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Determinant and status of income disparity among urban households: The case of north Shewa Zone, Oromia Regional State, Ethiopia

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***Abstract*---**The policy message for the developing world was clear: you can't expect to have both lower poverty and less inequality while you remain poor, and if you choose to give poverty reduction highest priority then focus on growth. Ethiopia's experience is a case in point for the complex interaction between inequality and growth. Structural transformation and poverty reduction may require the implementation of reforms that could lead to an increase in income disparities in addition to the growth of economy. Urban inequality has been given less attention on research and development agenda of Ethiopia particularly for medium towns like zone and district town of North Shewa Zone. In Ethiopia, annual urban population growth rate is estimated to be above 4.3 %. In line with this income inequality in urban areas income inequality is growing up and the incidence of urban poverty in developing country like Ethiopia is very high. Thus, the present study aims to identify the determinant and status of income inequality among urban households of North Shewa Zone Oromia National regional state by using Gini index and multiple regression models on the data collected from 400 respondents.

***Keywords*---**income inequality, gini coefficient, lorenz curve, north Shewa.

Introduction

The existence of high inequality within many developing countries beside with persistent poverty, started to attract attention in the early 1970s. Nonetheless, through the 1980s and well into the 1990s, the mainstream view in development

economics was still that high and/or rising inequality in poor countries was a far less important concern than assuring sufficient growth, which was the key to poverty reduction. The policy message for the developing world was clear: you can't expect to have both lower poverty and less inequality while you remain poor, and if you choose to give poverty reduction highest priority then focus on growth (Ravallion, 2014).

Income distributions are commonly unimodal and skew with a heavy right tail. Therefore, different skew models, such as the lognormal and the Pareto, have been proposed as suitable descriptions of income distribution, but they are usually applied in specific empirical situations. For general studies, more wide-ranging tools have been considered. The target for them is to introduce measures that are useable for comparisons of different distributions. Primary income data yield the most exact estimates of income inequality coefficients such as Gini and Pietra. Earlier studies have shown that no method is always optimal. Therefore, different attempts are still worth studies. In this study, we review income analysis methods based on Lorenz curves. The theory is applied to specific models. (Fellman, 2018).

A source of income diversification at the individual or household level simply means adding new activities. This can include agricultural, non-agricultural work, work for one's self, or for an employer, home based work or work at other places. Rural livelihood diversification could be described, as the process by which rural households construct an increasingly complex portfolio of activities and assets in order to survive and to improve their standard of living (Ellis, 2000). As diversification is not an end by itself, it is essential to connect observed patterns of income back to resulting income distribution and poverty. Not all diversification into nonfarm income earning activities offers the same benefits and not all households have equal access to the more lucrative diversification options (Tura, 2017).

Inequality, Poverty and growth interact with one another through a set of two-way links. Some of these can be explored separately, but often one influences another causing indirect effects. For instance inequality can indirectly influence poverty as inequality affects growth and growth in turn influences poverty. Poverty is Very Sensitive to Distribution Changes: The Theory Small changes in income distribution can have a large effect on poverty. A simple arithmetical example can help to visualize this triangular cycles. (ERC, 2002). Ethiopia is the second most populous nation in Africa after Nigeria, and the fastest growing economy in the region. However, it is also one of the poorest, with a per capita income of $790 and struggling to reach lower-middle-income status by 2025. (world Bank , 2019).This contradicts holds true in Ethiopia, income growth reduces poverty and increases inequality; the income-poverty elasticity lies in the range of -1.7 to -2.2. Growth occurred in urban areas but the rise in inequality in urban areas wiped out the poverty-reducing effect that this growth might boast. (Araya M. Tekaa, 2019)

Research conducted by (Tadesse, 2019)on determinants of income inequality in woldia town, analyzed using both Lorenz curve and Gini coefficient and income

distribution is proved to be highly unequal even higher than the national average with a Lorenz curve far away from the equality line and the gini coefficient of 0.39. In addition to this, the OLS estimation coefficient declared the existence of direct positive effect of level of education on income but inverse relationship between income and dependency ratio. Moreover income of male headed households is greater than that of female headed and those household heads hired in public sectors earn income less than the private sector employees and this research was aimed to identify the determinants, status and income inequality using household characteristic in the study area.

