty and Well-being

Child Poverty is a broad object of research that can be defined in several ways. It is usually conceived as the poverty experienced by children and young people. It differs from adult poverty in that it can have different causes. It can also have different effects and these effects may have a permanent impact on children (Waddington, 2004). Even short periods of deprivation can affect children's long-term growth and development (Minujin, et al, 2006). Traditionally, child poverty is seen as an immediate consequence of family poverty (resulting directly from the lack of economic resources) (Eurochild, 2007).

On the other hand poverty advocates a hybrid approach – a mixture of the basic needs principles and the human rights approach and affects many aspects of child conditions like economic, social, physical, moral, psychological etc (Minujin, et al, 2005). Therefore, expanding the definition of child poverty beyond traditional conceptualizations, such as low household income or low levels of consumption, is particularly important. And yet, child poverty is rarely differentiated from poverty in general and its special dimensions are seldom recognized (Minujin, et al, 2006).

Following either of the two, various researchers define and conceptualize child poverty in different ways. For instance, Children living in poverty are those who experience deprivation of the material, spiritual and emotional resources needed to survive, develop and succeed, leaving them unable to enjoy their rights, achieve their full potential or participate as full and equal members of society (Minujin, et al, 2005). Christian Children's Fund (CCF cited in Minujin, et al, 2005), defines poverty as poor children are deprived of essential material conditions and

services; they are excluded on the basis of their age, gender, class, background, etc.; and they are vulnerable to the increasing range of threats in their environments. Minujin, et al (2006) also portrays children experience poverty as an environment that is damaging to their mental, physical, emotional and spiritual development. These all various approaches towards the conceptualization and definitions of child poverty and well-being are essentially classified under two broad categories. These are: material and non material deprivation. Regarding the material deprivation, poverty could be defined in terms of absolute and relative terms.

In the absolute poverty, people are defined as poor when some absolute needs are not sufficiently satisfied. In other words, it is the cost of a bundle of food items that are necessary to ensure the fulfillment of a predetermined energy requirement and other non-food basic requirements (World Bank, 2005). Rowntree (1880) cited in Kenneally and Ryan, 2009) defines absolute poverty as, the minimum amounts of essential goods and services families needed to survive and calculated the budget or income they needed to purchase these subsistence amounts. This subsistence budget or income is called the 'poverty threshold' or the 'absolute poverty line' a family whose income falls below the poverty line is absolutely poor (Duclos et al, 2006). Kenneally and Ryan (2009) also argue that families who are absolutely poor are close to the margins of existence.

On the other hand, in relative poverty definition, a person is said to be poor if she/he has less than what others have. Rowntree (1880) cited in Kenneally and Ryan, 2009), defines a family is relative poor if its standard of living falls seriously below what is normal for the society in which they live. Consequently, a family may be relatively poor without being absolutely poor. Duclos et al (2006) also argues that relative poor families are not suffering from deprivation, but suffers from exclusion; it is excluded from participating in society in the normal ways the majority population takes for granted.

Considering the non material deprivation poverty is also defined as limited or lack of basic needs, such as nutrition, access to education, health, housing, safe environments, participation in decision making in social life, social discrimination, homelessness and other basic services (Minujin et al, 2006). In general, childhood poverty differs from adult poverty in that childhood is the most vital period in the body's mental, physical and social development (Waddington,

2004). Even for relatively short periods it can have major long-term, irreversible consequence resulting in life-course or inter-generational (i.e. chronic) poverty transmission (Minujin, et al, 2006).

Child poverty in terms of this deprivation can be also defined in terms of criticality and absoluteness. Children not meeting any one of the non material basic needs are classified as critically deprived and at the same time absolute poverty can be defined as deprivation based on two or more of these types of human need (Waddington, 2004).

In particular nutrition is one of the indicators of non material child wellbeing. Nutrition can be expressed as a diet and dietary intake (USAID, 2008). According to Cogill (2001), from a nutritional disorder or condition resulting from faulty or inadequate nutrition, malnutrition is happened. In the macroeconomic as well as microeconomic level, malnutrition is positively related with poverty, such that people with higher income invests in their human capital and health while healthier workers tend to be more productive and receive higher earnings (USAID, 2008).

Having the overall above definitions, societal well-being (and hence poverty) can be also defined from the perspective of poverty severity. According to Jeffrey (2010), extreme poverty is existed when individuals cannot meet their basic needs for survival and they are chronically hungry, unable to access health care and lack of various facilities. Extreme child poverty can also be defined as children that are living in persistent poverty, which is either in low income for long periods or are going without the basic goods and services (Magadi and Middleton, 2007).

2.1.2 The Concepts of Measuring Poverty

Three ingredients are required in computing a poverty measure. These are the relevant dimension and indicator of well-being, that is monetary (income or consumption) and nonmonetary dimensions (such as nutrition, health, education, and assets), the poverty line, that is, a threshold below which a given household or individual will be classified as poor and the poverty measure

to be used for reporting for the population as a whole or for a population subgroup only (Chen and Corak, 2005).

Vandemoortele (2000) cited in Minujin et al, 2005), argues that there is no uniform approach for measuring poverty. The debate over poverty is concerned with different potential causes of poverty and ways by which poverty can be measured and compared nationally and internationally (World Bank, 2005). The concepts, measures, and analytical tools can be applied to numerous dimensions of well-being, such as income, consumption, nutrition, health, education, and assets ownership (Coudouel et al, 2002). This broad concept of measuring poverty is classified into two approaches, the “monetary” and “non monetary” measures (World Bank, 2005).

The first approach is to think of one’s well-being as the command over commodities in general, so people are better off if they have a greater command over resources. In this view, the main focus is on whether households or individuals have enough resources to meet their needs. Typically poverty is then measured by comparing an individual’s income or consumption with some defined threshold below which they are considered to be poor(Chen and Corak, 2005). This is the most conventional view poverty is seen largely in monetary terms and is the starting point for most analyses of poverty (World Bank, 2005). According to Vandemoortele (2000) cited in Minujin et al, 2005), this approach is used to identify poverty reduction strategies to increasing individuals’ income levels.

The second approach to well-being (and hence poverty) is to ask whether people are able to obtain a specific type of consumption good: do they have enough food? Or shelter? Or health care? or education? or voting and/or participation? (Minujin et al, 2006). In this view the analyst would need to go beyond the more traditional monetary measures of poverty: nutritional poverty might be measured by examining whether children are underweighted, stunted or wasted; and educational poverty might be measured by asking whether someone is illiterate, or by the amount of formal schooling they have received (World Bank, 2005). Thus, non-monetary measure like nutritional status could seem more realistic in understanding levels of children’s wellbeing in the developing societies.

Given these approaches, in poverty analysis, the most and crucial method is selecting a poverty line. They can be monetary (for example, a certain level of consumption) or nonmonetary (for instance, a certain level of literacy or nutrition).

According to Chen and Corak (2005), poverty lines are cutoff points separating the poor from the non-poor. Based on this broad definition, monetary measures are often based on estimates of the cost of basic food needs, that is, the cost of a nutritional basket considered minimal for the health of a typical family (2200 kilocalories), to which a provision is added for nonfood needs (Coudouel et al, 2002). In this regard, individuals or households that fail to attain the minimum level of income or consumption expenditure as defined by the cutoff are said to be in poverty (World Bank, 2005).

When estimating poverty using this measure therefore, one may have a choice between using income or consumption as the indicator of well-being. Most of the time analysts argue that, in developing countries consumption is a better indicator of poverty measurement than income for the following reasons,

Consumption is a better outcome indicator than income: consumption is more closely related to a person's well-being (Coudouel et al, 2002). According to World Bank (2005), consumption shows the minimum expense required to meet a given level of utility. On the other hand, income is only one of the elements that will allow consumption of goods; others include questions of "access and availability" (Coudouel et al, 2002).

Consumption may be better measured than income: Income typically rises and then falls in the course of one's lifetime, in addition to fluctuating somewhat from year to year, whereas consumption remains relatively stable (World Bank 2005). Thus information on consumption over a relatively short period, a month for instance as typically collected by a household survey is more likely to be representative of a household's general level of welfare than equivalent information on income (Waddingot, 2004). In most rural economies, incomes of households may fluctuate during the year according to various shocks and in urban economies it may also be irregular.

In most cases most households recall their income incorrectly (underestimate or overestimate) and in this regard quality of information derived from the survey may be low (Coudouel et al, 2002). This implies a potential difficulty for households incorrectly recalling their income, in which case the information on income derived from the survey may be of low quality (Waddingot, 2004). For example, in estimating agrarian income, an additional difficulty in estimating income consists in excluding the inputs purchased for agricultural production from the farmer's revenues (Coudouel et al, 2002). Large shares of income are not also monetized if households consume their own production or exchange it for other goods, and it might be difficult to price these (World Bank, 2005).

Consumption may better reflect a household's actual standard of living and ability to meet basic needs: consumption expenditures reflect not only the goods and services that a household can command based on its current income, but also it explores if the household consumption expenditure is allowed to credit and saving when current income is inadequate (Coudouel et al, 2002).

