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Determinants of income inequality in urban Ethiopia: A study of South Wollo Administrative Zone, Amhara National Regional State

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Abstract
The main focus of this paper is to analysis of the determinants income inequality among sampled households who find themselves at the bottom and top of the income/consumption distribution in urban centres in South Wollo Adimistrative Zone, Ethiopia. The study covered a total of 600 household heads. An assessment of the values of the General Entropy (GE) indexes is an interesting value that the GE (2) is very high for all urban centers in the study area. Surprisingly, per adult the consumption expenditure inequality is very high at the top of the distribution followed by the bottom adult equivalent consumption distribution. The contribution of the between-groups inequality component to aggregate inequality in these groups (household education head level) was estimated to be 12.96% for GE (0), 14.33% for GE(1) and 13.24% for GE(2), which was higher than other group formation. These results indicate the role of education in consumption expenditures is strongly significant. The results of OLS and quantile regression analysis also show that the household adult equivalent family size, household head main employment status or income sources, quality of houses, household energy sources, durable goods/assets, water and sanitation and place of residence are the main determinants of expenditure/ income inequality of per adult equivalent consumption expenditure across all quantiles distribution. Whereas, the household years of schooling and housing occupancy are the main determinants of expenditure/ income inequality at the bottom and higher quantiles distribution of per adult equivalent consumption expenditure.
This finding of the suggests that widening access to education, supporting informal sector, urban agriculture and creation of job opportunities, urban investment to improve access to urban land urban infrastructure, the quality of life and housing development. The policy should be adopted by government and community based organizations so as to reduce urban poverty and consumption expenditure/income inequality.

Keywords: Decomposition, Quantile Regression, South Wollo, Ethiopia

1. Introduction
Poverty and inequality are usually studied simultaneously. Indeed the relative position of households and individuals between themselves, in addition to their absolute position, is essential in the analysis of the population welfare. It is well known that the measures of poverty focus on households or individuals below the poverty line. But measures of inequality consider the whole of the population.
As for measures of poverty, as well as inequality can be calculated from an indicator such as income or expenditure, (Boccanfuso D., and Kabore T.S (2000, p 26). That is the poverty measures depend on the average level of income or consumption in a country, and the distribution of income or consumption. Based on these two elements, poverty measures then focus on the situation of those individuals or households at the bottom of the distribution. It focuses only on those whose standard of living falls below an appropriate threshold level (such as a poverty line). This threshold may be set in absolute terms (based on an externally determined norm, such as calorie requirements) or in relative terms (for example a fraction of the overall average standard of living).
By contrast relative poverty is more closely related to inequality in that what it means to be poor reflects prevailing living conditions in the whole population, (McKay, A., 2002, p.1). Hence inequality is different from poverty but related to it. Inequality concerns variations in living standards across a whole population. Inequality is a broader concept than poverty in that it is defined over the entire population, not only for the population below a certain

poverty line. Most inequality measures do not depend on the mean of the distribution, and it this property of mean independence is considered to be a desirable property of an inequality measure. Instead, inequality is concerned with the distribution.

There is also a growing of concern that income inequality (at least) within and between countries has been increasing and why academic, public, policy makers and development agencies are highly concerned with inequality. According to McKay, A. (2002), the reasons are; inequality matters of poverty, growth, individuals own rights, behind crimes and social unrest and inequality is critical in attainment of Millennium Development Goals (MDGs)

Nevertheless, , the available literature on urban poverty and income inequality in Ethiopia has been limited, reflecting the lack of an appropriate and reliable household survey data that would allow the comparison of welfare across time. Even some researches were undertaken on urban areas; they were mostly concentrated in a few large and major cities of the country, used the secondary data sources organized by either Household Income, Consumption and Expenditure Survey (HICES) and Welfare Monitoring Survey (WMS) that were conducted by the Central Statistical Authority (CSA) of Ethiopia or Socio-economic survey data conducted by Addis Ababa University & Goteberg University of Sweden and they were also different in their methodology. However, none of them gave a complete picture of the relevant relationship between the determinants of poverty and income inequality at the household level at any specific big, medium & small urban areas.

Particularly, in the South Wollo Administrative Zone, the problem of poverty and income inequality is increasing tremendously because of the zone has been frequently affected by a frequent drought and other socio-economic and demographic constraints. This area is drought and famine prone area in the region as well as in the country. Sever environmental degradation problems, soil erosion, nutrient depletion which is spome constrained agricultural production in the zone. The main stronghold of the economy is mainly rain-fed, in an area where rainfall is erratic and drought is prevalent. Hence, in urban areas of South Wollo Zone, the impact of these shocks has been mainly observed through higher food prices and increased rural-urban migration that aggravate to increased urban poverty.

Consequently, urban poverty and income inequality has become high agenda of the Government of Ethiopia, donor agencies, NGOs and other actors that have the inspiration to reduce the level and mitigate the effect and its associated impacts on the well being of the people. Particularly, South Wollo zone is among the chronically affected areas in eastern part of Amhara National Regional State of Ethiopia, which is currently facing daunting challenges of drought and other socio-economic and demographic variables.

Objective

The objective paper is to analysis of the socio-economic and demographic features of the households and their correlation with the incidence of inequality among households in the south wollo Administrative Zone urban.

- To suggest appropriate policy interventions and alternatives based on research findings, lessons learned from economic development theory and policies and experience of other countries

2. Literature Review

Kuznet (1955 cited in Abbi.M Kedir, (UNDP 2014, pp-3-5 [6]) argued that growth leads to a deterioration of income distribution at early stages of development. Because at early stages the majority workers are in the agriculture while the minority are in the industrial sector and as a result the minority earn higher income. At later stages of economic development, the majority will migrate to urban areas for industrial employment and this will reduce the income inequality. This hypothesis is, however, challenged by other theories and empirical studies. For example, Ravallion (2004) showed that growth tends to be distribution neutral on average.

Conversely, as cited in Fekadu G (2009, pp1-2 [20]), Studies until 1990's, based on cross-sectional comparisons, generally supported the hypothesis that income inequality initially increase then declines as the country grows. Many recent studies, however, such as Bourningon, 2003, Deininger and Square, (1998), Li, Squire and Zou (1998), Bruno *et al.,* (1996), Ravallion and Datt, (1995), and others, based on larger data set, have consistently refuted of the inverted-U curve of Kuznets on the ground that either there is no systematic relationship between the two or the relationship is country specific

Even if the Kuznets hypothesis failed to be universal, at least in the current situation, country specific studies show mixed results. Ferreira (1999) for Tanzania, Aghion, *et al.,* (1999), Balisca and Fuwa (2003) for Philippines, Meng *et al.,* (2005) for China, Odedokun and Round (2001) using cross-country data of 35 African countries, all have found positive relationship between inequality and growth. Jeong (2005), on the other hand, using micro data of Thailand, and Iradian (2005) using 82 countries cross-country evidences, both found a quadratic relationship between inequality and growth – a rising inequality followed by declining inequality as per-capita grows over time – supporting the Kuznets hypothesis (Ibid, 2009 [20])

Still, Barro (1999, Ibid [20]) using a three-stage least squares estimator which treats the country-specific terms as random, finds that the effect of inequality on growth is negative in poor countries (GDP per capita below or around US$ 2000 at 1985 prices), but is positive in rich countries (GDP per capita above US$ 2000 at 1985 prices) – a real U-curve as opposed to Kuznets.

