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Urban Economic Inequality and Its Determinants in the Southern Ethiopia: An Empirical Analysis

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Abstract
Income distribution among the economy participants in the urban settings has becoming the top agenda of research and development concerns in a contemporary world. The present study attempts to examine the status of urban economic inequality and its determinants in the Southern Ethiopia. A pre-tested structured questionnaire was used to collect the primary data from 508 households selected following multistage random sampling techniques. To analyze the status of urban economic inequality proxied by the share of annual consumption expenditure and total assets value, the study used Lorenz curve and Gini coefficients while econometric models approach was employed to explore its determinants. The study results revealed highly skewed distribution of economic wellbeing among the sampled households as evidenced by high Gini coefficients in its dimensions. Precisely, relative to other urbans, the wealth inequality was the highest in Wolaita Sodo town with Gini index of 0.4974 followed by Hawassa, while the highest consumption inequality (0.5082) measured by the same index was recorded in Hawassa city administration. The results of GLM and quantile regressions show that age of the household head, employment in casual works and town-dummy have statistically significant negative effect on per adult annual consumption expenditure, whereas the education level of household head, self-employment, asset ownership, income diversification, access to credit, private and saving habit are important variables that positively and significantly influence the household consumption expenditure; hence, make differences in the living standards among households. Furthermore, the positive and significant effect of gender of the household head, employment public sector and NGO, and cooperative membership was noticed in the 90th quantile regression result. Therefore, considering these significant variables during policy interventions is worthwhile. Above all, the use of appropriate redistributive policies can play a pivotal role in mitigating the unequal distribution of economic welfare among participants so as to augment the poverty reduction efforts.
Keywords: Urban Economic Inequality, Lorenz curve, Gini-coefficients, Quantile regression Southern Ethiopia

1. Introduction

In the course of development process, there is a paradigm shift in development policies world-wide. Poverty reduction has been the ultimate goal of the development policies and; hence, in the late 1990s the focus of global development policy agenda of poverty has been shifted from the neo-liberalism Washington consensus of mere quantitative economic growth solutions to some wider aspects of human development- the pro-poor growth, inclusive growth strategies, and to the Millennium Development Goals that put poverty and inequality at the heart of development, among others, and now a days shifted to a people-centered Post-2015 Sustainable Development Goals. An emerging consensus is that growth alone is not a sufficient but a necessary condition for poverty reduction (Kakwani and et al., 2004; Alemayehu Geda and et al., 2007). Congruently, income distribution among the economy participants of the urban settings has also becoming the top agenda of economic policy, research and development interventions in the contemporary era, mainly because of its linkage with multidimensional urban poverty.

Conceptually, both inequality and poverty are multidimensional, though the former is broader concept in that it is defined over the entire population while the latter only focus on the poor. The present study focusses on economic aspects of urban inequality. Economic inequality is defined as the disparities in various measures of economic wellbeing among individuals in a group, groups in a population, or among countries at large. Economic inequality sometimes referred as income inequality, wealth inequality, or the wealth gap; hence, economists commonly use three common dimensions- wealth, income, and consumption so as to measure its status. If the growth process is not accompanied by appropriate redistributive welfare policies, it leads to multifaceted deprivations and several dimensions of inequality. For a given average growth, if income is distributed more unequally and biased towards the haves (the higher fraction of total income earned by richer people), more people will live in poverty. That means, unfair income distribution adversely affects the poverty reduction capacity of the growth and development efforts. In extreme case, high and persistent economic inequality can cause disequilibrium in the entire economic system. Consequently, it is widely believed that realization of effective poverty reduction goal is materialized when sustained economic growth is coupled with non-worsening distribution of welfare.

Poverty reduction is the central goal of the Ethiopian government. To realize this dream through broad-based growth, since the introduction of structural transformation of "developmental state" model in the early 1990s, the government has implemented a full- fledged policy frameworks during the last twenty-five years. Particularly, the implementation of Sustainable Development and Poverty Reduction Program (SDPRP 2002/03-2004/05), the Plan of Sustainable Development to End Poverty (PSDEP, 2005/06-2009/10), Growth and Transformation Plan I (GTP I, 2010/11-2014/15) along with Millennium Development Goals (MDGs) and the current the Growth and Transformation Plan II (GTP II, 2015/16-2019/20) are the testimonies of the government efforts. During these periods, Ethiopia has maintained the double-digit GDP growth, that puts the country as one of the fast-growing economies, and the achievements in the reduction of absolute poverty (income or consumption poverty) measured by national poverty line, infrastructure development and social sectors (health, education) have been indeed remarkable (MoFED, 2010, 2014). However, still the lions share population live below the poverty line, expressly from the view point of multidimensional poverty analysis; thus, the problem is unfinished development challenge for the country. Among others, the growing income inequality encumbers the poverty reduction pace of the growth. The recent country trends show that the fruits of growth fundamentals have not been equitably shared among the citizens, predominantly in the urban context. Realistically, promoting a sound inclusive development in general and poverty reduction efforts in particular require narrowing down the urban economic inequality to its optimum. The urban income equality, the unheeded development challenge, might be partly posed by the rapid urbanization and provoked by various demographic, socio-economic and institutional factors. Hence, this study is intended to assess the level of urban economic inequality and its determinants in Southern Ethiopia can assist the government and development practionaries while evaluating the effectiveness of the on-going development interventions as well as to design appropriate redistributive policies that deemed to real poverty reduction.

2. Review of Literatures

The relation among inequality, growth and poverty is controversial, complex and interdependent one. The classical economists argue that income inequality is necessary for economic growth (direct relationship) while others have shown that developing countries with high inequality tend to grow more slowly (inverse relationship). The first school of thought's argument follow the initial analysis of Simon Kuznets (1955), who analyzed their relationship using an inverted U-hypothesis by plotting Gini coefficient on y-axis and GNP per capita in x-axis. He hypothesized that at early stage of economic growth, the distribution of income will tend to worsen (rising inequality), whereas at latter stages it will improve (falling inequality). According to Kuznets, this non-linear relationship was due to two reasons. The first reason relates to the nature of structural change in a dual economy setting. Early growth may be concentrated in the modern industrial sector where employment is limited but wages and productivity are high, in accordance with Lewis model. Thus, the labor was shifted from traditional agricultural sector to a more productive and differentiated modern industrial sector. Secondly, the Kuznets's curve could be generated by a steady process of modern sector enlargement growth, as country develops from a traditional to a modern sector. In general, the development thinking in the 1950s and 1960s was the dominated by the so-called Trickle-down development approach. Classicalists argue that inequality is growth-enhancing and investment in growth should be foremost priority so that benefits of economic growth go to the rich first (full bread) and eventually trickle down to the poor (small slices of broad) as the rich start spending their gains from growth. This argument is based on the traditional Kaldor's hypothesis (1956) that the rich save more because the marginal propensity to save of the rich is higher than that of the poor, higher inequality means higher rates of aggregate savings, capital accumulation, investment and future growth; thus, the poor benefit from the growth only indirectly through a vertical flow from the rich (Melkamu Mada and Mesfin Menza, 2016). The validity of Kuznets's hypothesis is questionable. According World Bank, per capita incomes are not necessarily related to inequality. For instance, the very poorest countries such as Ethiopia, may have low inequality simply because there is so little income. But even very poor countries like Mozambique and Zambia have extremely high inequality by international standards. However, in countries like Taiwan, South Korea, China, Costa Rica and Sir Lanka, higher income levels can be accompanied by falling inequality. It all depends on the nature of development process. Although inequality is not highly correlated with per capita income, still there might be a slight non-linear correlation as the inverted U-hypothesis suggests when high income countries are considered.