But, consumption has also its own weakness, yet it is likely to be systematically understated for which households tend to under-declare what they spend on luxuries (e.g. alcohol, cakes) or unlawful items (drugs) (World Bank, 2005).

These traditional money metric welfare measures in general therefore have their own drawbacks for which they are indirect. That is; even though, the poverty estimates should be calculated for individuals and not households, income and consumption data are collected at the household level and assumptions are made about intra-household distribution (usually based on pre-determined adult equivalence scales, which assign shares of household resources to the family size, different age and gender groups according to their perceived needs)(Waddingot, 2004).

According to World Bank (2005), critical assumptions must make in order to measure poverty at the individual level and all members of a given household enjoy the same level of well-being. But, in reality this assumption may not hold in many situations and not all consumption is evenly shared across household members (Chen and Corak, 2005). For example, some elderly members

of a household, or girls, may be much poorer than other members of the same household. As a result, World Bank (2005) argues that, the appropriateness of this assumption will depend upon the theoretical perspective used.

In addition to this, an economy of scale (costs of consuming household public goods when another person is added) is manipulated (Waddingot, 2004). It can be transforming the number of adult equivalents into “effective” adult equivalents, which are then applied evenly across all households (World Bank, 2005). But, because of the problem of picking in appropriate and common scale, equivalent scale in general is less persuasive, and leads to different poverty rates followed by wrong conclusions (Waddingot, 2004).

Moreover, money metric measure is not practically possible to measure precisely individual income levels if there is joint household production or consumption, since many items, including the main consumption goods (food) are purchased for all household members at one time (Waddingot, 2004).

World Bank (2005) argues that, even though, an intra-household share of consumption and income seems accurate and show that children’s share do indeed vary between households, more reasonable estimates of child welfare is recommended. Accordingly, welfare of children should therefore be measured by making use of indicators on different dimensions of welfare which include monetary poverty, non monetary welfare (nutritional status, health, education, physical and social surrounding) (Minujin et, al, 2006).

Once an aggregate income, consumption, or nonmonetary measure is defined at the household or individual level, the next step is to define one or more poverty lines. However, the definition of poverty line depends on how one understands the concept of poverty and may vary across individuals, households, societies, etc due to a number of factors such as difference in taste, preference, price etc (World Bank, 2005).

Among others, health and nutrition are the most critical components of household basic needs in developing countries (Waddingot, 2004). Gorden et al (2006) underlined that nutritional status

measures are comprehensive and they assist in capturing aspects of welfare that are inadequately reflected while using other indicators. Thus, the use of nutritional status as an indicator of welfare of a child is tempting since health of a child has a long term welfare implication and dictates to great extent productivity all throughout adulthood.

Moreover, poverty is a concept which is always moderated by time and space. What we mean by poverty in today's economies is profoundly different from what it meant a century ago. Hence, the context, i.e., time and space is what matters in poverty measures (Wong.C& Wong.H, 2004).

Recent approaches have therefore, focused on using measures that encompass education, health and nutritional status dimensions of child welfare (Waddingot, 2004). Of which, nutritional status indicators have been the most widely used. Specifically, anthropometric measures based poverty measure is an alternative way of measuring child poverty which has turned out to be the most ideal indicators of child nutritional status. Because it includes the prediction of who will benefit from interventions, identifying social and economic inequity and evaluating responses to interventions (Cogill, 2001).

In practice, these measures are the most commonly used indicators of child nutritional status (Alemu et al, 2005). It is used to assess and predict performance, health and survival of individuals and reflect the economic and social well being of populations (Waddingot, 2004). It is also inexpensive measure of the general nutritional status of an individual or a population group (Cogill, 2001).

Anthropometric measure is also the leading indicator in assessing child malnutrition over other measures such as clinical signs of malnutrition or biochemical indicators because anthropometry is quite sensitive to every spectrum of malnutrition and they are commonly utilized for they are relatively easy to assess health and nutritional status, whereas clinical signs or biochemical indicators are useful only at the extreme of malnutrition (Kamiya, 2009). In general, anthropometric status is often taken as a direct measure not only of a population's nutritional status, but also of its overall health and well-being, a marker for the success of development programs in improving welfare (Simith and Hadad, 2000).

Assessment of nutritional status of the child based on Anthropometry measure therefore, has four elements, age, sex, height and weight (Kamiya, 2009). Each of these variables provides one piece of information about a person. When they are used together they can provide important information about a person's nutritional status and termed as indices (Cogill, 2001). According to Kamiya (2009), currently, three indices are commonly used in assessing the nutritional status of children: Weight-for-age, Length-for-age or Height-for-age and Weight-for-length or Weight-for-height.

Underweight is the 1st indicator and expressed by low weight-for-age and reflects relative or absolute deficiency of one of the most essential nutritive substances and or/calories, for a specific age and shows both past (chronic) and/or present (sensitive) under nutrition (Cogill, 2001). This form of malnutrition is relatively sensitive to the fluctuations in the short term access to health and resulting from a loss of weight or a delay of growth (USAID, 2008). Cogill (2001) underlines that, this index is a composite measure of stunting and wasting and is recommended as the indicator to assess changes in the magnitude of malnutrition over time.

The 2nd index, length/Height-for-age is an indicator of past under nutrition or chronic malnutrition (Kamiya, 2009). It shows long period of food or nutritional deficiency related to frequent incident of discriminating malnutrition and unable to measure short term changes(USAID, 2008). Deficits in length-for-age or height-for age are signs of stunting and it is associated with a number of long-term factors including chronic insufficient protein and energy intake, frequent infection, sustained inappropriate feeding practices and poverty (Alemu et al, 2005). This can be used for evaluation purposes (Cogill, 2001).

The 3rd index, wasting or weight-for-height identifies children suffering from recent weight loss or severe under nutrition related to a sudden deprivation of food followed by fast loss of weight (USAID, 2008). This measure is appropriate for examining short-term effects such as seasonal changes in food supply, incorrect feeding or short-term nutritional stress resulted from illness (Kamiya, 2009). According to Cogill (2001), wasting in individual children and population groups can change rapidly if immediate availability of food and prevalence of disease also

changed. Because of its response to short-term influences, wasting is not used to evaluation (Kamiya, 2009).

Given the stated indices, the degree of malnutrition across individuals or population in relation to the reference population can be measured (Waddingot, 2004). Thus, the international reference of child growth was produced by the National Center for Health Statistics (NCHS) and is recommended for international use by the World Health Organization (Kamiya, 2009). The NCHS/WHO reference standards are available for children up to 18 years old but are most accurate when limited to use with children up to the age of 10 years (Cogill, 2001).

Using the Anthropometric measures and taking into consideration age and sex, differences in measurements can be expressed in a number of ways, such that, standard deviation units, or Z-scores, percentage of the median and percentiles (Cogill, 2001).

In terms of accurateness, simplicity and appropriateness, the standard deviation units, or Z-scores is also recommended and widely used by the international nutrition community (Kamyra, 2009). It also offers two major advantages. 1st it allows us to identify a fixed point in the distributions of different indices and across different ages, i.e., for all indices for all ages and 2nd it gives useful summary statistics such as mean and standard deviation, which are calculated from them.

But, percentages of the median (defined as the ratio of a measured or observed value in the individual to the median value of the reference data for the same age or height for the specific sex, expressed as a percentage) and or centiles (defined as the rank position of an individual on a given reference distribution, stated in terms of what percentage of the group the individual equals or exceeds) fails to capture calculations of mean and standard deviation (Cogill, 2001).

Therefore, child nutritional status indicators expressed as Z-scores are corresponded to standard deviations from the median of the reference population. Z-score for an individual *i* is expressed mathematically as follows:

$$\text{Z score} = \frac{(\text{observed value}) - (\text{median reference value})}{\text{Standard deviation of reference population}}$$

Or

$$\text{Z score} = \frac{x_i - x_r}{\delta_r}$$

Where X_i is an observed value for i in a target population, X_r and δ_r are a median and a standard deviation (SD) of the reference population respectively (Cogill et al, 2001).

As can be discussed above, to identify the child nutritional status, one has to use cut off points. Cut offs are used for identifying those children suffering from or at a higher risk of adverse outcomes (Kamya, 2009). The most commonly-used cut-off with Z-scores is -2 and -3 standard deviations, irrespective of the indicator used. This means children with a Z-score for underweight, stunting or wasting, below -2 and -3 SD are considered moderately or severely malnourished (Waddington, 2004). In other words, children who are less than two SDs to three SDs below the median of the reference population are classified as moderately or severely malnourished (USAID, 2008).

Given this outcome, some literatures try to relate malnutrition with poverty. Babatunde and Martinetti (2010) underscored that, food security has a positive impact at mitigating undernourishment and poverty in developing countries. In this case, food security is achieved when a person has access to enough food for an active and healthy life (World Bank, 1986 cited in Simith and Hadad, 2000). These gains for access to food are also food production, income for food purchases or in kind transfers of food (whether from other private citizens, national or foreign governments, or international institutions) (Simith and Hadad, 2000).

The relationship between poverty and nutrition in general is a two-sided one: on the one hand, economic growth (which is generally associated with an eradication of poverty) leads to reduced malnutrition. On the other hand, nutrition is one of the key ingredients for human capital, which in turn represents one of the key factors of growth (Linnermayr and Alderman, 2006).