Materials and Methods

The study conducted in urbans of North Shewa Zone of Oromia regional state in Ethiopia, North Shewa Zone using primary data that collected directly from household head by using structured open and close ended questionnaire and completed by sample respondent. Interview also conducted with considered officials. In addition to dig out further deep information key informants (from considered officials like trade, municipality, Revenue Authority Offices) and focus group discussion (FGD with leaders of group employed at each selected town. The population of the study is the total urban householders in the North Shewa zone, Oromia. Researchers purposively selected those towns considering that relatively more Populated towns. Accordingly, Fitche, GerbaGuracha, Goahtsion,Fital, DebreTsige and Sheno are towns which are the focus of this study. Once we selected the towns based on their number of residents then finally the researchers implemented random sampling technique to select urban household respondents from each town. Based on this 400 householders from six towns proportionally distributed. There is total population of 1639587 in the zone that used to determine sample size. From these projects, Yemene formula of determining sample size used to determine sample size. The formula is given by:

$$n = \frac{N}{1 + Ne^2}$$

Where: n = Sample size N = Population size e = Error tolerance using this formula, the sample size for contractors will be:

$$n = \frac{1639587}{1 + 1639587(0.05)^2} = 400$$

The determined sample proportionately distributed for each selected urban area of the study.

Table 1
Sample size detail of selected towns

S.No	Name of Town	Number of Household	Sample Size	Percentage
1.	Fitche	25,000	87	21.75
2.	GerbaGuracha	42,429	148	37
3.	Gohatsion	13634	48	12
4.	Fital	21400	75	18.75
5.	DebreTsige	3731	13	3.25
6.	Sheno	8156	29	7.25
Total		114,350	400	100

Proportion of sampled population among selected districts: Researchers computation, 2021

The analysis of data collected was accomplished by the use of stata version 15, software. Where the scores assigned to each factor by the respondents entered and consequently the responses from the questionnaires retrieved subjected to statistical analysis for further insight. The study employed both descriptive and inferential statistics in analyzing the data. In addition Gini index of the study area depending on the income of the household calculated using Lorenz curve.

The Dependent variable

In this study the researchers identified the dependent variable income by identifying factors affecting urban household income and income disparity among urban households.

The independent variables

In this study the researchers tried to measure income disparity of household using independent variables such as: education level, marital status, household head year of stay in urban, family size, number of productive member in the family, dependent individuals in household, employment situation, residential house ownership, saving condition, state of remittance, urban agriculture owning, rural agriculture owning, access to health services, owning water supply in private, having electric meter privately, cost household incurred for phone services and access to credit. The income inequality model includes these explanatory variables in the form of multiple linear regression function (Gujarat, 2004).

$Inco=\beta_0+\beta_1 edu+\beta_2 yest+\beta_3 fs+\beta_4 pro+\beta_5 de+\beta_6 pho+ \ldots+Ui$
INCO = income
EDU = education level
YEST = year of stay in the town
FS =family size
PRO = productive member of family
DEP =dependency ratio
EMP = employment condition

HOU =house owning
SAV = saving situation
REM = remittance
URBA =urban agriculture owning
RURA = rural agriculture owning
HEAL =health facility
WATE = water supply privately
ELEC = electric meter owning
PHO = phone subscription
CREC =credit access
AGE = age of household head
SEX = sex of household head
MAR = marital status
UI = error term (residual term)
B0=constant term
Bi=coefficient of explanatory variable

Here is the expected output of the independent variables that forecasted to income inequality in the proposal while the fact results of the discussed in the discussion part.

Table 2
Sample size detail of selected towns

Independent variable	Description	Hypothesized correlation between dependent and independent Variables (Expected sign)
Sex	The study will use this variable as dummy, 1 if the household head is male and 0 otherwise	+
Age	Continues variable which explained by the duration of the household head lasted there in year	-
Education	Continues variable which explained by the duration of household lasted schooling	+
Marital status	The study will use this variable as dummy, 1 if the household head is couple and 0 otherwise	+
Household head's year of stay	It is continues variable measured by the time that household head lasted in the urban area	+
Family size	The study will use this variable as continuous and it will be measured as family size in numbers	-
Number of productive	The study will use this variable as continuous and it will be measured as family member participate in production activities	+
Dependency ratio	It is continuous variable explained by the number of family member age blow 15 and above 60	-
Employment situation	The study will use this variable as dummy, 1 if the household head is employed and 0 otherwise	+

