International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2013): 4.438

Multidimensional Measurements of Poverty Analysis in Urban Areas of Afar Regional State

Gebretsadik Hishe Gebreslassie

Lecturer in Economics, Adigrat University, Ethiopia

Abstract: ***In view of the multi faceted nature of poverty, a multidimensional approach is needed to understand the complex phenomenon of poverty or to evaluate household or individual wellbeing. This study examines the extent of poverty using the data collected from three selected urban areas of Afar Regional State through structured questioner of 186 households in 2013/2014 and the Alkire and Foster (2007) counting approach and FGT poverty measure approach were employed in the analysis. The study measure multidimensional deprivation in seven dimensions: education, health, source of energy for cooking, electrification, house quality, house congestion and Per capita income. The result shows that the multidimensional deprivation far exceeds the unidimensional poverty. It has been estimated that about 63.2 percent and 33.9 percent of the households are poor in Alkire and Foster counting approach and unidimensionally approach respectively. This shows that, Alkire and Foster dual cut off approach is the best estimation to measure the magnitude of multidimensional poverty and the level of deprivation in many dimensions. Using the intersection method at k=1, 87.5 percent of the total households are deprived in one or more dimensions. Among dimensions, above 70.97 percent of household head deprivation was due to lack of source of energy for cooking, i.e. the highest contributor to overall multidimensional poverty. Finally, the results of the dual cutoff and counting approach with the unidimensional poverty approach shows that the former one is the best suitable approach in estimation of poverty analysis using different methods of poverty estimation.***

Keywords: Multidimensional Measurements of Poverty Analysis, Dual cut off, Afar Regional State.

1. Introduction

Poverty is being increasingly recognized as an inherently multidimensional phenomenon. Consequently, a holistic approach is needed to develop poverty reduction strategies and programs. Welfarists stress both the existence of market imperfections and incompleteness and the lack of perfect correlation between relevant dimensions of well-being (Atkinson 2003, Bourguignon and Chakravarty 2003, Duclos and Araar 2006). Non-welfarists point to the need to move away from the space of utilities to a different and usually wider space, where multiple dimensions are both instrumentally and intrinsically important.

The trend in the expansion of poverty in terms of the number of poor and depth or severity of poverty is high in the sub-Saharan African countries. The evidence (WDR, 2000/2001) shows that the Share of population living on less than $1 a day in Sub-Saharan Africa was highest with 49.7 percent and lowest with 46.3 percent in the year 1993 and 1998, respectively. In the same period number of poor people increased from an already high 217 million in 1987 to 291 million in 1998 leaving almost half the residents of that continent poor. This shows over this period, the number of poor people who live below $1 a day has increased by 74 million people (WDR, 2000/2001).

According to UNDP's 2011 Human Development Index Ethiopia is one of the poorest countries in the world, ranking 174 out of 187 countries. About 39 percent of Ethiopia's populations were living in absolute poverty in 2005. Furthermore, 83 percent of the rural population has no access to safe drinking water, compared to 8 percent of the urban population. The Ethiopian government has expanded its health-care services in the last five years. Therefore, targeting of poverty alleviation remains an important issue in many countries.

Poverty remains widespread in Ethiopia. Using a unidimensional measure of poverty, 38.7 percent of Ethiopians were poor in 2004/05, implying that 27.5 million people were living below the poverty line. Poverty is slightly higher in rural areas (39.3 percent) than urban areas (35.1 percent). The headcount poverty rate fell in rural areas from 0.475 in 1995/96 to 0.393 in 2004/05. Over the same period, in urban areas it rose slightly, from 0.332 to 0.351 (MoFED, 2008).

Most empirical studies of poverty are usually based on unidimensional indicators of individual welfare, such as income (or total expenditure) per capita or per equivalent adult. When more than a single dimension of welfare is considered outside of the axiomatic approach, poverty comparisons are either based on a combination of a series of indicators that have been previously aggregated across individuals or on individual data that allow the retained welfare indicators to be aggregated at the individual level first, and then across individuals.

A simple way of dealing with the multidimensional aspect of poverty consists of assuming that individuals' various attributes can be aggregated into a single indicator of welfare. Poverty can then be defined with respect to this indicator. In other words, individuals will be considered poor if their global welfare index falls below a certain poverty line, the specification of which accounts for the multidimensional aspects of poverty.

According to Smeeding *et al*. (1993), individuals' welfare depends not only on monetary income, but also on their access to certain social services, such as education and health care. Furthermore, when they own their homes, individuals benefit from the services their residences provide. Consequently, imputing the same level of welfare to two individuals with the same income, one of whom owns his own home while the other rents, has the net effect of

underestimating the welfare level of the homeowner. To incorporate this element, impute a value to the service homeownership confers, using either the market value of a rental, when available or the yield on the capital market of an equivalent investment when the market value of an equivalent residence is unknown.

As per the same author, education and healthcare services, the imputed global values are assumed equal to the amount the government spends on them. The distribution across households of education services is obtained by estimating the per capita cost of primary, secondary, and university education. Expenditures on education are thus allocated according to the number of individuals in each household having completed a certain level of education.

Finally, as to the distribution of healthcare spending, Smeeding *et al.* (1993) treat healthcare spending as an insurance benefit received by all individuals, regardless of their actual use of these services. These benefits vary by age and sex. The value of the benefits imputed to households is thus estimated as a function of healthcare expenditures by age and sex for each group in the population.