Regarding to Ethiopia, Little. P.G. Sanchez, A. and Lndrerch, R.C. (World Bank, 2009 Pp.2-3) analysed the disappointing performance poverty reduction in Ethiopia was accompanied by a surge in urban inequality, with the Gini Coefficient increasing by 10 percentage points in urban areas from 0.34 in 1995 to 0.44 in 2004. In rural areas the coefficient remained stable at around 0.27. The MOFED report estimated that without this adverse distributional shift urban poverty would have been reduced by 12.6 percentage points, but that the positive impact of growth on poverty reduction was muted by 14.6 percentage point increase in the headcount due to distributional factors.

In the same way, Tassew W, Hoddinott, J and Dercon S. (2009), in their poverty and inequality analysis in Ethiopia, found that while inequality remained unchanged in rural areas, there was a substantial increase in urban inequality. In Ethiopia, income growth reduces poverty and increases in inequality increase poverty; the income-poverty elasticity lies in the range of -1.7 to -2.2. In rural Ethiopia, the increase in consumption has led to a reduction in headcount poverty.

Growth also occurred in urban areas but the rise in inequality in urban areas wiped out the poverty-reducing effect that this growth might have otherwise provoked. The overall national Gini coefficient increased from 0.28 to 0.304. For urban areas the increases in the Gini coefficient are substantial while the Gini coefficient for rural areas has not changed at all indicating that the overall increase in income inequality is due to the increase in urban areas.

In urban areas there was a substantial decline in inequality from 44% in 2004/05 to 37.8% in 2010/11 while it was increasing until 2004/05 at an alarming rate. The details are presented as follows; per capita consumption expenditure is higher in urban areas than in rural areas. Similarly, compared to 2004/05, poverty has declined substantially, but limited to the incidence (head count) and depth of poverty (poverty gap).

Regarding to Trends in consumption inequality as measured by the Gini Coefficient are reported in Ethiopian (2010/11), the Gini coefficient for urban areas become 0.37 and rural 0.27. Similar to the previous years, inequality is higher in urban areas than in rural areas. However, rural inequality marginally increased, while urban inequality declined substantially leaving the national Gini coefficient unchanged. Likewise, according to EDHS Mini-Survey (CSA, 2014, pp.11-12), 77 percent of the urban population is in the highest wealth quintile, in sharp contrast to the rural areas, where only 9 percent of the population are in the highest wealth quintile. Among regions the wealth quintile distribution varies greatly. A relatively high percentage of the population in the most urbanized regions in the country is in the highest wealth quintile-Addis Ababa (95 percent), Harari (69 percent), and Dire Dawa (59 percent). In contrast, a significant proportion of the population in the more rural regions are in the lowest wealth quintile, as in Affar (57 percent), Somali (44 percent), and Gambela (35 percent) (EDHS 2011

3. Data, Methods and Model Specification

3.1. Description of the Study area

The Amhara National Regional State (ANRS) is one of the nine regional states of the Federal Democratic Republic of Ethiopia (FDRE). It had an estimated human population of 17,221,971 million, of which 2, 112,595(17.3%) lives in Urban centers whereas 15,109,381 (87.3%) lives in the rural areas with its livelihood mainly depending on agriculture and related activities. Debub Wollo (or "South Wollo"), the study Zone[1], is one of 11 Zones in the Amhara Region of Ethiopia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 2,518,862, percent accounts for is about 14.6% of the region's population size and an increase of 18.60% over the 1994 census, of whom 1,248,698 are men and 1,270,164 women; with an area of 17,067.45 square kilometres.

Therefore, the study has selected three cities; Dessie, Kombolcha and Hayq from South Wollo administrative Zone, Ethiopia. The sampled households were covered under study are 368, 168 and 64from Dessie, Kombolcha and Hayq, respectively. A selection of sample is based on the proportion of size of population of the respective cities. The total sample of the study area consists of 600 households.

3.2. Data Type and Source

The study collected primary data through a well specially designed and pre-tested questionnaire for the sample households. The data covered under study are socio-economic demographic features and household consumption expenditure. The reference period for the study is November to December 2014.

3.3. Sampling Technique

In south wollo administrative, there are one major and one medium / emerging city and 17 small district towns/ cnters. For this reason, the study followed a multi-stage sampling technique. In the first stage of sampling technique the central part, more crowded and slum areas/ cities, Dessie, Kombolcha and Hayq, have been directly selected according to their population size, number of households and the proportion of households engaged in non agricultural activities to represent major, medium and small cities/district centers for purpose of intensive urban poverty analysis.

The study followed four stages random sampling procedures. In the first stage of sampling technique the central part, more crowded and slum areas/ cities, Dessie, Kombolcha and Hayq, were directly selected according to their population size, number of households and the proportion of households engaged in non agricultural activities to represent major, medium and small cities/district centres for purpose of intensive urban poverty analysis. In the second stage numbers of kebeles[2] were selected randomly from a list of kebeles in each town by excluding the expansion and rural kebeles. That is 7 (1,2,3,4,5,6 ,7 and 9 out of 15) in Dessie, in kombolcha 3 (2,3 & 5 out of 5), and in Hayq 3 (1, 2, 5, out of 5) central slum and very crowded urban kebeles are selected, respectively.

In the third stage, the above predetermined total sample size of 600 households was allotted in proportion to the size of the population residing in the selected urban centres in 2014. Thus, 368 households were drawn from Dessie and 168 from Kombolcha and 64 from smaller city Hayq. And finally, using the registration of residential houses at the kebele administrative offices as the sampling frame, systematic random sampling was used to select households from each of the kebeles. 3.4.

3.4. Methods of Data Analysis.

3.4.1. Inequality Indices

Inequality indicators can be harder to develop than income/consumption poverty indicators because they essentially summarize one dimension of a two-dimensional variable. Note that inequality measures can be calculated for any distribution, not just for consumption, income or other monetary variables, but also for land and other continuous and cardinal variables. The study analyzes and describes quantitatively by making use of STATA 13 version, SPSS20 version, *DASP*: Distributive Analysis Stata Package and tables. The commonest way to begin is by dividing the population into fifths (*quintiles*) from poorest to richest, and reporting the levels or proportions of income (or expenditure) that accrue to each level. Hence a simple, and widely-used, measure is the decile dispersion ratio, which presents the ratio of the average consumption of income of the richest 10 percent of the population divided by the average income of the bottom 10 percent. This ratio can also

[1] Zone is the third administrative level, next National regional States, of Ethiopia.

[2] Kebelle is the smallest administrative unit in Ethiopia

be calculated for other percentiles (for instance, dividing the average consumption of the richest 5 percent – the 95th percentile – by that of the poorest 5 percent – the 5th percentile).

i. Deciles Ratio

The decile ratio is readily interpretable, by expressing the income of the top 10% (the "rich") as a multiple of that of those in the poorest decile (the "poor"). However, it ignores information about incomes in the middle of the income distribution, and does not even use information about the distribution of income within the top and bottom deciles.

ii. Gini Coefficient

The most widely used single measure of inequality is the Gini coefficient. It is based on the Lorenz curve, a cumulative frequency curve that compares the distribution of a specific variable (e.g. income) with the uniform distribution that represents equality.

