



**Determinant of income inequality in urban Ethiopia an empirical evidence with  
Gondar: OLogit model**

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**Abstract**

*Income inequality is unequal distribution of household or individual income across the varied participants in an economy. This outshines the presence of high poverty especially for households who were during a lower income category. So as to scale back the income disparity between households, identify the factors that contribute to the existing inequality is so important. The study was conducted to analysis the determinants of income inequality among households who finds themselves at rock bottom and top of the income distribution in Gondar city. For the successful accomplishments of objective of analysing the determinants of income inequality, primary data was collected from the sample household heads within the city. The study were used descriptive statistics of percentile ratio, Lorenz curve and Gini coefficient. Addition to the descriptive statistics; econometric techniques of Ordered logit model were applied. The inequality situation is analysed by using the Lorenz curve and Gini index. The Gini index of the town is found to be 0.35. Finally, from the estimation of Ordered logit model, there's direct significant effect of occupation, level of education and sort of labour that the individual working on income level. The opposite variables have insignificant impact on income levels. From the marginal effects of ordered logit model proved that household who works on private sector have high probability to be included within the higher income groups than the general public sector workers. Male household heads have high probability to incorporate within the higher income groups than female headed households. Therefore, the study recommends that the government and the concerned body should find a way to minimize income inequality among households in Gondar city.*

**Key words: Income inequality; Gini coefficient; Urban; Gondar**

## Acronyms

CSA= Central statistical Authority

WB= World Bank

OLS= Ordinary Least Square

DCs= Developed Countries

LDCs= Least Developed Countries

IFPRI= International Food Policy Research Institute

## Introduction

Income disparities issue has long been existed among the various communities and different groups of individuals of societies. Checking out the causes of problem and for tactics to unravel it's been a priority for economists and political leaders. Poverty and inequality are usually studied simultaneously. Indeed, the relative position of households and individuals between themselves, additionally to their absolute position is important within the analysis of the population welfare. It's documented that the measures of poverty specialize in households or individuals below the poverty level. But measures of inequality consider the entire of the population. As for measures of poverty, inequality are often calculated for several indicators like income or expenditure (Boccanfuso and Kabore 2000).

Inequality may be a broader concept than poverty therein it's defined over the whole population, not just for the population below certain poverty level. Income inequality is one among the concerns of worldwide economy.

Global inequality is worth than at any time since the 19th century. But this income inequality doesn't seem so bad. "Branco Millanovich" one among the world's leading expert in global income inequality, argues that while inequality is getting worse with in countries, on a worldwide scale it's actually recuperating. To measure income inequality with the Gini index score of 0 represents total equality and a score of 1 represents total inequality, where one person has everything and everybody else has nothing.

According to Milanovich, the worldwide Gini index has decreased slightly from 0.72 in 1988 to 0.71 in 2008. So perhaps we shouldn't be overly worried about inequality. In Sub-Saharan Africa income inequality is one among the issues. Our current evidence on income inequality within the region suggests some fascinating and surprising trends. First, Sub-Saharan Africa, when measured by the Gini, reports a better mean and median level of inequality (0.41 and

0.41) in comparison with economies within the remainder of the developing countries (0.39 and 0.39).

However closer examination of the info reveals the presence of seven high inequality “African outliers”. Angola, Central African Republic, Botswana, Zambia, Namibia, Comoros, and South Africa show an extremely high levels of inequality reporting with a Gini of above 0.55. When excluding those African outliers, Africa’s level of inequality actually approximates of other developing economies. Second, inequality levels, since the mid-1990s have a mean decline in Africa, driven by economies not highly unequal.

To understand what percentage inhabitants of a rustic are poor or not it's not enough to understand only a country’s perpetual income. The recent economic development in Ethiopia; Ethiopia joined the family of the planet rapidly advancing economies since 2004 with a strangely high annual average of 11% of rate of growth by International fund (IMF)), International Bank for Reconstruction and Development (WB), Africa Development Bank (ADB), World Health Organization (WHO), and Organization for Economic Cooperation and Development (OECD).

Economic growth refers to the share change within the national output (Gross Domestic Product) of the given economic. Gross Domestic Product (GDP) refers to the market values of all good and repair produced within the economy. Real GDP used as a measurement of economic process. In 2006 the annual economic process of Ethiopia was 11.5 percent. Within the same way, after four years, meaning in 2010, the country has achieved 10.6 percent economic process. In 2013, the economic process recorded in Ethiopia was 9.7 percent. This economic process was above the typical SSA economic process. In 2006, 2010 and 2013, the typical SSA countries annual economic process was 6.3, 2.6 and 4.9 percent respectively. Despite the lower economic process of SSA countries, it had been characterized as irregularity which isn't the case of Ethiopia economic process. The last eight years average economic process of Ethiopia was 10.6 but the typical SSA countries were 5.3 percent.

The planet Bank, in its recent poverty assessment reports that “Ethiopia is one among the foremost equal countries within the world as a results of a really equal consumption distribution in rural areas. as compared to other African countries, Ethiopia has rock bottom inequality as measured by the Gini coefficient, Ethiopia’s Gini coefficient has consistently remained below 30% while other countries have Gini coefficients around 40%.Urban Ethiopia has consistently higher inequality than rural areas, across measures and across time, but as compared to other countries it's still quite low at 35%. In urban areas, all measures of inequality show a considerable increase in inequality from 1996 to 2005 and a considerable

reduction in urban inequality from 2005 to 2011(International Bank for Reconstruction and Development, 2015).