Fighting extreme poverty on a multidimensional base like improving Wealth, education, Sanitation, Source of watering condition, Sources of energy for cooking and housing condition are among the main Millennium Development Goals (MDGs) agreed by 189 heads of state in 2000. Hence, this study analyzes the multidimensional poverty measurement of poverty and to show the situation of poverty in having development interventions and strategies designed to address the welfare need of the society at large in some selected urban areas of Afar Regional State.

Although poverty is a multifaceted issue, the literature on poverty has been largely concerned with single dimensioned indices. However, there is a clear need among policymakers and international agencies for meaningful descriptive and normative measures of multidimensional deprivation. There is a widespread agreement that poverty is a multidimensional issue, including a number of monetary and non-monetary deprivations. For instance, the basic needs approach of Streeten (1981) perceives development as an improvement in an array of human needs and not just as growth of income.

It is sometimes true that income rise enables households to better reach their basic needs. This fact presupposes, however, the presence of markets for all basic needs which do not always exist. Further, empirical studies often reveal weak correlation between income and other welfare variables. Given the rather loose relation between income (expenditure) and welfare in many contexts (like incomplete markets, presence of externalities and public goods), it is irrelevant to look solely at income distribution to assess the extent of poverty.

In the assessment papers, Sen (1985; 1992; 1999) suggests to measure welfare and poverty directly by observing individuals' functioning and capabilities, where functioning's deal with what a person can do and capabilities indicate the freedom that a person enjoys in terms of functioning's. Poverty indices have then to capture the inability of individuals to achieve a minimal level of capabilities to function (such as the inability to be healthy, well-nourished, educated, sheltered, etc.).

It is now widely recognized that poverty should be more properly conceptualized as a multidimensional phenomenon, related to the condition of exclusion from the life of society that some individuals experience because of a lack of resources. Accordingly, poverty does not simply imply the inability to satisfy some basic needs essential for physical survival, but rather the involuntary absence of material, social and cultural resources considered as necessary by the society as a whole. Poverty continues to be a major development challenge in Ethiopia. Despite a significant decline in the incidence of poverty during the past four decades, poverty is still prevalent in the country.

Despite the fact that poverty is very actual to Ethiopia, there is little research done in multidimensional poverty and related topics (see for example Fredu et al, 2010; Kelemework, 2011; and UNDP, 2013). And also, in my knowledge there is no study in Afar region that analyzes the Multidimensional measurement of Poverty analysis.

It is important to analyze how various characteristics of household in urban areas of the three zones of Afar region affect their multidimensional poverty status and what can be done to help household to overcoming this poverty. In this study seven (7) dimensions of multidimensional poverty are used (i.e. education, health, source of energy for cooking, electrification, house quality, house congestion and Per capita income) are the dimension deriving in and out of poverty using the multidimensional approaches of poverty.

In addition to individual or household characteristics there are different macroeconomic factors that also have strong effect on poverty status of the country. In times of economic downturn and as a result of certain government policies the level of poverty may go up. Finally, there are many local factors driven regional aspects such as geographic futures of the locality, the status of infrastructure, cultural difference are to name a few. So, multidimensional approach is thus more than ever required to better understand the performance of a given country in the combat against poverty in all its aspects. The objective of this study examines empirically the poverty situation and socio economic determinants of multidimensional measurement of poverty analysis in urban areas of Afar Regional state and to answer the following questions:

- What does the magnitude of multidimensional poverty and unidimensional poverty looks like?
- To what extent are the same households identified as poor by unidimensional and multidimensional poverty approaches?

2. Methodology of the Study and Data Analysis

2.1. Sample Size and Instrument of Collection

Structured questionnaire were prepared and used to collect primary data through household survey. The questionnaire was designed in such a way that it can help the researchers to

dig out detailed information on household demographic characteristics, and socioeconomic aspects of households.

A two stage sampling design was made in the study and the primary sampling units were towns. A total of three major towns were addressed in the survey namely Asayta, Abala, and Gewine. A list of households for each town was obtained from respective city administration. A total of 200 households were selected for the survey. The sample size was distributed to each town in proportion to the population size. Once the sample size for each town was set, households were picked from the list using systematic sampling procedure, i.e., households were selected from the list at a fixed interval from a random start. The resulting sample data is representative of the population size in each of the towns addressed in the study. The study uses the data obtained from 186 households. Fourteen observations were dropped due to missing data problem.