The second category, the new political thinking, argue that inequality has adverse effect on poverty reduction and growth. Of course, the high economic can reduce the incidence of poverty even if the poor receive only a small fraction of total benefits, but with high inequality, the beneficial impact of growth is more than offset by the adverse impact of rising inequality; hence, it is also possible that high economic growth increases poverty. Consequently, the income inequality would result in a poverty trap, and lower growth since the income and wealth inequality affect education, health and other economic opportunities (Kakwani and Perina, 2000; Thorbecke and Charumilind, 2002; Bourguignon, 2003; John page, 2005). Thus, for these group the pro-poor

growth is acceptable. Growth without redistributive welfare policies can be jobless (without increased employment opportunities) and rootless (benefits the few riches and neglects majority poor). Policies that promote growth at the expense of increasing income inequality are not pro-poor. Thus, in order for growth to be pro-poor and sustained, it must result in poverty reduction which is backed by a decrease in income inequality and employment creations.

The empirical literatures on Africa shows the negative impact of inequality on the poverty reduction effect of growth and in Sub-Saharan Africa, the impact of GDP growth on poverty reduction is a decreasing function of initial inequality (Alemayehu and Abebe, 2006; Alemayehu et al., 2008; Fosu, 2009, cited in Alemayehu Geda and Addis Yimer, 2014). Therefore, the high inequality reduces growth and in turn hinders the poverty reduction actions. Even though there are irregularities in figures and controversies, most recent empirical evidences from Ethiopia revealed that urban income equality is becoming the major concern of development challenges. The study made by Tassew W. et al., 2009, (as cited in Abebe Fantaw and Appa Rao, 2015), found that while inequality remained unchanged in rural areas, there was a substantial increase in urban inequality. In Ethiopia, income growth reduces absolute poverty and increases in inequality, in turn increase poverty; the income-poverty elasticity lies in the range of -1.7 to -2.2. Similarly, another study conducted by Alemayehu and Addiss (2014), pin-pointed that there has been an increase in the severity of poverty, as measured by the increase in the poverty gap squared from 2.7 percent in 2004/5 to 3.1 percent in 2010/11. As per their justification, this implies how the poorest people were worse off in 2010/11 than they were in 2004/5 and the change in growth has not been sufficient enough to lead to a significant decline in poverty. They reasoned-out that this is partly related to a rise in income inequality during this period and lack of structural transformation in the economy. Correspondingly, a recent study made by World Bank also confirmed that urban inequality measured by the Gini coefficient is high (World Bank, 2015). Thus, most recent trends show that urban income inequality is an upward increasing function of growth that calls for prerogative research-based interventions.

3. Research Methodology

3.1. Description of the study area

The present study is conducted in the selected urban areas of Southern Nations, Nationalities and Peoples' Regional (SNNPR) State, one of the nine regions of Ethiopia located in the South and South-Western part of Ethiopia. Astronomically, it roughly lies between 4 ^{o}.43 - 8 ^{o}.58 North latitude, and 34 ^{o}.88- 39 ^{o}.14 East longitudes and bordered with Kenya in South, Sudan in South-West, Gambella region in North-West and surrounded by Oromiya region in the North, West and East. The total area of the region is estimated to be 110,931.9 square kilometers, which accounts 10 percent of the country's land mass. Based on the CSA (2007) figures and an average annual growth rate projection of 2.9 percent per annum, the region`s population size is estimated to be 19,534,340 in 2015/16, covering nearly 20 percent of the total population of the country, of which 86.2 percent reside in semi-urban and rural areas while the remaining 2,691,672 (13.8 %) inhabited in urban areas. The crude population density of the region was 181 persons per square kilometer, which makes the region one of the most populous parts of the country. In 2015/16, the adjusted household size was 3,986,600 revealing the average household size (family size) of 4.9 in the region. The region is being an amalgam of the main homelands of numerous ethnicities, contains 56 ethnic groups living together with their own distinct geographical location, language, cultures, and social identities (BoFED, 2015/16). Agriculture is the predominant economic activity of the region, particularly in the rural, while the livelihood of the majority urban dwellers is dependent on non-agricultural activities like trade and business activities, formal and informal sector employments. The region is endowed with abundant natural resources (fertile land, water, flora and fauna), tourist attraction destinations and huge human resources. The region is experiencing fast growing urbanization, due to the cumulative effects of the natural growth, historical and socioeconomic factors, and migration resulted from push and pull factors of dual economy. Consequently, the demand for the development interrogations become highly increasing and the pressure can pose triggering challenges on urban development. Among others, multifaceted poverty, income inequality, unemployment and vulnerability to poverty are the major ones. Thus, tackling these and foreseeing future challenges of urbanization require sound urban development policies founded on multidisciplinary empirical researches.

3.2. Data, sampling techniques and sample size

To analyse the status of urban economic inequality and its determinants in the study area, the present micro-econometric study primarily used the cross-sectional data set. The primary data was collected from the household survey using structured and pre-tested questionnaire from December, 2016 to June, 2017. The questionnaire was designed to provide detailed information on a wide range of variables like households' demographic, institutional, income, consumption expenditure, assets and other important socio-economic variables. Given the motivation of research emanated from the prior information on the strictness of the problem and non-availability of previous empirical studies on the topic of interest in the study areas, the regional prime

city (Hawassa) and the two zonal towns (Wolaita Sodo and Arba Minch) were purposively selected for the study. These towns are among rapidly urbanizing areas in the region and are located at 275, 390 and 505 Kms, respectively from Addis Ababa, the capital city of the country. Each town further divided in to sub-cities, 'kebeles' and 'sub-kebeles' and there are 8 sub-cities comprising 21 kebeles in Hawassa city, 3 sub-cities with 16 kebeles in Wolaita Sodo and 4 sub-cities with 11 kebeles in Arba Minch towns. After determining the adjusted sample size by appropriate formulas, the multistage probability sampling techniques were carried out to select 508 sampled households for the final analysis. In the first stage, sub-cities of respective towns were categorized in to two categories based on their heterogeneous characteristics of residence they live to form some homogeneity within groups and then following the stratified random sampling techniques, 3 sub-cities from Hawassa and 4 sub-cities from Wolaita Sodo and Arba Minch (2 from each) were selected. That is after stratification, by applying the simple random sampling with proportionate to sample size technique on each stratum. In the second stage, the same procedures were applied to select 6 sample kebeles from the three sub-cities of Hawassa (2 kebeles from each), 5 from Wolaita Sodo and 4 from Arba Minch were selected. Finally, using the respective kebele's roster of household heads as a sampling frame, the ultimate sample households were selected using systematic sampling technique. The reason behind using these multistage random samplings is to have a good representative sample of the population for the inferential purpose and to avoid subjectivity and personal errors (C.R Kothari, 2004; Yogesh Kumar Singh, 2006). Accordingly, a total of 508 sampled households (207 from Hawassa, 162 from Wolaita Sodo and 139 from Arba Minch) were selected for the final survey. Focus group discussions and key informants interview were conducted for the triangulation purpose. The secondary data consists of relevant information were collected from different concerned offices, magazines and pertinent documents.