”Similarly, the recent human development report issued by UNDP pertaining to government of Ethiopia sources also individual authorities, presents a levelling-off in inequality particularly in urban areas reports that “Between 2004/05 and 2010/11, income (consumption) inequality measured by the Gini coefficient index is a summary statistic that measures the dispersion of incomes or consumption or wealth on a scale of zero (everyone has precisely the same income) to 1 (one person has all the income). Coefficient has shown a small decline from 0.3 in 2004/05 to 0.298 in 2010/11 (MoFED, 2013b). Inequality as measured by the coefficient declined in urban areas during this period from 0.44 to 0.37, while rural inequality remained broadly unchanged, at around 0.26 (National Human Development, 2014).

In their study of distribution and growth, Christiaensen, Demeryand Stefano provides Gini Coefficients for the 1990s for several sub-Saharan African countries supported consumption data. For Ethiopia, they report Gini coefficient of 0.44. In 1994 and 0.48 in 1997 for urban areas.

Labour income, wages and salaries are important as an incentive to elicit higher productivity. However, they're likely to cause legitimate inequality since people differ in their academic qualification, skills, experience and other labour attributes. Within the case of Ethiopia, comparing wages and salaries during a few ministries and parastatals might be instructive about such disparities. As an example, in September 2014, for the Ministry of Transport and Communication, the ratio of the bottom salary for the very best step and lowest step was 15.3.

It means, at the bottom level (starting salary). The salary scale for the very best scale was over 15 times above rock bottom scale. An equivalent ratio for the ceiling salary was 10.9. The corresponding ratios for the Ethiopian Roads Authority, a parastatals, were 16.4 and 14.3for the starting and ceiling salaries, respectively. These indicate that for people who worked in Ministries or parastatals, wages of the very best paid were over 10 times above rock bottom paid workers.

Particularly, In Gondar city the matter of income inequality is increasing tremendously because in Gondar city the source of income for every individual or family features a huge

difference. The income generating activities in Gondar city where, like non-farm income sources, agricultural income, income from livestock and also some group of the people generate income from their relatives living abroad. This creates huge income difference between peoples of the region (in Gondar city).

Consequently, Income inequality has become the main agenda of varied institution and countries of the planet. Similarly, in Ethiopia also the matter of income inequality has become high agenda of the gov't of Ethiopia, donor agencies NGO and other actors that have the inspiration to scale back the extent and mitigate the effect and its associated impacts on the well-being of the people.

### **Rationale of the study**

Income distribution is how nation's total gross domestic product (GDP) is distributed among its population. Income distribution has always been the central concern of various economic theories and economic policies. As an example, Classical economists like Smith, Malthus, and Ricardo were mainly concerned with the factors' income distribution: that's distribution value between the factors of production like land, capital, and labour. Modern economists have also addressed the difficulty, but are more concerned with the distribution of value across household.

It is widely believed that income and wealth in our world are distributed unequally or there's no equal distribution of income. During a manner during which income is split among the members of the economy, an ideal equal distribution of income would mean every individual within the country has precisely the same amount of income. A particular amount of inequality is to be expected to occur, because during this world resources aren't equally distributed, and individuals also differ in their income earning ability. Some labour are naturally getting to be more productive and better ready to produce goods and services that buyers want and thus gets more income. An equivalent is true for capital, land, and entrepreneurship. However; without government intervention and policy measures unequal distribution of income tends to perpetuate itself and brings vicious circles of poverty (Todaro, 1989).

According to the study in Gondar, the source of income or income generating activities are the most causes of income inequality within the study area. Consistent with this study the most sources of income are: non-farm income source, agricultural income, and income from

livestock. With respect to inequality, non-farm income and livestock income represent an inequality increasing source of income while agricultural income represents an inequality decreasing source. Land owned is the most significant factor with the highest inequality weight in agricultural income while social capital is the case in the non-farm activities. The non-farm income is an inequality increasing source of income because of barriers to entry. Within the non-farm activities, the food for work, which is open for all by the government has an equalizing effect whereas own business, which requires start-up capital, and wage income, which requires skill, have an dis-equalizing effect. The analysis also shows that some of the significant factors for the overall income inequality such as land owned, family size and oxen owned are also significant when the inequality is analysed for female headed and male headed households (Fredu N. et al., 2007 ).

Whether economic growth reduces or increases poverty depends on the elasticity of poverty to economic growth and Elasticity of income inequality to economic growth. Reducing inequality for higher poverty reduction could be accepted as the next best policy option if the poverty elasticity of growth is sufficiently larger than the inequality elasticity of growth. If growth is followed by change in inequality, the extent to which growth will benefit the poor depends on the direction and the magnitude of the change in inequality. If, for instance, inequality decreases following growth, then inequality will re-enforce the effects of growth and growth can be considered as pro-poor growth. Thus, the net effect of growth and change in inequality on poverty reduction will depend on their relative magnitude the two changes. If growth reduced poverty by less than what inequality increased poverty, then growth will be the poor. Thus, the relationship between growth and inequality are important from a policy perspective (Bigsten and Levin, 2001). As a result, studying causes of income inequality in a given is an important thing in reducing poverty through economic growth.