This study was used both statistical and econometric analyses. The nature and actual situation of multidimensional poverty examined on the descriptive part of analysis using summary statistics of frequency tables and means. In econometric analysis, two sets of models were utilized: the Alkire and Foster dual cutoff (2007) approach, and FGT poverty measure.

i. Unidimensional Poverty Measurements

In order to explore the extent of unidimensional poverty measurements, the FGT poverty measure that was introduced by Foster, Greer, and Thorbecke, (1984) was used.

$$P_\alpha = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{Z-y_i}{Z}\right)^\alpha,$$

Where
α = Poverty aversion parameter
n = Total number of individuals in the population
q = Total number of poor individuals
Z = Poverty line
yi = Expenditure of individuals below poverty line
i = 1, 2…q. the poverty level among the household.
By using the above model we can identify poverty headcount index, poverty gap index and poverty severity index to decompose the poverty level among the household.

ii. Multidimensional Approaches of Poverty Measurements

Alkire and Foster (2007) suggest a counting approach which follows the method of aggregation proposed by Foster, Greer, and Thorbecke (1984) in the sense that it is built on the same family of measures. This family satisfies a certain number of axioms such as symmetry, replication invariance, decomposability, etc. Consider a population of *n* individuals. Let *d* , 2 be the number of dimensions and $x = [x_{ij}]$ the *n x d* matrix of achievements, where x_{ij} is the achievement of individual *I* (*i* = 1*; ...*, *n*) in dimension *j* (*j* =1, ……, *d*) *x* is of the following form:

$$x = \begin{bmatrix} X_{11} \,.\, X_{1j} \,.\, X_{1d} \\ \cdots \\ X_{i1} \,.\, X_{ij} \,.\, X_{id} \\ \cdots \\ X_{n1} \,.\, X_{nj} \,.\, X_{nd} \end{bmatrix}$$

Let *z* be a row vector of dimension-specific thresholds z_j, *xi* the row vector of individual *i*'s achievements in each dimension, and *xj* a column vector of dimension *j* achievements across the set of individuals.

a. Identification

To identify the poor we assume that all dimensions are equally weighted. Suppose that a matrix of deprivations X0= [Xij0] is derived from x as follows;

$$For\ all\ i\ and\ j, Xij = \begin{cases} 1\ if\ \ x_{ij} < z_j \\ 0\ other\ wise \end{cases}$$

For example X^0_{ij} =1 means that individual i is deprived in dimension j and X^0_{ij} = 0 that individual i is not deprived. By summing each row of X^0_{ij} , we can obtain a column vector *c* of deprivation counts containing *ci* the number of deprivations suffered by individual *i*.

For identifying, consider the identification function ρ (*xi*; *z*) such that

$$\rho(x_i;\ z) = \begin{cases} 1 \text{ if individual } i \text{ is multidimensionally poor} \\ 0\ \ if\ not \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Let *k* be the cutoff. An individual *i* will be considered as poor or ρ (*xi*; *z*) =1 if *ci* ≥ *k*. $\rho(x_i;\ z)$ is the identification function relating to the cutoff *k*. The equation (1) could be rewritten:

$$\rho(x_i;\ z) = I\ (ci\ \geq\ k)\ = \begin{cases} 1\ if\ \ ci\ \geq\ k) \\ 0\ if\ not \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

I (*ci* ≥ *k*) is the standard indicator function taking the value 1 if the expression in brackets holds and the value 0 if not. The most commonly used identification criteria of multidimensional poverty is the union method of identification. In this approach a person i is said to be multidimensionally poor if there is at least one dimension in which the person is deprived ($(x_i;\ z)$ = 1 if and only if ci≥1) (Alkire, 2008). In this case, the cutoff *k* = 1. This definition seems to strong and could overestimate the poverty, especially when the number of dimensions *d* is high enough with possible substitutability among some dimensions (Batana, 2008).

A second identification approach is the intersection approach, which identifies person i as being poor only if the person is deprived in all dimensions ($\rho(x_i;\ z)$ = 1 if and only if ci=d) (Alkire,et,al. 2008).This could on the other hand underestimate the poverty by not considering, for

example, a healthy homeless as poor when health and housing are two of the dimensions (Batana, 2008).

A natural alternative is to use an intermediate cutoff level for c_i that lies somewhere between the two extremes 1 and d that is 1<k<d. In this case ρ_k identifies person i as poor when the number of dimensions in which i is deprived is at least k; otherwise if the number of deprived dimension fall below the cutoff k, then i is not poor according to ρ_k. Since ρ_k is dependent on both the within dimension cutoffs Z_j and across dimension cutoff k it is referred to as dual cutoff method of identification (Alkire *et al*. 2008).

b. Multidimensional poverty measure

Suppose that $M(x; z)$ is the class of multidimensional poverty measures proposed by Alkire and Foster (2007). The first measure is given by headcount ratio. Let *qk* be the number of poor identified according to the thresholds vector *z* and the cutoff *k*, the headcount ratio *H*, the percentage of the population that is poor given by:

$$H = \frac{qk}{n}$$

Where, $qk = \sum_1^n \rho(xi; z) = \sum_1^n I(ci \geq k)$

The headcount ratio has its own weakness in the sense that if a poor person becomes deprived in a new dimension, *H* remains unchanged. This violates one important axiom of 'dimensional monotonicity', which says that if poor person *i* become newly deprived in an additional dimension, then overall poverty should increase. Also, *H* cannot be broken down to show how much each dimension contributes to poverty. To encompass these concerns, there is a need to have extra information on the breadth of deprivation experienced by the poor.
The *share of possible deprivations* suffered by a poor individual *i* is given by;

$$ci(k) = \frac{1}{d}[ci\ \rho(xi; z)]$$

and the *average deprivation share* across the poor by;

$$A = \frac{1}{qkd}\sum_i^n ci\ \rho(xi; z)$$

The second measure proposed by Alkire and Foster (2007) combines *H* and *A* to obtain an expression satisfying the dimensional monotonicity. The new measure M_0 called *adjusted headcount ratio* is given by:

$$M_0 = HA = \mu(g^0(k))$$

$$M_0 = HA = \frac{1}{nd}\sum_i^n ci\ \rho(xi; z)$$

As a simple product of *H* and *A*, the measure M_0 is sensitive to the frequency and the breadth of multidimensional poverty. In particular, the methodology (ρk, M_0) clearly satisfies dimensional monotonicity, since if a poor person becomes deprived in an additional dimension, then *A* rises and so does M_0.