3.3. Methods of Data Analysis

Both descriptive statistics and econometric methods were employed to analyze the collected data. The descriptive statistics like mean, frequency, percentage, ratio, deciles, quantiles and indices were used to analyze the data from primary and secondary sources while the econometric approach was duly used to analyze the data obtained from household survey through structured questionnaire. The statistical software packages, namely SPSS and STATA were used for the present study analysis. More specifically, an STATA add in feature, called Distributive Analysis Stata Package (DASP version-2.3) was used to estimate the most popular statistics such as indices and curves used for the analysis of urban economic inequality.

3.3.1. Inequality measures

Economic inequality refers to cross-sectional distribution of income or wealth with in the economy or society at any particular period. The status of urban economic inequality proxied by annual consumption expenditure and wealth ownership of the households can be analyzed using the most widely used measures of inequality called the Lorenz curve and Gini coefficient (Lorenz M., 1905; Melkamu and Mesfin, 2016). The Lorenz curve as a measure of income inequality is defined as a graphical representation of the percentage of cumulative frequency distribution of income or wealth of the households (on the vertical axis) and the cumulative per cent of the population or number of income recipient or expenditure outlay makers ranked from the poorest to the richest households (on the horizontal axis). It is usually shown in relation to a 45-degree line that represents perfect equality and as the Lorenz curve further and further than this line, the more unequal the distribution of economic wellbeing. There are various numerical indices for measuring economic inequality. The most commonly used index is the Gini coefficient, invented by an Italian Statistician Corrado Gini in 1900. This index derived from the Lorenz curve and lies between 0 and 1 (or expressed as a number from 0 to 100). It is usually used to measure income inequality but can be used to measure any form of uneven distribution. A higher Gini coefficient represents a more unequal distribution. The two extremes, a Gini of zero and one indicate that everyone in the defined group shares income equally (perfect equality) and one individual earns all the income and everyone else zero (perfect inequality), respectively. Both outcomes are not necessarily good, however, fair income distribution is justifiable for sustained growth and development.

In practice, the entire sample households divided in to five or ten equal-sized groups, ordered from the lowest to highest income or wealth monetary value. In our case, the per adult consumption expenditure and total assets value of the households were calculated and sorted from lowest to highest to form approximately equal-sized ten groups (deciles) and further to five (quintiles) for the sake of analysis of share of income or wealth distribution. In mean time the Lorenz curve can be constructed for each dimension of economic inequality to visualize the distribution and concentration of economic wellbeing in the study areas. Furthermore, more meaningful Gini indices can be calculated from the Lorenz to show the extent to which the distribution in economic wellbeing's within the region and respective towns deviates from a perfectly equal distribution.

The mathematical derivations to construct the Lorenz curve and Gini coefficients given as follows: Let i = (1---n) individuals or households sorted from lowest to highest income/consumption expenditure or wealth (y_i). The Lorenz curve is a graph of the set of points r ϵ i:

$$(\frac{r}{n}, \frac{\sum_{i=1}^{r} yi}{\sum_{i=1}^{n} Yi})100 \quad (1)$$

Where, r is the cumulative number of households across the group distribution (quantiles or deciles), n is the total number of households (508), y_i is the income (per adult consumption expenditure per year or total asset value) of the i^{th} household in the distribution, $\sum_i^r \mathbf{y_i}$ is the cumulated income (per adult consumption expenditure per year or total asset value) up to the r^{th} household, $\sum_i^r Y_i = Y$ is the total income (per adult consumption expenditure per year or total asset value) and equation (1) shows the cumulative proportion of households to the cumulative proportion of income (per adult consumption expenditure per year or total asset value). It is obvious that $\sum_i^r \mathbf{y_i}$ ranges between 0, for $r = 0$, and Y, for $r = n$, therefore the equation value ranges between 0 (origin) and 1 or 100% (maximum value) to construct the curve.

Graphically, the Gini coefficient can be easily represented by the area between the Lorenz curve and the line of equality. The Gini coefficient is calculated as the area A divided by the sum of areas A and B (see figure 1) and the index lies between 0 & 1 ($0 \leq G \leq 1$).

$$\text{Gini(G)} = \frac{\text{Area of (A)}}{\text{Area of (A + B)}} \quad (2)$$

The bigger the area "A" gets, the more income inequality there. Since, A+B equals 0.5 (Area of equality triangle, i.e., half of base and height (1/2*b*h)), the Gini coefficient will be:

$$G = \frac{A}{0.5} = 2A = 1 - 2B \quad (3)$$

Analytically, the area of "A" is obtained by deducting area of "B" from 0.5, which is calculated from cumulative percentage of income/consumption or wealth.

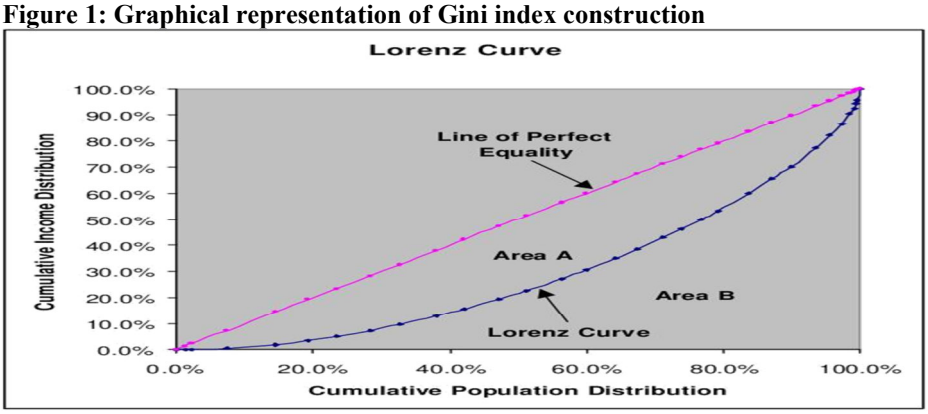
If the Lorenz curve is represented by the function Y = L(X), the value of B can be found with integration and:

$$G = 1 - 2\int_0^1 L(X)dX \quad (4)$$

For a population with values y_i, i = 1 to n, that are indexed in non-decreasing order ($y_i \leq y_{i+1}$):

$$G = \frac{n+1}{n} - \frac{2\sum_1^n (n+1-i)X_i}{n\sum_1^n X_i} \quad (5)$$

Figure 1: Graphical representation of Gini index construction



3.3.2. Econometric Models approach

After the level of income inequality has been measured and analysed with help of the descriptive statistics- the Lorenz and Gini coefficients, an econometric model approach was employed to explore the magnitude and direction of explanatory variables up on the dependent variable of interest. It is customary that economists make use of monetary value for consumption expenditure to measure the existence of economic or income inequality among a given population. This is the most commonly used dimension where inequality is manifested and is a mirror image of income. Due to the volatility nature of income and sensitivity of the respondents while providing accurate information on the value of asset owned and income, there may be overestimation or underestimation in the monetary valuation. In this case, use of consumption expenditure per adult equivalence dimension is advisable to analyze the economic inequality at household level.