Formally, let xi be a point on the X-axis, and y_i a point on the Y-axis. Then

$$Gini = 1 - \frac{1}{N}\sum_{i=1}^{N}(x_i - x_{i-1})(y_i + y_{i-1}) \tag{2.32}$$

When there are N equal intervals on the X-axis this simplifies to

$$Gini = 1 - \frac{1}{N}\sum_{i=1}^{N}(y_i + y_{i-1}) \tag{2.33}$$

For users of Stata, there is a gini command that may be downloaded and used directly. This command also has the advantage that it allows one to use weights, which are not incorporated into the two equations shown above.

iii. General Entropy Index

The common inequality indicators mentioned above can be used to assess the major contributors to inequality, by different subgroups of the population and regions as well as by income source. The GE class has important advantages: First, they can be decomposed into within- and between group inequality over space and time. The within-group inequality shows how much of the overall inequality is attributed due to the change in income distribution within the group taking the group as a population. The between-group inequality index helps to examine how much of the overall inequality is due to change in the mean income of each group by assuming all members in the group earn/consume the average amount equally. Second, different entropy class of measures are sensitive to different parts of the distribution.

The Generalized Entropy class of indicators, including the Theil indexes, can be decomposed across these partitions in an additive way, but the Gini index cannot. To decompose Theil's T index (i.e. GE(1)), let *Y* be the total income of the population, *Yj* the income of a subgroup, *N* the total population, and *Nj* the population in the subgroup. Using *T* to represent GE(1)

The general formula is given by:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right] \quad \alpha \neq 0,1 \tag{2.34}$$

Where $\bar{y}$ is the mean income (or expenditure per capita). The values of GE measures vary between 0 and ∞, with zero representing an equal distribution and higher value representing a higher level of inequality. The parameter α in the GE class represents the weight given to distances between incomes at different parts of the income distribution, and can take any real value. For lower values of α, GE is more sensitive to changes in the lower tail of the distribution, and for higher values GE is more sensitive to changes that affect the upper tail.

The commonest values of α used are 0,1 and 2. GE(1) is Theil's T index, which may be written as

$$GE(1) = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)\ln\left(\frac{y_i}{\bar{y}}\right) \tag{2.35}$$

GE(0), also known as Theil's L, and sometimes referred to as the mean log deviation measure, is given by:

$$GE(0) = \frac{1}{N}\sum_{i=1}^{N}\ln\left(\frac{\bar{y}}{y_i}\right) \tag{2.36}$$

Therefore, one of the most frequently used inequality measures for this decomposition purpose is the General Entropy class of measures introduce by Sharrok (1980) and Cowell (1980) which is defined as:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right] \quad \alpha=0,1$$

$$GE(\alpha) = \left[\frac{1}{n}\sum_{i=1}^{n}\log\left(\frac{\bar{y}}{y_i}\right)\right] \quad \alpha=0$$

$$GE(\alpha) = \left[\frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\bar{y}}\log\left(\frac{y_i}{\bar{y}}\right)\right] \quad \alpha=1$$

$$GE(\alpha) = \left[\frac{1}{n\bar{y}^2}\sum_{i=1}^{n}(y_i - \bar{y})^2\right] \quad \alpha=2$$

Where y_i is the income of the *ith* household and *y* is the mean income and α is the distributional parameter. As the value to of α approaches to zero, the GE class is more sensitive to changes at the lower end of the distribution and equally sensitive to changes across the distribution for α equal to one (which is the Thiel index) and sensitive to changes at the higher end of the distribution for higher values (Foster, 1980).

The total inequality obtained above can be decomposed into a component of inequality between the population groups *Ib* and the remaining within group inequality *Iw*. The decomposition by population group at a point in time of the GE class is defined as

$$I = I_b + I_w = \sum_{j}^{k} V_j^{\alpha} f_j^{1-\alpha} GE(\alpha)_j + \frac{1}{\alpha^2 - \alpha}\left[\sum_{j}^{k} f_j\left(\frac{y_n}{\bar{y}}\right)^{\alpha} - 1\right]$$

Where *fj* is the population share of group *j* (*j* = 1, 2, …, k); *Vj* is the income/consumption share of group *j;* and *yj* is the average income in groups *j*.

3.5. Regression Approach

In this part, we use ordinary least squares (OLS) and quantile regression methods to estimate the effects of personal characteristics on individual's annual consumption expenditure for the study.

Ordinary Least Squares (OLS)

Once the nature of data and method of sampling are identified, an OLS regression is used to analyze the determinants of household inequalities. In order to see how much inequality is accounted for by each explanatory variable Fields (2002) proposes the semi log income or consumption function[3]. In addition to the above conventional decomposition of inequality presented in the preceding section, this study analyses the determinants of income inequality (in both levels and differences) via multivariate analysis. More specifically, it adopts a methodology suggested by Fields (2002) to account for income inequality. This approach allows us to assess the importance of household and community characteristics in explaining the level of inequality, where the relative contribution by each factor is independent of the inequality measure used.

The specification of such model, the standard semi log consumption function, could be given as:

$$\ln C_i = \alpha + \beta X_i + U_i$$

Where C_i stands for consumption expenditure per adult equivalent of household i, X_i is vector of explanatory variables, and Ui is a random disturbance term, which is assumed to be normally, independently and identically distributed with mean 0 and variance σ^2.

Quantile Regression

The classical quantile regression (CQR) model introduced for the first time by Koenker and Bassett (1978, cited in Fambon, s. 2014, [14]), may be considered as an extension of the ordinary least squares (OLS) regression model. More specifically, the OLS model only estimates the extent to which predictor variables are related to the average value of the dependent variable. The CQR model, on the other hand, helps the researcher to model the predictors at different points of the dependent variables. The CQR model therefore completes and improves the OLS regression approach. The « boostrap » and asymptotic approaches are often used in CQR modelling to calculate the covariance of the correlation matrices of parameter estimates. The use of the CQR model therefore provides three mainly advantages: i) it precisely depicts the stochastic associations between random variables; ii) it also yields robust estimates when the dependent variable is not normally distributed; and iii) it minimizes the impact of outliers in the dependent variable, these outliers being a usual occurrence in the data of developing countries like Ethiopia (Koenker and Bassett, 1978, Ibid [14]). These methodological merits permit the associations of independent co variables with the response variable to vary according to the site, the scale and the form of the response of the distribution.

[3] See Fields (2002) for the mathematical manipulations of the derivation that follows

Quantile regressions of error terms use the minimization procedure of the absolute sum of errors, whereas OLS regressions minimize the sum of residuals squared. The estimator in quantile regressions is also called the «Least Absolute Deviations (LAD) estimator ». The median of regression coefficients may be estimated by minimizing the following equation:

$$\Phi = \sum_{i=1}^{n} \left| \ln(c_i - x_i^{'}\beta \right| = \sum_{i}^{n} (\ln(c_i) - x_i^{'}\beta) sqn(\ln(c_i - x_i^{n}\beta) \quad (3)$$

where, $\ln(y_i)$ is the natural logarithm of the expenditure per adult equivalent of the i^{th} household ; sqn is the sign(a) of which takes on the value of 1 if is positive and -1 if is negative or equal to zero (a≤0), where 'a' is the difference between the real value and the expected value of $\ln(y_i)$ for the i^{th} household; x_i represents a column vector of realizations on k explanatory variables, and β, the column vector corresponding to unknown parameters.

In the present study, it is better to use the quantile regressions of the error terms than regressions at the median, and the former may be defined by minimizing the following equation:

$$\Phi = -(1-q) \sum_{\ln y \le x_i^{'}\beta} (\ln(c_i) - x_i^{'}\beta) + q \sum_{\ln y \ge x_i^{'}\beta} (\ln(c_i - x_i^{'}\beta)$$

$$= \sum_{i=1}^{n} \left[q - 1(\ln(c_i) \le x_i^{'}\beta) \right] (\ln(c_i - x_i^{'}\beta) \quad (4)$$

Where, 0≤q≤1 is the quantile of interest is equal to 1(z) when declaration z is true. , and the value of function 1(z) and if not 0.In the context of the models specified in equations (1) and (2), quantile regressions help us estimate the parameters at any quantile[4]. These estimated parameters make it possible for us to establish the magnitudes of the *ceteris paribus* effects of the co variables at different points of the conditional distribution ln(c).