On the same way Waddington (2004) argues that, the multiple pathways are bi-directional: nutritional status affects health and survival, physical and cognitive functioning, and thus work capacity and productivity at the individual level. Productivity affects an individual's real income, and of course income is a key determinant of the individual's ability to obtain adequate food, as well as other conditions of living that affect nutritional outcomes. In general, since malnutrition and poverty are inter-related, the child with a Z-score below the cutoff is poor and non poor otherwise.

2.2 Empirical Literature

2.2.1 Determinants of child poverty and experiences from African Countries

In most countries the nutritional well being of children is determined by three broad sets of factors, demographics, labor markets, and government policy: the family, the market, and the state (Chen and Corak, 2005). By demographic or family factors we have in mind four influences: sex of the household head, the average age of parents, the education of parents and the number of children per household as indicated by the probability of living with a single parent (Linnemayr and Alderheman, 2006). Older parents are more likely to be better situated to care for their children, if for no other reason than that more labor market experience implies higher earnings. In a similar vein more educated parents are likely to have better labor market skills, lower chances of unemployment, and higher earnings when employed (Alemu et al, 2005). Finally, the impact of the state is measured by changes in the amount of transfer income received by households in receipt of some transfers. All other things equal the greater the average amount of income support, the lower the chances of child poverty (Chen and Corak, 2005).

All African countries also share similar challenges (for instance, demography, disease and environment) (Tsegaye, et al, 2008). Turshen (2008) decomposes poverty by various demographic characteristics. For example, 55% of South African households with four or more children are in the lowest income quintile as compared to 14% of households with one child. Among the most vulnerable are children in women headed households.

Tsegaye, et al (2008) also argues that female-headed households are more likely to be poor from the outset as they are prone to arise in situations of economic stress, deprivation and insecurity. For instance, in Malawi, female-headed households were poorer than other households and they also owned less land, had less access to credit markets, and owned fewer productive assets than other households. In Guinea-Bissau, women have also only about half the incomes of men and are only half as likely to be able to read or write (i.e. children with educated mothers are less likely to be poorer than uneducated mothers) (Tsegaye, et al, 2008).

Simith (2006) investigates that maternal education is also identified as particularly significant, especially in terms of nutritional information, for the well-being of children. Moreover, early enrolment in schools and sustained education are shown to influence adult income-earning potential. Education is demonstrated to be a significant pathway for the breaking of intergenerational transmission of poverty cycles and, potentially, for the catching-up of bad starts in life due to poverty.

According to Turshen (2008), poverty situation is also decomposed by location and as a result there is a huge disparity in the proportion of poor people (children) in rural and urban areas. The percentage of rural people (children) living below the national poverty line in Uganda is more than three times higher than the percentage of poor people living in urban.

2.2.2 Levels and determinants of child poverty in Ethiopia

This part of the literature review aims to systematically present existing academic literatures on Ethiopian children in the context of a more general debate on child poverty, since hundreds and millions of children in Ethiopia are growing up in unfavorable conditions (Ajobush, 2010).

Although poverty rates have reduced during the last decades, Ethiopia is still among one of the poorest countries in Africa with among the highest child poverty prevailing country in the world and ranked 174 out of 187 countries in terms of human development index (Tassew et al, 2011). Almost 40 per cent of the population survives on less than 1.25 dollars a day. The country also suffers regularly from drought, which affects up to 13 million people. Many families are unable to buy or grow enough food to feed themselves, and so need food aid. Consequently, the effects

on children are devastating and one in every 13 children dies before reaching their first birthday, while one in every eight does not survive until they are 5 years old (Tassew et al, 2011 cited at Young lives, 2012).

Generally, most of Ethiopian's children remain very poor and continue to live with not enough in terms of household assets, food and goods, basic services and opportunities. Consequently, percentage of urban children living with poverty due to lack of basic needs is 58.6% and those of rural 99.2% (UNICEF, 2002 cited at Ajobush, 2010).

Different studies are also tried to analyze the poverty situation of Ethiopia following different measures. From the findings of Ajobush (2010), child poverty levels in Ethiopia is very high and in general, despite some progress over the last few decades, life for many of Ethiopian children remains short, poor, insecure and violent.

Tassew et al (2011) employed wealth index categories to see whether poverty situation in Ethiopia is improving between 2002, 2006 and 2009. The findings indicate that by categorizing households as extremely poor, poor and non-poor based on their wealth index. About 63 per cent of households were extremely poor in 2002 compared to only 46 per cent in 2006 and 35 per cent in 2009. This indicates that extreme poverty has declined over time. For the category of non-poor they also see improvement over time. However, the proportion of poor households is also slightly increasing over time, which makes the decline in overall poverty smaller than the decline in extreme poverty (also affected by the fact that those ceasing to be in the extremely poor group, are then likely to move into the poor group). The proportion of households from the total sample who moved into and out of poverty between 2006 and 2009 is 11.1% & and 15.2% respectively.

The same study also derived poverty lines following the cost of basic needs approach and calculated the Foster-Greer-Thorbeck class of poverty indices. The results indicate that the magnitude of poverty in Ethiopia for the year 2006 and 2009 to be 72% and 68% respectively. In addition, the investigation revealed that in both periods, rural poverty was higher than urban poverty, but the reduction in poverty was higher for rural areas (7.5%) than for urban area

(2.5%). The study also, identified that those who were non-poor in 2006, 40 per cent moved into poverty and among those who were poor in 2006 only 21 per cent moved out of poverty.

Kelemework (2011) decomposed child poverty situation by type of location (urban-rural) that children reside using multidimensional approach. The investigation reveals that the proportion of the children below the poverty threshold is higher in rural areas than in urban areas in both period (2002 and 2006). Although child poverty is more of rural than urban phenomenon, it showed a decline by about 13% in rural areas over the period 2002 to 2006. The result of his investigation also revealed that child poverty is more associated with higher family size. It is also more observable in illiterate household heads relative to the literate one.

The study also generalized that absolute mobility with respect to entering and exiting poverty is characterized by the transition matrix and shows that 30.72% of all poor children in 2002 were not poor in 2006. The transition matrix also shows that 12.46 percent of children which were not poor in 2002 fell into poverty in 2006.

In a similar way Camfield and Roelen (2012) present the proportions of rural children having followed an upwards, downwards or stable trajectory from 2002 to 2009 using 3 rounds of quantitative and 2 rounds of qualitative data. Estimates indicate that more than half of all rural children experienced an improvement in their living conditions. However, 11 percent of all rural children experienced deterioration and one third of all children remained in the same situation. As only 12 percent of all children were classified as non-poor in 2002, such a stable situation represents being trapped into poverty or near-poverty for the majority of children.

Roelen and Camfield (2012) also studied poverty on rural children of Ethiopia based on nutrition using the three rounds panel data (2002, 2006 and 2009) and categorized children in to four groups ultra-poor, poor, nearly poor and not poor. The rate of under-nutrition is 7.4 per cent in Round 1 and drops substantially to 0.3 and 0.5 per cent, in Rounds 2 and 3 respectively.

The study also revealed that an overall increase in living standards shifts those children from poverty to near-poverty between 2002 and 2006 (Round 1 and Round 2) and from near-poverty to out of poverty between 2006 and 2009 (Rounds 2 and 3).

Another study by employing the Anthropometric measure tries to show the prevalence of malnutrition in Ethiopia. The study reveals that, there is a tremendous decline in the rate of malnutrition measured by stunting and underweight throughout the country (Daniel, 2006).

This study also tried to correlate educational status of mothers with their income and in the same time with their nutritional status. The result revealed that, educational status of mothers has a positive relationship with their income and their income is also positively correlated with nutritional status of the child and in the same time negatively correlated with poverty.

Berhan (2010) also investigated the correlation between child malnutrition and household economic status. In this case children in poor households are found to be, on average, at a higher risk of malnutrition/health problem than children from rich households. This implies that better off households have better access to food and higher cash incomes than poor households, allowing them a quality diet, better access to medical care and more money to spend on essential non-food items such as schooling, clothing and hygiene products.

The study also explores the correlations between mother's education and child malnutrition. In this regard, children whose mothers have no education and primary education level are highly vulnerable to health problem and malnutrition than children whose mothers have secondary and above education level.

In addition to identifying and understanding the level of poverty, different studies also give an emphasis on poverty severity and knowledge of its determinants in poverty dynamics, for which it is useful in designing poverty reduction strategies. In particular, it would assist policy makers to determine which target groups are best-suited to long-term or short-term programs. Evidences from several studies are therefore, drown below.

Kelemewerk (2011) tried to estimate multinomial logit model by categorizing the dependent variable into one/two dummy variables so as to identify the correlates of chronic and transient child poverty in Ethiopia. The results of his investigation revealed that land, location, education level of household head and caregiver, occupation in agricultural activity and access to credit were significantly influence both chronic and transient nature of poverty. Education level of the household head is highly correlated with probability of chronic poverty with negative sign. The other important variable is the location that children reside. The result shows that, children in urban areas are less likely to become chronically poor.