Although, the existing literature work on urban poverty and income inequality in Ethiopia has been limited, reflecting the lack of an appropriate and reliable household survey data. Even some researchers have been done regarding the title. They are more concerned with determining the effects of some selected macroeconomic variables leaving microeconomic variables and house hold characteristics untouched. In addition, they were preoccupied with studying the relationship among them by using time series data. The study would try to fill the gap seen in the other studies by including more relevant variables, and using appropriate methodology.

The main objective of the study was to identify the determinant for the presence of income inequality. Specifically, the study would address the following main questions like: what factors do contribute for income inequality; what are the patterns of income distribution; and how the socio-economic and demographic characteristics are correlated with income inequality?

#### **Causes of income inequality**

Distribution of income in an economy arises thanks to different reasons; the foremost important are the followings:

**The system of inheritance:** - the build-up of wealthy person passes to heir by the system of inheritance. The heirs are ready to enjoy an income without doing any work. Also, in several economic function, opportunities can pass to the heirs by the system of inheritances. Different person performs differing types of jobs (Todaro, 1989).

**The system of personal property:** - under the system of personal property income inequality tries to multiply itself. If the system of personal property is absent, no individual will have incentives to figure more and save more. Thus, personal property is that the main explanation for unequal distribution of income.

**Unemployment, under unemployment and disguised unemployment:** - due to population pressure, rapid climb of population and inability to figure results in slow pace of economic expansion. Unemployment, under unemployment and disguised unemployment has been increasing poor countries with wide spread distribution of income.

**Monopoly capital and large business:** - due to monopoly capital and unprotected growth of massive business during the method of industrialization, there has been great concentration of

economic power within the hands of a couple of firms which exploits illiterate and poor workers consequently widen the gap within the income distribution (Linduare, 1997).

### **Inequality Indices**

The most widely used measure of income inequality is that the Gini coefficient, which is additionally the chosen inequality measure during this thesis. Without going into detail, the Gini coefficient measures income inequality on a scale from zero to at least one, with zero indicating perfect equality and one indicating perfect inequality. Essentially, it measures the difference between the particular income distribution and therefore the perfect equality scenario. The Gini measure, however, is quite simplistic and it merely gives a snapshot of the extent of overall inequality during a population. By its very nature, a given Gini value can cover many various income distribution functions and underlying movements between income groups aren't accounted for.

For descriptive analysis simple statistical tools like tables, mean ratio and graph were of great importance. Firstly, Kuznets ratio was calculated and Lorenz curve was drawn to point out the extent of income inequality, then Gini coefficient for the study area is calculated from the info presented in tables, mean and Lorenz curve.

#### **i. Deciles ratio**

The deciles ratio readily interpretable, by expressing the income of the highest 10% (the “rich”) as a multiple of that of these within the poorest decile (the poor). However, it ignores information about incomes within the middle of the income distribution, and doesn't even use information about the distribution of income within the highest and bottom deciles.

#### **ii. Gini coefficient**

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

Gini coefficient is that the commonest and widely used measures of in equality. It ranges between 0 and 1, where 0 corresponds with perfect equality (Everyone has an equivalent income) and 1 corresponds with perfect inequality (one person has all the income and everybody has 0 income)

### **iii. Kuznets ratio**

The Kuznets ratio may be a measurement of the ratio of income getting to the highest-earning households (usually defined by the upper 20%) and therefore the income getting to the lowest-earning households, which is usually measured by either the bottom 20% or lowest 40% of income. Kuznets ratio is high if the richest 20% receive an outsized share of income and/or the poorest 40% receive a little share of total income.

### **iv. Lorenz curve**

Lorenz curve may be a diagrammatic way of depicting the distributions of income within the society. The curve displays the cumulative proportions of the population on the horizontal axis and therefore the cumulative proportions of expenditure (or income) on vertical axis (WB, 2005). The whole is figure enclosed during a square box with a 45° reference line drawn from the origin to the upper right of the box.

## **Methodology of the study**

A mixed method research approach adopts in which both qualitative and quantitative research techniques can use in the study. Research design provides a logical and critical evaluation for research data gathering and analysis. The study adopt a cross-sectional survey research design as its framework to guide the process of data collection. This cross-sectional survey research design is a collection of data mainly using questionnaires. This mixed methods research design creates a wider picture by enhancing the depth and insight.

### **Description of the study area**

The study were conducted in Gondar city Amhara national regional state. Gondar is the former capital city of Ethiopia and founded in 1636. Gondar is one of the reform towns in the regions and has a city administration service office 13 sub city and 11 rural kebeles. The town has a structural plan which is prepared in 2004 (Gondar city administration).

The city is one of the major historical and religious destinations in the country. The astronomically location of the city is 12°45'North latitude and 37.45°East longitude has an average temperature 20°C. the city annual rain fall is 1,172mm. Its altitude is 2200m above sea level.