House ownership	It is dummy variable, 1 if the household head has residential house and 0 otherwise	+
Saving condition	The study will use this variable as dummy, 1 if the save and 0 otherwise	+
State of remittance	The study will use this variable as dummy, 1 if the household obtain remittance and 0 otherwise	+
Urban agriculture	It is dummy variable, 1 if the household has urban agriculture and 0 otherwise	+
Rural agriculture	It is dummy variable, 1 if the household has rural agriculture and 0 otherwise	+
Access to health	It is dummy variable, 1 if the household has access to health and 0 otherwise	+
Owning water supply	It is dummy variable, 1 if the household has private water supply in compound and 0 otherwise	+
Having electric meter	It is dummy variable, 1 if the household has electric meter in private and 0 otherwise	+
Phone subscription	Continues variable which explained by the monthly expenditure of household to phone communication consumption	-
Access to credit	It is dummy variable, 1 if the household has access to credit and 0 otherwise	+

Results and Discussion

Demographic and socio-economic characteristics of the households

Socio – economic characteristics of sample households by age, sex, household size, and education level are summarized in relation to the household income at household level. Possible explanations on factors supposed to have contribution on household saving are also presented and analyzed.

Sex of the household

As indicated o figure 1 below o u t of the sampled households 327 (81.75%) were male and the remaining 73 (18.25%) were female as generalized that at each income category female respondents were proportionally lower and most of the sampled households obtain annual income of less than 100,000 Ethiopian birr.

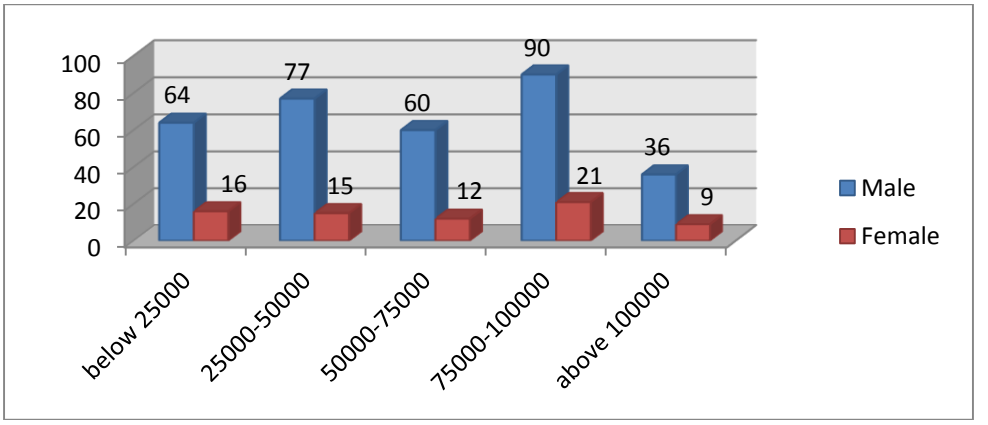

Figure 1. Household Income by Sex
Source: Own Survey result 2021

Age of the household

Researchers evaluated the income of 400 sampled households based on their age as indicated on the table 4.1. Accordingly, household aged between 36 and 55 leading the age group of randomly selected household and the higher percentage of different aged groups obtain annual income 75,000 -100,000. As it indicated on each column of the table as age increases the household categorized under each income category(column) increases and then starts to decline with the further increment of age(as the household heads become older). In other ways in all age category higher percentage of the sampled households concentrated at the middle of income categories (income between 50,000 – 100,000) and it can be generalized that income first has positive relationship with age but when people become older the income and age turn direction to negative relationship while higher percentage of the sampled households obtain income at the middle of category irrespective of age difference.

Table 2
Household Income by Age

Annual Income → / Age in year↓	below 25000	25000-50000	50000-75000	75000-100000	above 100000	Total	Percentage
Below 25	5	13	7	6	3	34	8.50%
26 – 35	9	11	8	15	6	49	12.25%
36 -45	23	25	23	27	6	104	26.00%
46 -55	27	25	17	33	15	117	29.25%
56-65	12	11	14	20	10	67	16.75%
Above 65	4	7	3	10	5	29	7.25%
Total	80	92	72	111	45	400	100%
Percentage	20%	23%	18%	27.75%	11.25%	100%	

Source: Own Survey result 2021

Marital Status of the household

According to this study marital status of the sampled household heads categorized in 4 as single (those not engaged to marriage), couple (those who live as paired or husband and wife), divorced (those who engaged to marriage before but marriage is broken currently) and widowed (in this study it represents women household heads those their husband died and not married yet). Accordingly, among the sampled households heads 318(79.50%) of them are couple and they are leading at each income category. For couple and divorced the leading percentage is found in the annual income category between 75,000 -100,000 Ethiopian Birr while another groups of marital status are randomly distributed over different income groups. The researchers conclude that in each groups of marital status of the sampled households most of the sampled household concentrated in the income group 75,000 -100,000 when it is become lower in both lower and higher income group.