On the other hand, Daniel (2006), using four rounds longitudinal data and Anthropometric measurement, tried to relate child malnutrition with number of children in the household. The result revealed that children living in households with high number of children are more vulnerable to malnutrition.

CHAPTER THREE

3. DATA AND METHODS

3.1 Data source and collection strategy

People's welfare is changed over time and hence there can be a trend of moving in and out of poverty situation. Accordingly, determinant factors of poverty also change over time. Because of this nature of the subject of the study, poverty is best studied by having a panel of observations in a longitudinal study design.

In this regard, Young Lives in Ethiopia gives a broad outline of the key indicators of childhood poverty and changes that have been taking place in children's lives. The data is collected by the Department of International Development; University of Oxford associated with the International Development Research Center (IDRC) in five selected Regions in the country, Addis Ababa, Amhara, Oromia, SNNPR and Tigray in 2002(1st round), 2006(2nd round) and 2009(3rd round).

The main criterion for selection was 1) national coverage and 2) food deficiency (Tassew et al, 2008). Out of the selected areas the author investigated the desired outcomes of Tigray Region based on the two rounds (2002 and 2006) panel data analysis. The panel study generally allows examination on trends of child poverty, effect of socio economic variables and relationships between outcomes of child poverty and characteristics of demographics and households.

The first Young Lives survey was carried out in 2002 and selected a cohort of 2000 children (younger) aged 6 to 18 months and a cohort 1,000 aged 7.5-8.5years (older) and using sentinel site sampling approach. It consists of a multi-stage sampling procedure, whereby households within a sentinel site were selected randomly. Twenty sentinel sites were selected across the country using purposive strategy and within each site households were randomly sampled until 100 and 50 children of the younger and older cohort ages were found (Tassew et al, 2008). Based on the sentinel sampling approach, 365 of children are selected during the 2nd round (2006) against the study area and therefore children aged below 6 years are employed.

3.2 Method of Data Analysis

3.2.1. Descriptive statistics

Descriptive statistics is one of the techniques used to summarize information (data) collected from a sample. By applying descriptive statistics such as mean, standard deviation, frequency etc, one can compare and contrast different categories of sample units (in this case the child) with respect to the desired characters so as to draw some important conclusions.

3.2.2. Econometrics Model

3.2.2.1 The Foster-Greer-Thorbecke Poverty Analysis

As discussed in the literature, malnutrition might be a sign of poverty and reducing malnutrition can be taken as a reduction of poverty. Anthropometry measures are the most appropriate measure of child poverty, which is taken from individual data and focuses on categorizing children who tend to be particularly vulnerable to nutritional deficiencies and it might be used to segregate the poor from the non poor using the standard cut off point. The measure is not only used as an indicator but also in monitoring and evaluation purpose for policy makers (Cogill, 2001). In measuring the nutritional status of a child, we have three Anthropometric indicators, underweight (Weight for age), stunting (Height/Length for age) and wasting (Weight for height). Some literatures argue that, due to the following reasons however underweight is the most important indicator;

- It is a combined measure of stunting and wasting
- It is used to assess changes in the magnitude of malnutrition over time
- It is used for monitoring and evaluation purpose, while the other indicators could use either of the two (i.e. stunting for evaluation purpose and wasting for monitoring purpose) (Cogill, 2001). But in order to have more accurate result, the author employs the two measures (the weight for age and height/length for age). Roelen and Camfiel (2012) have tried to identify the level and severity of child poverty using weight for age and height for age of the anthropometric measures.

The z-score mathematical model of child nutritional status indices are used to calculate the nutritional status of the child and based on this indicator the researcher tries to evaluate the intensity of poverty using the standard z score, where the weight for age z score of less than -2 indicates the situation of malnourishment (underweight or stunted). As discussed in the above literature, since malnutrition and poverty are inter-related, those children owing weight and height for age z score below the cutoff point are also poor and non poor otherwise.

Having the overall stated information, poverty can be analyzed using three poverty indices; the headcount index/ratio; the poverty gap index/ratio; and severity index/ratio or Foster-Greer-Thorbecke (FGT) index.

Head count ratio

Head count ratio is the commonly used indicator of poverty, which divides the population in to poor and non poor (World Bank, 2005). This poverty measure is used to calculate the magnitude of poverty in a specific area, time and group. The mathematical expression is;

$$\text{HCR} = \frac{q}{n} \quad (1)$$

Where q is the number of poor people and n is the size of the population. This index uses as a binary indicator equal to one if a child is poor and zero otherwise. It is popular because it is a simple measure and easy to understand (World Bank, 2005). But as pointed out by numerous observers, this measure has a number of limitations. It gives equal weight to all individuals below the threshold and explicitly assumes that poverty is a discrete event associated with being above or below a given line. Someone just below the threshold is given the same consideration as someone at the very bottom. It also says nothing about how far below the poverty line the poor person is, i.e. the poverty gap. The head-count index does not also indicate how poor the poor are, and hence does not change if people below the poverty line become poorer (World Bank, 2005).

Poverty gap ratio

Poverty gap ratio (PGR) is a ratio reflecting the depth (or intensity) of poverty, in our case it takes into account the distance between the poverty line and the poor's nutritional status. The sum of these poverty gaps gives the minimum cost of eliminating poverty, if transfers were perfectly targeted (World Bank, 2005). However, this measure has its own limitations that the measure does not reflect changes in inequality among the poor (World Bank, 2005).

$$PGR = \frac{1}{n} \sum_{i=1}^g \left[\frac{z - z_i}{z} \right] \quad (2)$$

Where z is the poverty line, z_i is the calculated individual's z-score, n is the number of peoples in the economy and g is the number of poor (those individuals below the poverty line). For people with calculated z-score above the cut-off point (the "non-poor") the ratio is obviously set equal to zero.

FGT-index (measuring of intensity of poverty)

FGT-index is the aggregating measure belonging to the class of additively decomposable measures proposed by Foster, Greer and Thorbecke (1984). Like the poverty gap ratio, it is an index of poverty intensity. By squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line (the weight increasing with parameter alpha) (World Bank, 2005). In many cases, the FGT-index with $\alpha=2$ is common. In general, as suggested by Foster *et al* (1984), the three poverty indices can be calculated using the following formula:

$$FGT(\alpha) = \frac{1}{n} \sum_{i=1}^g \left[\frac{z - z_i}{z} \right]^\alpha, \quad 0 \leq FGT \leq 1 \text{ and } \alpha = 2 \quad (3)$$

Where $\left[\frac{z - z_i}{z} \right]^\alpha$ is the individual component

The formulation is the same as the poverty gap, where the head count ratio and the poverty gap ratio are indeed two special cases of FGT-indexes with $\alpha=0$ and $\alpha=1$ respectively (Iris Macculi,

2009). At P_0 , all poor are given equal weight and the measure is equivalent with the head count ratio. At P_1 , each poor person is weighted by his distance to the poverty line ($z - z_i$). Thus, P_1 measures the distance to the poverty line for the average poor person (the poverty gap index). At P_2 , the weight given to each of the poor is more than proportional to the shortfall from the poverty line.

According to World Bank (2005), the choice of index is important for designing poverty reduction policies. In our case the Head count index seems the most appropriate, logical and sound in reflecting the reality. In this regard, even if, policies helping the poorest may not be captured by this index, it might nevertheless be desirable. Since malnutrition in general is a serious case, head count index can easily reduced by aiming policies at those just below the poverty line or cutoff.

3.2.2.2 Multinomial Logit Model

Knowledge of the determinants of extreme and less extreme poverty and examining why individuals (children) are always poor versus sometimes (temporarily) poor and understanding the correlates are important. In order to identify the poverty status and poverty spells, regression models are very useful. In this respect, Verbeek (2004) argue that, when there is no natural ordering in the alternatives and it is not realistic to assume that there is a monotonic relationship between one underlying latent variable and the observed outcomes; multinomial logit model is the most appropriate.

Green (2003), also generalized that a multinomial logit model is the best when a model of some dependent variable chosen based on a sample size of n observations drawn from the population using T period of time, which consisting of j alternatives, $0, 1, 2 \dots j$ and relevant explanatory variables. For instance, Iris Macculi (2009) uses multinomial logit regressions to investigate the relative influence of various socio-demographic and socio-economic characteristics of the household and the child on poverty status of a child using panel data from Switzerland. Tesfay (2005) uses multinomial logit regressions to investigate the relative influence of various socio-demographic characteristics of the household on poverty status (spell) of a three rounds panel of households from urban Ethiopia.

Accordingly, the researcher also uses multinomial logit regression model to investigate the relative determinants of various socio-demographic and socio-economic characteristics of the child and the household on poverty status (spell) of the child. In general speaking multinomial logistic regression is one commonly used strategy which is a straight forward extension of logistic model:

The mathematical expression of the model is:

$$P(y_i = j/x) = \frac{\exp\{\beta x_{ij}\}}{\exp\{\beta x_{i1}\} + \exp\{\beta x_{i2}\} + \dots + \exp\{\beta x_{im}\}} \quad (4)$$

This structure automatically implies that $0 \leq P\{y_i = j\} \leq 1$ and that $\sum_{j=1}^m P\{y_i = j\} = 1$.