According to Gondar city administration office in 2008 Gondar has an estimated total population of 313, 910, with 48,979 urban and 264,931 rural residents. The town has an estimated area of 40.27 square kilometre which gives Gondar density of 7,795 peoples per square kilometres.

The town was served with an international airport, digital telephone communication 24 hours, electric power and good network of internal road, expanding the asphalt pad coverage, rehabilitating and conducting badge have been a major focus in the last seven years.

The five largest ethnic groups reported in Gondar were the Amhara (95%), the Tigray (3%) and the all other ethnic group made up (0.5%) of the population. Amharic was spoken as the first language by (95%), Tigrigna was spoken (4.6%) and the remaining (0.6%) spoke all other primary language reported.

### **Types and sources of Data**

The study was employed cross-sectional primary data type including secondary data source. The study were collected primary data through a well specially designed and the pre-tested questionnaire for the sample households. The data covered under study are socio-economic, demographic features and household consumption expenditure.

### **Methods of data collections**

The primary data were used to collect from the representatives of the target population (sample) through questionnaires. These questionnaires prepared and distributed to those households who were selected as sample of the study area. These questionnaires have been preparing in accordance with the objectives of the study and in a way that they can capture relevant data and information from the respondents. For those respondents who can't read due to different reasons the researcher uses structured interviews.

To get households, actually unit of analysis, the researcher uses both probability and Non-probability sampling designs. Non-probability sampling designs particularly purposive sampling design is used while selecting the study area; and among the probability sampling designs two-stage sampling technique and simple random sampling techniques are employed while selecting the household's sample.

## Target population and sampling

The target populations under the study had a population of 140,068 peoples. There are 3 selected kebeles selected purposively. Namely, Azezo sub city kebele 19 with the population 20,068 and kebele 18 around Maraki with the population of 120,068 and Arada 86400. Because of respondents lived on these kebeles has different economic background as suggested from key informant interview and other related documents at kebeles level as compared with others.

## Sample size Determination

Basically, there are different possible ways of sample size determination with different approaches in determining error terms and precision levels. While calculating the published tables as a guide for sample size determination, Israel (1992) can used a formula developed by Yamane (1967) with the statistically estimated at 90% confidence level, degree of variability 10%, Therefore, due to this and the commensurately known use of precision levels starting from 10%. Therefore:

$$n = N / (1 + Ne^2) \text{ where:}$$

N=designates total number of households in the city

n=the sample size whom the researcher used

e=designates maximum variability or margin of

Error (level of significance 10%)

Thus, N=224668

$$e = 0.1 \text{ Therefore, } n = 224668 / (1 + 224668(0.1)^2)$$

$$= 224668 / (1 + 224668(0.01)) = 224668 / (1 + 2246.8) = 224668 / 2246.8 = 100$$

Following this, the sample size for this study in conducting questionnaire, 100 households would took as sampled respondents. In each three kebeles, the sampled proportion can be determine, and the strata seems like follows:

$$n_i = (N_i / N) n$$

Where  $n_i$  =  $n_0$  of observation in each kebeles

$N_i$  = total no of total households in each kebeles

$N$  = total no population in three kebeles

$n$  = total no of sample size that will be used

Therefore, by using this stratified formula the proportional number of respondents in each kebele as follows

**Azezo kebele 19,**  $N=20,068$

$ni1=20,068/224668*100=9$

**Kebele 18,**  $N=120,000$

$ni2=120,000/224668*100=53$

**Arada,**  $N=84600$

$ni3=84600/224668*100=38$

By doing so, each elements of the target population got an equal chance to be included in the sample selection and also relevant data and information for the study were obtained.

### **Sampling Technique**

For the purpose of data collection sample of the study area draw by using two stage sampling techniques. At the first stage, the city would be divide into sub with a number of geographical clusters (kebeles), and then the study were used to draw three sample kebeles. At the second stage, simple random sampling technique apply to select individual households for the responses of the questionnaires.

### **Methods of Data analysis**

The data were obtaining from the primary source was analyse in two different ways. Firstly, these data analyse by using descriptive analysis so that meaningful information and conclusions are drawn. Secondly, the data was analysed by method econometrics especially in line with the specific objectives of the study.

### **Descriptive data analysis**

For descriptive analysis simple statistical tools such as tables, mean ratio and graph were of great importance. Firstly, Kuznets ratio was calculated and Lorenz curve was drawn to show

the level of income inequality, and then Gini coefficient for the study area is calculated from the data presented in tables, mean and Lorenz curve.

### Econometric analysis and model specification

The data analysed by descriptive method were further analysed through ordered logit model with the aim of measuring the relative contribution of individual as well as household factor to income inequality. The factors are introduced as explanatory variables within ordered logit model concept.

The dependent variable that is disposable income is a function of the family size, sex of the household head, age of the household head, educational level of the household, dependency ratio, the type of occupation that the household head is working, marital status, and the type of housing tenancy. In study, ordered logit models can estimate the effects of the socio-economic and demographic factors on disposable income of the household.

Income in multiple-regression is ordered to take a form of categories in order, in which the dependent variable is nonlinear, where four categories namely low income, low middle income, and high-income levels are included under the dependent variable.

The logit models involving in ordered outcomes are described as ordered logit models. Since the dependent variable disposable income can be categorized into different classes that is why the study uses ordered logit model.

