Addis Ababa University

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Determinants of Youth Unemployment in Urban Ethiopia: Application of Multilevel Analysis

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Declaration

I, the undersigned, declare that the thesis is my original work, has not been presented for degrees in any other University and all sources of material used for the thesis have been duly acknowledged.

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This thesis has been submitted for examination with my approval as an advisor.

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As members of the Board of Examiners of M.Sc. thesis open defense examination of the above title, we have evaluated the thesis and examined the candidate.

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Abstract

Determinants of youth Unemployment in urban Ethiopia :Application of Multilevel Analysis Meseret Dekeba

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The high population of youth unemployment is one of the most critical issues at global level. Which is caused by socio-economic and demographic factor. The objective of the study was to identify the determinants of youth unemployment in Urban Ethiopia. The study is done based on the 2018 Urban Employment-Unemployment Survey (UEUS) which was conducted by the Central Statistical Agency (CSA) of Ethiopia. The data analysis was conducted by using descriptive statistics, chi-square test and multilevel logistic regression model. Out of 8,183 youth, 2484(30.36%) of were unemployed while 5699 (69.64%) were employed. The chi-square test result shows there was a significant association between youth unemployment at socio-economic and demographic factors. The multilevel logistic regression analysis also shows that sex, marital status, educational level, kinship and field of study were found to be statistically significant determinants of youth unemployment in urban Ethiopia.

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Acronyms

AIC Akaike Information Criterion

BIC Bayesian Information Criterion

CSA Central Statistical Agency

EA Enumeration Area

ICC Intra Class Correlation Coefficient

ILO International Labour Organization

IMF World bank Condition

ML Maximum Likelihood

MQL Marginal Quasi Likelihood

NEET Not in Education,Employment or Training

PQL Penalized Quasi Likelihood

S.E Standard Error

SNNP South Nations, Nationality and People

WHO World Health organization

Chapter 1

INTRODUCTION

1.1 Background

The majority of world countries currently affected by youth unemployment. The capacity of youth to fit in place of productive activities has both social and economic consequences on an economy. Youth unemployment is often higher than the unemployment rate for adults that highlights the concerns of several countries and obliges them to face in facilitating the transition from school to employment. In developing countries, youth face not only the challenge of obtaining prolific employment that could bear fruit, but also obtaining safe and upto standard works (Broussara et al., 2012).

The towering population of youth unemployment is one of the crucial socio-economic problems that fetch social disturbance, political instability and economic recession, which becomes a challenge for most of developing and developed countries (ILO, 2015). Moreover, unemployment among young people has become a major policy challenge for all nations in the world. Particularly, in the Sub-Saharan Africa, youth unemployment rate is significantly higher than the adult unemployment rate. Evidently, it is as twice as adult unemployment rate (ILO, 2010). According to ILO figures, and the Sub-Saharan Africa region has the highest rate of youth unemployment subsequent to the Middle East and North Africa.

The youth unemployment rate serves as an indicator of success and base line to create appropriate employment strategies. Nowadays unemployment has become one, among the other socio-economic problems practically prevailed in every single country of our planet. It becomes a serious social and economic problem for developed as well as developing countries. It has a serious effect not only on the living standards of people and on the socio-economic status of a nation, but also elevates the size and extent of

corruption, poverty, occurrences of crime and suicidal rates in a society (Asif et al., 2015).

Taking into account what has been discussed above Ethiopia in particular is not different from other countries. Currently Youth unemployment is a pressing issue in the country where approximately two-thirds of its population is younger than 25 years of age. Ethiopia, being among the countries with a rapidly growing population coupled with a still backward economy, need for proper management and efficient utilization of its work force is indispensable. In this respect, the capacity of the economy in absorbing the potential labor force needs monitoring in a regular basis, and suitable employment policy consequently needs placement in an appropriate manner. It is a well understood notion that the level of unemployment of a country is widely used as an overall indicator in evaluating the current performance of its economy (Amanuel, 2016). Similarly, a high level of unemployment indicates the failure of a country's economy to use its labor resources efficiently. There can be range of factors explaining unemployment, such as a low level of general economic activity, recession, and inflation, rapid changes in technology, disability, willingness to work and deliberate discrimination are the few to mention.

Youth unemployment is a multidimensional concept that we need to study yet again and again to see the reasons behind its dynamics and draw a reasonable conclusion. In the case of Ethiopia; quite a lot of factors contribute to the causes of youth unemployment. Many young people end up facing unemployment for extended period, or momentous underemployment in jobs that fall short to offer career opportunities. The analysis of occupational status and unemployment is therefore necessary both in tackling present difficulties and in foreseeing future changes; though, the government firmly made clear that it is confident in creating job opportunities, particularly for the urban youth.

1.2 Statement of the problem

At present, youth employment is a critical concern to almost every country of the world. It is one of the most pressing economic and social problems confronting developing countries whose labor markets have weakened substantially (Bell et a1., 2010). The concern about youth unemployment is not only having a job but also about undermine self-esteem and sense of purpose that indicates the loss of hope and dignity (CSA, 2014) .

Unemployment is a serious socio-economic problem, which could be experienced by all age groups of a population both in developing and developed countries. The intensity, level of frequency and rate of unemployment may differ in each country. Whereas, the situation in Ethiopia where there is high youth population density that adults have high opportunities than youths because they have more experience in job competition which implies there is high youth unemployment than adults is alarming (UNESCO, 2012).

There is high unemployment condition of youth in Ethiopia, mostly those who live in urban areas. Taking into account the existing situation of high youth unemployment rate, in recent times, the government has formulated new strategies to decrease the problem through promoting entrepreneurship mainly small scale enterprise, and creating awareness for the youth to change the attitudes of youths towards job preference and involving in the development activities of the country (Abiy, 2014).