In this regard, the distribution of ϵ_{ij} is undefined. To solve this problem, it is common to normalize one of the deterministic parameters to zero. Thus with this we obtain,

$$P(y_i = j/x) = \frac{\exp\{\beta x_{ij}\}}{1 + \exp\{\beta x_{i2}\} + \dots + \exp\{\beta x_{im}\}} \quad j = 1, 2, \dots, m \quad (5)$$

The above expression (equation 5) can be also written as

$$P(y_i = j/x) = \frac{\exp\{\beta x_{ji}\}}{1 + \sum_j^m \exp\{\beta x_{im}\}} \quad j = 1, 2, \dots, m \quad (6)$$

Where, $p(y_i=j/x)$ is the response probability of the individual i , x is the vector of individual, household and or community variables and β is a vector of coefficients.

When we come to our analysis the above econometric model can be expressed as follows. Here children are classified into five groups according to the number of time they spent in poverty as well as the number of nutritional deficiency and the poverty status. P_i is discrete variable taking values zero, one, two, three and four for never poor, moderate poor, nearly poor, less extreme poor and extreme poor respectively and depends on the explanatory variables as in the following equation (equation 7).

$$P_i = \beta X_t + v_i \quad (7)$$

Where X is a vector of covariates, β is a vector of parameters and v_i is the disturbance term.

In the equation above P_i is the dependent variable of the econometric model, where;

- Never poor: children are not poor in any of the rounds by any measurement ($Z_{it} \geq Z$ for all t)
- Moderately poor: children are poor in one of the rounds by any measurement and not poor in the other round ($Z_{it} \leq Z$ but $Z_{it} > Z$ for some t)
- Nearly poor: children are poor by one measure in each of the period ($Z_{it} \leq Z$ for all t)
- Less extreme Poor: children are poor in one of the measurements in one round and by two of the measurements in the other round ($Z_{it} \leq Z$ for all t)
- Extreme poor: children are poor in both of the measurements in the two rounds ($Z_{it} \leq Z$ for all t).

Where (Z_{it}) is the calculated individual's Z -score and Z is the standard Z - score (the cut-off point)

But the author tested if some of the outcomes can be combined or not. Long and Freese (2006) underscored that, two outcomes say a and b are said to be indistinguishable if none of the variables significantly affects the odds of outcome a versus outcome b . If these two outcomes are indistinguishable with respect to the variables in the model, one can obtain more efficient estimates by combining them (Long and Freese, 2006). The author therefore applied the Wald test and the result indicates that the second and the third (outcome variables 1 and 2) and the fourth and the fifth (outcome variables 3 and 4) can be combined independently. Thus the following three outcome variables, never poor, poor and extreme poor are obtained and the result becomes:

- Never poor: children are not poor in any of the rounds by any measurement ($Z_{it} \geq Z$ for all t)

- Poor: Children are poor in one of the rounds by any measurement and not poor in the other round or poor by one measure in each of the period ($Z_{it} \leq Z$ but $Z_{it} > Z$ for some t)
- Extreme poor: Children are poor in one of the measurements in one round and by two of the measurements in the other round or poor in both of the measurements in the two rounds ($Z_{it} \leq Z$ for all t).

Therefore, let np to represent $P_{i=0}$, pr to represent $p_{i=1}$, ep represents $p_{i=2}$ and where the subscripts: np, pr and ep are never-poor, poor and extreme poor respectively assuming all the disturbance terms v_{np} , v_{pr} and v_{ep} , are distributed independently. The probability a child is never poor, poor and extreme poor respectively is:

$$P(y_i=np/x) = \frac{\exp\{\beta_{np}x_i\}}{\exp\{\beta_{np}x_i\} + \exp\{\beta_{ep}x_i\} + \exp\{\beta_{pr}x_i\}} \quad (8)$$

$$P(y_i=pr/x) = \frac{\exp\{\beta_{pr}x_i\}}{\exp\{\beta_{np}x_i\} + \exp\{\beta_{ep}x_i\} + \exp\{\beta_{pr}x_i\}} \quad (9)$$

$$P(y_i=ep/x) = \frac{\exp\{\beta_{ep}x_i\}}{\exp\{\beta_{np}x_i\} + \exp\{\beta_{ep}x_i\} + \exp\{\beta_{pr}x_i\}} \quad (10)$$

As in the binary response case, we are interested in how ceteris paribus changes in the elements of x affects the response probabilities, $P(y=j/x)$, $j=0, 1, 2$). Since the probabilities must sum to unity, $P(y=0/x)$ is determined once we know the probabilities for $j=1, 2$ (Woodridge, 2000). The probability of the alternatives is given by;

$$\Pr(y_i=j/x) = \frac{\exp\{\beta_{ij}x_i\}}{1 + \exp\{\beta_{pr}x_i\} + \exp\{\beta_{ep}x_i\}} \quad (11)$$

Where x is the explanatory variable, j is the alternatives (never-poor, poor and extreme poor) and β is the coefficient. For example a positive β_{ep} and β_{pr} coefficients then means that the probability of becoming extreme poor and poor respectively (Verbeck, 2004). In this respect in general, for all of the tools, STATA software version 9.0 is employed.

3.3. Variable Specification

The dependent and the explanatory variables that were considered to determine the poverty status and poverty spell of the child were selected based on experiences from the related studies and the availability of data on the subject.

As discussed above, the dependent variable of the econometric model for this study is the poverty spell of the child, never poor, poor and extreme poor.

The explanatory variables selected for this study are also broadly categorized under socioeconomic and Demographic factors. The following is a summary table which shows a brief explanation of the explanatory variables selected for this study.

Table 2: Names and description of independent variables

Demographic variables	
Explanatory variable	Description
Number of children in the household (nochildren):	A total number of children living under the same roof. An increase in the number of children implies more mouth to be fed from the limited resources.
Location	Is a dummy variable taking 1 if the child lives in rural 0 otherwise. It is a site where anybody resides.
Sex of the household head (HHSEX):	Is a dummy variable taking a value of 1 if the household head is male and 0 otherwise. Household head is a person who economically supports or manages the household or for some reason of age or respect is considered as head by other members of the household. It could be male or a female.

Socio-economic variables	
Education level of household head (HHEDUC):	Education is a dummy variable taking a value of 1 if a household head is literate and 0 otherwise. It is the knowledge or ability gained through being educated. Education is an important determinant factor for income earning potential of a household which has a significant influence on consumption behavior of the household.
Education level of the mother (MTHEDUC):	Level of education of the mother is a dummy variable taking 1 if the mother is literate, 0 otherwise
Wealth:	Wealth in this regard refers to the wealth index of the household and this index is a measure of the value of all of the assets of worth owned by a person. Wealth is the found by taking the total market value of all the physical and intangible assets of the entity and then subtracting all debts.

CHAPTER FOUR

4. RESULTS AND DISCUSSION OF THE STUDY

This chapter discusses the analytical results of the study. The first section of this chapter presents the descriptive analysis followed by discussion of the econometric model.

4.1 Descriptive Analysis

4.1.1 Description of the Data

Children in this study are defined as those individuals below the ages of six years old. The summary characteristics of the panel data is presented in table 3 below. Out of the 400 children surveyed in 2002(round 1), only 365 children are in the panel (around 8 percent attrition). The mean and standard deviation of the selected variables for the analysis are presented in table 3.

According to the information, the average age of the head of the household increased from 39.7 years in 2002 to 43.8 years in 2006. The average age of female-headed households increased from 39.9 years in round 1 to 45.61 years in round 2 and that of male headed households increased from 39.64 years in round 1(2002) to 43.46 years in round 2(2006). The descriptive statics also reveals that the average number of children in the household is increased from 3.8 in 2002 to 4.37 in 2006.

Table 3: summary statistics of the sampled individuals

Variables	2002		2006	
	Mean	Std.dev	Mean	Std.dev
Household head age by sex				
Female	39.9	15.54	45.61	16.04
Male	39.64	10.94	43.46	10.68
Number of children	3.80	1.64	4.37	1.48

Source: own computation based on young lives' 2002 and 2006 data

4.1.2 Poverty Profile

Table 4 below shows that child poverty with regard to Anthropometry measures over the two years period. The prevalence of child poverty could be disaggregated according to the number of anthropometry measures the child is nutritionally defected. Accordingly, a child may be defected in one or two measures (a low height for age or a low weight for age or both at the same time).

In this regard, the poverty incidence, P_0 , obtained by laying the standard cut off point to measure the nutritional status as well as poverty situation of the child, i.e. the Z-score -2, indicates that out of the total poor, the share of child poverty with regard to one measure was 43 percent and 70 percent in 2002 and 2006. Similarly 57 percent in 2002 and 30 percent in 2006 of the children were found to be below the cutoff point in terms of the two anthropometric measures. This poverty index may show poverty severity and has been decreased by 45 percent between the year 2002 and 2006. According to Table 4 below one can generalized that poverty in 2002 was more of severe.

Nevertheless, when the measures are treated aggregately, poverty rate is increased from 41 percent (148/365) to 42 percent (153/365) from the year 2002 to 2006.