The ordered logistic regression model can be identified as:

$$\text{Lnc} = \alpha + \beta_1 \text{dma} + \beta_2 \text{age} + \beta_3 \text{dpri} + \beta_4 \text{dformal} + \beta_5 \text{level edu} + \beta_8 \text{dsex} + \beta_9 \text{dmarr} + \epsilon_i$$

Where: *lnc* is income of multivariate choice; *dfe*, is dummy of male; *age* of the household head; *dpri* is dummy of private ; *dformal* is dummy of formal sector; *dsex* is dummy of sex; *dmarr* is dummy of married; and *level edu* is level of education

### Definition of the dependent and independent variables

- a) **Income:** The dependent variable of the model is the natural logarithms of income. It is important to note that the main reason for using the log of income is to impose the constant percentage effect of the explanatory variable on disposable income. In this study income is categorized into low, middle income and higher income.

- b) **Age of household head:** it is measured in years and one of the continuous variables in this study.
- c) **Gender of the household head:** it is another factor which potentially affects the income of the household, (dummy- female headed), as numerous researches have suggested that the existence of the gender income gap (Macpherson and Hirsh, 1995: Hughes and Maurer-Fazio, 2002)
- d) **Marital status of the household head:** The effect of marital-status on income also incorporated (dummy-married).
- e) **Level of education of the household head:** households' 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).
- f) **Occupation of the household head:** with respect to occupation of the household head dummy variables are included corresponding to public, private, formal and informal sectors.
- g) **Dependency ratio:** is the ratio of economically inactive individuals which includes those who are under 15 years old and above 65 to economically active and young individuals whose age is between 15 and 64 (working population).
- h) **The size the household:** the effect of the household size on income is included, as previous studies have noted a negative relationship between income and the size of the household (Lipton and Ravallion, 1994).
- i) **Housing tenancy:** the effect of housing on income is measured by the type of housing

## Data analysis results and discussions

### Descriptive analysis

Under method of data analysis different tools of data analysis such as ratios, figures, percentages, means, variances, graph and standard deviations are used to analyse the characteristics of the data set. Among this descriptive data analysis, more emphasis is given to graphical method to measure Lorenz curve and then Gini coefficient of income among households.

| Variables             | type       | mean  | var.   | Std.   | Min | max | skewness | kurtosis |
|-----------------------|------------|-------|--------|--------|-----|-----|----------|----------|
| Age                   | continuous | 43.5  | 173.71 | 13.18  | 20  | 80  | 0.33     | 2.41     |
| Years of<br>Schooling | continuous | 10.81 | 36.6   | 6.05   | 0   | 40  | 0.70     | 7.25     |
| Family size           | continuous | 5.3   | 5.76   | 2.4    |     | 1   | 13       | 0.72     |
| 3.44                  |            |       |        |        |     |     |          |          |
| Working<br>Hours      | continuous | 8.89  | 3.88   | 1.97   | 4   | 16  |          | 0.68     |
| 4.37                  |            |       |        |        |     |     |          |          |
| Work<br>Experience    | continuous | 15.93 | 169.05 | 13.002 | 0   | 50  |          | 0.71     |
| 2.30                  |            |       |        |        |     |     |          |          |

The above table shows the descriptive statistics of continuous variables used in the model. Based on the table 4.1, the average (mean) age of the households is estimated to be 43.5. The minimum and maximum age of the households is 20 and 80 respectively. The age of the households varies with the variance of 173.71 and standard deviation of 13.18.

The household's year of schooling (level of education) is ordered from illiterate (0 year of schooling) to doctors and professors. The average year of schooling of the households is estimated to be 10.81 with 0 and 40 years of minimum and maximum years respectively. The variance and standard deviations are 36.6 and 6.05 respectively.

The average family member of the households is estimated to be 5.3. The family size varies from one household to the other household with variance of 5.76 and standard deviation of

2.4. The minimum family member of the household is 1 and the maximum family members are 13. i.e. the family members of the households ranges from 1 to 13.

The average hours that the households spend in work place is estimated to be 8.89. The working hours spend on work place varies from households to households with the variance of 3.88 and standard deviation of 1.97. The minimum and maximum hours spend on work place are 4 and 16 respectively.

The average year of work experience of the household is 15.93 with variance and standard deviation of 169.05 and 13.002 respectively. The minimum and maximum years of work experience by the households are 0 and 50 years respectively.

#### Descriptive statistics on dummy variables

| Variables                | type of variables with category | Number of obs. | Frequency | percentage |
|--------------------------|---------------------------------|----------------|-----------|------------|
| Sex                      | Male=2                          | 100            | 68        | 68%        |
|                          | Female=1                        |                | 32        | 32%        |
| Household Status on work | At work=2                       | 100            | 81        | 81%        |
|                          | Retire = 1                      |                | 19        | 19 %       |
| Marital status           | Married=2                       | 100            | 72        | 72%        |
|                          | Single=1                        |                | 28        | 28%        |
| Type of sector           | public =2                       | 100            | 34        | 34%        |
|                          | Private=1                       |                | 66        | 66%        |
| Formality of Sectors     | Formal=2                        | 100            | 71        | 71%        |
|                          | Informal =1                     |                | 29        | 29%        |

**Table 4.2 Descriptive statistics on dummy variables**

According to the results table from the total of 100 samples household heads 68 household heads are Male and 32 are female households. Based on the above table male household heads accounts for 68% of the total sample size and the remaining 32% managed by female head.