The methodology (ρk, M_0) is based on a dichotomization of data into deprived and non-deprived states, and so it does not make use of any dimension-specific information on the depth of deprivation. Consequently it will not satisfy the traditional monotonicity requirement that poverty should increase as a poor person becomes more deprived in any given dimension.

To develop a methodology that is sensitive to the depth of deprivation (when data are cardinal), we return to the censored matrix of normalized gaps $g^1(k)$. Let *G* be the *average poverty gap* across all instances in which poor persons are deprived, given by $G=|g^1(k)|/|g^0(k)$.

The adjusted poverty gap is given by M1=HAG=μ(g1(k)).It is thus the product of the adjusted headcount ratio M_0 and the average poverty gap *G*. The equivalent definition $M_1=\mu(g^1(k))$ says that the adjusted poverty gap is the sum of the normalized gaps of the poor, or $|g^1(k)|$ divided by the highest possible sum of normalized gaps, or nd. Under methodology (ρk, M^1) if the deprivation of a poor person deepens in any dimension, then the respective $g^1_{ij}(k)$ will rise and hence so will M_1. Consequently, (ρk, M1) satisfies the monotonicity axiom .However, it is also true that the increase in a deprivation has the same impact no matter whether the person is very slightly deprived or acutely deprived in that dimension. One might argue that the impact should be larger in the latter case.

Consider the censored matrix $g^2(k)$ of squared normalized shortfalls which provides information on the severity of deprivations of the poor (as measured by the square of their normalized shortfalls). The *average severity* of deprivations, across all instances in which poor persons are deprived, is given by $S=|g^2(k)|/|g^0(k)|$. The following multidimensional poverty measure $M_2(x;z)$ combines information on the prevalence of poverty , the range and severity of deprivations. The *adjusted* FGT *measure* is given by $M2 = HAS$. M_2 is thus the product of the adjusted headcount ratio M_0 and the average severity index *S*. Its alternative definition $M_2=\mu(g^2(k))$ indicates that M_2 is the sum of the squared normalized gaps of the poor, or $|g^2(k)|$, divided by the highest possible sum of the squared normalized gaps, or *nd*. Under (ρk, M_2), a given-sized increase in a deprivation of a poor person will have a greater impact the larger the initial level of deprivation. Consequently, the methodology satisfies the transfer property and is sensitive to the inequality with which deprivations are distributed among the poor, and not just their average level.

In general M0, *M*1, and *M*2 to a class $M\alpha(x;z)$ of multidimensional poverty measures associated with the unidimensional FGT class. The *adjusted* FGT *class* of multidimensional poverty measures are given by $M\alpha=\mu(g^\alpha(k))$ for α>0. In other words, *M*α is the sum of the α powers of the normalized gaps of the poor, or $|g^\alpha(k)|$, divided by the highest possible value for this sum, or *nd*. The methodology employing the dual cutoff function ρk and an associated FGT measure *M*α will be denoted by $Mk\alpha = (\rho k, M\alpha)$.

3. Discussion and Data Analysis

3.1. Estimation of Total Poverty

The government's official income poverty level in 2012/13 is computed based on a poverty line of Birr 3,781 per year per adult equivalent. This is a daily equivalent of Birr 10.50 per adult equivalent (about 0.50 United States dollars, USD) (The food poverty line is Birr 5.4 (0.27 USD)). First the food poverty line is defined by choosing a bundle of food typically consumed by the poor. The quantity of the bundle of food is determined in such a way as to supply the predetermined level of minimum caloric requirement (2,200 kilo calorie). This bundle is valued at local prices. Then a specific allowance for the nonfood goods consistent with the spending pattern of the poor is added to the food poverty line. To account for the nonfood expenditure, the food poverty line is divided by the food share of the poorest quartile or quintile (MoFED, 2002).

From the survey of Afar Regional State in analyzing the Headcount, Poverty gap and the squared poverty gab the calculated poverty line is 3,781 birr. Table 4 indicated that about 33.9 percent of the households in the region are below the poverty line, these are the households who could not consume enough to the minimum kilo calorie requirement of 2200 Kcal per day adjusted to basic non-food consumption. The depth of poverty and the intensity of poverty are indicated by the poverty gap and the squared poverty gap respectively. So that, the poverty gap in the region is 10.3 percent. The severity of poverty as indicated in the squared poverty gap is only 3.5 percent.

Table 4 Estimation of Total poverty by per capita income

FGT	Poverty index	SE
Headcount ratio	0.339	0.008
Poverty gap ratio	0.103	0.003
Squared poverty gap ratio	0.035	0.001

Source: own computation survey (2013/14).