The theoretical model commonly used for the continuous dependent variable (Y_i) with many explanatory variables is the vector approach regression model and given as:

$$Yi = Xi'\beta + Ui \quad (6)$$

Where, X_i' is vector of explanatory variables, and U_i -is a random disturbance term.

Specifically, the Generalized Linear Model (GLM) and Quantile Regression (QR) methods were used to estimate the above equation so as to see the effects of household characteristics on the dependent variable that proxy the urban household economic inequality.

The generalized linear model (GLM) refers to a larger class of models popularized by McCullagh and Nelder (1982, 1989). In these models, the response variable Y_i is assumed to follow an exponential family distribution (including normal) with mean μ_i, which is assumed to be some nonlinear function of X'β, but McCullagh and Nelder consider them to be linear, because the covariates affect the distribution of Y_i only through the linear combination X'β. In particular, the GLM that follow Gaussian or normal, usually refers to linear regression models for a continuous response variable given continuous and/or categorical predictors. When we are dealing with the simultaneous effects of multiple variables, including mixtures of categorical and continuous variables and their associations with the effect variable, a special class of log-linear, GLM is superior over the traditional OLS method of estimation. A generalized linear model is made up of a linear predictor and two functions- a link function (η) that describes how the mean, $E(Y_i) = \mu_i$, depends on the linear predictor $g(\mu_i) = X'\beta$, and a variance function that describes how the variance, $var(Y_i)$ depends on the mean $var(Y_i) = \varphi V(\mu)$, where the dispersion parameter φ is a constant. The advantages of GLMs over traditional OLS regression are: 1) we do not need to transform the response Y to have a normal distribution, as it follows Gaussian or normal distribution, 2) The choice of link is separate from the choice of random component thus we have more flexibility in modeling, 3) If the link function produces additive effects, then we do not need constant variance due to the fact that it follows Gaussian, the link function, $\eta = g(E(Y_i)) = E(Y_i) = g(\mu_i) = \mu_i$ is identity and variance function, V(u)=1, 4) Since the models are fitted via Maximum Likelihood (ML) estimation; thus, optimal properties of the estimators.

Quantile regression (QR), also known as median regression is an extension of OLS that completes the shortcomings of latter. Similar to the conditional mean function of linear regression, the quintile regression considers the relationship between the regressors and outcome using the conditional median function Qq(y|x), where the median is the 50th percentile, or quantile q, of the empirical distribution. The quantile $q \in (0,1)$ is that y which splits the data into proportions q below and 1-q above: $F(y_q) = q$ and $y_q = F^{-1}(q)$: for the median, q = 0.5. Thus, the basic difference between the two approaches is that the OLS minimizes summation square of error terms ($\sum ei2$), while the QR, also known as Least-Absolute-Deviations (LAD) regression, minimizes summation of absolute value of the error term ($\sum_i |ei|$). That is the latter minimizes a sum that gives asymmetric penalties (1-q) $|e_i|$ for overprediction and $q|e_i|$ for underprediction (Christopher F Baum, 2013).

Although its computation requires linear programming methods, the quantile regression estimator is asymptotically normally distributed. The most important advantages of quantile regression over OLS are: more robust to non-normal errors and outliers where OLS can be inefficient if the errors are highly non-normal. The other advantage is that it provides a richer characterization of the data so that allows to consider the impact of a covariate on the entire distribution of y, not merely its conditional mean. Furthermore, QR is invariant to monotonic transformations, such as logarithm and is semiparametric as it avoids assumptions about the parametric distribution of the error process (Ibid).

Accordingly, the empirical model for this study is derived from the theoretical counterpart of equation (6), to estimate the effects of households' demographic, socioeconomic and institutional characteristics on natural logarithm of per adult's annual consumption expenditure that proxy the urban economic inequality (distribution of economic wellbeing) and is given as follows:

$$\ln yi = Xi'\beta + Ui \quad (7)$$

Where, lnyi -stands for the natural logarithm of consumption expenditure per adult equivalence of household i, X_i' -is vector of explanatory variables, and U_i -is a random disturbance term, which is assumed to be normally, independently and identically distributed with mean 0 and variance σ^2.

A total of ten explanatory variables that might influence the dependent variable were selected for the analytical purpose of this study. These are Gender of household head, Age the household head, Education of the household head, Current employment status of the household head, sources of income of the household, Asset ownership, Access to Credit, Saving habit of the household, Cooperatives membership, and Town dummy.

4. Findings and Discussion

This section deals with the analysis and discussion of major results of both descriptive analysis and econometric model out puts sequentially.

4.1. Descriptive Analysis and Discussion

Wealth and consumption expenditure distribution among the population of interest are a good indicators and

dimensions of the economic wellbeing or living standards of the society. The unfair distribution of these dimensions among the participants is an implication of economic inequality. As indicated in table-1, the mean asset value owned by the average household at the regional level is about Ethiopian Birr (ETB) 614, 683.14. A study revealed that the relative richest 1 percent respondents alone owned an assets value of nearly 20 percent of the wealth of the remaining 99 percent respondents and almost 17 percent of the entire sample households during the study period. The richest 10 percent respondents (top deciles) own 31 percent of the total wealth and 77.5 times higher wealth than their bottom 10 percent counterparts while the top 20 percent (top quintiles) own nearly 49 percent of asset value of the entire study populations. Each household from upper 20 percent owned averagely ETB 1,530,069.26, which is very much higher as compared to their bottom counterpart's average of ETB 42,859. That is 35 times higher than the average household's in the lowest 20 percent (quintiles) and about 2.49 times higher than the average equal distribution value in the region. The middle quintiles own nearly 16 percent of the entire wealth, which is 32 times higher than the bottom equal 20 percent households.

In the same talk as indicated in the same table, the results of consumption expenditure presented also indicate the economic inequality in the region. The mean annual consumption expenditure per adult equivalent average household in the Sothern urban study areas would made be about ETB 13, 730.5. The results show that consumption expenditure made by the top 10 percent households (top deciles) per adult equivalence was exceedingly 34 percent of the entire households and the share that of the lowest 10 percent (bottom deciles) was less than 1 percent, which indicates the huge gap between the two extreme groups. Similarly, the share of upper 20 percent haves (top quantiles) is higher than 50 percent of the total annual expenditure per adult equivalence of the regional urbans, while their bottom decile counterparts share only 2.62 percent. The consumption expenditure share of the uppermost 20 percent quintile is nearly 19.5 times higher than the lowest 20 percent counterparts. The remaining middle 60 percent households combined outlay above 47 percent of total annual expenditure per adult equivalence per annum of the regional sampled households on consumption, but their share is still below the top quintiles'. Thus, these evidences are attestations for the existence of inequality in economic wellbeing distributions measured by consumption inequality. Moreover, the shapes of the Lorenz curves of the sampled households depicted in the figure-2 also, clearly show the existence of wealth inequality in the study areas. The curves are highly skewed and the skewness of distribution is peak at the top in both cases, rather than being symmetric around their means; hence, the curve is bowed out which shows higher wealth inequality in the study areas, particularly the wealth distribution. It is widely stated in the economic literatures that the Gini coefficient less than 0.3 is in the green zone while 0.3 to 0.39 is in yellow region. However, when the coefficient is greater or equal to 0.4, it is the state of red zone and the problem needs diagnosis. As indicated in table- 5, the Gini-coefficient values of wealth (0.4764) and consumption expenditure (0.4773, above the national average, 0.37, of course outdated), obtained from the data are higher than the acceptable optimum also confirm the existence of unequal distribution of economic wellbeing among the sampled households. The relative measure of the overall Gini coefficient suggests that, on average 47.64 percent wealth and 47.73 percent consumption expenditure are unequally distributed among groups in the study towns.