In terms of household status on work 81 household heads from 100 totals of sample household heads are currently engaged in working activities which accounts for 81% of the total household heads. About 19 household heads are retired at this time, which accounts for 19% of the total household heads.

With respect to marital status about 72 household heads are married and 28 household heads are single due to divorced, widowed or not married. Married household heads account for 72% of the total household heads and single household heads share 28% of the total household heads.

Moreover, 34 household heads are engaged in public sector working activities and 66 household heads are engaged in private sector. The former accounts about 34% and the latter 66% of the total sample households. From the household heads engaged in private sector about 71% are working under formal sector and the remaining 29% are on informal sector activities like street vending and underground economic activities.

### **Summary statistics on distribution of income**

The distribution of income can be analysed through various descriptive summary measures. From those measures in this paper we use the percentile ratio to assess the distribution of income among the community.

#### **Income distribution of the bottom 25% to the top 25%**

Based on the result of the study, the poorest 1%, 5%, 10% and 25% of the population receives an average monthly income of 500, 700, 1500 and 2686 respectively.

The richest 1%, 5%, 10% and 25% of the population receives an average monthly income of 17500, 10250, 1000 and 7750 respectively. This shows the top 25% occupies the majority of income of Gondar town.

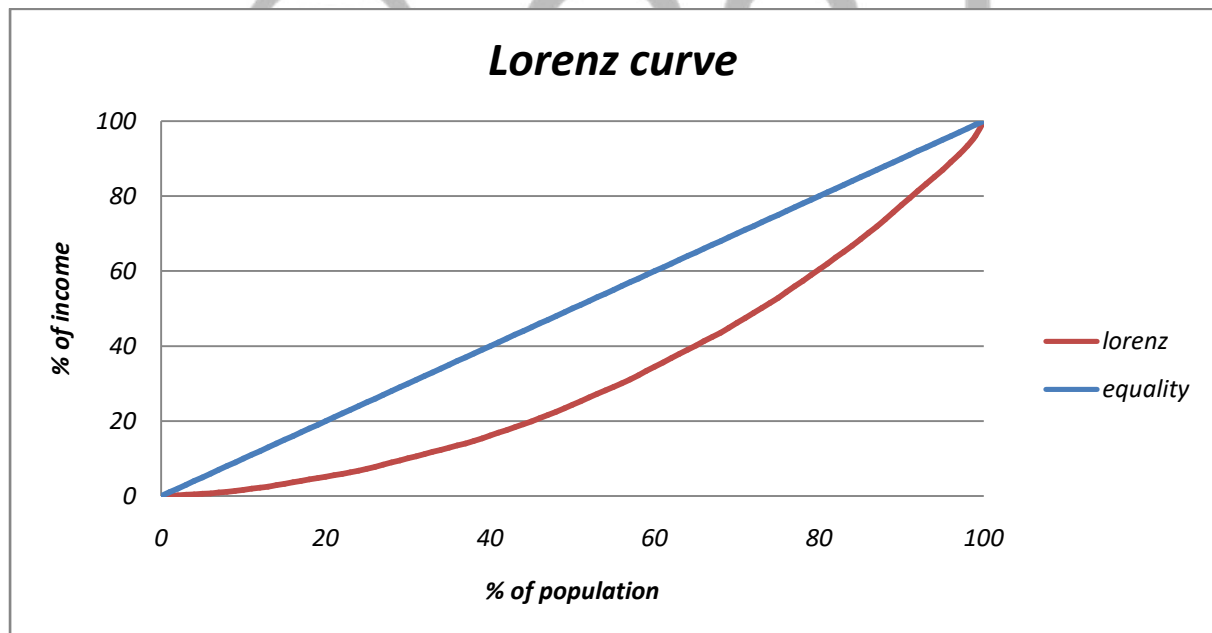
Based on the results of the study, 50% of the individual households of Gondar town earned an average monthly income of 5000. The mean of income value of income is 5284 even if

individual household income varies from 500 to 21000 with the standard deviation of 3470. In addition to this we can measure the level of inequality by using the Lorenz curve and Gini coefficient of income inequality.

### **Lorenz curve and Gini index of measuring income inequality**

The distribution of income in an economy is represented by a Lorenz curve and the degree of income inequality is measured through the Gini coefficient. The Lorenz curve (the actual distribution of income curve), a graphical distribution of wealth developed by Max Lorenz in 1906, shows that the proportion of income earned by any given percentage of the population. The line at the 45-degree angle shows perfectly equal income distribution. While the other line shows the actual distribution of income. The further away from the diagonal, the more unequal the size of distribution of income. The more bound out a Lorenz curve the higher is the inequality of income in the country.

According to this the Lorenz curve of distribution of income in Gondar town is shown by the following graph.



As shown in the above Lorenz curve the extent of income inequality is higher in Gondar city. This is shown by the Lorenz curve as it is far from the line of equality. The more far away the Lorenz curve from the line of equality the higher will be the level of income inequality.