Hence, in this pepper, we analyze the determinants of inequality in household expenditures using both the decomposition of inequality into sub-groups of the population and quantile regression. Decomposition into sub-groups of the population makes it possible for us to see the extent to which the level of total inequality may be attributed to inequality between population sub-groups or to inequality within population sub-groups

4.2. Results and Discussions

4.2.1. Results of Inequality Indexes

The most widely use single measure of inequality is the Gini coefficient. The estimated Gini coefficient using DASP distributive analysis Stata Package software and the value was 0.3385. This result indicates that consumption inequality of the urban household was very high in 2014/15 in the study

[4] The interpretation of parameter estimates is similar to those of OLS models but they are slightly different from those of OLS models (Buhai, 2005; Koenker & Hallock, 2001). In OLS models, the coefficient of a specific predictor X, represents the expected change in the dependent variable which is associated with a unit change in X. On the other hand, the coefficient of X in the qth quantile may be interpreted as the marginal change (relative to the value of the qth quantile of the dependent variable) which is due to a unit change in X.

area, but it was lower than the national report of gini coefficient before 5 years, (37.8 % in 2010/11). Furthermore, a simple, and widely used, measure is the decile dispersion ratio, which presents the ratio of the average consumption of income of the richest 10 percent of the population divided by the average income of the bottom (the poorest) 10 percent.

Table 1 gives the summary of estimates of inequality in the study area. Hence, one can easily infer that the richest 10 percent households consume 9.18 times than the consumption of the poorest 10 percent households. This distribution indicates there is a huge gap in consumption/ welfare among the population.

In literature, it is known that the mean log deviation GE (0) is mainly sensitive to expenditures in the lower part of the distribution; GE (2) is more sensitive to expenditures around the upper part of the distribution, while GE (1) manifests a constant receptivity across all the ranges of expenditures. Consequently, the following table reveals that the general entropy measures of inequality, per adult expenditure inequality was very high at the top of the distribution (GE(2) = 0.2221) followed by the bottom adult equivalent consumption distribution (GE(0) = 0.1987) and across all ranges of expenditures (GE(1) = 0.1559). In conclusive, the mean consumption expenditure per adult equivalent was uneven across different expenditure groups and inequality measures.

Table 1: Summary Estimates of Inequality

Inequality Measures	Estimates
Total Consumption Expenditure Per Adult Equivalent Per year	
Decile (ETB)[5]: First (Poorest)	2105.34
Tenth (Richest)	**19526.97**
Total	7988.613
Decile Dispersion Ratio	9.18
Gini Coefficient	0.3385
GE(0)	0.1987
GE(1)	0.1900
GE(2)	0.2221

Source: Computation from own survey, 2014/15

4.2.2. Results of Inequality Decomposition by Household Head Sub-groups

The decomposition of inequality indexes through household socio-economic and demographic groups or sources of consumption expenditure per adult equivalent is useful in the estimation of the contribution of each component of total inequality. Examination of Table 2 shows the substantial differences in the average household consumption expenditure between the urban centres of the study area. Consequently, the average household consumption expenditure was higher in Kombolcha, birr712.83 followed by Dessie (big city), birr 657, and Hayq, birr 591.73. The estimates of all indexes suggest that the most unequal urban centre is Dessis (big city), followed by Emerging (or industrial city), Kombolcha, whereas the lowest inequalities show in the small city, Hayq. An assessment of the values of the General Entropy (GE) indexes is an interesting value that the GE (2) is very high for all urban centers in the study area. Surprisingly, per adult the consumption expenditure inequality is very high at the top of the distribution followed by the bottom adult equivalent consumption distribution.

On the contrary, the Decomposition analysis shows that only a very small share of total inequality may be attributed to between-cities inequality. In particular, as far as the contribution of between-groups inequality to total inequality is concerned, it was 1.21% for GE (0), 0.7% for GE(1) and 0.6% for GE(2). As a consequence, more than 98.79% for GE(0) , 98.75 for GE(1) and 98.95% for GE(2) of total inequality is attributable to within-groups (urban inequality). Since a higher percentage of total inequality is attributed to within-cities inequality, efforts for reducing this type of inequality are likely to contribute significantly to total equality. This type of information may provide an important guide in the conception of policies who purpose is the reduction of inequality and eventually of relative poverty within each city itself.

Table 2: Inequality Decomposition by Place of Residence of Household

City	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Dessie	0.6133	657.08	0.3457	0.2039	0.1886	0.2283
Kombolcha	0.2800	712.83	0.3287	0.1970	0.1830	0.2131
Hayq	0.1067	591.73	0.3026	0.1598	0.1579	0.1891
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1973	0.1886	0.2207
% share				99.28	98.25	99.36
Between-group				0.0014	0.0014	0.0014
% share				0.7	0.7	0.6

Source: Computation from own survey, 2014/15

Table 3 below also presents the estimates of differences in between- and within- households' inequality according to the age of the household head. The estimates of all the inequality indexes show that households whose heads belong to the age group « above 64» constitute the group that has the highest income inequality. This group is also the one that has the lowest average per adult consumption expenditure. The lowest inequality was estimated in households head age between 31- and 64. Moreover, decomposition of total inequality into between- and within-age groups' inequality components shows that the between-groups inequality component only explains a small share of total inequality. By contrast, the within-age groups' inequality contributed substantially to the explanation of total inequality. This result suggests that any inequality reduction policy targeting within-age groups', old aged household heads in particular, inequality would be likely to reduce inequality in the urban areas more effectively.

[5] ETB refers to Ethiopian Birr, i.e., legal currency of Ethiopia

Table 3: Inequality Decomposition by Age Category of Household Head

Age Group	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Age Between 20-30	0.1000	951.34	0.3642	0.2227	0.2251	0.2774
Age Between 31-64	0.7117	660.93	0.3175	0.1774	0.1631	0.1762
Age above 64	0.1883	532.16	0.3497	0.2049	0.2020	0.2404
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1871	0.1787	0.2091
% share				94.16	93.58	94.14
Between-group				0.0116	0.0122	0.0130
% share				5.84	6.42	5.86

Source: Source; Computation from own survey, 2014/15

The examination of the following inequality indexes, in Table 4 below, shows that gender-wise-in the study area. The inequality among male household heads is not very much different from inequality of all urban centres, while per adult expenditure inequality was very high for female household heads at the bottom of adult equivalent consumption distribution, GE (0) = 0.1748), followed by the top of adult equivalent consumption distribution (GE(2) = 0.1682) and across all ranges of expenditures (GE(1) = 0.1598). In the same way, the gender inequality is not such a major factor in overall expenditure inequality. Because the between-groups inequality amounted only 2.54 per cent for GE(0), 2.58 percent for GE(1) and 2.15 for GE(2) of total inequality. By contrast, the contribution to within-genders inequality remained a significant factor in explaining inequality in 2014/15. This result suggests that any inequality reduction policy targeting within- gender groups' inequality would be likely to reduce inequality in the urban centres more effectively than addressing between-gender groups' separately. In other words, the elimination of gender inequality will not reduce total expenditure inequality so much as expected

Table 4: Inequality Decomposition by Gender of Household Head

Gender	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Male-Headed	0.6750	710.83	0.3422	0.2028	0.1949	0.2300
Female-Headed	0.3250	572.02	0.3170	0.1748	0.1598	0.1682
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1937	0.1851	0.2174
% share				97.46	97.42	97.85
Between-group				0.0050	0.0048	0.0048
% share				2.54	2.58	2.15

Source: Source; Computation from own survey, 2014/15

It is well known that in urban and rural poor households tend to be larger in size and expected to have a significant impact on poverty and inequality. Conversely, the assessment of the following inequality indexes, in Table 5 below, shows that inequality per adult expenditure was very high for household heads who have one , 3-4 and more than 4 adult equivalent family sizes at the top of adult equivalent consumption distribution, GE (2) = 0.2296), GE(2)=0.2065 and GE(2)=0.2046, respectively, whereas inequality per adult expenditure was very high for household heads who have 2-3 adult equivalent family size at the bottom of adult equivalent consumption distribution, GE (0) = 0.1487).