Table 4: Child Poverty profile based on the Anthropometric measure

Poverty indices	2002	2006
	No. (percent)	No. (percent)
Child poverty by only one measure (Either WFA or HFA)	64 (43%)	107 (70%)
Child poverty by two measures (Both WFA and HFA)	84 (57%)	46 (30%)
Total	148 (100%)	153 (100%)

Source: own computation based on young lives' 2002 and 2006 data

*Numbers in parenthesis are column percents

4.1.3 Child poverty, Demographic and Socio-economic characteristic in the study area

This section reports the descriptive results of the characteristics of some determinant factors and the correlations between child poverty. Variables that include the household heads sex, educational background of the households head and mothers, number of children in the household and residency of the children (location) were briefly analyzed.

In Ethiopia the head of a household strongly influences the household's livelihood. Their demographic features would then affect the living standards of the child. In view of this, an attempt was made to assess the level of child poverty that exists between households headed by men and those by women.

Much more common to observe a good deal of female headed households, especially in the developing countries like Ethiopia they are more likely to being poor as compared to their male-headed counterparts. In this specific survey, female headed households accounts for 19 percent (67) in 2002 (round 1) and 18 percent (65) in 2006(round2).

This figure seemed to be small when compared to male headed ones (which accounts for 81 percent (298) in round 1 and 82 percent (300) in round 2 respectively). But it is enough to analyze the situation of female-headed families in the study area. In general, the decrease in the number of female headed households and on the other hand the increase in the number of male headed households might be due to re-marriage and the new spouse becomes the head of the household.

According to Table 5 below, with such small rate of proportion the rate of poverty seems to be high among female headed households constituting 40 percent in round 1 and 46 percent in round 2 of the total female-headed sampled households. On the other hand, the male headed poor household accounts for 40 percent in round 1 and 41 percent in round 2 of the total male headed sampled households. However, the difference on both rounds is not statistically significant.

In most of the parts of the region where illiteracy is pervasive different researchers found that the illiteracy rate is high. The result of this particular study also supports earlier findings. Accordingly, 46 percent (168) in round 1 and 43 percent (156) in round 2 of the household heads were found to be illiterate who could not read and write while only 54 percent (197) in round 1 and 57 percent (209) in round 2 were found to be literate. Table 5 shows that the percentage of poor children is higher among illiterate household heads than literate household heads. About 48 percent in 2002 and 43 percent in 2006 of the total sample children of illiterate households were found to be poor while the figure for literate households were 35 percent in 2002 and 42 percent in 2006. The difference is also statistically significant at 1% level of significance for each round.

Similar to the education level of the household head, the level of education of the mother also affects child poverty. Table 5 confirms that while child poverty for households where the mother is illiterate was 44 percent and 42 percent for 2002 and 2006 respectively, the figure for households where the mother is literate was 31 percent and 41 percent respectively for the same period. The result is also statistically significant at 5% significance levels for each round.

The other factor that affects child poverty is number of children in a household. Categorizing households in to two- those with four or less number of children and those with five or more children-table 5 reveals that child poverty is highly correlated with number of children. While child poverty is 50 and 43 percent respectively for 2002 and 2006 for households with five or more children, the figure for those with four or less children is 36 and 41 percent respectively for the two survey periods and the difference is statistically significant at 1% level of significance.

Child poverty is also decomposed by location. In this case 25 and 75 percent of the total sampled households were in urban and rural areas respectively. Out of the total urban sample, 37 percent in 2002 and 47 percent in 2006 were poor. On the other hand 42 percent in 2002 and 41 percent in 2006 of the sample households from the rural area were poor. The high rate of poverty for the urban area for the second round might be due to the movements of children from extreme poor group to poor group. The result shows that the difference is not statistically significant. But hypothetically this result is not common in Ethiopia and most researchers found that the urban rural difference is statistically significant (Kelemework, 2011).

Table 5: Child Poverty decomposition by demographic and socio economic variables

Variable	2002				Chi ² -test (t-test)	2006				
	Poor		Non poor			Poor		Non poor		Chi ² -test (t-test)
	No.	%	No.	%		No.	%	No.	%	
Sex of the household head										
Male	121	40	177	60	0.0021	123	41	177	59	0.5829
Female	27	40	40	60		30	46	35	54	
Total	148		217			153		212		
Household head education										
Literate	68	35	129	65	6.7127***	87	42	122	58	3.4556***
Illiterate	80	48	88	52		66	43	90	57	
Total	148		217			153		212		
Mothers education										
Literate	28	31	62	69	4.1314**	39	41	55	59	2.3357**
Illiterate	120	44	155	56		114	42	157	58	
Total	148		217			153		212		
Number of children										
<=4 children	87	36	157	64	-13.9027***	76	41	111	59	-8.003***
>=5 Children	61	50	60	50		77	43	101	47	
Total	148		217			153		212		
Location										
Urban	34	37	59	63	0.8237	43	47	50	53	0.9561
Rural	114	42	158	58		110	41	162	59	
Total	148		217			153		212		

Source: own computation based on young lives' 2002 and 2006 data

*** Significant at 1%, **significant at 5% significant level and * significant at 10% significant level

*t-test for number of children and chi-square test (Chi²-test) for the other independent variables

*Percents are raw percents

As discussed above, the prevalence of child poverty in Ethiopia has been and still is very high for so many years. However, as can be recalled from the literature, the results of successive surveys have indicated that over time there is a tremendous decrease in the rate of child poverty severity measured by different measures, consumption, wealth and other multidimensional measures. Similar statistics can also be derived for the sample that this study utilizes.

A general look at Table 6 shows that the trends observed are based on the two different anthropometric measures, the weight for age and the height/length for age and both measures at the same time considering the total sample size of 365. The trend is also shown by keeping the same decomposition used in the previous discussion.

Education of the household head: The decomposition of poverty rates by education level of the household head with regard to the two anthropometric measures show that household heads with no education allow the burden of poverty. Child poverty is high among households where the head is not able to read and write than otherwise. For example from the total number of illiterate household heads 31 percent and 19 percent of the children in the year 2002 and 2006 were poor compared to 17 percent and 9 percent of the literate household heads. The difference is also statistically significant at 5% level of significance for each round.

Education of mothers: The decomposition of poverty rates by education level of mothers also indicates that mothers with some level of education have shown low rate of child poverty in terms of the two indicators. The lowest poverty rate is observed for households where mothers were able to read and write. For example from the total number of illiterate mothers 28 percent and 16 percent in the year 2002 and 2006 were poor compared to 11 percent and 6 percent of the literate mothers. As we can see from the table below in general, on average children from mothers with the ability to read and write have better nutritional outcomes. The difference is also statistically significant at 1% and 5% level of significance for both rounds respectively.

Number of children: The table also indicates that poverty rates in terms of the two anthropometric measures increases with number of children. In 2002, poverty rate increased to a maximum rate of 33 percent for children living with households having greater than 5 children. This rate has declined to 13 percent in 2006. On the other hand child poverty rates of children living with households having less than or equal to 4 children is 18 percent in 2002 and 13 percent in 2006, which is very low when compared with poverty rates of households with high number of children especially for the first round. In this regard, the difference is also statistically significant at 5% level of significance for the first round and insignificant for the second round. However, some literatures argue that children living in households with high number of children

are more vulnerable to malnutrition (Daniel, 2006). The insignificance of the result in our analysis for the second round might be therefore due to high number of productive adults are found in the household.

Location: Child poverty situation can also be decomposed by type of residence (urban-rural) that children reside. Table 6 shows that the proportion of the children below the poverty threshold regardless of the two anthropometric measures is higher in rural areas than in urban areas in both rounds. The result also shows that the difference is statistically significant at 5% level of significance for each round.

Table 6: Trend in child poverty based on anthropometric measures

Variable	Poor children in 2002			Poor children in 2006		
	By one measure (%)		Chi ² -test (t-test)	By one measure (%)		Chi ² -test (t-test)
WFA	HFA	WFA and HFA		WFA	HFA	
Household head education						
Literate	25	27	17	27	23	9
Illiterate	38	40	31	29	32	19
Mothers education						
Literate	22	21	11	25	23	6
Illiterate	34	37	28	29	28	16
Number of children						
<=4 children	27	28	18	27	24	13
>=5 Children	41	43	33	50	28	13
Location						
Urban	25	26	14	22	32	8
Rural	33	35	27	30	25	15

Source: own computation based on young lives' 2002 and 2006 data

*** Significant at 1%, **significant at 5% significant level and * significant at 10% significant level

*t-test for number of children and chi-square test (Chi²-test) for the other independent variables

Table 6 in general, indicates that over time there is a gradual decrease in the rate of child poverty severity when measured by percentages of both underweight and stunting on the same time between rounds 1 and 2, i.e. from 23 percent (84/365) in 2002 to 13 percent (46/365) in 2006.

4.1.4 Transitions in and out of child poverty

Even if panel elements could allow analysis of the dynamics of child poverty and looking at which individuals move in and out of poverty over time, the results of this particular research may not show long run dynamism, but it could reveal some important clues.

The two rounds dataset here is used to examine the status of child poverty and it is possible to track children's experience of poverty over two periods. Table 7 provides information on the level of transition into and out of poverty, including whether children were poor in either 2002 or 2006 or in both years, as well as transition rates into and out of each state.