The disaggregate level of wealth and consumption expenditure distribution among the respective towns can be analyzed in the same fashion for comparisons purpose. For instance, as indicated in table-2, in the Hawassa city, the upper quintiles solely owned half of the entire wealth; however, the share of the same lowest quintiles is not higher than 1 percent, meaning 50 times higher and this gap is even much higher than the regional figure. That is the poor own insignificant proportion of the total wealth. Similarly, the share of consumption expenditure of upper 20 percent (top quintiles) in the city was more than 54 percent; however, the share of the same lowest quintiles was only around 2.5 percent, which can imply the disparities in per adult consumption expenditure among groups. The situation is almost the same Wolaita Sodo and Arba Minch towns in both dimensions, but in relative terms the disparities in the latter case is better than the other two towns. The Lorenz curves portrayed in figure 3, 4 and 5 as well display the highly skewed wealth and consumption expenditure distribution among the groups (deciles and quantiles) with slight differences across the towns. Particularly, the curves show the existence of more uneven distribution in wealth and consumption expenditure among sampled households in the Hawassa city and even more worse wealth distribution in Wolaita Sodo town. In general, the Gini indexes in table-5 also confirm the scenarios and the high Gini-coefficient (0.5082) of Hawassa city is exceptionally high than the indexes for other dimensions, of other urbans and the regional one; hence, shows the existence of high consumption inequality in the city among the sampled households. Similarly, the wealth Gini index of the city (0.4955) is also high next to Wolaita Sodo's maximum (0.4974). Actually, the wide disparities in consumption pattern is also due to differences in wealth status of the households, among others. These all evidences show that wealth is concentrated at the hands of the top classes and the economic well-being's are unevenly distributed among the sampled households in the study urbans. When the resources are at the hands of a few and there is a wealth concentration, then the process of wealth concentration makes economic inequality a vicious cycle. Thus, the high economic inequality in its dimensions among the households in the study areas might be caused by different factors and can be aggravated by the deep-rooted poverty and; in turn, become a bottleneck for the

poverty reduction efforts.

4.2. Econometric model results and interpretations

The detail descriptive analysis of urban inequality in the preceding section has clearly shown that there is a wide gap in economic wellbeing among the groups of sampled households in the study areas. In this particular section, the econometric model approach was employed to see the explaining power of the detrimental factors that contributed to the urban income inequality or differences in living standard, particularly using quantile regressions of various range.

Prior to model estimation and interpretations, all possible diagnostic checking's' of the common problems of cross-sectional data set, namely multicollinearity, functional misspecification and omission variable bias, that will result in biased and inefficient parameter estimators have been properly conducted and all the test results confirmed that no such problems as evidenced by low VIF (< 10), the non-significance p-values of Ramsey Reset test and Link test's "hatsq" coefficient of functional misspecification, but coefficient of "hat" significant that show correct functional specification in the model, as signposted in the appendix section. However, the issue of heteroscedasticity and non-normality can be sorted-out by the use of generalized linear models (GLM).

The results of both the generalized linear models (GLM) and quantile regression (QR) show that age of the household head, engagement in casual works and $town_2$ have negative and significant effect on household consumption expenditure while the household head's level of education achievement, self-employment, asset ownership, income sources (diversification), access to credit, private saving habit are important variables that positively and significantly influence the household consumption expenditure and hence, make a difference in living standards among households. However, the estimation results of the two models are slightly different with variations in the magnitude and level of significance. For instance, the coefficients of gender, primary and secondary education, employment in public sector and NGO, pensioner, cooperative membership and $town_3$, which were non-significant in the GLM become significant across quantile regressions, particularly at higher (90^{th}). Thus, the main advantage of using quantile regression over GLM is that it clearly shows the exact magnitude and direction of the covariates in respective quantiles ranges.

As clearly indicated in the table-6, age of the household head is negatively associated with the annual consumption expenditure per adult equivalent (consumption inequality) that reflects the aged household heads have lower living standard than their younger productive counterparts, as they supply low labor. The variable is statistically significant at 1%; hence, as age of the household head increases by one unit (year), the per adult annual consumption expenditure will reduce by about 0.9%, maintaining other variables effect constant; however, the magnitude of reduction is higher in 25^{th} quantile (1.1%), and then declining. This result coincides with that of Abebe and Rao (2016) and Samuel F., (2017).

As regression results revealed, in general education of the household head has positive impact on the dependent variable and this result also complements with the result of Abebe and Rao. However, uniquely in our study, education was labeled as categorical variable so as to see the non-linear relationship among the various levels of achievements up on the return and it was found that education (level of schooling) has a power to influence the consumption expenditure positively at all levels and has statistically significant effect, except in GLM from the secondary levels. The living standard of those household heads who completed high schooling and above led better life in comparison with illiterates as the regression coefficients are statistically significant. For instance, for the household heads who completed grade 9-12, unit scale increase in education level will result in 27.3% increase in consumption expenditure in reference to illiterate pole, ceteris paribus and the mean difference is statistically significant at 1%, and the increase is higher in 25^{th} quantile (30.7%) and even higher for those with bachelor and master's and above degree (65% and 73.45%, respectively), for the more educated household heads, the living standard measured by consumption expenditure shows an upward improvement The results show that education has a meaningful power to make differences among households and of course the difference is non-linear. However, for the household heads' in 10^{th} quantile who graduated in Bachler degree and master's degree and above, the consumption expenditure has increased by 71.3% and 57.67%, significant at 1% and 5%, respectively as compared to illiterates, ceteris paribus and conversely, the increase was 68.6% & 79.2%, 51.2% &72.1% and 70.6% & 38.8% in reference to non-educated, for those in 25^{th}, 50^{th} and 90^{th} quantiles, respectively, other variables held constant and all are statistically significant at 1% level of significance. This shows the magnitude of increment is decreasing towards top quantiles and it can be argued that at the higher level of education, the gap in consumption expenditure among households become narrow down and; thus, education productive investment in human capital, is a successful weapon to fight against income inequality.