Several researches like Abiy (2014) have studied the determinant factors of youth unemployment different countries but most of the researchers studied by considering at regional and country level.The researcher also limited to determinants of unemployment status by using logistic regression model.This study aims to identify the determinants of youth unemployment in Urban Ethiopia using multilevel logistic regression model due to the hierarchical nature of data.

1.3 Objective of the study

1.3.1 General Objective

- The main objective of this study was to identify the determinants of youth unemployment in Urban Ethiopia.

1.3.2 Specific objective

:

- To describe socio-economic and demographic factors interms of youth unemployment.
- To check the existence of variation in youth unemployment among and within enumeration area.

1.4 Significance of the Study

The current levels of youth unemployment need to be understood in the context of increased labor market flexibility.

- This finding will be helpful for better understanding of the determinant of urban youth unemployment in Ethiopia.
- This study will be helpful for the formulation of policies and strategies towards youth unemployment.
- Finally, the findings and conclusion for this study can be used as the basis for further research on the area of youth unemployment.

Chapter 2

LITERATURE REVIEW

According to the report of ILO (2011), globally, the number of young people is about to become the largest in history comparative to the adult population. They constitute 47% of the world unemployed, and approximately 88 million young individuals globally are out of work. As per the report by ILO (2013). The level of youth unemployment is three times higher than for the adult population; that is 12.6 and 4.6 respectively. By 2018, the global youth unemployment rate is projected to stand at 12.8%.

Sharma (2015) conducted a study and said that international labor organization estimates that the number of unemployed youth is on the rise again since 2011, after declining somewhat from the peak it reached at the height of the global financial crisis. It is expected to reach 73.4 million young people by 2013 (ILO, 2012). The global youth unemployment rate has also been rising since 2011; it is currently estimated at 12.6 % and is projected to increase to 12.8 % by 2018. In contrast, the global adult unemployment rate, while also rising slightly, is much lower at 4.6 % in 2013 (ILO , 2012).

Putun et al. (2017) conducted a study about the economic consequences of the youth unemployment case in EU countries and his critical analysis explains that the data for this study were collected from the data base of the World Bank. The research mainly pertaining to youth unemployment data collected from 28 countries in the European Union as percentage of total labour force in between the ages of 15-24 years . All series are annual and, cover the period from 1996-2014 with the purpose of observing which countries' youth unemployment rates are declining. Of course, the researchers have subtracted the lowest one from all and check the series whether they have unit root. Since Austria has the lowest youth unemployment rates, it is subtracted from all series with corresponding years. So, if the new series does not include unit roots, we can conclude that these differences are getting to disappear.

A study conducted by Msigwa and Kipesha (2013), uses multinomial logistic regression model to analyze the determinants of unemployment in Tanzania. The findings of the study show that the variable like gender, geographical location, education, skills and marital status are find to be statistically significant effect in explaining the difference in youth employment status in Tanzania. Similarly, Eita (2010) has investigate the determinants of unemployment in Namibia for the period 1971 to 2007. The analysis is carried out through macroeconomic and macroeconomic models of unemployment. The unemployment model (with macroeconomic variables) is estimated using the Engle-Granger two-step econometric procedure. The results shows that there is a negative relationship between unemployment and inflation in Namibia. Unemployment responds positively if actual output is below potential output, and if wages increase. An increase in investment causes unemployment to decrease significantly. The results provide evidence that the Phillips curve holds for Namibia and unemployment can be reduced by increasing aggregate demand. It is important to increase output up to the country's potential, and there is a need for wage flexibility (workers need to reduce their wage demands) in order to decrease unemployment in Namibia. Increasing investment will reduce unemployment significantly.

A study conducted by Uddin et al. (2013), revealed that unemployment in Nigeria increased from 21.1% in 2010 to 23.9 % in 2011 with youth unemployment at over 50% From 2011 to 2013 there is an increase of 16 % unemployment growth rate in Nigeria. Dimitrov (2012), the study reported that youth employment problem was high in the country and factors such as early school leaving age, low education quality and business cycle were the key determinants of youth unemployment. Moreover, the study found that social status and family background had a significant effect with youth unemployment. If parents or one of the parents are unemployed, inactive, have low education, illiterate, without skills and qualification, live in poverty, belong to particular ethnic groups are likely to duplicate the same to the youth people.

According to report of ILO (2019), young people with aged from 15-24 years were more exhibiting an unemployment rate of 11.8 %. A major global challenge is the phenomenon of young people who are not in education, employment or training (NEET). Worldwide, 30 % of young women and 13 % of young men were classified as NEET in 2018. In line with a stable aggregate unemployment rate, the outlook for men, women and young people with regard to opportunities on the job market is also very stable. This means that neither the above-mentioned gender disparities nor the labor market

challenges faced by young people assertively expected to decline in the coming years.

A study conducted by Asalfew (2011), using multi variable logistic analysis showed that sex, migration, education, social network, job preferences and access to business advisory services significantly determine youth unemployment in Debre Birhan town.

A study conducted by Dejene et al. (2016), the binary logistic regression to assess the determinants of youth unemployment at Ambo, Ethiopia. Their results showed that, age of the respondents, education, health status, household income, access to credit ,saving services, or experience and migration status were significantly related to youth unemployment.

A study conducted by Chikako (2018), using multilevel logistic regression analysis , the result shows that region, sex, age of youth, literacy status, marital status, type of training, steps taken to search work, household size and educational level are found to be the significant determinants of youth unemployment in urban Ethiopia. The intra correlation coefficient suggests that there is clear variation of youth unemployment status across the region of urban Ethiopia.

Amanuel (2016) studied the determinants of youth unemployment; evidence from Ethiopia using the 2011 Ethiopian Demographic and Health Survey (DHS) which was conducted by Central Statistical Agency (CSA) of Ethiopia. The result of his analysis revealed that about 10.4 % of the youth are unemployed while 89.6 % are employed. The multi- level analysis results indicates that, access to electric power, age, gender, access to market information, economic status of their families and youth?s educational level are found to be the significant determinants of youth unemployment in Ethiopia.