The figures in the table below show that 25 percent (88/365) of the households were poor in both years. Of those people who were not poor in 2002, 30 percent (65/217) entered in to poverty by 2006. The corresponding exit rate from poverty was 40 percent (60/148) over this period. While the figures provide evidence of mobility, they also give evidence that a child who was poor in 2002 is more likely to be poor in 2006 than a child who was not poor in the earlier period.

Over the two rounds (2002 and 2006), just 41.6 per cent (152/365) of children were never poor. In general absolute mobility with respect to entering and exiting poverty is characterized by the transition matrix presented in the following table.

Table 7: Transition in to and out of poverty between 2002 and 2006

	Non poor in 2006	Poor in 2006	Total(2002)
Non poor in 2002	152 (70%)	65 (30%)	217 (60%)
Poor in 2002	60 (40%)	88 (60%)	148 (40%)
Total(2006)	212 (58%)	153 (42%)	365 (100%)

Source: own computation based on young lives' 2002 and 2006 data

* numbers in parenthesis are raw percents

It is also important to differentiate between children whose poverty situation varies according to the number of anthropometric indicators the child is poor. Generally, out of the total 365 sample children 31(9 percent) of them were poor by two anthropometric measures in round one and remains poor by one measure in round two. On the other hand, 10(3 percent) of the children were poor by one measure in round one and become poor by two measures in round two. These results are shown in the table below.

Table 8: Status and number of poor children in the two rounds

	Poor by one measure (2006)	Poor by two measure (2006)	Non poor (2006)	Total (2002)
Poor by one measure (2002)	21 (33%)	10 (16%)	33 (51)	64 (18%)
Poor by two measures(2002)	31 (37%)	26 (31%)	27 (32%)	84 (23%)
Non poor (2002)	55 (25%)	10 (5%)	152 (70%)	217 (59%)
Total (2006)	107 (29%)	46 (13%)	212 (58%)	365 (100%)

Source: own computation based on young lives' 2002 and 2006 data

*numbers in parenthesis are raw percents

4.2 Modeling child Poverty Dynamics

A major limitation of the single-year cross-sectional analysis of poverty is that it gives no information on the length of time individuals are poor and, thus, tends to overestimate or underestimate the degree of poverty. The importance of a long-term perspective of poverty has been put forward by a number of authors and the increasing availability of panel surveys has provided fine material for examining poverty from a dynamic perspective.

To assess poverty dynamics or the repetition of poverty status has an extremely important impact on the risk of poverty in the future. Studies show that long poverty spells increase the risk for a person or an individual to remain in poverty for a long time. For children in particular, the impact of poverty on future development and life chances depends significantly on the length of time spent in poverty during childhood. Based on the reality the author investigates some

information of the study area based on two rounds data. Even though the result may not show a long term child poverty dynamism, it might give some clues to different stakeholders.

The author therefore, aims to find some correlation between individual and parental characteristics and the number of years children remain in poverty. The dependent variable in this case is the profiles of poverty as described in the methodology part and the explanatory variables include demographic and socio economic variables. To identify the determinants of child poverty multinomial logit model is employed.

Before fitting this model, the problem of correlation among explanatory variables is checked. Because the avoidance of correlation enables the explanatory variable to separately contribute to the variation in the dependent variable. Studenmund (2010) underscored that it can be said there is a serious correlation if the correlation coefficient among two explanatory variables is greater than 0.8. But, correlation is not a serious problem between the independent variables as the maximum value of the coefficients is 0.66, which assumes weak association between the variables.

The model in general includes variables of sex of the household head, education of the household head, education level of mothers, number of children in the house hold, wealth of the household and location.

Based on specification of the model in the methodology, multinomial logit model is estimated to see the effect of expected determinant factors of child poverty (never poor, poor and extreme poor) in the study area and the results are presented in table 9 below. The magnitude of the coefficients obtained from the model shows the multinomial logit regression coefficient of each explanatory variable on the probability of being the child is poor.

Table 9: The regression estimates of multinomial logit

Poor (P=1)				Extreme Poor (P=2)					
Variable	Coefficient	z	P> z	Std. err.	Variable	Coefficient	z	P> z	Std. err.
Location	1.334868***	0.001		.3929457	Location	.4361196*	0.092		.5451601
HHSEX	-.4365083**	0.042		.3495645	HHSEX	-.2833185	0.531		.451703
HHEDUC	.295038	0.260		.2616605	HHEDUC	-.5104448**	0.023		.3289778
MTHEDUC	-.2464261	0.446		.3236515	MTHEDUC	-.1848713	0.687		.4580485
Nochildren	.0507579	0.501		.0754104	Nochildren	.2553788**	0.007		.0953698
Wealth	-5.975321***	0.001		1.759385	Wealth	-4.575093**	0.047		2.40368
Constant	.7365939	0.123		.4775621	Constant	-.6566083	0.290		.6201979

Source: model output

*Never poor is the base outcome

*** Significant at 1%, **significant at 5% & *significant at 10% significant level

LR chi2 (12) = 37.71

Log likelihood = -360.86597

Prob > chi2 = 0.0000

Pseudo R2 = 0.497

The likelihood equation (Prob > chi2) indicates that the model result is significant at less than 1 per cent level. Another measure of goodness of fit used in the regression analysis is the prediction success, which indicates the number of sample observation correctly predicted by the model.

A positive estimated coefficient in the model implies increase in the severity of child poverty with increased in the value of the explanatory variable. Whereas negative estimated coefficient in the model implies decreasing severity with increase in the value of the explanatory variable.

Independent variables from each category that were tried to see in the model specification are discussed below. The regression values provide the impacts that a unit changes in the individual

independent variables have on different levels of child poverty when all other variables are held at their means.

Based on the poverty status classification of the sample individuals into non poor, poor and extremely poor five variables were found to be significant at different probability level. The variables include educational status of the household head (HHEDUC), number of children in the household (nochildren), wealth of the household (wealth), household head sex (HHSEX) and location. The effect of mother's education (MTHEDUC), the sixth variable is found to be statistically insignificant with negative sign.

As discussed in the methodology part, given the difficulties of interpretation that are associated with the dependent variables of the multinomial logit model, it is tempting to search for more precise model excluding variables or combining outcome categories based on a series of statistical test. In this case two outcomes can be combined if the outcomes are indistinguishable with respect to the variables in the model and could be tested by the Wald test (Freese and Long, 2000). In our case therefore, the group is not statistically different from zero and as a result individual parameter can be continuing independently and statistically significant.

4.2.1 Determinants of extreme child Poverty

In the analysis there are individual and household characteristics. Many of these characteristics may be associated with each other. For example the education of the household head as well as mothers may be thought to play a role in determining the labor market status (wealth). Similarly, there are well-known associations between the level of education and fertility, which in turn determines the number of children in the household. Table 9 therefore presents a multivariate analysis of the correlates of extreme child poverty, with the independent variable being the likelihood that a child aged under 2 in 2002(round 1) will be in poverty for the second time in 2006 (round 2) regardless of the two anthropometric measures. The determinant factors are discussed here under.

Number of children in the household (nochildren): this has been found to be positively and significantly related at 5% level of significant with child poverty. The result in the multinomial logit indicates that those children who live in the household who had high number of children are more likely to become in extreme poverty.

The positive and significant correlation between number of children in the household and extreme child poverty might be due to the relation between larger number of children and the corresponding higher demand for food in the household. In a family with a greater number of mouths to feed, competition arises for additional source of income, where the opportunity is limited.

The positive relation of number of children to extreme child poverty could also be explained by increased intensity and subsistence demand on a limited source of food, i.e. land, especially for rural households. It is an indication of the effect of decreasing land-to-man ratio. Large number of children in the household leads to a lower land to man ratio.

Household head Education: the result of this variable from the multinomial logit is significant at 5per cent significance level. This variable has also the expected sign and is powerful and significant determinant factors of being extremely poor. As labor markets have been liberalized, the returns to education have increased and it is clear from this analysis that educated household heads are much more likely to be able to move their families out of poverty. The estimates show that children who live with educated household heads are less likely to be extremely poor.

Location: the urban-rural differentials in extreme poverty found in Table 9 revealed that rural children are more likely to suffer extreme child poverty than those living in urban areas. The multinomial logit regression result shows that the indicator is significant at 10per cent level of significance.

Wealth: the coefficient of this variable supports the proposed hypothesis and it is significant at 5 per cent level of significance. It is in line with the hypothesis that children of wealthier households had a better chance of getting good nutritional value or food than those children of

poor households. The multinomial logit model estimates for this variable shows that children live with wealthier households are less likely to be extremely poor.

4.2.2 Determinants of poor poverty status

The multinomial logit result of the poor category shows that the following factors are significantly associated with this dependent variable.

Residencies of the children, household head sex and wealth of the household are significant predictors of the poor poverty status. The factors are significant at 1%, 5% and 1% probability levels respectively. The results indicate that rural children are more likely poor than those living in urban areas. Similarly, wealth of the household has been found to be negatively related with this category. The multinomial logit model estimates for this variable shows that children live with wealthier households are less likely to be poor. The result also shows that household head sex is another significant determinant factor, which reveals that those children who live with female headed households are more likely to become poor than those children headed by male.