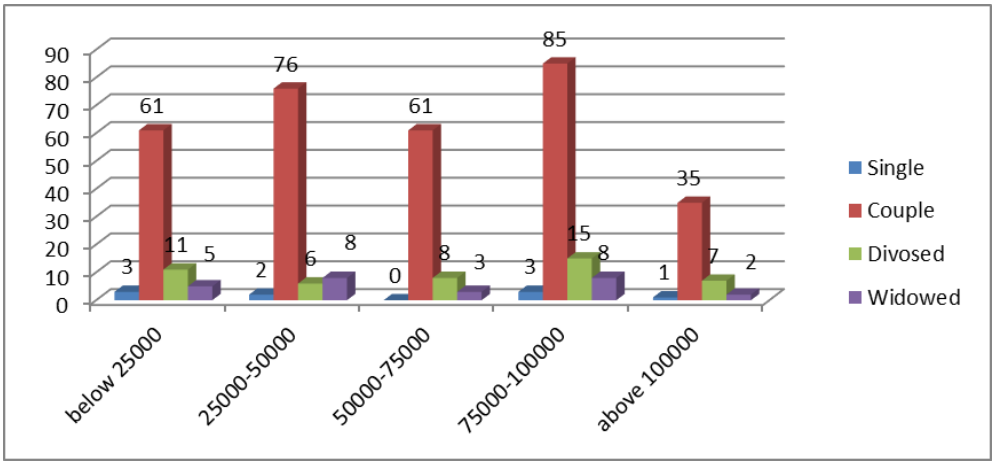

Figure 2. Household Incomes by Marital Status
Source: Own Survey result 2021

Education level of the household

Like other socio-economic factors education level of the targeted population addressed through questionnaires and in this study the relationship between income of the sampled households and corresponding education shown in table 3. Accordingly education level of the sampled household categorized as illiterate, primary education, secondary education, certificate, and diploma and above diploma.

Table 3
Household Income by Education

Annual Income → / Education ↓	below 25000	25000-50000	50000-75000	75000-100000	above 100000	Total	Percentage

Illiterate	5	10	4	15	1	35	8.75%
Primary school	39	40	33	42	17	171	42.75%
Secondary school	10	21	9	33	9	82	20.5%
Certificate	11	13	12	8	10	54	13.5%
Diploma	6	6	10	7	5	34	8.5%
Above diploma	9	2	4	6	3	24	6%
Total	80	92	72	111	45	400	100%
Percentage	20%	23%	18%	27.75%	11.25%	100%	

Source: Own Survey result 2021

Income by Family Size of the Household: Generally, even though here is some similarities among the groups there is no continues direct or indirect relationship between annual income of the sampled households and family size. Rather the group of income is randomly distributed among different family size as sampled households were concentrated from 3-6 family size.

Table 4
Household Income by Family Size

Annual Income → / Family Size↓	below 25000	25000-50000	50000-75000	75000-100000	above 100000	Total	Percentage
1-2	10	5	7	12	2	36	9%
3-4	27	37	28	34	22	148	37%
5-6	29	35	34	52	20	170	42.5%
above 7	14	15	3	13	1	46	11.5%
Total	80	92	72	111	45	400	100%
Percentage	20%	23%	18%	27.75%	11.25%	100%	

Source: Own Survey result 2021

Job situation of the household

When the income of the households compared with others factors affecting income, employment has its own impacts on the income of the sampled household. The number of employed household heads less in lower income groups while the number of employed household heads become increases in the higher income groups (on the last three income category).