A study conducted by Abera (2013) to identify the most important socio-economic and demographic determinants of unemployment based on the 2011 Demographic and Health Survey of Ethiopia by binary logistic regression analysis were applied for analyzing the data. The indicators such as age, sex, region, place of residence, educational level, economic status, and marital status, sex of head of household and household size are found to be having considerable effect on unemployment status of an individual in Ethiopia.

A study conducted by Duguma et al. (2019) on determinants of youth unemployment urban area: the case of Guder town, Western Shoa zone, Ethiopia. A binary logic

model result shows that sex, educational level, marital status, skill match and access to credit use of youth are found to be statistically significant effect urban youth unemployment. Similarly, a study conducted by Batu (2016), with the objective of identifying the main factors affecting youth unemployment and constraints they face particularly in self-employment in Ethiopia and based on data collected by Central Statistical Agency (CSA) in 2015. The study shows that youth unemployment is highly related with regional location, sex, marital status and education.

Chapter 3

DATA AND METHODOLOGY

3.1 Data Source and sampling design

The data source used for this study was obtained from Ethiopia Urban Employment-Unemployment Survey conducted in 2018 by the Central Statistics Agency (CSA). The 2018 survey conducted from June 12-July 11, 2018. The outcomes of the survey is used as an input for planning, policy formulation, to monitor and evaluate labor programs in urban areas of the country. The total enumeration areas 660 (19,800 of households) were systematically selected from 102 urban centers of the country but ultimately 647 EA's and 19,384 households (97.90%) were successfully covered, respectively. Ethiopia as a whole, urban areas (or all nine regions and two administrative cities) of Ethiopia (CSA, 2018). The study was assumed that the youth comprises of the age limit 15-24 years (WHO, 2019).

3.2 Study Variables

3.2.1 Dependent Variable

The response variable for this study was employment status of youth in urban Ethiopia. According to International Labor Organizations (ILO) definition those persons who are simultaneously without work, currently available for work and seeking work are considered as unemployed. Therefore, the dependent variable for the i^{th} individual is represented by a random variable Y_i with two possible outcomes:

$$Y_i = \begin{cases} 1, if i^{th}\ respondent\ is\ unemployed \\ 0, if i^{th}\ respondent\ is\ employed \end{cases}$$

3.2.2 Independent Variable

In this study, the independent variables like region, sex, age, kinship, field of study, marital status and education level were considered.

Table 3.1: Description of independent variables

No.	variables	Categories
1	Region	0=Tigray 1=Affar 2=Amhara 3=Oromiya 4=Somali 5=Ben-Gumuz 6= SNNP 7= Gambela 8 =Harari 9= Addis Ababa 10=Dire dawa
2	Sex	0=Female 1=Male
3	Age	0=15-19, 1=20-24
4	Field of study	0=No field of study 1=Social science 2=Natural science 3=Engineering 4=Health Science 5=Agriculture 6=Other social service
5	Marital Status	0=Never Married 1=Married 2=Others
6	Kinship	0=Head of household 1=Spouse 2=Son/daughter of head and spouse 3=Son/daughter of Head 4=Son/daughter of spouse 5=Other
7	Educational level	0=No education 1=Primary education 2=Secondary education and Above

3.3 Methods for data analysis

For this study, the descriptive statistics, chi-square test and multilevel logistic regression model were used. The descriptive statistics are used to describe the socio-economic and demographic factors with youth unemployment status in urban Ethiopia. The chi-square test is used to test the association between the dependent and independent variables. Moreover, two level multilevel logistic regression analysis was used to analyze the effect on each independent variable on youth unemployment while controlling for the other independent variables and the multilevel logistic regression model is used to identify the statistically significant that affect youth unemployment status in urban Ethiopia.

3.3.1 Multilevel Logistic Regression Model

The multilevel logistic regression analysis considers variations due to hierarchy structure in the data. It allows the simultaneous examination of the effects of group level and individual level variables while accounting for the non-independence of observations within groups. The analysis also allows the examination of both between group and within group variability as well as how group level and individual level variables are related to variability at both levels.

In this study, the clustering of the data points within enumeration area offers a natural 2-level hierarchical structure of the data. The basic data structure of two-level logistic regression model is a collection of N groups (units at level-two (EA)) and within group j (j=1, 2,. . . , N).

Let y_{ij} be the binary outcome variable for the i^{th} youth in the j^{th} enumeration area, coded '0' or '1', and x_{ij} an explanatory variable. Also Let π_{ij} be the probability that the response variable for youth i in EA j. y_{ij} follows a Bernoulli distribution. The two-level logistic regression model can be written as,

$$logit(\pi_{ij}) = \beta_0 + \beta_1 X_{ij} + U_{0j} \tag{3.1}$$

where, U_{0j} = random quantity at level 2 and follows N(0,σ_u^2)
β =unknown parameters
X_{ij}= The independent variable

3.3.2 Test of heterogeneity

For the proper application of multilevel analysis, the first logical step is to test heterogeneity of proportions between groups. The most commonly used test statistic to check for heterogeneity of proportions between groups is the chi-square test. The chi-square test is given as follows:

$$X^2 = \sum_{j=1}^{N} n_j \frac{(\hat{p_j} - \hat{p_.})}{\hat{p_.}(1 - \hat{p_.})} \tag{3.2}$$

where, $\hat{p_j} = \frac{1}{n_j} \sum_{i=1}^{n_j} y_{ij}$ is the proportion of successes in group j which is an estimate for the group-dependent probability P_j. Similarly, $\hat{p_.} = \frac{1}{M} \sum_{j=1}^{N} \sum_{i=1}^{n_i} Y_{ij}$ the overall proportion of successes. N is the number of groups, n_j is the number of samples in the j^{th}group. The decision were based on approximately chi-square distribution with N-1 degrees of freedom.