The type of occupation in which the household head engaged is also the most important categorical variable with many meaningful features as a determinant for differences in consumption expenditure of households, and; hence, urban income inequality of the study areas. As compared to unemployed, the per adult consumption expenditure of self-employed household heads is increased by 54.43%, ceteris paribus and is statistically significant at 1% of significance level, which is by far larger increment than that of the GLM estimation result

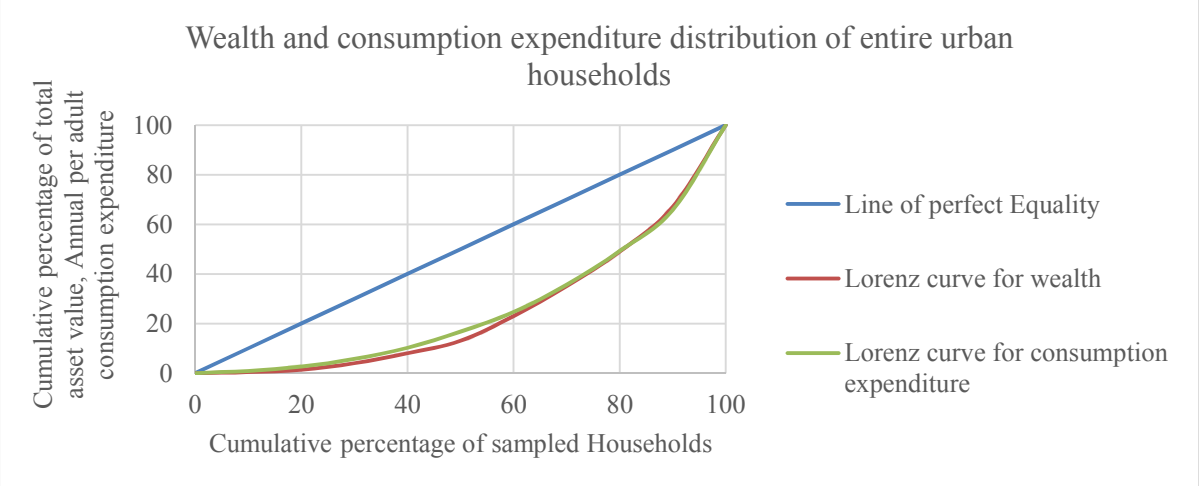
(30.39%). As a case in GLM result, the per adult consumption expenditure of casual worker shows a decreasing trend in approximately the same magnitude in all quantile regressions, but with different level of significance.

Income diversification is another most influential variable that can affect the living standard of the households under investigation. Like the GLM result, the regression results of all quantiles reveal that having diversified income sources has positive and significant effect on consumption pattern of the households and the magnitude of rate of change (increase) is upward across the quantiles, except the top where the rate of increment is a bit lower than 50th quantile. As income sources increases by one unit (suppose from 1 to 2 or to 3) and assuming other variables being constant, the per adult consumption expenditure of household heads in 10th, 25th, 50th and 90th can increase by 31.1%, 41.5%, 45. 6% and 41.72%, respectively, as compared to households with only one income sources, and all the coefficients are statistically significant at 1% level of significance.

Finally, unlike GLM result, the quintile regression results of town dummy show mixed results. The negative sign of the dummy for town shows that households under survey do not allot much income to consumption as compared to base category, might be due to their living standard and the opposite true for the positive sign. Households residing in Wolaita Sodo in the first three quintiles made lower consumption expenditures than those while those in Hawassa in the same three quintiles invest more in consumption expenditure relative to those in Arba Minch town. Specifically, maintaining other things constant, the per adult consumption expenditure of household heads' in Wolaita Sodo town of 10th quantile is reduced by 31.16% relative to those in Arba Minch and the difference is significant at 1%. Parallelly, the consumption expenditure of those in 25th quantile decreases by 13.42%, ceteris paribus. However, consumption expenditure of households in Hawassa made is higher than those in Arba Minch, except in the 90th quantile. That is, that the living standard of the households in the middle two quantiles of Hawassa is better than their Arba Minch counterparts. However, the per adult consumption expenditure of households in the higher quantile (90th) of Hawassa spend 13.77% less income relative to those in the same quantile in Arba Minch, ceteris paribus and the difference is significant at 5% level of significance.

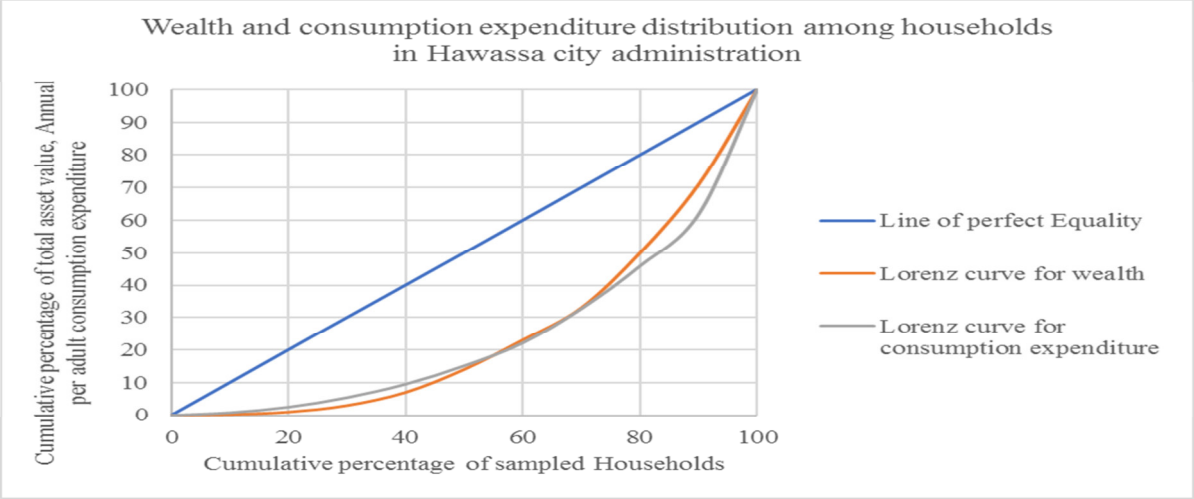
From the results and discussions, we made so far it could be concluded that economic inequality measured by various economic wellbeing confirmed the severity of the problem in the study areas as evidenced by high Gini indexes (above the national average and the optimal range) and the development interventions has to put the inequality issue at the heart of the proactive development policies and strategies of urban development. In addition, in an attempt to shed some light on factors which contributed to the present urban income inequality in the study areas, the study identified a dozen of variables with powerful effect in making differences among urban households' living standard. Thus, considering these significant variables is worthwhile in policy-making to support the urban poverty reduction efforts.

Figure 2: Lorenz curve for Wealth and Consumption expenditure distribution of the entire households