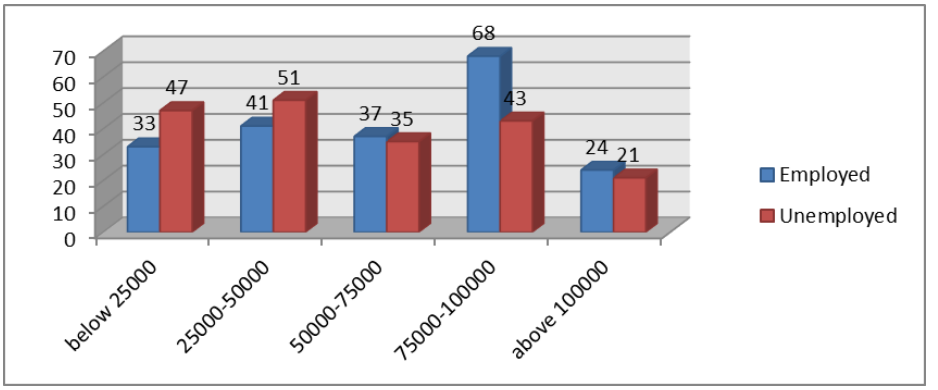

Figure 3. Household incomes by occupation
Source: Own Survey result 2021

Income frequency of the household

The income of sampled households with respect to the frequency of income or in how much length of time they earn for their incomes, households can earn their income daily, weekly. In all income groups' monthly income earners of sampled household heads are leading proceeded by the daily income earners, annually income earners are on the third with 77 individuals while only 12 household's heads are earning their incomes semi-annually and weekly. The survey indicates that in higher income groups like 50,000 -75,000, 75,000 -100,000 and above 100,000 income groups the share of monthly income earners increases proportionally. It clearly indicated that at every point of income category those households receiving their income monthly leading the income groups and especially in higher income groups monthly income earners dominating while others like annually, semi-annually, weekly and daily income receivers are proportionally higher in lower income groups.

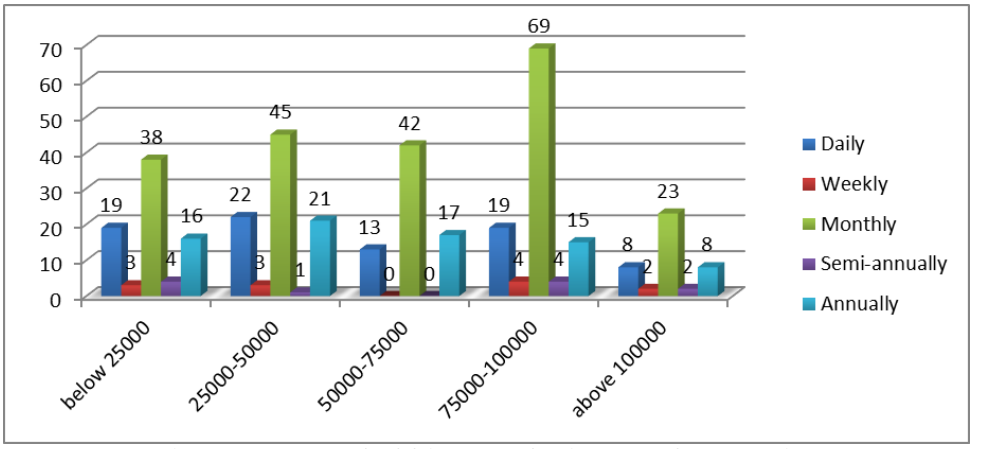

Figure 4. Household income by income frequencies
Source: Own Survey result 2021

Dependent family of the household

The study indicating for households those have not dependent family member, most of them categorized under lower income groups 12 of the earn income of below 25,000, 15 of them found in income category of 25,000 – 50,000, while 7 and 5 of the sampled households earn income between 75,000- 100,000 and 100,000 respectively. For the household contain 1-2, 3-4 and 5-6 dependent family members the distribution is somewhat reverse of 0 dependent family members while it indicates the sampled households having above 6 dependent family members found in lower income group below 25,000 and 25,000 -50,000 income group. Generally according the data indicated from the sampled households in the study area the proportion of the sampled household in all income groups is proportion and similar indicating that the dependent family members have no such significant impact on the income of the household's citrus paribus.

Table 5
Household Income by Number of Dependent Family

Annual Income → / Dependent Family ↓	below 25000	25000-50000	50000-75000	75000-100000	above 100000	Total	Percentage
0	12	15	12	7	5	51	12.75%
1-2	36	46	31	61	23	197	49.25%
3-4	25	26	24	32	13	120	30%
5-6	6	4	5	11	4	30	7.5%
Above 6	1	1	0	0	0	2	0.5%
Total	80	92	72	111	45	400	100%
	20%	23%	18%	27.75%	11.25%	100%	

Source: Own Survey result 2021

Income category of the household

Accordingly 400 households sampled while 80(20%) the household earn annual income of less than 25,000ETB, 92(23%) earns annual income of between 25,000 -50,000 ETB, as 72(18%) of them are earning income between 50,000 -75,000 ETB, 111(28%) of the sampled household earn annual income between 75,000 -100,000ETB and 45(11%) the sampled households earns their annual income more than 100,000 ETB.