3.3.3 Estimation of between and within group variance

The true variance between the group dependent probabilities, i.e., the population value of Var(P_j), can be estimated by:

$$\hat{\tau}^2 = S^2_{between} - \frac{S^2_{Within}}{\tilde{n}} \tag{3.3}$$

where $\tilde{n}$ is given by:
$\tilde{n} = \frac{1}{N-1}(M - \frac{\sum_{j=1}^{N} n_j^2}{M})$
For dichotomous outcome variables, the observed between-groups variance is closely related to the chi-squared test statistic .

$$S^2_{between} = \frac{\hat{p_.}(1 - \hat{p_.})}{\tilde{n}(N-1)} X^2 \tag{3.4}$$

The within-group variance in the dichotomous case is a function of the group averages, via,

$$S^2_{Within} = \frac{1}{M - N} \sum_{j=1}^{N} n_j \hat{p_j}(1 - \hat{p_j}) \tag{3.5}$$

where, $\hat{p_j}$ is the proportion of successes in group j, $\hat{p_.}$ is the overall proportion of successes, n_j is the sampled observation in group j, M is the total sampled observations, and N is the number of groups (i.e.EA).

3.3.4 The Empty Logistic Regression Model

This is the simplest case of a hierarchical two level model for a dichotomous outcome variable in which there are no explanatory variables at all. This model only contains random groups and random variation within groups. Thus, for the logit link function, the log-odds have a normal distribution in the population of groups, which is expressed by

$$logit(\pi_{ij}) = \beta_0 + U_{0j} \tag{3.6}$$

For the deviations U_{0j}, it is assumed that they are independent random variables with a normal distribution with mean zero and variance σ_0^2.

3.3.5 The Random Intercept Logistic Regression Model

Random intercept models are models where only the intercept of the level-1 dependent variable is modeled as an effect of the level-2 grouping variable and possibly other level-1 or level -2 (or higher). In the random intercept model, the intercept is the only random effect meaning that the groups differ with respect to the average value of the response variable. It represents the heterogeneity between groups in the overall response. We assume that there are variables which are potential explanation for observed success or failure.

These variables are denoted by $X_h = x_{hij}, i = 1, 2, \ldots, n_j, h = 1, 2, \ldots, k, j = 1, 2, \ldots, N$ n_j number of observation in j^{th} EA , k is the number of predictor variables, N is the number of groups (EA). The logistic random intercept model expresses the log-odds, i.e. a random group-dependent deviation U_{0j}. That is,

$$logit(\pi_{ij}) = log(\frac{\pi_{ij}}{1-\pi_{ij}}) = \beta_{0j} + \sum_{h=1}^{k} \beta_h X_{h_{ij}} = \beta_0 + \sum_{h=1}^{k} \beta_h X_{h_{ij}} + U_{0j} \tag{3.7}$$

where the intercept term β_{0j} is assumed to vary randomly and is given by the sum of an average intercept β_0 and group-dependent deviations, U_{0j}; that is $\beta_{0j} = \beta_0 + U_{0j}$.The first part of the right hand side of (3.7) incorporating the regression coefficients, $\beta_0 + \sum_{h=1}^{k} \beta_h X_{hij}$ is the fixed part of the model, because the coefficients are fixed. The remaining part U_{0j} is called the random part of the model. It is assumed that the residual, U_{0j} are mutually independent and normally distributed with mean zero and variance σ_0^2

(Snijders and Bosker, 1999). From (3.7) we have

$$logit(\pi_{ij}) = \beta_{0j} + \sum_{h=1}^{k} \beta_h X_{h_{ij}} \tag{3.8}$$

solving for π_{ij} we have

$$\pi_{ij} = \frac{e^{\beta_0 + \sum_{h=1}^{k} \beta_h X_{h_{ij}}}}{1 + e^{\beta_0 + \sum_{h=1}^{k} \beta_h X_{h_{ij}}}}$$

Thus, a unit difference between the $X_{h_{ij}}$ values of two individuals in the same group is associated with a difference of β_h in their log-odds, or equivalently, a ratio of $exp(\beta_h)$ in their odds. Level-2 residual, U_{0j} is the effect of being in j^{th} group on the log-odds that y = 1 with level-2 (residual) variance σ_{0j}, or the between-group variance in the log-odds that y = 1 after accounting for the predictor(s).

3.3.6 The Random Coefficient Logistic Regression Model

Random coefficients models are ones where the coefficient(s) of lower-level predictor(s) is/are modeled as well. Random coefficients model explain unobserved heterogeneity in the effects of explanatory variables on the response variable. In logistic regression analysis, linear models are constructed for the log-odds. The multilevel analysis, random coefficient logistic regression, is based on linear models for the log-odds that include random effects for the groups or other higher level units (Snijders and Bosker, 1999).

$$logit(\pi_{ij}) = \beta_{0j} + \beta_1 X_{1ij} \tag{3.9}$$

The intercepts β_{0j} as well as the regression coefficients, or slopes, β_{ij} are group-dependent. These group-dependent coefficients can be split into an average coefficient and the group-dependent deviation:

$$\beta_{0j} = \beta_0 + U_{0j} \; and \; \beta_{ij} = \beta_1 + U_{1j} \tag{3.10}$$

substituting (3.9) and (3.10)we have

$$logit(\pi_{ij}) = (\beta_0 + U_{0j}) + (\beta_1 + U_{1j})X_{1ij} = \beta_0 + \beta_1 X_{1ij} + U_{0j} + U_{1j} X_{1ij} \tag{3.11}$$

From (3.10) there are two random group effects, the random intercept U_{0j} and the random slope U_{1j}. It is assumed that the level-two residuals U_{0j} *and* U_{1j} have means zero given the value of the explanatory variable X. Thus, β_1 is the average regression coefficient like β_0 is the average intercept. The part, $\beta_0 + \beta_1 X_{1ij}$ of equation (3.11) is called the fixed part of the model and the other part, $U_{0j} + U_{1j} X_{1ij}$ is called the random part. The term

$U_{ij}X_{1ij}$ can be regarded as a random interaction between group and explanatory variable X.