In the same way, the family size inequality is to some extent a major factor in overall expenditure inequality. That is the between-groups inequality amounted 8.88 per cent for GE (0), 9.33 percent for GE(1) and 8.08 for GE(2) of total inequality. By contrast, the contribution to within-genders inequality remained a significant factor in explaining inequality in 2014/15. This result suggests that any inequality reduction policy targeting within- high family size groups' inequality would be likely to reduce inequality in the urban centres.

Table 5: Inequality Decomposition by Adult Equivalent Family Size of Household Head

Adult Equivalent Family Size	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
0-1	0.2067	856.39	0.3335	0.1885	0.1888	0.2296
2-3	0.2150	751.33	0.2929	0.1487	0.1369	0.1435
3-4	0.2567	613.29	0.3228	0.1993	0.1825	0.2065
More than 4	0.3217	527.82	0.3326	0.1833	0.1792	0.2046
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1811	0.1723	0.2042
% share				91.12	90.67	91.92
Between-group				0.0176	0.0177	0.0179
% share				8.88	9.33	8.08

Source: Source; Computation from own survey, 2014/15

The differences in inequality levels were also analysed according to the educational level of the household head (see Table 6). The estimates of all the indexes show that the highest inequality level was observed in the group of households whose heads had a lower educational level (illiterate and primary first cycle), followed by high school and first degree. Similarly, the contribution of the between-groups inequality component to aggregate inequality in these groups was estimated to be 12.96% for GE (0), 14.33% for GE (1) and 13.24% for GE(2). These results indicate the role of education in consumption expenditures is somewhat significant. Hence, the elimination of differences in consumption expenditures between these household groups would only have a strong impact on the reduction of total inequality. In other words, a policy that would eliminate differences in average consumption expenditures among educational categories while leaving inequality in consumption expenditures among the households of each group unchanged could significantly reduce total inequality by more t

Table 6: Inequality Decomposition by Education Level of Household Head

Level of Education	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Illiterate	0.2317	517.26	0.3606	0.2198	0.2086	0.2337
Primary First Cycle (1-4)	0.1983	561.56	0.3508	0.2100	0.1974	0.2194
Primary Second Cycle (5-8)	0.1583	589.64	0.2790	0.1319	0.1251	0.1340
High School(9-10)	0.1050	698.99	0.3334	0.1808	0.1882	0.2351
Preparatory, Technical and vocational	0.2200	807.18	0.2715	0.1266	0.1272	0.1509
First degree	0.0633	1030.70	0.3150	0.1649	0.1687	0.2002
Above First degree	0.0133	1261.90	0.2155	0.0749	0.0753	0.0797
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1730	0.1628	0.1927
% share				87.04	85.67	86.76
Between-group				0.0258	0.0272	0.0294
% share				12.96	14.33	13.24

Source: Source; Computation from own survey, 2014/15

The challenge of employment generation is synonymous to achieving the objectives of sustained growth, reduction of poverty and income inequality. But, as shown in Table 7 below, the estimates of all the indexes show that the highest inequality level was observed in the group of households whose heads were engaged in petty trade or informal sectors, followed by casual workers, pensioners/ retired heads, wage employed and traders or engaged in permanent business, respectively. Correspondingly, the contribution of the between-groups inequality component to aggregate inequality in these groups was estimated to be 8.26% for GE (0), 8.53% for GE (1) and 7.26% for GE (2). These results indicate that the role of permanent employment in consumption expenditures inequality is significant. Hence, the elimination of differences in consumption expenditures between these household employment occupation groups would have a meaningful impact on the reduction of total inequality. In other words, a policy that would generate employment opportunities and other technical and financial assistance for all needy urban citizens would eliminate differences in average consumption expenditures among household heads.

Table 7: Inequality Decomposition by Main Employment Occupation of Household Head

Main Employment	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Casual worker	0.1783	507.12	0.3599	0.2147	0.2118	0.2462
Pensioner /retired	0.2367	590.62	0.3232	0.1832	0.1705	0.1901
Wage employed	0.2633	783.12	0.3067	0.1631	0.1561	0.1769
Petty trade	0.1317	576.49	0.3576	0.2205	0.2292	0.3193
Trade	0.1900	807.23	0.2995	0.1510	0.1507	0.1759
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1823	0.1738	0.2061
% share				91.74	91.47	92.74
Between-group				0.0164	0.0162	0.0161
% share				8.26	8.53	7.26

Source: Source; Computation from own survey, 2014/15

The issue of housing tenure has become a crosscutting agenda of urban dwellers and is assumed to get as one of the indicators of urban poverty and inequality. As shown in the following Table 8 the estimates of all the indexes show that the highest inequality level was observed in the group of households whose heads rented houses from Kebele administration. Correspondingly, the contribution of the between-groups inequality component to aggregate inequality in these groups was estimated to be 4.66% for GE (0), 4.96% for GE (1) and 4.35% for GE (2). Hence, the elimination of differences in consumption expenditures between these household housing tenancy groups would have an important impact on the reduction of total inequality. In other words, a policy that would generate employment housing and urban land ownership right of urban dwellers would eliminate differences in average consumption expenditures among household heads.

Table 8: Inequality Decomposition by Housing Tenancy of Household Head

Housing Tenancy	Share of Population	Mean Total Consumption Expenditure Per Adult Equivalent (in birr)	Gini Index	GE(0)	GE(1)	GE(2)
Rented from Kebele	0.2383	547.26	0.3970	0.2573	0.2737	0.3683
Rented from Organization	0.0550	676.53	0.3651	0.2776	0.2227	0.2288
Rented from Private	0.1500	851.18	0.3204	0.1758	0.1782	0.2208
Owner Occupied	0.5567	664.87	0.2998	0.1554	0.1443	0.1545
All groups	1.0000	665.72	0.3385	0.1987	0.1900	0.2221
Within-group				0.1895	0.1806	0.2225
% share				93.34	95.04	95.65
Between-group				0.0093	0.0094	0.0097
% share				4.66	4.96	4.35

Source: Computation from own survey, 2014/15

4.3. Econometrics Analysis

4.3.1. The Variables of the Model

It can be noted that the dependent variable of the model is the natural logarithm of consumption expenditure per adult equivalence. It is important to note that the main reason for using the log of consumption expenditure per adult equivalence is to impose a constant percentage effect of explanatory variables on expenditure per adult. Since the regression uses log of per adult consumption as the dependent variable, the estimated coefficients can be interpreted as partial effects measured in percentage terms. Before the final estimation was done and taken for discussion, data exploration is an important step. To this end, we made data exploration through testing important classical linear regression assumptions.

The simplest way to measure inequality among individual households is by dividing the whole population from the poorest to the richest and show the percentage of consumption expenditure attributed to each quintile of the population.