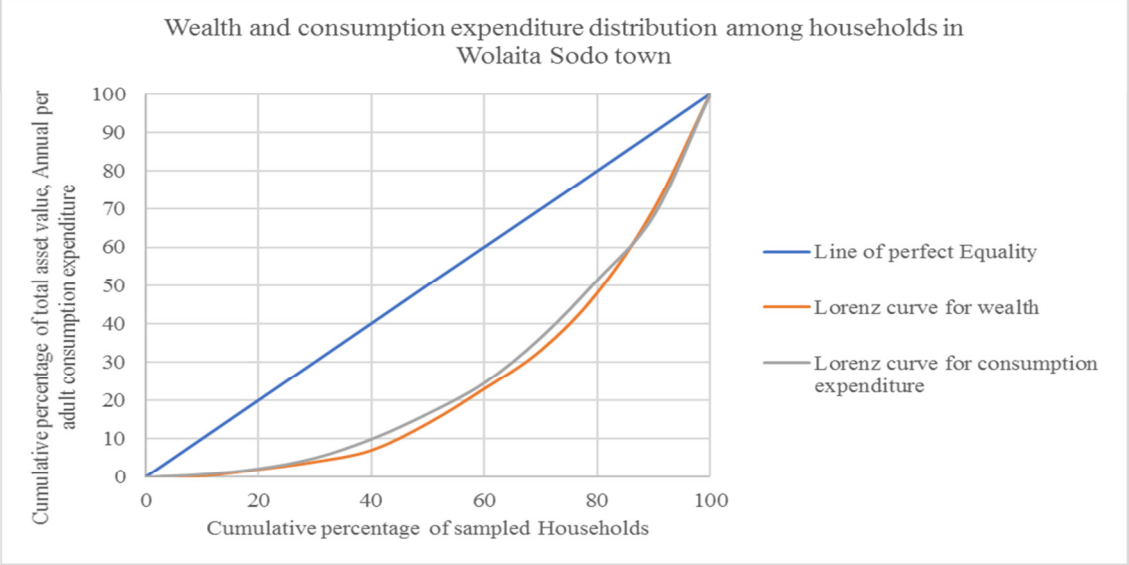
Source: Constructed from own household survey data, 2017

Figure 3: Lorenz curve for distribution of Wealth and Consumption expenditure in Hawassa city



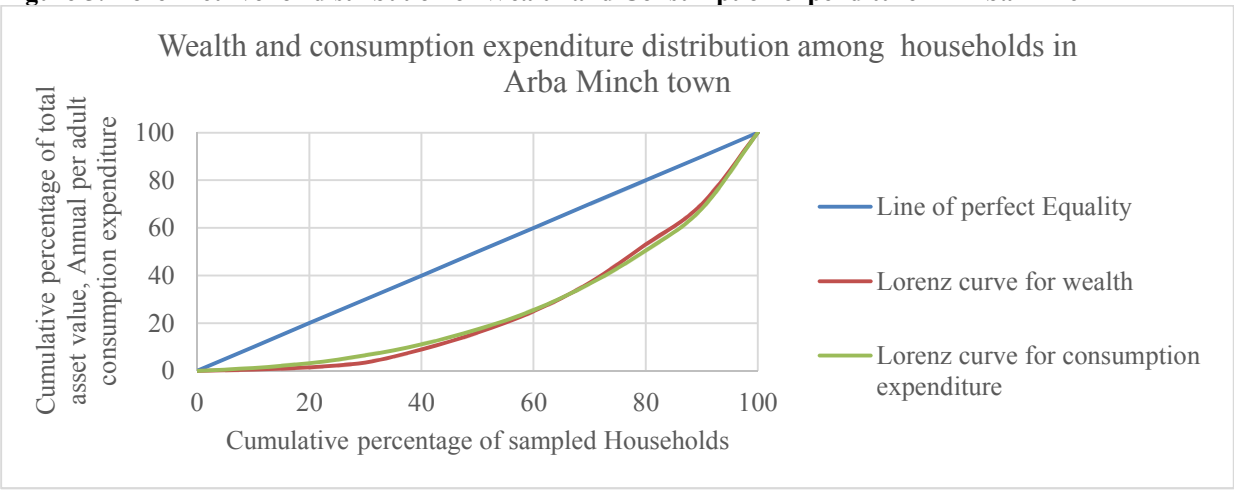
Source: Constructed from own household survey data, 2017

Figure 4: Lorenz curve for distribution of Wealth and Consumption expenditure in Wolaita Sodo



Source: Constructed from own household survey data, 2017

Figure 5: Lorenz curve for distribution of Wealth and Consumption expenditure in Arba Minch



Source: Constructed from own household survey data, 2017

Table 1: Wealth and Consumption expenditure distribution among the entire Sampled Households

	Group	Number of Households with in a group	Cumulative Percentage of Households	Share of group wealth (in ETB)	Cumulative percentage share of group wealth	Share of group Consumption Expenditure per adult equivalence (in ETB)	Cumulative Percentage share of group consumption Expenditure
	1	51	10	1249036	0.4	62776	0.90
	2	51	20	3122591	1.4	119972	2.62
	3	51	30	8118735	4	216227	5.72
	4	51	40	15612952	9	313879	10.22
	5	51	50	18735542	15	453381	16.72
	6	51	60	31225903	25	551032	24.62
	7	51	70	37471084	37	767260	35.62
	8	51	80	43716265	51	948613	49.22
	9	50	90	56206626	69	1150890	65.72
	10	50	100	96800300	100	2391062	100
Total		508		312259034		6975092	

Source: Authors' computation from own household survey data, 2017

Table 2: Wealth and Consumption expenditure distribution among Hawassa Sampled Households

	Group	Number of Households with in a group	Cumulative Percentage of Households	Share of group wealth (in ETB)	Cumulative percentage share of group wealth	Share of group Consumption Expenditure per adult equivalence (in ETB)	Cumulative Percentage share of group consumption Expenditure
	1	21	10	414006	0.25	23538	0.80
	2	21	20	1242019	1.00	50017	2.50
	3	21	30	3312049	3.00	85324	5.40
	4	21	40	6624099	7.00	120631	9.50
	5	21	50	11592173	14.00	164764	15.10
	6	21	60	14904222	23.00	205955	22.10
	7	21	70	16560247	33.00	311875	32.70
	8	20	80	28152420	50.00	388372	45.90
	9	20	90	34776519	71.00	470754	62.00
	10	20	100	48024716	100	1120983	100
Total		207		165602470		2942213	

Source: Authors' computation from own household survey data, 2017

Table 3: Wealth and Consumption expenditure distribution among Wolaita Sodo town Households

	Group	Number of Households with in a group	Cumulative Percentage of Households	Share of group wealth (in ETB)	Cumulative percentage share of group wealth	Share of group Consumption Expenditure per adult equivalence (in ETB)	Cumulative Percentage share of group consumption Expenditure
	1	17	10	234194	0.30	15295	0.72
	2	17	20	1327101	2.00	31865	2.22
	3	16	30	1561295	4.00	59482	5.02
	4	16	40	2341943	7.00	104093	9.92
	5	16	50	5464533	14.00	140631	16.54
	6	16	60	7025828	23.00	169947	24.54
	7	16	70	7806476	33.00	250672	36.34
	8	16	80	11709714	48.00	318651	51.34
	9	16	90	17174247	70.00	361138	68.34
	10	16	100	23419428	100	672566	100
Total		162		78064759		2124340	

Source: Authors' computation from own household survey data, 2017

Table 4: Wealth and Consumption expenditure distribution among Arba Minch town Households

	Group	Number of Households with in a group	Cumulative Percentage of Households	Share of group wealth (in ETB)	Cumulative percentage share of group wealth	Share of group Consumption Expenditure per adult equivalence (in ETB)	Cumulative Percentage share of group consumption Expenditure
	1	14	10	343485	0.50	22902	1.20
	2	14	20	686970	1.50	38171	3.20
	3	14	30	1373940	3.50	62982	6.45
	4	14	40	3778334	9.00	87793	11.00
	5	14	50	4808789	16.00	120238	17.40
	6	14	60	6182729	25.00	154592	25.50
	7	14	70	8243638	37.00	209939	36.50
	8	14	80	10991518	53.00	267195	50.50
	9	14	90	11678488	70.00	333994	68.00
	10	13	100	20609096	100	610733	100
Total		139		68696987		1908539	