This model implies that the groups are characterized by two random effects: their intercept and their slope. These two group effects, U_{0j} and U_{ij} will not be independent, but correlated. The random intercept variance $var(U_{0j}) = \sigma_0^2$, the random slope variance $var(U_{ij}) = \sigma_1^2$ and the covariance between the two random effects $cov(U_{0j}, U_{1j}) = \sigma_{01}$ are called variance components (Snijders and Bosker, 1999).

The model for a single explanatory variable discussed above can be extended by including more variables that have random effects. Suppose that there are k level-one explanatory variables X_1, X_2,...,X_k, and considering the model where all x-variables have varying slopes and random intercept. That is

$$logit(\pi_{ij}) = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij} + \cdots + \beta_{kj}X_{kij} \tag{3.12}$$

Letting
$\beta_{0j} = \beta_0 + U_{hij}$ and
$\beta_{hj} = \beta_h + U_{hij}, for\ h = 1, 2, \ldots, k$

$$logit(\pi_{ij}) = \beta_0 + \sum_{h=1}^{k} \beta_h X_{hij} + U_{0j} + \sum_{h=1}^{k} U_{hj}X_{hij} \tag{3.13}$$

the first part of this model
$\beta_0 + \sum_{h=1}^{k} \beta_h X_{hij}$ is the fixed part and the second part and $U_{0j} + \sum_{h=1}^{k} U_{hj}X_{hij}$ is the random part of the model (Snijders and Boskers, 1999).

3.3.7 Intra-class Correlation Coefficient (ICC)

The main reason of using multilevel analysis is the existence of more similarities between youth unemployment in the same EA compared to those of different EA. ICC is the degree of resemblance between level one units belonging to the same group. It is an indication of the proportion of variance at the second level (EA) and it can also be interpreted as the expected (population) correlation between two randomly chosen individuals within the same group (Hox, 2010). In two- level model, the ICC is calculated in the intercept only model. This model can be derived from Equation (3.13) by excluding all explanatory variables, which results in the following equation:

$$logit(\pi_{ij}) = \beta_0 + U_{0j}$$

The ICC is then calculated as follows:

$$ICC = \frac{\sigma_{u0}^2}{\sigma_{u0}^2 + \sigma_e^2} \tag{3.14}$$

where, σ_e^2 is variance of individual (lower) level units (Snijders and Bosker, 1999).

3.3.8 Methods of parameter estimation

Parameter estimation for multilevel logistic regression model is not straightforward like the methods for single level logistic regression model. Thus, we use the most two common methods of estimating the parameters multilevel logistic models such as Marginal Quasi Likelihood or MQL [Goldstein (1991), Goldstein and Rasbash (1996)] and Penalized Quasi Likelihood or PQL [Laird (1978) and Breslow and Clayton (1993)]are the prevailing approximation procedures. Both MQL and PQL are based on Taylor series expansion to achieve the approximation. Based on the first and second term of Taylor expansion, MQL and PQL are often known as first order MQL and second-order MQL, first-order PQL and second-order MQL respectively. After applying these quasi likelihood methods, the model is then estimated using iterative generalized least squares (IGLS) or reweighted IGLS (RIGLS) [Goldstein (2003)].

3.3.9 Goodness of fit test

For this study, test of goodness of fit was employed using the deviance. The maximum likelihood procedure produces a statistic called the deviance, which indicates how well the model fits the data. The test compares the deviance (-2 log likelihood) of two models by subtracting the smaller deviance (model with more parameters) from the larger deviance (model with lower parameters).

Chapter 4

RESULTS

In this chapter, we used descriptive statistics, chi-square and multilevel logistic regression results. The descriptive result is used to describe the socio-economic, demographic and other proximate factors interms of youth unemployment in urban Ethiopia. The multilevel analysis is used to see the variation of youth unemployment across enumeration areas and two level multilevel logistic regression analysis was used to analyze the effect to each independent variable on youth unemployment while controlling for the other independent variables. The data analysis for the study was done using STATA version 14.

4.1 Descriptive analysis

In this study, a total of 8,183 youths were considered. Out of 8,183 youth, 2,484(30.36%) were unemployed the remaining 5,699(69.64%) were employed. As shown in Table 4.1, the chi-square test is used to test the association between youth unemployment and the socio-economic and demographic factors. The results also show that there was a significant association between youth unemployment status with region, sex, age, kinship, field of study, marital status, and education level at 5% level of significance.

Table 4.1, shows that the proportion of employment status across region. The highest number of youth unemployment was recorded in Dire Dawa 122(41.22%) followed by Oromiya and Tigray with 764(34.63%) and 230(32.08%), respectively. While the smallest number of youth unemployment was recorded in Gambela 41(18.3%) followed by Benishangul-Gumuz, Addis Ababa and Harari with 50(18.45%), 245(24.85%) and 53(27.18%), respectively. Regions like Afar, Amhara, SNNP and Somalie had youth unemployment rate of 73(27.34%), 484(28.958%), 118(31.64%) and 95(31.32%), respectively. Female youth unemployment 1,602 (33.26%) is higher than that of male 882 (26.2%).