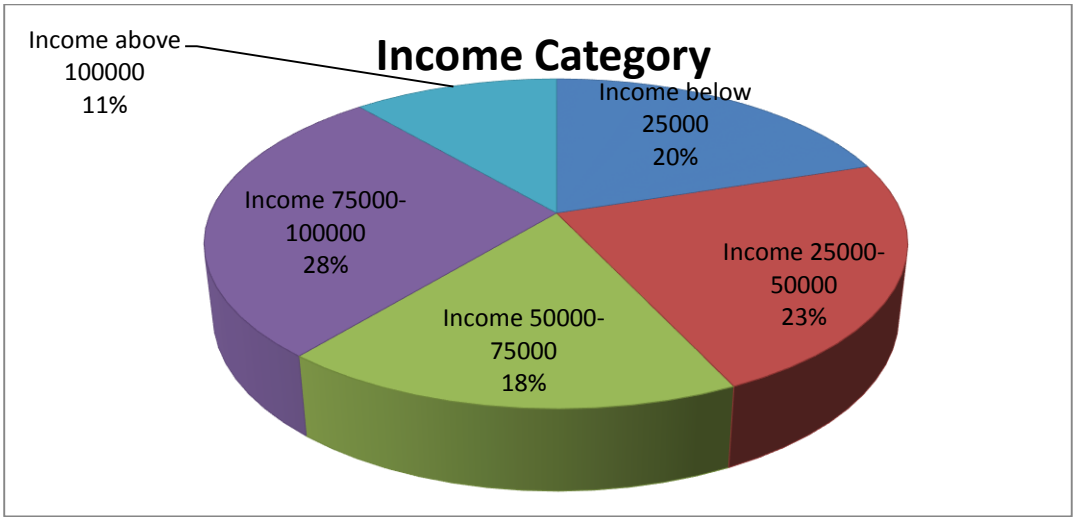

Figure 5. Households by Income Sizes
Source: Own Survey result 2021

OLS regression model

The annual income of the sampled household computed by considering variables sex, age, marital status, education level, family size, job situation, frequency of income and number of dependent family within the households. The OLS results sex, marital status education and frequency of income earning are statistically insignificance while age, family size, occupation and number of dependent family members are statistically significance.

Table 6
OLS Regression

Source	SS	df	MS		
				Number of obs	= 400
				F(8, 391)	= 1.59
Model	21.9521387	8	2.74401734	Prob > F	= 0.1257
Residual	674.545361	391	1.72517995	R-squared	= 0.0315
				Adj R-squared	= 0.0117
Total	696.4975	399	1.74560777	Root MSE	= 1.3135

Income	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Sex	-.0293163	.2500732	-0.12	0.907	-.5209725	.4623399
Age	.0875411	.0505632	1.73	0.084	-.0118687	.1869509
Maritalstatus	-.0182722	.1659078	-0.11	0.912	-.3444552	.3079109
Educationofhouseholdhead	.0105334	.0497502	0.21	0.832	-.0872779	.1083447
Familysize	-.1119026	.0837897	-1.34	0.182	-.2766373	.0528322
Occupation	-.3428916	.1318462	-2.60	0.010	-.6021078	-.0836754
Frequencyofincome	.0036671	.0514308	0.07	0.943	-.0974484	.1047826
Numberofdependentfamily	.1014234	.0847489	1.20	0.232	-.0651971	.2680439
_cons	3.176665	.8416071	3.77	0.000	1.522023	4.831306