Therefore, the independent variable is logarithms of Consumption expenditure (logc) and the study retained the following exogenous variables all regression models: a) age of household head; two variables are used, i) age (in years), and age-squared to reflect the non-linear effects of age on the consumption level. Ii) Mean age of family members to incorporate the impact of dependent family members on consumption expenditure; b) The gender of the household head is another factor which potentially affects the income of the household, and hence the consumption expenditure of the household, (dummy-female headed), as numerous researches have suggested that the existence of the gender income gap (Macpherson and Hirsch, 1995; Hughes and Maurer-Fazio, 2002; Wang and Cai, 2006, cited in Fambon,s. 2014 [14]); c) the effects of marital status also incorporated (head married); d) the effect of household size on the consumption level is incorporated, as previous study have noted a negative relationship between income and the size of the household (Lipton and Ravallion, 1994); e) with respect to occupation, dummy variable are included corresponding to five

Occupational groups, dummy head-casual worker, dummy head-pensioner/retired, dummy head-wage employed, dummy head-petty trade, and dummy head trade or permanent self-account (base reference); f) Household human capital is measured by the number of years of schooling acquired by the more educated of the household head (household head years of schooling); g) the effect of housing on urban consumption expenditure is measured by the type of housing tenancy. In this regard, four dummies are included, dummy house rented from kebele, dummy house rented from other organization (Housing enterprise agency, municipality, religious and other non-governmental organizations, employers), dummy house rented from private and dummy owner occupied (base reference) ; h) To capture the impacts of i) quality of house (material of floor, walls, ceiling, toilet facility kitchen); ii) households' energy sources (electricity supply, access to improved cooking fuel and availability of improved kitchen materials, stove); iii)durables/ facilities (represented by mobile telephone, television and radio) and iv)water and sanitation (represented by improved water sources, such as tap inside in the compound and households' waste disposal system) we used Principal Component Analysis (PCA) to reduce these 13 variables to 4 indexes for econometrics regression analysis.

It is well known that the PCA is a multivariate statistical technique that reduces the number of variables in a dataset into a smaller number of dimensions or factors. Using the correlations between sets of variables, PCA extracts a number of factors that can be considered as salient unobserved variables capturing important aspects of the complete set. Each of these factors is a linear weighted combination of the initial variables and is uncorrelated to other factors.

In this paper, therefore, the Principal component analysis (PCA) was used to reduce 13 factors into for components and thereby the study constructed indexes and determined the important factors explaining household poverty and inequality. The explicit factors, relevant to housing materials/ quality index (PCA_1) are the materials of floor, materials of wall, materials of ceiling, toilet facility, and kitchen; relevant to energy sources index (PCA_2) are electric supply, type of cooking fuel and stove; relevant to durable assets/ facilities (PCA_3) are mobile telephone, television and radio; for water and sanitation index PCA_4), water sources and household waste disposal system are included.

This finding leads to the conclusion that factor analysis is very helpful in planning well-targeted and efficient poverty alleviation policies.

The Eigen values are calculated for each component. The Eigen values and Scree test were used to determine the number of extracted components from the observed data. The size of an Eigen value indicates the amount of variance in the principal component explained by each component. (KMO) of sampling adequacy is a measure for comparing the magnitudes of observed correlation coefficients with the magnitudes of partial correlation coefficients. The value of the KMO is 0.811 and shows the appropriateness of the model which is within an acceptable range for a well specified model and which good to warrant interpretation of results. (Appendix 6 and 7)

The orthogonal rotated solution was chosen to obtain uncorrelated components using varimax rotation method.

The rotated component matrix of PCA led to the selection of six components explaining poverty. These components reflect poverty thorough different indicators, especially housing conditions, assets and human resources. The components are extracted from a set of indicators by the application of the PCA. The first principal component makes up the largest proportion of the total variability in the set of indicators used. The second component accounts for the next largest amount of variability not accounted by the first component, and so on for the higher order components. The poverty components can be easily interpreted by analyzing the signs and size of the indicators in relation to the new component variable. Consequently**,** the pepper used these Principal components (PCA_1, PCA_2, PCA_3 and PCA_4) as further inputs for regression analysis

Finally, to take account of the impact of household residential area on consumption expenditure inequality, 3 binary residential variables and dummies are created. The residential dummies are dummy city-Dessie, dummy city-kombolcha and dummy city-Hayq(base reference)

4.3.2. Results of OLS and Quantile Regressions

Since habits and differences in consumption exist among households according to their socio-economic and demographic difference, OLS and quantile regressions are estimated for selected factors that affect household consumption expenditure inequality. To begin with, as shown in Table 9 below , the statistics of the overall model indicates that the OLS regression is a good fit, with R-squared= 0.5 and it is statistically significant, with p-value 0.000. Similarly, the pseudo-R^2 of quantile regressions lie between 0.3029 and 0.4110, thus indicating that the coefficient estimates derived from our model perform reasonably well. The study also examined a simple correlation coefficient matrix and Variation Inflation Factor (VIF) for OLS estimates so as to test whether multicollinearity is present or not among the explanatory variables. Accordingly, the multicolinearity test using Variance Inflation Factor (VIF) indicates that multicollinearity problem is not observed in our data since the correlation matrix results are less than 0.8 and Variation Inflation Factor (VIF) is less than 10 with the exception of the correlation between age and age squared, which is high as expected. But, heteroscedasticity problem is inherent in our data. We made heteroscedasticity corrected robust regression when each of the estimations was carried out. The normality and specification error tests are also carried out (for details Appendixes tables 1-4 and appendix figure 5).

As it is pointed out in the OLS results, age and age squared of the household head is negatively associated with expenditure per adult equivalent that reflects negative effect. Conversely, the relationship is quite difference across different quantiles, the age of the household head is negatively associated with expenditure per adult equivalent, whereas age squared reflected a negative effect at the bottom quantiles. In other words, age has higher consumption at lower and media quantiles and significant at the bottom as well as median quantiles, while its square has negative for the two three quantiles and then positive for the remaining quantiles with constant effect across the quantiles and significant at the very top of the distribution. Mean age of the household is positively associated with consumption expenditure inequality throughout all quantiles of consumption expenditure distribution and the significant effect is recorded at the median and top distribution of consumption expenditure. The positive effect of mean age of the household indicates that as there are more adult members of the household, consumption has become higher at all quantiles.

As regards the gender of the household head, quantile regression results show that households whose heads are females have a negative relationship with consumption of the median quantile (50^{th} and 75^{th}), and have a positive relationship with consumption of bottom quantiles. Hence, gender of household head becomes an important determinant of inequality at the bottom of the distribution. Even at higher quantiles there is expenditure difference between male and female headed households, although none is statistically significant. In other words, this result hints on a growing gender gap in consumption distribution.

As far as the marital status is concerned, the married households have a positive relationship with 10th and 99^{th} quantiles consumption distribution, whereas they have a negative relationship with median quantile distribution and are only statistically significant at 75^{th} quantile consumption distribution.

In contrast, household size per adult equivalent is negatively associated with expenditure per adult equivalent (except it is positively related with expenditure of 25^{th} quantile) and it is the most important determinant of inequality, just as the case in OLS result. It significantly determined expenditure inequality in all quantiles. This result not only indicates that large-sized families usually have lower expenditure per adult equivalent, but it is also similar to the results of other studies such as that of Lanjouw and Ravallion (1995 [19]), which finds that large-sized households are more likely to fall into poverty than small-sized ones.

