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TRENDES AND DETERMINANTES OF INCOME INEQUALITYIN ETHIOPIA

By

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ADDIS ABABA, ETHIOPIA

TRENDES AND DETERMINANTES OF INCOME INEQUALITYIN ETHIOPIA

A THESIS SUBMITTED TO THE ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES PARTIAL FULFILLMENTS OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ART IN DEVELOPMENTAL ECONOMICS

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DECLARATION

I, the under signed, declare that this thesis is my original work, prepared under the guidance of **KurabachewMenber (PhD)**.All sources of material used while working on this thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any type of degree.

Assefa Belay Signature:_____

ENDORSEMENT

This thesis has been submitted to St. Mary's University, school of Graduate Studies for examination with my approval as a university advisor.

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Advisor Signature

St. Mary's University, Addis Ababa December, 2020

APPROVED BY BOARD OF EXAMINERS

As members of board of examining of the final MA thesis open defense, we certify that we have read and evaluated the thesis prepared by Assefa Belay under the title "**Trends and Determinants of Income Inequality the Case of Ethiopia**" we recommend that this thesis to be accepted as fulfilling the thesis requirement for the Degree of Master of Art in Development Economics.

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ACRONYMS

ADF	Augmented Dickey Fuller
ARDLM	Auto Regressive Distributed Lag Model
CSA	Central Statistics Agency
CUSMSQ	Cumulative Sum of Squares
CUSUM	Cumulative Sum
DW	Durbin Watson
EEA	Ethiopia Economic Association
EKC	Environmental Kuznets Curve
EPL	Employment Protection Legislation
FRED	Federal Reserve Economic Data
GDP	Gross Domestic Product
IMF	International Monetary Found
KPSS	Kwiatowski Phillips Schmidt Shin
MOFED	Ministry of Finance and Economics
NBE	National Bank of Ethiopia
OLS	Ordinal Least Square
PP	Philip-Perron

UNCTAD	United Nation Conference on Trade and Development
UNSESCO	United Nation Educational Scientific and Cultural Organization
VARM	Vector Error Correction Model
VECM	Vector Error Correction Model
VIF	Variance Inflation Factor

ABSTRACT

Income inequality has been regarded as one of the most serious problem that most countries (both developed and developing countries) face today. Inequality can be signal of lack of income mobility and opportunity reflections of persistent disadvantage for particular segments of the society. The main objective of this study is to analyze the trends and examine the determinants of income inequality in Ethiopia from (1988 to2018). The data collected from World Development Indicator (WDI), the Global Economy, World Data Bank and National Bank of Ethiopia websites. The method of analysis was both descriptive and econometrics analysis. In descriptive analysis, the trend of income inequality, real GDP per capita, unemployment rate, net primary school enrollment rate trade openness and inflation rate have been analyzed. To check the verifiability of the estimated long run model, some diagnostic test is undertaken. This paper used Autoregressive Distributed Lag (ARDL) and Error Correction Model (ECM) in order to investigate the long-run and short run relationship between the dependent variable (income inequality) and its determinants. To test stationary Augmented Dickey –Fuller (ADF) test and Phillpes Perron (PP) test were used. All the determinants have got with a sign as expected by the paper. The finding of the Bounds test shows that there is a stable long run relationship between income inequality and real GDP per capital, School of enrollment rate, trade openness, unemployment rate and general inflation rate. The study results real GDP per capita, unemployment rate and inflation rate have a positive impact on income inequality. The remaining has negative impact. In the long run analysis, real GDP per capita, net primary school enrollment rate, unemployment rate and constant are statistically significant .The error correction coefficient, estimated at -0.84277 is highly significant, has the correct negative sign, and imply a very high speed of adjustment to equilibrium. According to the econometrics analysis, real GDP per capita and unemployment rate are the main determinants of income inequality for Ethiopia based on ARDL model estimation result. According to the thesis, the paper gives some policy recommendations. Like the government or other responsible body should focus on the countries growth and development, decreasing unemployment rate, Inflation rate the expansion of education access and the development of international trade in order to reduce the income gap of the people. And the policies should consider the poor to participate them from the countries benefit.

Keywords: Economic Growth, Income Inequality, ARDL, ECM, Ethiopia.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Economic inequality is most obviously shown by people's different positions within the economic distribution - income, pay, and wealth (The Equality Trust 2012-2016). There are three main types of economic inequality. Such as income inequality, pay inequality, wealth inequality. The first one is income inequality which is the extent to which income is distributed unevenly in a group of people. Income is not just the money received through pay, but all the money received from employment (wages, salaries, bonuses etc.), investments, such as interest on savings accounts and dividends from shares of stock, savings, state benefits, pensions (state, personal, company) and rent. The second one is pay inequality. Pay refers to payment from employment only. This can be on an hourly, monthly or annual basis, is typically paid weekly or monthly and may also include bonuses. Pay inequality therefore describes the difference between people's pay and this may be within one company or across all pay received. The last one is wealth inequality. Wealth refers to the total amount of assets of an individual or household. This may include financial assets, such as bonds and stocks, property and private pension rights. Wealth inequality therefore refers to the unequal distribution of assets in a group of people, (The Equality Trust 2012-2015).The word income means "the money that a person, a region, a country, etc… earns from investing money, from business etc… ".And inequality defined as "something that is unfair; the state of being unfair, unjust". Together, income inequality means "unfair or unjust distribution of money, earns from investing, from business etc…" (Oxford, 2017). There are a number of factors that drive income inequality, Such as technological change, change in labor market institutions, redistributive policy, education and other social, economic, political and demographical factors. Technology has led to improvements in productivity and well-being by leaps and bounds, but has also played a central role in driving up the skill premium resulting in increased labor inequality. This is because technological changes can disproportionately raise the demand for capital and skilled labor over law – skilled and unskilled Labor by eliminating many jobs through automation or upgrading the skill level required to