In general the research investigates the demographic and socio-economic correlations of the change in poverty status of the same sampled children between the two rounds. The analysis shows that the children that were poor in the first round of the two panels and live with a household having a large number of children, less wealthier households, illiterate household heads, female headed households and rural residencies tended to remain poor in the second round relative to those children live with a household having a small number of children, wealthier households, literate household heads, male headed households and urban residencies. For instance, the significant and positive association of large number of children in the household with the extreme poor category shows that the children are more likely either to stay longer in poverty or to be vulnerable to poverty than being never poor status.

CHAPTER V

5. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of main findings emanating from the present study as well as some important policy implications to mitigate the problems.

5.1 Conclusion

The problem of child poverty is persistent in Ethiopia in general and in Tigray region in particular. With this in mind, the study has attempted to identify child poverty situation and the determinants of child poverty and the level of moving out of poverty and the risk of falling into poverty in the study area. Accordingly the young lives panel data is used to answer the research questions of this specific research. The data is analyzed both through descriptive analysis and multinomial logit model of regression.

To investigate the study area, the author uses anthropometric indicators of weight for age and height for age. In light of the evidences that obtained from the study, the data analysis revealed that the study area, i.e., Tigray region is severed in child poverty.

In order to show the level of child poverty, poverty head count ratio is employed. This poverty incidence, P_0 , obtained by using the cutoff point of -2 (z-score) of the anthropometric measure indicates that in 2002, 41 percent of the children lived below the cutoff point. In 2006, the incidence increased to 42 percent of the sampled children.

The proportion of child poverty severity in terms of the two indicators is decreased from 23 percent in 2002 to 13 percent in 2006. From the total sampled children, extreme poor children in general accounts for 25 percent. Out of which, 13 percent were poor regarding to the two anthropometric measures, 9 percent of the children were poor by two measures in 2002 and one measure in 2006 and on the contrary 3 percent of the children were poor in one measure in 2002 and in two measures in 2006.

The transition matrices of child poverty also revealed that the movements of a child between the two rounds in relation to the standard cutoff point (z-score). This matrix shows 40 percent of children from the total poor population had the chance of moving out of poverty and on the other hand 30 percent of the total non poor children had the risk of moving into poverty.

The decomposition of child poverty based on demographic and socio economic characteristics shows that, child poverty is more in rural residencies than children in urban areas. The decomposition also showed that the proportion of poor children in illiterate household heads and mothers is higher than children in literate household heads and mothers. The decomposition of child poverty by number of children in the household revealed that children live with households having higher number of children are poorer than those children live with households having a small number of children. The decomposition of poverty by sex of the household head also confirms that children living with female headed households are more likely poor than those children living with male headed counterparts.

Besides, results from multivariate analyses of the multinomial logit model shows that education of the household head, number of children in the household, location, household head sex and wealth are significant predictors of child poverty. The results indicate that having a larger number of children in the household, illiterate household heads, less wealth and rural residencies increases the chance of being extremely poor. The poor poverty status is also determined by rural residencies, household head sex and wealth.

5.2 Recommendation

As we have discussed above, various demographic and socio-economic variables have significant effect on the status of child poverty in the region. Out of these variables, place of residence, educational status of the household head, number of children in the household, household head sex and wealth status of the household are the most important determinant factors. Consequently, the following intervention programs would contribute to the effort towards alleviating the level and severity of child poverty.

- It is observed that children living in rural parts of the region are at higher rate and severity of child poverty. Therefore, it is useful to strengthen and promote a special food security (such as food aid and Productive Safety Net Programs) in the area to directly address the problems.
- The result also suggested that children from uneducated household heads are at high risk of poverty. To address the issue of illiteracy therefore, access to education and enrolment ratio in adult education should be encouraged.
- The analysis indicates that children living with households with high number of children have the probability of being extremely poor. Therefore, increasing awareness among the couples in using family planning to reduce fertility and have small number of children is very important.
- The result revealed that children living with female headed households are more likely to be poor. In this regard, policy actions that could be addressing the problem, such as improving their income earning capacity, creating awareness how to enhance the quality of care and attention they can provide to their children must be implemented.
- The result also revealed that wealth is another important predictor of child poverty. Children living in wealthier households are at less risk to become poor. Hence, there is a need for social and economic policies that simulate economic growth in general and create employment opportunities for the poor households in particular.

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Appendices

Appendix 1: Multinomial logistic regression Output

a) For the first round (2002)

Number of obs =365

LR chi2 (12) =37.71

Prob > chi2 =0.0000

Log likelihood= -360.86597

Pseudo R2= 0.0497

Poverty status	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
poor (1)						
Location	1.334868***	.3929457	0.001		.5647084	2.105027
HHSEX	-.4365083**	.3495645	0.042		-1.121642	-.2486256
HHEDUC	.295038	.2616605	0.260		-.2178072	.8078832
MTHEDUC	-.2464261	.3236515	0.446		-.8807713	.3879191
Nochildren	.0507579	.0754104	0.501		-.0970436	.1985595
Wealth	-5.975321***	1.759385	0.001		-9.423653	-2.526989
Constant	.7365939	.4775621	0.123		-.1994106	1.672598
Extreme poor (2)						
Location	.4361196*	.5451601	0.092		-.6323746	1.504614
HHSEX	-.2833185	.451703	0.531		-1.16864	.602003
HHEDUC	-.5104448**	.3289778	0.023		-1.1552295	-.1343399
MTHEDUC	-.1848713	.4580485	0.687		-1.08263	.7128872
Nochildren	.2553788**	.0953698	0.007		.0684574	.4423002
Wealth	-4.575093**	2.40368	0.047		-.286218	-.1360325
Constant	-.6566083	.6201979	0.290		-1.872174	.5589571

(Poverty status==0 is the base outcome)

b) For the second round (2006)

Number of obs =365

LR chi2 (12) =40.53

Prob > chi2 =0.0000

Pseudo R2= 0.0534

Log likelihood= -359.45811

Poverty status	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
poor (1)					
Location	1.273535****	.3974053	0.001		.4946345 2.052435
HHSEX	-.6049102*	.3522569	0.086		-1.295321 .0855007
HHEDUC	.2962114	.2669963	0.267		-.2270918 .8195145
MTHEDUC	-.1979008	.3219185	0.539		-.8288494 .4330478
Nochildren	.0405611	.0835506	0.627		-.123195 .2043172
Wealth	-3.994646**	1.333526	0.003		-6.608278 -1.380954
Constant	.36777728	.4709874	0.435		-.5553456 1.290891
Extreme poor (2)					
Location	1.228856**	.5770467	0.033		.0978651 2.359846
HHSEX	.1161139	.4888223	0.812		-.8419603 1.074188
HHEDUC	-.667602**	.3312773	0.044		-1.316894 -.0183104
MTHEDUC	-.1887309	.4459034	0.672		-.6852237 1.062685
Nochildren	.1883671*	.1088379	0.084		-.0249512 .4016855
Wealth	-6.963521***	2.163428	0.001		-11.20376 -2.72328
Constant	-.9738604	.644954	0.131		-2.237947 .2902262

(Poverty status==0 is the base outcome)

Appendix 2: The marginal effect estimates of the Multinomial logit model

Variable	Marginal Effect		Std. err.	
	P=1	P=2	P=1	P=2
Location	.2911942	.0420913	.08341	.06073
HHSEX	-.0860619	-.0074842	.07882	.05854
HHEDUC	.1062119	-.0931148	.05696	.04329
MTHEDUC	-.0468374	-.0092822	.07194	.05857
Nochildren	-.0052675	.0321359	.01673	.01197
Wealth	-1.131102	-.2276518	.39785	.31296

(Poverty status==0 is the base outcome)

(P=1 and 2 represents poverty status of poor and extreme poor respectively)

Appendix 3: Correlation coefficient among independent variables

	Location	HHSEX	HHEDUC	MTHEDUC	nochildren	wealth
Location	1.0000					
HHSEX	-0.1670	1.0000				
HHEDUC	0.1345	0.2283	1.0000			
MTHEDUC	0.3631	-0.3256	0.1892	1.0000		
Nochildren	-0.0921	0.1692	-0.0611	-0.2204	1.0000	
wealth	0.6674	-0.1035	0.2208	0.3741	-0.1145	1.0000

Appendix 4: Test for combining dependent categories

a) When the outcome variables are five

mlogtest, combine

**** Wald tests for combining outcome categories

Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed).

Categories tested	Chi2	df	p>chi2
1 2	6.094	6	0.413
1 3	16.172	6	0.013
1 4	23.113	6	0.001
1 0	23.798	6	0.001
2 3	18.596	6	0.005
2 4	21.175	6	0.002
2 0	19.094	6	0.004
3 4	9.419	6	0.151
3 0	19.021	6	0.004
4 0	28.020	6	0.000

b) When the outcome variables are three

mlogtest, combine

**** Wald tests for combining outcome categories

Ho: All coefficients except intercepts associated with given pair
of outcomes are 0 (i.e., categories can be collapsed).

Categories tested	Chi2	df	p>chi2
1 2	31.595	6	0.000
1 0	28.657	6	0.000
2 0	35.413	6	0.000