An examination of the main employment status of household indicates that although all main status of occupations are negatively associated with expenditure per adult equivalent across all quantiles, they are still the most important determinant of inequality or statistically significant across all quantiles, just as the case in OLS (except household heads being casual works for OLS)

The education of household head is also positively associated with consumption across all quantile, just as the case in OLS. In contrast, the welfare of more educated household heads are significantly differs than the less educated ones at bottom and higher quantile and the result in this model with reference to education is consistent with that of OLS model, which means that education has a stronger effect on the welfare of poor and rich households

As said earlier, the issue of housing tenure has become a crosscutting agenda of urban dwellers and is assumed to get as one of the indicators of urban poverty and inequality. In terms of Housing occupancy, therefore, inequality in consumption distribution among households living in rented decayed and crowded kebele houses are negatively associated with adult equivalent consumption distribution across all quantiles, but only statistically significant 75^{th} quantile distribution. In contrast, , inequality in consumption distribution among households who are living in houses rented from other organization houses are negatively associated with adult equivalent consumption distribution and only significant at lower and higher qauntiles of consumption distribution, just as case in OLS. Similarly,

inequality in consumption distribution among households who rented houses from private renters is positively associated with adult equivalent consumption distribution (except 75th quantile) and only significant at lower qauntiles (10th and 25th) of consumption distribution. Accordingly, this result indicates that inequality of adult consumption expenditure is very high at lower quantile housing tenancy distribution than at median and higher quantile distribution.

Regarding Housing quality index (Materials of floor, wall ceiling, toilet facility and kitchen); Energy sources (electric power supply, quality of cooking fuel, modern stove); ownership of durable assets or facilities (radio, television and mobile telephone) and water and sanitation index (tap water in dwellings compound and modern or organized waste disposal system) are all positively related with adult equivalent consumption expenditure and statistically significant across all quantile consumption distribution, just as the case in OLS. In terms of residential area and by comparison with households residing in small city (Hayq), the study results show that residential variables have negative effects on household consumption in study areas across all quantile distribution. On the other hand, compared with households residing in Dessie, residing in Dessie is the most important determinant of inequality and it significantly determined expenditure inequality in all quantiles, just as the case in OLS results, whereas in residing in Kombolcha is only statistically significant at bottom and median quantiles consumption distribution. Hence, a comparison of urban centres in the study area unsurprisingly indicates that consumption inequality is substantially higher in big urban than in medium and small urban centres of Ethiopia.

Table 9: OLS and Quantile regression for determinants of inequality (n=600)

Dependent Variable: Log Consumption (logc)												
Explanatory variables Variable	OLS		**.1**		**.25**		**.5**		**.75**		**.99**	
	Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
Head age	-.0179	-2.26**	.0108	0.86	-.0154	-0.83	-.0372	-2.23**	-.0367	-2.66***	-.0446	-1.53
Head age^2	-.0001	1.43	-.0001	-0.81	.0001	0.51	.0002	2.14**	.0002	1.76*	.0004	1.45
Mean age of household members	.0106	4.55***	.0030	0.80	.0087	1.68*	.0110	2.53***	.0169	4.06***	.0605	2.89***
Dummy-Head female	-.0875	-1.44	.1190	0.50	.0599	0.36	-.1509	-1.05	-.1608	1.43	.0701	0.47
Head Married	-.0857	-1.47	.1190	0.67	-.0121	-0.08	-.1890	-1.30	-.2115	-1.82*	.1831	0.91
Adult Equivalent Family size	-.1296	-10.44***	-.1516	-4.08***	.1204	-5.05***	-.1427	-5.08***	-.1100	-4.63***	-.1454	-4.55***
Dummy-Head casual worker	-.0630	-1.12	-0.3927	-3.41***	-.2808	-2.41**	-.3077	-3.11***	-.3583	-4.63***	-.4767	-3.36***
Dummy-pensioner/retired	-.0557	-0.93	-.3884	-3.05***	-.3009	-3.61***	-.3312	-2.99***	-.2841	-2.69***	-.7104	-3.72***
Dummy-wage employed	.1256	2.19**	-.0817	-0.89	-.0194	-0.24	-.1162	-1.74*	-.1699	-1.99*	-.5550	-3.01***
Dummy-petty trade	omitted	omitted	-.4511	-3.83***	-.3515	-3.48***	-.2239	-2.37**	-.2343	-2.17**	-.2583	-1.12
Head years of schooling	.0119	3.00***	.0213	2.48**	.0085	1.50	.0110	1.25	.0047	0.61	.02066	2.18**
Dummy-House rented from kebele	-.2071	-3.61***	-.0002	0.00	-.0547	-0.66	-.0609	-0.87	-.1648	-2.51***	.0525	0.32
Dummy-Rented from other organizations	-.2853	-3.74***	-.2918	-3.08***	-.2231	-1.50	-.0677	-0.57	-.2153	-1.40	-.4041	-2.85***
Dummy rented from Private	-	-	0.2999	2.59***	.2977	4.02***	.0957	1.34	-.0354	-0.44	.0018	0.01
Housing quality index	.1839	10.55***	.1683	4.69***	.1792	6.05***	.1974	6.15***	.1954	7.18***	.1517	3.39***
Energy source index	0.1992	11.25***	.1799	3.41***	.1989	5.91***	.2074	8.76***	.1731	7.83***	.2378	4.05***
Durable goods index	.1536	9.03***	.1464	6.67***	.1453	4.29***	.1421	5.62***	.1434	4.79***	.1891	4.78***
Water and sanitation index	.1125	6.56***	.1262	3.66***	.1289	4.18***	.1384	4.66***	.1151	4.75***	.0282	0.86
Dummy City-Dessie	-.1478	-4.07***	-.3786	-3.64***	-.2762	-3.22***	-.3059	-3.46***	-.3091	-4.73***	-.2544	-1.81*
Dummy City-Kombolcha	-	-	-.2299	-2.01**	-.1543	-1.28	-.1770	-2.19**	-.1151	-1.47	-.0208	-0.18
F(20, 875) = 46.11 Prob > F = 0.0000 R-squared = 0.5131 Adj R-squared = 0.5020 Root MSE = .45157			Pseudo R2 = 0.3763		Pseudo R2 = 0.3540		Pseudo R2 = 0.3385		Pseudo R2 = 0.3029		Pseudo R2 = 0.4110	

* Significant at 10%; ** Significant at 5%; *** Significant at 1%

Source: Computation from own survey, 2014/15

5. Conclusion and Policy Implication

5.2. Conclusion

In this paper, the study estimated the Gini coefficient using DASP distributive analysis Stata Package software and the value was 0.3338. This result indicates that consumption inequality of the urban household was very high in 2014/15 in the study area, but it was lower than the national report of gini coefficient before 5 years, (0371 in 2010/11). Furthermore, a simple, and widely-used, measure is the decile dispersion ratio, which presents the ratio of the average consumption of income of the richest 10 percent of the population divided by the average income of the bottom (the poorest) 10 percent. Hence, we found that the richest 10 percent households consume 9.18 times than the consumption of the poorest 10 percent households. This distribution indicates there is a huge gap in consumption/welfare among the population.

The study also estimated the mean log deviation GE (0) which is mainly sensitive to expenditures in the lower part of the distribution; GE (2) is more sensitive to expenditures around the upper part of the distribution, while GE (1) manifests a constant receptivity across all the ranges of expenditures. Consequently, the results of the study revealed that the general entropy measures of inequality, per adult expenditure inequality was very high at the top of the distribution GE(2) = 0.2221) followed by the bottom adult equivalent consumption distribution GE(0) = 0.1987) and across all ranges of expenditures (GE(1) = 0.1900). It is observed that the mean consumption expenditure per adult equivalent was uneven across different expenditure groups and inequality measures.