### **The Gini coefficient**

The Gini coefficient which is derived from the Lorenz curve can be used as an indicator of economic development in a country. The Gini coefficient measures the degree of income equality in a population. The Gini coefficient can vary from 0(perfect equality) and 1(perfect inequality). A Gini coefficient of zero means that everyone has the same income, while a coefficient of one represents a single individual all the incomes. The Gini coefficient is equal to the area between the actual income distribution curve and the line of perfect income equality scaled to a number between 0 and 100. The Gini coefficient is the Gini index expressed as a number between 0 and 1.

As the Gini coefficient derived from the Lorenz curve, the coefficient of the above Lorenz curve or the Gini coefficient of Gondar city is 0.35. This indicates higher level of income inequality prevail in Gondar city.

### Econometric Analysis

In study were used ordered logistic regression model with the estimation techniques of maximum likelihood. Therefore, before estimating the model, some diagnostic tests about the relevance nature of data are carried out and the report shows no violation on assumptions of econometrics diagnostic tests and the results of order logit model is presented here below.

#### Ordered logistic regression results

| VARIABLE           | COEF.    | STD. ERR. | Z    | P> Z  |
|--------------------|----------|-----------|------|-------|
| SEX                | .3556748 | .827395   | 0.43 | 0.667 |
| AGE                | .0103637 | .0265582  | 0.39 | 0.696 |
| FAMSIZE            | .1296186 | .1597234  | 0.81 | 0.417 |
| MARTIAL            | 1.152068 | .8786834  | 1.31 | 0.190 |
| OCCUPATION         | 3.855064 | 1.560948  | 2.47 | 0.014 |
| TYPE OF WORK       | 2.523057 | .88368    | 2.86 | 0.004 |
| LEVEL OF EDUCATION | .4073238 | .1977074  | 2.06 | 0.039 |

/cut1 | 9.610807 3.333678 3.076918 16.1447

/cut2 | 17.13536 4.189689 8.923716 25.347

Ordered logistic regression      Number of obs.      =      100

LR chi2 (7)      =      24.10

$$\text{Prob} > \chi^2 = 0.0011$$

$$\text{Log likelihood} = -35.251011 \quad \text{Pseudo R}^2 = 0.2547$$

Based on the above table the Ologit regression coefficients are statistically significance and different from zero in their joint effect, so that the full model with the predictor provided a better fit (reject the null hypothesis  $H_0$ : all coefficients are zero because the p- value i.e  $p=0.0011$  is less than 5%).

Under this logistic regression model, the effect of each explanatory variable on the dependent variable income is analysed using the coefficients, odd ratios and marginal effects of the maximum likelihood estimation, since we estimate ordered logit model using maximum likelihood techniques. The effects of the independent variables can be interpreted in several ways, including how they contribute to the odds and their probabilities of being at or beyond a particular category. They can also interpret as how variables contribute to the odds of being at or below particular categories.

The coefficients of this model cannot tell us the magnitude of the change in income as the independent variables changes by some amounts rather the coefficients of this model will tell us simply the relationship between income and each explanatory variable; whether there is positive or negative relationship exists between the dependent and explanatory variables.

The magnitude of the change in income due to the change in explanatory variable can be determine using marginal effects and odd ratio values of each explanatory variable. Based on the above table, as the coefficient of age indicates the level of income and age of the household head is directly related that is the level of income increase as age of the household head increases and vice versa.

The other variables like gender being male headed family size, marital status being married affect the level of income positively. Type of occupation being worked in private sector affect the level of income positively and increases in this variable will increase the likelihood of a household head being included in the higher categories. Level of education has also positive relation with the dependent variable income as indicated by its coefficient so the increase in year of schooling increases the likelihood of a household head being included in the higher categories.

The marks for estimated coefficients only can be interpreted regarding which income category they can be placed. Therefore, in order to derive further results from the estimated model, marginal effects should be calculated or each income category. For this purpose, the marginal effect for each income category is calculated and the results are presented in table.

**Table 4.2.2 Estimation of marginal effects after the ordered logit model**

| Var.          | dy/dx    | p>z   | dy/dx  | p>z   | dy/dx  | p>z   |
|---------------|----------|-------|--------|-------|--------|-------|
|               | (y=1)    |       | (y=2)  |       | (y=3)  |       |
| Gender        | -0.009   | 0.675 | 0.0014 | 0.828 | 0.007  | 0.668 |
| Age           | -0.0003  | 0.697 | 0.0004 | 0.830 | 0.0002 | 0.693 |
| famsize       | -0.003   | 0.454 | 0.0005 | 0.805 | 0.003  | 0.440 |
| Marital       | -0.093   | 0.248 | 0.0044 | 0.796 | 0.0234 | 0.241 |
| Occupa        | -0.061   | 0.074 | 0.1489 | 0.791 | 0.078  | 0.091 |
| Type of work  | - 0.0098 | 0.063 | 0.097  | 0.792 | 0.0513 | 0.060 |
| Level of edu. | -0.009   | 0.130 | 0.016  | 0.795 | 0.0082 | 0.106 |

**Table 4.2.3: The results of marginal effects**

Based on the above marginal effect results table, being male headed household is associated with 0.9 % less likely to be included in the low-income group, 0.14% more likely to be included in middle income groups and 0.7% more likely to be included in higher income group households. These probabilities indicated that the chance of male headed households to be placed on higher income groups is higher than that of female headed households.