Table 4.1, also shows youth unemployment status varies by marital status. The highest proportion of youth unemployment was observed in married 755(40.55%) followed by never married 1,660(27.37%) while the lowest youth unemployment was recorded for other marital status 69(26.95%). With regards to kinship the highest proportion of youth unemployment was observed in spouse 553(48.09%) whereas the lowest proportion of youth unemployment was recorded Head of Household 216(13.14%).

There is also relationship between youth unemployment status and their educational level (see Table 4.1). The table shows the highest of youth unemployment was recorded for respondents where educational level was secondary and above 1624(34.53%) followed by primary 721(24.83%) and no education 139(24.13%).

Table 4.1: Cross tabulation Employment Status by Socio-economic Demographic and other proximate factors

	Employment Status						
		Employed	Unemployed				
Variables	Category	n(%)	n(%)	N	Chi-squ	df	P-value
Region	Tigray	487 (67.92)	230 (32.08)	717	89.075	10	.000
	Afar	194 (72.66)	73(27.34)	267			
	Amhara	1,186(71.02)	484(28.98)	1670			
	Oromia	1,442(65.37)	764(34.63)	2,206			
	Somalie	255(68.36)	118(31.64)	373			
	Beni-Gumuz	221(81.55)	50(18.45)	271			
	SNNP	647(68.68)	295(31.32)	942			
	Gambela	183(81.7)	41(18.3)	224			
	Harari	142(72.82)	53(27.18)	195			
	Addis Ababa	768(75.15)	245(24.85)	1,022			
	Dire Dawa	174(58.78)	122(41.22)	296			
	Total	5,699(69.64)	2,484(30.36)	8183			
Sex	Male	2,485(73.8)	882(26.2)	3,367	46.835	1	.000
	female	3,214(66.74)	1,602(33.26)	4,816			
	Total	5,699(69.64)	2,484(30.36)	8183			
Age	15-19	1,721(69.56)	753(30.44)	2,474	0.011	1	0.917
	20-24	3,978(69.68)	1,731(30.32)	5,709			
	Total	5,699(69.64)	2,484(30.36)	8183			
Field of study	No field of study	4072(68.45)	1877(31.55)	5949	39.116	6	.000
	Social science	402(69.67)	175(30.33)	577			
	Natural science	195(72.76)	73(27.24)	268			
	Engineering	204(64.15)	114(35.85)	318			
	Health science	146(76.84)	44(23.16)	190			
	Agriculture	34(70.83)	14(29.16)	48			
	Other social service	646(77.55)	187(22.45)	833			
	Total	5,699(69.64)	2,484(30.36)	8183			
Marital Status	Never married	4406(72.63)	1660(27.37)	6066	118.889	2	.000
	Married	1106(69.43)	755(40.55)	1861			
	Others	187(73.05)	69(26.95)	256			
	Total	5,699(69.64)	2,484(30.36)	8183			
Educational level	No education	437(75.17)	139(24.13)	576	91.313	2	.000
	Primary	2183(75.47)	721(24.83)	2904			
	Secondary And Above	3097(65.47)	1624(34.53)	4,703			
	Total	5,699(69.64)	2,484(30.36)	8183			
kinship	Head of Household	1,428 (86.86)	216 (13.14)	1,644	567.14	5	.000
	Spouse	597 (51.91)	553 (48.09)	1,150			
	Son/daughter of head and spouse	1,008 (59.29)	692 (40.71)	1,700			
	Son/daughter of head	760 (63.49)	437(36.51)	1,197			
	Son/daughter of spouse	25 (64.10)	14(35.90)	39			
	Other	1,881 (76.68)	572 (23.32)	2,453			
	Total	5,699(69.64)	2,484 (30.36)	8183			

4.2 Multilevel logistic regression analyses

For this study, a two-level structure (with youth as first level unit and EA as second level unit) has been used. The nesting structure is youth within EA that resulted in a set of 53 EA with a total of 8,183 youth. The data used in this study consist of variables describing individuals as well as EA.

The multilevel analysis is used to identify the significant factor that affect youth unemployment at individual level(youth) and second level (EA's). Therefore, in this section, three types of multilevel logistic regression analysis such as empty model, random intercept with fixed effects model and random coefficient with random intercept model is used. Moreover, test goodness of fit, interpretation, model building and model selection is also presented.

4.2.1 Test of heterogenity

Before we proceed to multilevel logistic regression analysis, we need to test the heterogeneity of youth unemployment in urban Ethiopia. A chi-square test was applied to assess heterogeneity in the proportion of youth unemployment among the 53 EA. The test X^2= 166.7222 , df =52, P=0.001. Thus, there is evidence for heterogeneity with respect to youth unemployment across EA's.

4.2.2 Model building

The immediate uni-variable analysis plays a role first to detect whether the factors individually affect the unemployment among the youth at 25% level of significance. The uni variable multilevel analysis result shows that the socio-economic and demographic factors like sex, educational level, field of study, kinship and marital status were found significant while age was not significant. Backward variable selection method was used to select significant variables/factors in fitting a multilevel logistic regression model to be used for identifying the determinants of youth unemployment and those predictors which were significant at 0.05 level of significance were considered.

4.2.3 Model selection criteria

As it can be seen in Table 4.2, the value of AIC and BIC were used to make an overall comparison of the empty model with random intercept model, random intercept with fixed effect model and random coefficient model. The value of AIC and BIC for random intercept model(AIC = 9212.105 and BIC = 9338.282) are less than those for the

empty model with random intercept (AIC = 9997.559 and BIC = 10011.88), and for random coefficient model(AIC = 9215.809 and BIC = 9356.005). This implies that the random intercept model with fixed effect model better fit the youth unemployment data as compared with the empty model and the random coefficient model.