3.2. Dimensions and Poverty thresholds

This study analyzed household poverty in multidimensional perspective. The identification of the dimensions and variables to include in a multidimensional analysis of poverty is a crucial step. In an extensive review of literature on the selection of dimensions and indicators, Alkire finds researchers justifying their selection of indicators on the basis of up to five criteria (Alkire 2007). These criteria are: 1) data availability and adequacy; 2) based upon theoretical frameworks; 3) public discussions; 4) deliberative participation; and 5) empirical analysis. In this analysis by adopting the criteria to derive multidimensional poverty based on theoretical assumptions, empirical analysis and availability of appropriate data, a list of seven dimensions are selected for this study.

Education: Education is a central capability that has intrinsic as well as instrumental importance in enhancing individual wellbeing. It has a potential to enable individuals to participate in the social, economic and political spheres of their lives. Access to universal primary education is Goal2 of the MDGs that Ethiopia is committed to achieving by 2015.

Poverty cut-off point: A household is declared poor if any member of the household in the age group of 7 to 18 is not able to go to school.

Health: Like education, health has instrumental as well as intrinsic value in determining the wellbeing of individuals. Achievement of several valuable capabilities critically depends upon the health status of individuals (Ariana and Naveed 2009).

Poverty cut-off point: A household is declared poor in the health dimension if there was at least one member of the household who was sick and unable to do his/her normal activities in the last four weeks.

Housing Congestion: housing Congestion in this case represents the number of people per room of the household.

Poverty cut-off points: A household is said to be poor in this dimension if three or more people live in one room

Electrification: Access to electricity is an important aspect of everyday life of the household and it is part of the MDGs.

Poverty cut-off points: A household is declared poor in electrification if it does not have access to electricity.

Per capita income: Power to purchase goods and services that one values and has reason to value, is an important capability (Naveed and Islam, 2010). While the capability approach has strongly contested the exclusive reliance upon income or consumption as the only indicator of wellbeing and poverty. As poverty is officially measured in terms of consumption level, this dimension corresponds to MDG's Goal 1 (Eradicating poverty and hunger).

Poverty Cut-off point: Using updated poverty line for the year 2011, households with adult equivalent per capita consumption below 3,781 birr are considered poor in this dimension.

Housing quality: Housing is an important indicator of living standards. We focus on the quality of house that is assessed by quality of the material –wall material, roof material and floor material a house is constructed. This is related to MDG goal 7 (ensure environmental sustainability).

Poverty cut-off points: A household is declared poor in the housing dimension if it lives in a mud floor and straw roof house.

Fuel used for cooking: The type of fuel used for cooking is consequential for the health of a household. If solid waste material such as cow dung, wood or coal is used for cooking, the health of household members who breathe in such an environment for long periods can be adversely affected (Dufflo, et al. cited in Seth and Alkire 2009). Moreover, cooking fuel also impacts the environment. This dimension indirectly corresponds to MDG's Goal 7 (ensure environment sustainability).

Poverty cut-off point: A household is declared poor if it uses wood, cow dung or coal for cooking.

The selection of dimensions to be included is not the only controversial task when measuring multidimensional poverty. Defining the weights to give to each dimension is another difficult issue since it implicitly entails value judgments. The main methods of weighting proposed in literature includes equal weights, frequency based weights, most favorable weights, multivariate statistical weights, regression based weights and normative weights (Decanq and Lugo, 2008).None of these methods has been proved to be the best, and most approaches to poverty measurement don't provide suitable methods to address the weighting issues (Wambugu, 2010). Instead, they give the latitude to assign weights to each dimension in the normative way. Thus, the most commonly used approach to weighting is equal weighting (Alkire and Foster, 2007).

3.2.1. Aggregate Deprivation by dimensions

This section presents the extent of multidimensional poverty in urban areas of Afar Region.

Table 5: proportion of deprived urban household in each dimension

No.	*Dimensions*	*Total number of deprived HH's*	*Headcount Index (%)*
1	**Energy for Cooking poor**	132	70.97
2	**House quality poor**	103	55.38
3	**House congestion poor**	96	51.61
4	**Per capita income poor**	63	33.87
5	**Health poor**	35	18.82
6	**Electrification poor**	19	10.21
7	**Education poor**	17	9.14

Source: own computation survey (2013/14).

Table 5, indicates that the proportion of people who are poor and deprived in each dimensions. From this table, it can be seen that the highest deprivation is access to source of energy for cooking and it is more than 70 percent of the household are deprived in access to energy from electricity and gas. Following access to energy source, the next highest deprivation is access to quality house. Above 55 percent of the household live in poor quality houses defined in terms of construction materials of the wall, roof and floor. That is households live in houses whose walls were constructed from stone/wood with mud, the floor is earth/mud, and the roof material is wood/stone/thatch with mud.

Above 51 percent of the population lives in a household with three or more people per room, and 33.89 percent of the respondents live below a poverty line set at ETB 3,781 per year per person and Around 19 percent of the sample households were unable to carry on their usual activities due to illness or injury during the four weeks before the survey period and above 10 percent of the populations don't have access to electrification and Less than 10 percent of the populations are illiterate that means any member of the household in the age group of 7 to 18 is not able to go to school.

Based on the poverty cutoff for each dimension all the deprived population in access to source of energy for cooking, house quality and house congestion are the most deprived one so that; a significant portion (i.e. 70.97 percent) of all the deprived in energy source improvement is needed in priority case.