The Decomposition analysis also shows that the highest estimate of the between-groups component which is found in group formed according to the educational level of the household head. The contribution of the between-groups inequality component to aggregate inequality in these groups was estimated to be 12.96% for GE (0), 14.33% for GE(1) and 13.24% for GE(2), which was higher than other group formation. These results indicate the role of education in consumption expenditures is strongly significant. Consequently, the elimination of differences in consumption expenditures between these household groups would only have a significant impact on the reduction of total inequality. In other words, a policy that would eliminate differences in average consumption expenditures among educational categories while leaving inequality in consumption expenditures among the households of each group unchanged could significantly reduce total inequality by more than 12.96% to 14.33%.

In addition, the results of the study showed that determinants of household welfare are numerous and complex, going from individual and household characteristics to the social characteristics of the community, but that the relative importance of these factors varies from one sub-group to another subgroup and across the quantile distribution of consumption/welfare. The use of quantile regressions indicates that mean age of household members (except 10th quintile), adult equivalent family size, type of household head employment occupation (except wage employed for 10th quantile), quality of housing occupancy (except houses rented from kebele for 10th and 50th quantiles), energy sources, durable assets or information facilities and improved mater and waste disposal systems and areas of residence play a major role in the improvement of household inequality/ improve welfare.

In contrast, the human resource (educational level of household heads) plays a major role only for bottom and higher per adult consumption distribution quantiles. Similarly, age of the household has negative relationship with a higher quantiles of distribution (75th and 99th). And gender of household head is statistical insignificant in affecting quantile distribution of adult equivalent consumption expenditure across all quantiles.

5.2. Policy Implications

The findings of the study suggests that a good poverty reduction policy must be supported by a comprehensive poverty analysis that identifies the nature and evolution of poverty and consumption/or income inequality, the profile of poor people, and all determining factors of poverty and inequality. Therefore, further panel data analysis is needed to understand the dynamic change and construct better models of the determinants of urban poverty and inequality. Nevertheless, this paper suggests some of poverty reduction policy recommendations, such as;

- One of the main results of the study is the significant role that the educational level of the household head plays in reducing the poverty and consumption/income inequality of urban dwellers. This finding suggests that widening access to education is expected to reduce poverty and income inequality at first (the poorest quintile) by increasing individual productivity and by facilitating the movement of poor persons from the low-paying jobs of the casual work, towards the well-paying jobs of the industrial and services sectors of the economy.
- The most important factor to explain inequality is family size. Hence it is expected that educated households are likely to have fewer children. Hence, the expansion of education, especially female education, and intensification of family planning programme at grass root level are amongst areas deserving prime attention to mitigate problem of large family size as a means of aggravating urban poverty. This requires the provision of modern birth control methods and expansion of health centres.
- The occupation of household heads working in informal sectors and unsecured casual work does not reduce poverty and inequality. Therefore**,** supporting informal enterprises that typically operate on a small scale, with little capital and using family members as workers becomes a sound intervention. This can be done thorough employment creation opportunities and by making access to capital, improvement in the investment climate in which the sector operates especially in contract enforcement and creating market demand for their products by the public institutions are sound areas of intervention. Besides, enhancing urban agricultural productivity and employment will contribute a considerable impact on urban poverty and income inequality reduction, since urban agriculture is labour intensive.
- The other influential factors of urban poverty are place of household residence and house ownership. Under conditions of rapid urbanization, urban population growth far exceeds the capacity of receiving cities to provide adequate housing and infrastructure, as well as to provide effective management of the process and consequences of urban development. Thus much urban investment is needed to improve access to urban

infrastructure, the quality of life and housing development, either individually or by the local government itself.

- The government should endeavour to design and implement urban development programmes by providing physical infrastructure, housing, water and sanitation, energy, and social infrastructure such as roads, communications, telecommunications, schools, and hospitals, which can facilitate exchange of market information between rural and urban areas, which may in turn contribute to the modernization of the country and improvements in the well-being of urban as well as rural dwellers.

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Appendixes

Appendix 1: Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of logc

chi2(1) = 2.09
Prob > chi2 = 0.1

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	290.26	208	0.0001
Skewness	38.38	20	0.0080
Kurtosis	0.88	1	0.3481
Total	329.52	229	0.0000

Appendix 2: Ramsey RESET test using powers of the fitted values of logc
Ho: model has no omitted variables
F(3, 576) = 0.67
Prob > F = 0.5721

Appendix 3: Variance Inflation Factors for the Independent Variables (VIF)

Variable	VIF	1/VIF
Head Age	56.86	0.017588
Head age^2	52.77	0.018951
Head married	3.80	0.262855
Dummy headed-female	3.72	0.269130
Dummy city-Dessie	3.31	0.301714
Dummy city-Kombolcha	3.21	0.311996
Mean age of Household members	3.15	0.317893
Dummy owner occupied houses	2.82	0.354771
Dummy wage employed	2.67	0.373924
Dummy house rented from kebele	2.54	0.393186
Dummy trade	2.29	0.436354
Adult equivalent family size	2.03	0.493489
Dummy casual worker	1.99	0.501508
Head years of schooling	1.91	0.524353

Dummy petty trade	1.74	0.574103
Energy source index	1.41	0.710169
Dummy House rented from other organization	1.36	0.733999
Water and sanitation index	1.27	0.789909
Quality of house index	1.26	0.794590
Durable asset/facility index	1.23	0.813782
Mean VIF	7.57	

Appendix 4: Akaike's information criterion and Bayesian information criterion

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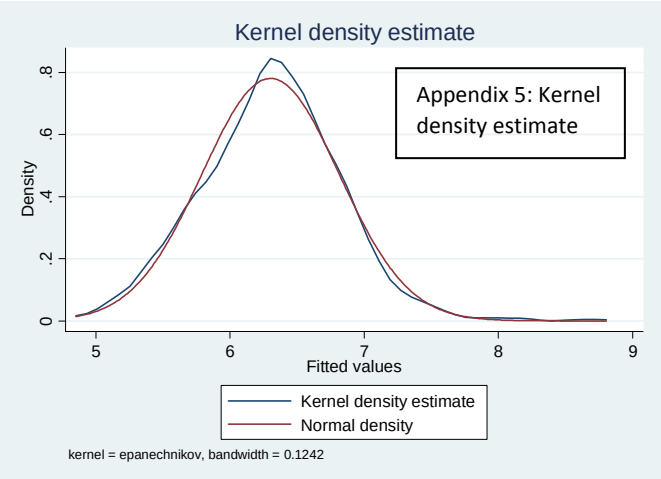
Model	Obs	ll(null)	ll(model)	df	AIC	BIC
	600	-588.8774	-362.7763	21	767.5527	859.8882

Note: N=Obs used in calculating BIC; see [R] BIC note



Appendix 6: KMO and Bartlett's Test for Principal Component Analysis (PCA)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.811
Bartlett's Test of Sphericity	Approx. Chi-Square	2137.152
	df	78
	Sig.	.000

Source: Computation from own survey, 2014/15

Appendix 7: Rotated Component Matrix

	Component			
	1	**2**	**3**	**4**
Household Electricity supply		.765		
Mobile telephone			.667	
Material of floor	.670			
Material of walls	.759			
Material of ceiling	.641			
Toilet facility	.475			
Cooking fuel		.784		
water source				.626
Household waste disposal system				.619
Kitchen	.577			
Stove		.804		
Television			.509	
Radio			.746	

Source: Computation from own survey, 2014/15