Source: Stata output 2021

The Lorenz curve and gini index of income

The Lorenz curve is one measure of income inequality through indicating by how much amount the distribution is far away from the equality line. Any distribution of income with a Lorenz curve near to the equality line represents relatively equal income distribution and if the Lorenz curve for a given distribution is far away the line of equality the distribution is highly unequal. As indicate in the Lorenz curve graph (fig 6) the distribution of income in this study area is high as indicated by the down ward bending curve. Even if Lorenz can serve as a measure of inequality, it can't indicate the exact quantitative value of the distribution's dispersion. So gini coefficient is the best measure of inequality with the exact number to indicate the level of inequality. It always measures a value between zero and one (between 0 and 100 when calculated as percentage). Gini index is zero when there is equal distribution indicating all individuals under consideration are earning equal income level and it is one in special case when one individual is earning all the income while others are earning nothing. To derive the value of gini coefficient the excel method of calculating income inequality at households level with the following formula (American Statistical Association, 2014) is applied in this study.μ

$$Gini = \frac{\Sigma(2\mathrm{i} - \mathrm{n} - 1)\mathrm{xi}}{2\mu\mathrm{n}\hat{}2}$$

Where;

i = individual household
μ = mean value of income

n = total sample size
xi = income of household i

Using this formula the gini coefficient of North Shewa towns is estimated to be 0.542 to indicate the presence of high level of income inequality. So this gini figure of .54 is greater than the 0.33 national average gini coefficient of Ethiopia as measured by World Bank (WB, 2015). The reason for this result is, there is high level of income inequality in urban areas of Ethiopia and relatively low level of income inequality in rural counter parts due to annually earned equal agricultural income. So, high level of income inequality in urban areas will exist when compared with the national average since the average is taken from low inequality rural areas as well.

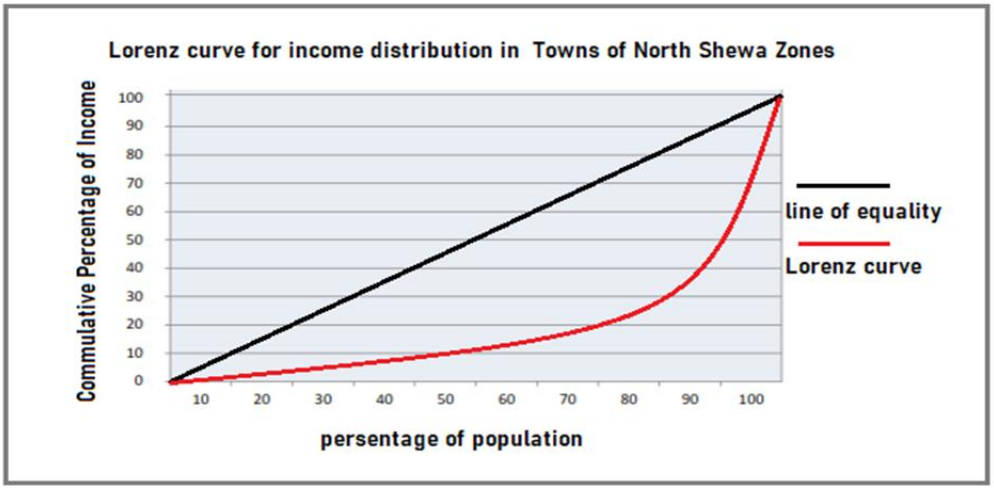

Figure 4. Lorenz curve for income distribution in North Shew Towns
Sources: Excel computation 2021

Conclusion and Policy Recommendation

Under this study, determinants of income inequality had been identified. To do so, the widely used measures of income inequality like the Lorenz curve and gini index are applied. The relatively more concave Lorenz curve of income distribution to the origin is obtained to indicate the presence of relatively high income inequality. This distribution is summarized using a quantitative value indicator inequality measure of gini coefficient and the gini index is given to be 0.35. This Urban resident of North Shewa Zone gini index is greater than the national average index of 0.33 because of high level of income inequality in urban areas than rural areas of the country.

In addition to this, The OLS estimation coefficients declared the existence of direct positive effect of level of education and dependency ratio on income level. Income will increase by 1.05% due to a unit change in education level and it will increase by 10.1% when the dependency ratio increases by one unit. The dummy variables

coefficients also shows that the income of male headed households is greater than that of female headed by 2.9% and those household heads hired in sectors earn income greater than the unemployed by large amount of 34.2%.

High level of education accounts a lot for households to get themselves in high income groups. So household heads of North Shewa towns has to give emphasis for education, to spend more for schooling for their children and themselves and the government is also required to increase its expenditure on education. When the income of unemployed is compared with that of employed, unemployed earn more income than employed. To reduce the level of inequality the governmental sectors or others employers are recommended to pay more. Additionally, there is male-female income difference and females are earning less than male. To make the balance, gender offices governmental and non-government institutions will give more emphasis for females through training and self-confidence creating activities.

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