3.3. Magnitude of Multidimensional Poverty

3.3.1.Distribution of deprivation counts

Naturally, it is not the same to suffer from only one deprivation as it is to suffer from multiple deprivations simultaneously. As the number of derivation increase the proportion of multidimensional poor reduce (Alkire, 2007). This part presents the proportion of multidimensional poverty in number of deprivation. The evidence in table 6 shows that the percentage and number of household who would be identified as poor for each value of k = 1, 2, 3… 7. in selected urban areas of Afar Regional State.

Table 6: Comparison of multidimensional poverty measures for different cutoffs.

Equal Weights			
Poverty Cut-off (K)	**Headcount Ratio (H_0)**	**Adjusted Headcount Ratio (M_0)**	**Average deprivation (A)**
1	0.875	0.426	4.35
2	0.834	0.417	4.62
3	0.763	0.395	4.93
4	0.632	0.354	5.34
5	0.285	0.214	5.81
6	0.025	0.018	6.07
7	0.002	0.00	0.00

Source: own computation survey (2013/14).

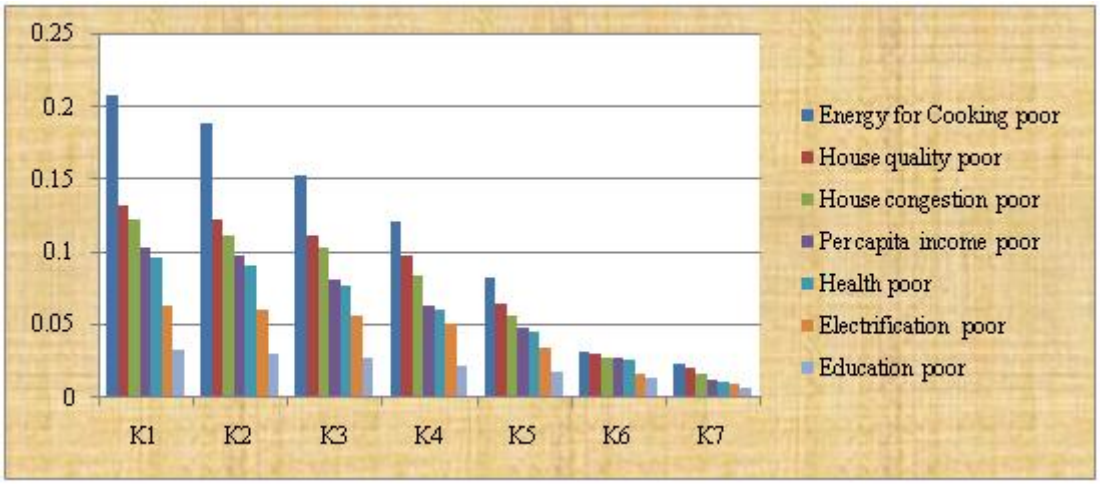
According to Alkire (2007), multidimensional poverty decreases as k increase. With equal weights, estimates indicate that 87.5 percent of the population of the Afar Regional State is deprived in one or more of any of the seven dimensions, and on average they are deprived in 4.26 dimensions, so that the adjusted Headcount Ratio is 0.435. This is a very high level of multidimensional poverty, and the average intensity of deprivation indicates that, even when the union approach is used, those identified as multidimensional poor do experiences on average more than four deprivations.

As indicate in table 6 more than 83.4 percent of the population in the study area is deprived in two or more of the seven deprivations, and on average they are deprived in 4.65 dimensions, so that the adjusted Headcount Ratio is 0.417. The percentage of people deprived in three or more of the seven dimensions is 76.3 percent, with M_0 being 0.395 and people being deprived on average in 4.93 dimensions. Similarly, in four or more of the seven dimensions, 63.2 percent of the population is multidimensionally poor with M_0 being 0.354 and the average intensity of deprivation being 5.34 dimensions. The multidimensional poverty level continues to decline with a rise in the k-values. Only 2.5 percent of the people are deprived in 6 dimensions and 0.2 percent household is deprived in total of the seven dimensions.

3.3.2. Contribution of each dimension

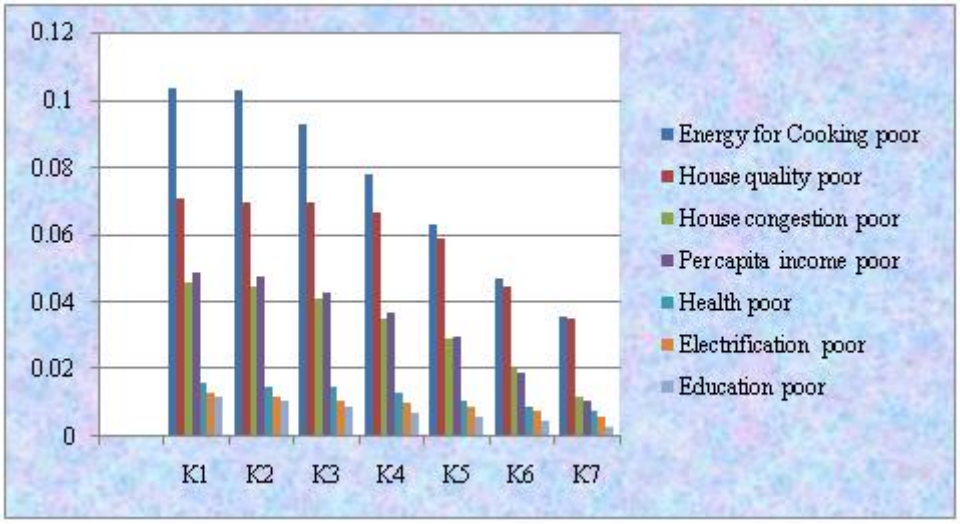
A natural question is how does deprivation in each dimension contributes to the overall multidimensional poverty. This can be analyzed breaking down H_0 and M_0 by the dimensions, which is precisely one of the advantages of this measure. Chart 1 and 2 presents such decomposition in the form of tables each k-value for equal weight. From the seven dimensions of Multidimensional poverty energy deprivation, house quality and house congestion are the major contributors to the multidimensional poverty, their contribution being varied with different k-values. Following these the next major contributors with almost similar percentage contribution are deprivations on per capita income and health. The least contributors are deprivations in electrification and education.