Table 4.2: Results of multilevel logistic regression model selection criteria

Fitted model	empty model	random intercept model	random coefficient model
-log likelihood(LL)	-4996.93	-4588.05	-4587.9045
AIC	9997.559	9212.105	9215.809
BIC	10011.88	9338.282	9356.005

4.2.4 Empty Model

Table 4.3: Result of Parameter Estimate of Random Intercept-Only Model

Outcome	Coef.	Std. Err.	P>|z|	95% Conf. Interval
_cons	-0.8970	0.0571	0.000	(-1.0090, -0.7850)
EA : Var(_cons) $=\sigma_0^2$	0.0839	0.0330		(0.0379 , 0.1856)
ICC	.0249	.0098		(.0114,.0534)

Table 4.3, shows the result of parameter estimation for empty model. From the Table the null hypothesis is $H_0 : \sigma_0^2 = 0$. (there is no significant youth variation among EA's) versus $H_1 : \sigma_0^2 \neq 0$. (there is a significant variation). Based on the table output with

$$Z = \frac{\hat{\sigma_0^2}}{SE(\hat{\sigma_0^2})} = .0838691/.0339984 = 2.467$$

df=1 with the corresponding which is less than α-value 0.05, the null hypothesis has to be rejected and this indicates there is a significant youth unemployment variation across EA's.Thus, multilevel analysis can be considered as an appropriate method for the study .

As it can be seen in Table 4.3, it is useful to see how much youth unemployment variation was attribute to the EA's. The intra-class correlation coefficient is used to measure the proportion of variance of youth unemployment between EA, not within EA. The intra-class correlation coefficient for intercept only model (ICC) = 0.0839/(0.0839+3.29)=0.025, which significant at 5% level. This means approximately 2.5% of the variation in youth unemployment is due to variation across EA, wheres the remaining 97.5% attribute to individual level, i.e., within EA .

4.2.5 Random intercept with Fixed effect model

The results of the two-level random intercept with fixed effect model are presented in table 4.4,

The random intercept with fixed slope results shows the socio-economic and demographic factors sex, field of study, marital status, educational level and kinship category are statistically significant predictors for youth unemployment.

Table 4.4, shows that sex of respondent is significantly associated with unemployment youth at 5% level of significance. This indicates, that female youth was (OR=1.2991; CI= (1.1500, 1.4549)) more likely to be unemployed than males. The odds of youth unemployed for married youth were 2.0021 times (OR=2.0021; 95% CI for OR = (1.6398, 2.4442)) higher than of youth unemployment in never married group.

Table 4.4, indicates that the educational level of respondent is significantly associated with youth unemployment status. The odds of youth unemployed who had secondary and above education were 98.16% (OR: 1.9816; 95% CI for OR: (1.5926, 2.4655)) more than who had no education.

This study also shows that the field of study they have taken is significantly associated with the unemployment status of youth at 5% level of significance. The odds of unemployment of youth who have study social science were 0.6325 times (OR=0.6325; 95% CI for OR= (0.5152, 0.7765)) less than the youth who had no field of study. The odds of youth unemployment who studied health science were about 58.31% (OR=0.4169;95% CI for OR = (0.2901, 0.5991)) less than those who had no field of study. The odds of unemployment of youth who had studied natural science were 0.5055 times (OR=0.5055; CI= (0.3763, 0.6791)) less than unemployed youth who had no field of study and the odds of youth unemployment who studied other social service were 52.41% (OR=0.4759; 95% CI for OR=(0.3947, 0.5738)) less than unemployed youth who had no field of study.

Table 4.4: Results of random intercept with fixed slope Model.

Employment status	category	$\hat{\beta}$	SE[$\hat{\beta}$].	P-value	OR	95% CI OR
Sex	Male(ref))	-	-	-	-	-
	Female	0.261673	0.0578	0.000	1.2991	[1.1500, 1.4549]
Field of study	No field of study (ref)	-	-	-	-	-
	Social science	-0.4580	0.1046	0.000	0.6325	[0.5152, 0.7765]
	Natural science	-0.6822	.1507	0.000	0.5055	[0.3763, 0.6791]
	Engineering	-.2217	.1294	0.087	0.8012	[0.6217, 1.0325]
	Health science	-.8749	.1850	0.000	0.4169	[0.2901, 0.5991]
	Agriculture	-.3830	.3378	0.257	0.6818	[0.3517, 1.3219]
	Other social service	-.7426	.0955	0.000	0.4759	[0.3947, 0.5738]
Marital status	Never married(ref.)	-	-	-	-	-
	Married	.6942	.1018	0.000	2.0021	[1.6398, 2.4442]
	Others	.3021	.1576	0.055	1.3527	[0.9933, 1.8423]
Educati-onal Level	No education (Ref)	-	-	-	-	-
	Primary	.0885	.1119	0.429	1.0925	[0.8773, 1.3605]
	Secondary and Above	.6839	.1115	0.000	1.9816	[1.5926, 2.4655]
kinship	head (ref)	-	-	-	-	-
	Spouse	1.2910	0.1046	0.000	3.6364	[2.8851, 4.5837]
	Son/daughter of head and spouse	1.6907	.0970	0.000	5.4231	[4.4845, 6.5581]
	Son/daughter of head	1.5286	.1029	0.000	4.6117	[3.7693, 5.6426]
	Son/daughter of spouse	1.5497	.3531	0.000	4.7101	[2.3573, 9.4113]
	Other	0.8679	.0963	0.000	2.3818	[1.9721 , 2.8768]
Random effect	Constant	-2.5791	.1455	0.000		[0.0570, 0.1009]
	$Var(U_0j)$	.0736	.0282			[.0389, .1842]
	ICC	.0219	.0082			[.0105, .0453]

$\hat{\beta}$: coefficient estimate; 95% CI for OR: 95% confidence interval for odds ratio; OR:odds ratio; SE: standard error.