The marginal effects for marital status show that, those households who are married are associated with 9.3% less likely to be included in the lower income group and 0.44% and 2.34% more likely to be included in the middle and higher income groups respectively.

The marginal effects of occupation show that, those households who are employed in private sectors are associated with 6.1% less likely to be included in lower income groups and 14.89 % and 7.8% of more likely to be included in the middle and higher-income groups respectively.

The household heads who work in the formal sector are associated with 0.98% less likely to be in the lower income groups and 9.7% and 5.15% more likely to be in the middle and higher income groups.

In this section the marginal effect of continuous explanatory variables on the level of income. Based on the above marginal effect result table, a unit change in age associated with 0.03% less likely to be in the lower income groups, and 0.04% and 0.02 % more likely to be in the middle and higher income groups.

One unit rise in the household family size is associated with 0.3% less likely to be in the lower income groups and 0.05 % more likely to be included in the middle and 0.03% more likely to be included in higher income categories.

One unit rise in year of schooling is associated with 0.9% less likely to be in the lower income groups and 1.6% and 0.82% more likely to be in the middle and higher income categories.

## **Conclusion**

Income inequality is unequal distribution of wealth/income/consumption household across the various participants with in an economy of a country. It is often presented as the percentage of income related to a percentage of the population. The objective of the study was to identify the determinants of income inequality in urban Ethiopia in case of Gondar town using the 2018/19 primary household data.

Considering the calculations and abovementioned descriptions the following results are achieved. The average (mean) age of the household heads is estimated to be 43.5 years. The minimum and maximum age of the households is 20 and 80 respectively. The age of the households varies with the variance of 173.71 and standard deviation of 13.18 and the study

find that the average year of schooling of the households is estimated to be 10.81 with 0 and 40 years of minimum and maximum years respectively. The variance and standard deviations are 36.6 and 6.05 respectively. The average family member of the households is estimated to be 5.3 according to the study. The average hours that the household head spend in work place is estimated to be 8.89.

The average year of work experience of the household is 15.93 with variance and standard deviation of 169.05 and 13.002 respectively. The minimum and maximum years of work experience by the households are 0 and 50 years respectively.

The study also found the following results on discrete variables used in the study. Male household heads accounts for 68% of the total sample size and the remaining 32% are leads and managed by female head in Gondar town. Around 81% of the household head in Gondar town are engaged in working activities at that time and about 9% the household head are retired that is most of the household heads are engaged in work. In Gondar town from the sample households, married household heads account for 72% of the total household heads and single share 28% of the total household heads.

About 34% of the household heads are engaged in public sector occupation and about 66% of the sample households are engaged in private sector. Most of the household heads are engaged in private sector activities as compared to public sector activities.

From the household heads engaged in private sector about 71% are working under formal sector and the remaining 29% are on informal sector activities like street vending and underground economic activities.

The distribution of income is also shown by the percentile ratio and according to this ratio, 50% of the individual households of Gondar town earned an average monthly income of 5000. The mean of income value of income is 5284 even if individual household income varies from 500 to 21000 with the standard deviation of 3470.

In addition to this, the level of inequality by using the Lorenz curve and Gini coefficient of income inequality were conducted. The Lorenz curve of Gondar city shows very unequal distribution of income as measured by the Gini coefficient which results in 0.35 this also shows the existence high income inequality in Gondar city.

In addition to descriptive statistics (results), the study also found the following results from econometric analysis of ordered logit model. The variable gender (male headed), family size (continuous), marital status (married), type of occupation (private), level of education and formality of jobs or type of work variables affect income levels in positive direction the increase in levels of these variables increases the likelihood of people to be placed at the higher levels of income levels. Also, according to the results of marginal effects, the increase in level of independent variables, the likelihood of people to be placed at lower of levels of income decreases and on the other hand the likelihood of people to be placed at higher levels of income increases.

The variable age (continuous) also affects income level in positive direction (direct relation). In other words, the increase in these independent variables increases the likelihood of people to be placed at higher income levels, but doesn't have significant impact as compared to the other variables. Considering the results of marginal effects, it can be said that with the increase in independent variables the likelihood of these individual to be placed at lower income levels decreases and on the other hand the likelihood of them to be placed at high income levels increases but insignificantly.

Based on the findings of the study, it suggests that a good poverty reduction policy must be followed by the government. The main finding of the study shows that the occupation of the household head has significant role in affecting the income of the individual. Those household heads who work in the private sector are more likely to be placed in the higher income groups. This finding suggests that supporting the private sector would increase the income of the households and helps to reduce the income disparity among the households.

Educational level of the household head also plays significant role in reducing the poverty and income inequality of the urban dwellers. Hence widening access to education is expected to reduce the disparity between the people by increasing individual productivity and help the individual to be paid a higher income in better jobs.

The jobs of the household head in the formal sector also has significant impact on reducing the extent of income inequality hence transferring informal works to formal sector will help to reduce income inequality.

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