Chart 1: Multidimensional **Headcount Ratio** for different values of k- contributions by each of seven dimensions.



Source: own computation survey (2013/14)

Chart 2 Multidimensional **Adjusted Headcount Ratio** for different values of k- contributions by each of seven dimensions.



Source: own computation survey (2013/14).

3.3.3. Cardinal and Mixed dimensions

The data available for multidimensional poverty assessment may be ordinal for some dimensions and cardinal for others. Ordinal dimensions justify only Mo while cardinal dimensions incorporates all Mα for α=0, 1 and 2 measures. Applying Mα measures for ordinal dimensions lose some information in M1 and M2 since it is difficult to measure adjusted gap and severity for dichotomized dimensions (Alkire, 2008).

Table 9: Multidimensional poverty measures: Mixed case and equal weights for all k- values

Cutoffs (K)	H_0	M_0 *(AH)*	*M1 (HAG)*	*M2 (HAS)*	*A*	*G*	*S*
1	0.875	0.426	0.212	0.103	0.435	0.461	0.218
2	0.834	0.417	0.218	0.109	0.462	0.483	0.237
3	0.763	0.395	0.229	0.128	0.493	0.524	0.301
4	0.632	0.354	0.225	0.135	0.534	0.565	0.348
5	0.285	0.214	0.208	0.134	0.581	0.618	0.401
6	0.025	0.018	0.167	0.116	0.607	0.667	0.452
7	0.002	0.00	0.108	0.069	0.00	0.738	0.55

Source: own computation survey (2013/14).

When we use cardinal and ordinal dimensions simultaneously it creates hybrid (mixed dimensions) as presented in the above table 9. The third column in table 9

report the value of Mo for cutoff k=1 with adjacent cutoffs. In this case when k=1 the incidence of poverty would be 47 percent while at k=2 it would be reduced to 0.5 percent, which implies as the dimension cutoff increases the incidence of poverty will be reduced. The fourth and the fifth columns present the values of M1 and M2 with normalized gaps for cardinal data and dichotomized values otherwise. The value of Mα changes very high from α=0 to α=2.This would be due to high effect of dichotomized values on the depth and severity of multidimensional poverty. For dichotomized dimensions Mo, M1 and M2 achieve almost the same values where as for continuous variables the value of Mα is strictly decreasing in α (Alkire, 2008).

3.4. Comparison of Poverty Approaches

3.4.1. Unidimensional and multidimensional Poverty comparisons

By using dull cutoff multidimensional poverty approach in our case the most suitable cutoff for mixed dimensions is k=4, about 63.2 percent of the total household are deprived in four or more dimensions. On the other hand the unidimensional income poverty analysis reveled 33.9 percent of the household were poor. The estimated multidimensional poverty level is much higher than income poverty for k-values of 4 or less.The income poverty is comparable to the multidmensional poverty only at k = 5. At this point income poverty is greater than multidimensional poverty by 5.4 perecent.

4. Conclusions and Recommendations

Because poverty is multidimensional, the unidimensional approach is not always sufficient to account for all the facets of this phenomenon. A multidimensional analysis therefore becomes necessary if we truly want to identify the poor, as well as the strategies to combat this burden.

4.1. Conclusions

The general objective of the study examines empirically the poverty situation and socio economic determinants of multidimensional measurement of poverty analysis in urban areas of Afar Regional state. The study performs multidimensional measurement of poverty analysis using seven dimensions: education, health, source of energy for cooking, electrification, house quality, house congestion and Per capita income.

The results of dual cutoff and counting approach developed by Alkire and Foster (2007) poverty analysis show that the estimated poverty index depends on the number of dimensions considered and that the poverty measure decreases with the number of dimensions. This shows that at k=1, 87.5 percent of the total population are deprived in one or more dimensions and at k=2, 83.4 percent of the total population are deprived in two or more dimensions and at k=3, 76.3 percent of the total population are deprived in three or more dimensions and the most suitable cutoff for mixed dimensions is at k=4, 63.2 percent of the total population are deprived in four or more dimensions and the incidence of poverty (M0) at k=4 is 35.4 percent. The results further suggest that the highest contribution to multidimensional poverty is source of energy for cooking and next highest deprivation are house quality, access of electricity, per capita income, and sanitation and house congestion in each dimension of poverty deprivation.