4.2.6 Goodness of fit test

After a multilevel logistic regression model has been fitted, a global test of goodness of fit of the resulting model should be performed. One assessment of the overall model fit in multilevel logistic regression analysis is the likelihood ratio test. From the random intercept model output of the deviance for reduced model and full model were 9993.858 and 9176.105, respectively. since LRT=817.75, df=16, P-value = 0.000. This indicates that random intercept with fixed slope model is better than empty model with random intercept. Therefore, this model is better fit as compared to empty model .

Chapter 5

Discussion

The objective of the study was to identify the determinants of youth unemployment in urban Ethiopia based on the 2018 Ethiopia Urban Employment-Unemployment Survey using descriptive statistics, chi-square test and multilevel logistic regression model. The descriptive result of the study shows that about 2484(30.4%) of the sample youth were unemployed while the remaining 5699(69.64%) were employed.

The analysis based on multilevel logistic regression analysis provided estimates for variances of the random effects and intra-class correlations. The estimates for each level were suggesting that the variance composition of unemployment status was different at individual and EA levels. This means that the sources of variations are individuals and EA's. The result of the multilevel logistic regression model comparison indicates that the random intercept multilevel logistic regression model best fits the model than the Empty model and random coefficient model of the multilevel logistic regression model. This study similar with the finding of the study by Chikako (2018)

The multilevel logistic regression result shows that sex, kinship, educational level, field of study and marital status were significantly related to youth unemployment. As female youth is more likely to be unemployed than male.The marital status of youth is statistically significant determinants of youth unemployment in urban Ethiopia. Married youths were more likely to be employed than never married youth. Simi1ar findings were obtained by Amanuel (2016), Asalfew (2011), Abera (2013), Duguma et al. (2019), Batu (2016) and Chikako (2018).

The study shows that, education level was an important the determinant of youth employment status and youth unemployment who had secondary and above education were significantly differ from those who had no education. But the odds youth unem-

ployment who had primary education did not significantly differ from those who had no education. A youth who had secondary and above education was (OR: 1.9816; 95% CI: (1.5926, 2.4655)) more likely to be unemployed than a youth who no education. Simi1ar findings were obtained by Amanuel (2016), Asalfew (2011), Abera (2013), Duguma et al (2019), Batu (2016) and Chikako (2018).

The Field of study for the youth is also found to be significant with youth unemployment status. This indicates the youth who had no field of study are more likely to be unemployed than the youth who have different field of study . Similar findings were obtain by Chikako (2018).but different findings by Amanuel (2016), Asalfew (2011), Abera (2013), Duguma et al (2019), Batu (2016)

Chapter 6

Conclusion and Recommendations

Conclusion

The multilevel analysis shows that educational level, sex, field of study, kinship and marital status had a significant effect on youth unemployment at 5% level of significance. In this case, from the youth covered by this study, females are more unemployed as compared to males.

The factor, field of study is positively associated with employed status of youth while the sex, educational level and marital status are positively associated with the unemployment status of youth.

From the results , it was found out that the multilevel random intercept model is better compared to empty model and random coefficient and explaining the variations of youth unemployment status across EA's of urban Ethiopia.

Generally, individuals, families, societies, nongovernmental sector in particular and the country in general, are affected by youth unemployment.

Recommendations

Based on the findings of the study the following are recommended in order to reduce youth unemployment in urban Ethiopia.

- As female are vulnerable to unemployment, efforts made by the government and non-government to empower them should further increase their participation through promoting equal opportunities for youth male and female. So as to facilitate their entry business and macro entrepreneurship; improving awareness society about female.
- Better educational level contributes to increased youth employment; so government and non-government organizations should focus on educating youth and improving employment opportunities for youth as these are effective.

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Appendix

Model Summary

Table 6.1: Results of random coefficient Model.

Employment status	category	Coef.	Std. Err.	P-v	OR	95% CI OR
Sex	Male(ref))	-	-	-	-	-
	Female	0.261673	0.0578	0.000	1.2991	[1.1500, 1.4549]
Field of study	No field of study (ref)	-	-	-	-	-
	Social science	-0.4580	0.1046	0.000	0.6325	[0.5152, 0.7765]
	Natural science	-0.6822	.1507	0.000	0.5055	[0.3763, 0.6791]
	Engineering	-.2217	.1294	0.087	0.8012	[0.6217, 1.0325]
	Health science	-.8749	.1850	0.000	0.4169	[0.2901, 0.5991]
	Agriculture	-.3830	.3378	0.257	0.6818	[0.3517, 1.3219]
	Other social service	-.7426	.0955	0.000	0.4759	[0.3947, 0.5738]
Marital status	Never married(ref.)	-	-	-	-	-
	Married	.6942	.1018	0.000	2.0021	[1.6398, 2.4442]
	Others	.3021	.1576	0.055	1.3527	[0.9933, 1.8423]
Educati-onal Level	No education (Ref)	-	-	-	-	-
	Primary	.0885	.1119	0.429	1.0925	[0.8773, 1.3605]
	Secondary and Above	.6839	.1115	0.000	1.9816	[1.5926, 2.4655]
kinship	head (ref)	-	-	-	-	-
	Spouse	1.2910	0.1046	0.000	3.6364	[2.8851, 4.5837]
	Son/daughter of head and spouse	1.6907	.0970	0.000	5.4231	[4.4845, 6.5581]
	Son/daughter of head	1.5286	.1029	0.000	4.6117	[3.7693, 5.6426]
	Son/daughter of spouse	1.5497	.3531	0.000	4.7101	[2.3573, 9.4113]
	Other	0.8679	.0963	0.000	2.3818	[1.9721 , 2.8768]
Random	Constant	-2.5791	.1455	0.000		[0.0570, 0.1009]
	$Var(u_0j)$	0.1026	0.0684			[.0278, .3791]
	Var($Educ.level$)	..0047	.0136			[.0000, 1.3592]
	Cov($cons, Educ.level$)	-.0130	.0272	-0.48	0.634	[-.0663, .0403]