Source: Authors' computation from own household survey data, 2017

Table 5: Overall and urban-specific Gin-coefficients

Urban	Gin-Coefficient	
	Wealth	Annual Per adult consumption expenditure
Regional overall	0.4764	0.4773
Hawassa	0.4955	0.5082
Wolaita Sodo	0.4974	0.470
Arba Minch	0.4690	0.4602

Source: Authors' computation from own household survey data, 2017

Table 6: Econometric Models Results

Dependent Variable: Natural logarithm of Per adult annual consumption (lnperadultconsum-lny$_i$)

Explanatory Variables	**GLM**	**Q_{10} (.1)**	**Q_{25} (.25)**	**Q_{50} (.5)**	**Q_{90} (.9)**
	Coefficient	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
Gender (male = 1)	.0099827 (0.17)	.0209662 (0.21)	.0374509 (0.52)	.0429003 (0.57)	.1874859 (2.83) ***
Age of the household head	-.0094941 (-3.57) ***	-.0097996 (-2.41) ***	-.0113403 (-3.83) ***	-.0081082 (-2.46) ***	-.002332 (0.415)
Education$_1$ (grade 1-4)	.1306126 (1.39)	.20903 (1.29)	. 231741 (2.09) **	.052646 (0.45)	.0445228 (0.44)
Education$_2$ (grade 5-8)	.1239946 (1.28)	.2634195 (1.48)	.2090151 (1.84) *	. 0229032 (0.20)	.0622567 (0.70)
Education$_3$ (grade 9-12)	.2726647 (2.54) ***	.3489631 (1.84) *	.3066459 (2.57) ***	.1772216 (1.46)	.1918696 (1.90) **
Education$_4$ (Diploma)	.4708112 (3.73) ***	.4666815 (2.30) **	.4178579 (3.18) ***	.3772799 (2.73) ***	.3683747 (3.01) ***
Education$_5$ (BA/BSc degree)	.6498203 (4.63) ***	.7125334 (2.97) ***	.6859776 (4.54) ***	.5120707 (3.34) ***	.706275 (5.69) ***
Education$_6$ (MA/MSc/PhD and above)	.7344981 (5.05) ***	.5767128 (2.30) **	.7921531 (4.60) ***	.7211558 (4.24) ***	.3877564 (2.66) ***
Employment$_1$ (Public sector employee)	.0174194 (0.21)	-.0132232 (-0.11)	-.1227235 (-1.30)	-.0865179 (-0.83)	.252469 (2.59) ***
Employment$_2$ (Private sector employee)	-.0343622 (-0.36)	.1264934 (0.66)	-.0851442 (-0.64)	-.047509 (-0.33)	-.0502982 (-0.40)
Employment$_3$ (Self-employed)	.3038992 (3.26) ***	.0993207 (0.77)	.1599998 (1.50)	.1756556 (1.45)	.5442604 (5.06) ***
Employment$_4$ (Casual worker)	-.1774861 (-2.28) **	-.1655138 (-1.32)	-.1605336 (-1.76) *	-.1678066 (-1.70) *	-.1601599 (-1.73) *
Employment$_5$ (NGO worker)	.0375217 (0.26)	.0969464 (0.47)	-.0044924 (-0.03)	-.1287371 (-0.70)	.5303377 (3.26) ***
Employment$_6$ (Pensioner)	.0763445 (0.57)	.0757641 (0.47)	-.0750375 (-0.47)	.082896 (0.49)	.2532436 (1.92) **
Asset ownership	.1822735 (1.95) **	.1161271 (0.82)	.233378 (2.41) ***	.2626136 (2.60) ***	.1466854 (1.53)
Income sources	.4384738 (9.23) ***	.3909774 (5.81) ***	.4150466 (7.26) ***	.4563425 (7.90) ***	.4171848 (7.82) ***
Access to credit	.2510984 (3.56) ***	.3554115 (3.95) ***	.2512992 (3.41) ***	.0819193 (3.44) ***	.2417706 (2.92) ***
Saving habit	.1915861 (2.60) ***	.1360535 (1.37)	.2719268 (3.25) ***	.0906571 (2.10) **	.2295888 (2.77) ***
Cooperative membership	.0271838 (0.47)	.0618904 (0.70)	.0610149 (0.87)	.0168173 (0.22)	.1876412 (3.13) ***
Town$_2$ (Wolaita Sodo)	-.1290788 (-2.05) **	-.3116379 (-3.51) ***	-.134217 (-1.90) **	-.1154355 (-1.51)	.0678594 (1.04)
Town$_3$ (Hawassa)	.1002013 (1.70)	.1487566 (1.45)	.2456191 (3.32) ***	.1311259 (1.69) *	-.1377254 (-2.19) **
Constant	8.111007 (53.13) ***	7.66891 (35.30) ***	7.750925 (43.14) ***	8.003442 (41.72) ***	8.348836 (50.09) ***
	N= 508 df = 486 Log pseudolikelihood = -345.7686318 AIC = 1.447908 Optimization: ML	N = 508 Pseudo R^2 = 0.5047	N = 508 Pseudo R^2 = 0.4854	N = 508 Pseudo R^2 = 0.5004	N = 508 Pseudo R2 = 0.4658

*Robust z-statistics of GLM and t- statistics of QR in parentheses ***, ** and * shows significance at less than 1%, 5% & 10%, respectively:* ***Source: Estimated from own household survey data, 2017***

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Appendix: Test Results

A. Multicollinearity Test Result

Variable	VIF	1/VIF
Gender	1.40	0.712039
Age	1.58	0.633083
Education		
1	2.10	0.475649
2	2.53	0.395523
3	3.40	0.294500
4	3.74	0.267235
5	3.22	0.310176
6	3.11	0.321724
Employment		
1	3.35	0.298258
2	1.23	0.811014
3	2.54	0.393345
4	1.66	0.603098
5	1.32	0.759072
6	1.56	0.642553
Assetowner~p	1.92	0.521280
Incomesource	2.26	0.441782
Credit	2.31	0.432751
Saving	2.88	0.347301
Coopmember~p	1.80	0.554514
Town		
2	1.75	0.570566
3	2.00	0.499365
Mean VIF	2.27	

B. Omission variable (Specification error I) Test Result

```
Ramsey RESET test using powers of the fitted values of lnperadultconsum
       Ho:  model has no omitted variables
                 F(3, 483) =      1.26
                  Prob > F =      0.2868
```

C. Functional misspecification (Specification error II) Test Result

Source	SS	df	MS
Model	282.03326	2	141.01663
Residual	115.871732	505	.229448975
Total	397.904992	507	.78482247

Number of obs	508
F(2, 505)	614.59
Prob > F	0.0000
R-squared	0.7088
Adj R-squared	0.7076
Root MSE	.47901

lnperadult~m	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_hat	1.611039	.723296	2.23	0.026	.1899994	3.032079
_hatsq	-.0334277	.039538	-0.85	0.398	-.111107	.0442516
_cons	-2.773806	3.291216	-0.84	0.400	-9.239969	3.692357