Finally, the results shows us the dull cutoff and counting approach with that unidimensional poverty approach, the former one is the best suitable approach in estimations poverty analysis using intersection, union and intermediate identification methods of poverty estimation.

4.2. Recommendations

In general the findings of this study have important implications for interventions designed to reduce the multidimensional poverty in Afar regional state and attempts to make further contribution to the previous studies and can be used as a spillover for further research in the study area.

Based on the findings of the study, the following policy recommendations are given:

Most studies were conducted in unidimensional poverty approach, but this could not show the deprivation level of households in various dimensions. So in order to have a good picture of poverty status of the household, studies should be conducted in multidimensional aspect.

Poverty affects people of different characteristics in different ways, because they play different roles, have different needs and face different shocks, constraints and opportunities. In this case, unidimensional poverty measures could not explain the overall poverty status of a given household whether multidimensional poor or not. So that, policy makers and organizations should be study poverty in multidimensional aspect to tackle the root causes of poverty.

References

[1] Alkire,S. and Santos, M. (2010), Acute Multidimensional Poverty: A New Index for Developing Countries, Human Development Research Paper 2010/11.
[2] Alkire,S. and Seth,S. (2009), Multidimensional Poverty and BPL Measures in India: A
[3] comparison of Methods, Working paper no.15, OPHI Working Paper Series, Queen Elizabeth House, Oxford, UK.
[4] Alkire,S.(2007). Choosing Dimensions: The Capability Approach and Multidimensional Poverty, Chronic Poverty Research Center, CPRC Working Paper 88.
[5] Alkire S. and S. Suman, (2008). Measuring multidimensional poverty in India: A new proposal, OPHI Working Paper No. 14
[6] Alkire S.and J. Foster, (2007). Counting and Multidimensional Poverty Measurement. OPHI Working Paper No.7. Oxford, University of Oxford.
[7] Ariana, P. and Naveed, A. (2009). An Introduction to Human Development and Capability Approach: Freedom and Agency. London: Earthscan.
[8] Atkinson, A. B., Cantillon, B., Marlier, E. and Nolan, B. (2002). Social Indicators: The EU and Social Inclusion. Oxford; New York: Oxford University Press.

[9] Batana Y.M. (2008) 'Multidimensional measurement of poverty in Sub-Saharan Africa', OPHI Working Paper No. 13.
[10] Bourguignon, F. and S.R. Chakravarty (2003) 'The Measurement of multidimensional poverty ',Journal of Economic Inequality, 1, 25-49
[11] Decanq, K.., & Lugo, M. A. (2010). 'Weights in multidimensional indices of well-being:
[12] An overview', CES Discussion Paper, 10.06, Katholieke Universiteit Leuven, Belgium.
[13] Decanq,K. and A.Lugo, (2008). Setting Weights in Multidimensional Indices of Well-Being. OPHI Working Paper No. 18.
[14] Duclos, Jean-Yves, David Sahn and Stephen Younger, 2006, ―Robust Multidimensional Poverty Comparisons, Economic Journal 116: 943-68.
[15] Foster, J.E., 2006. 2007. A Class of Chronic Poverty Measures. Department of Economics Vanderbilt University. Working Paper No. 07-W01.
[16] Foster, James, J. Greer, and Erik Thorbecke, 1984, ―A Class of Decomposable Poverty
[17] Measures‖, Econometrica 52: 761-765.
[18] Fredu.N, E. Mathijsb and M. Maertens, (2010). The multidimensional measurement of urban poverty in Ethiopia: A cluster analysis approach. Catholic University of Leuven, Leuven, Belgium.
[19] MoFED (2006), 'Ethiopia: Building on Progress: A plan of accelerated and sustainable
[20] development to end poverty (PASDEP), 2005/6 – 2009/10', volume1, Addis Ababa.
[21] MoFED, (2009). Ethiopia: Sustainable Development and Poverty Reduction: Executive Summary, Strategy Paper for Promoting Development and Poverty reduction, Addis Ababa.
[22] Naveed, A. and Islam, T.U. (2010) 'Estimating multidimensional poverty and identifying the poor in Pakistan: An alternative approach, RECOUP Working Paper No. 28, available at http://recoup.educ.cam.ac.uk/publications/WP28-AN-final.pdf
[23] Sen, Amartya K.(1985): Commodities and Capabilities, Amsterdam: North-Holland.
[24] Sen, Amartya K.(1992): Inequality Reexamined, Cambridge: Harvard University Press.
[25] Sen, Amartya K.(1999). Development as Freedom (DAF). Oxford, Oxford University/ Press.
[26] Streeten, P. (1981) First Things First: Meeting Basic Human Needs in Developing Countries, Oxford University Press, New York
[27] Smeeding, T., P. Saunders, J. Coder, S. Jenkins, J. Fritzell, A. Hagenaars, R. Hauser et M. Wolfson, (1993) Poverty, inequality and family living standards impacts across seven nations: The effect of non-cash subsidies for health, education and housing. Review of Income and Wealth, vol. 39 (3), pp. 229-256.
[28] UNDP (2002). Human Development Report 2002. New York, OUP.
[29] UNDP (2010) Human Development Report, New York: Palgrave Macmillan for the UNDP.
[30] World Bank, 1990, World Development Report, Oxford, OUP.