attaining or keeping those jobs (Card and Dinardo 2012; Acemoglu 1998). More flexible labor market institution can foster economic dynamism by reallocating resources to more productive firms and enabling firm restructuring. If it's not flexible income inequality will be increased. Education can play an important role in reducing income inequality, or it determines occupational choice, access to jobs, and the level of pay, and plays a pivotal role or ability and productivity in the job market. The distribution of income will be unfair when education is not well address to the people. And the above advantages will be lost.

Income inequality influences the macroeconomic and social activities indifferent ways. According to previous IMF studies, income inequality (which is measured by GINI coefficient) negatively affect growth and its sustainability (Beerg and Ostry, 2014). By depriving the ability of lower – income households to stay healthy and accumulate physical and human capital higher inequality lowers growth of the country (Galor and Moav, 2014). For example, it leads to under-investment in education as poor children ends up in lower quality schools and are less able to go to college. Because of this, labor productivity could be lower than it would have been in more equitable world (Stiglitz, 2012). Many empirical and theoretical studies indicates that the rising influence of the rich and stagnant incomes of the poor and the middle class have a causal effect on crises, and thus directly hurts short and long term growth. Similarly, higher inequality in advanced economies is associated with the global financial crisis. This global imbalance can be challenged for macroeconomic and financial stability and thus growth (Kumholf, 2013). Extreme inequality can be associated with conflict by damaging trust and social cohesion. Conflicts may arise from the management of common resources. In other words, inequality affects the economies of conflict by intensifying the power of a certain group and then reducing the opportunity costs of initiating and joining a violent conflict (Lichbach, 1989).

1.2 Statement of the Problem

Income inequality has been regarded as one of the most serious problem that most countries (both developed and developing countries) face today. Inequality with in most advanced, emerging markets and developing countries is a phenomenon that has received considerable attention. President Obama called widening income inequality has the "defining challenge of this time '(Obama,2014) .Inequality can be signal of lack of income mobility and opportunity

reflections of persistent disadvantage for particular segments of the society. Widening inequality also has significant implications for growth and Marco economic making power in the hands of a few, lead to a suboptimal use of human resources, cause investment reducing political and economic instability, and raise crisis risk. The economic and social fallout from the global financial crisis and the resultant head winds to global growth and employment have heightened the attention to rising income inequality. (Era dabble Norris, KalpanaKocchar 2015).According to many evidences, the rich becomes richer and the poor becomes poorer. This shows the presence of high wealth concentration. This means the newly created wealth is concentrated in already wealthy individuals because people who already hold wealth have the resource to invest, which creates new wealth. This wealth concentration process makes income inequality a vicious cycle. Its effect may be transform to future generations. The children with rich family have an economic advantage of getting quality education good health care. As a result, they may have a higher chance of earning a higher income than their poor peers. This creates a vicious cycle of inequality. Now a day, the issue becomes a headache for politicians. Higher inequality lower growth by depressing the ability of lower income house to stay healthy and accumulate physical and human capital (Galor and Moav 2004) for instance, it can lead to under-investment in schools and are less able to go on to college. As result, labor productivity could be lower than it would have been in a more equitable world (Stieglitz 2017).

Extreme inequality may damage trust and social cohesion and thus is also associated with conflicts, which discourage investment. Conflicts are particular prevalent in the management of common resources, for example, inequality makes resolving disputes more difficult, see, for example bard hare (2008).Although in Ethiopia, there is a high level of unequal distribution of resources exists between people. The countries level of national income inequality measured by GINI coefficient in2017/18 is 0.33, rural income inequality is 0.28 and urban income inequality is 0.38. Which is low, but it grows rapidly. It is especially so in the Ethiopia where poverty is widespread and where, give low likely to be significant. This research was used only 31 years data, because of time constraint but it is better to use 60 and above year's data to analyze tends and its determinants by using macro variables, this is interesting since it is important for policy makers, academics and others to understand the forces behind distribution of income in order to trickle the problem in most efficient way. Even though there are many studies on the issues at

international level, few attempts were made to examine the determinants of income inequality a case of Ethiopia by using micro variables. This research is tries to fill the gaps that are not address by other researcher. Much of the income inequality literature focuses on the relationship between income inequality and economic growth, but a different strand of literature takes a step back and instead looks at the causes of income inequality and they were not address' trends and determinants of income inequality by using macro variables, so this research was fill the gaps that was not address by other researchers by analyzing trends determinants of income inequality by using macro variables.

1.3 Objective of the Study

1.3.1 General Objective

The ultimate objective of this research is to analyze the trends and examine the determinants of income inequality in Ethiopia from (1988 to 2018).

1.3.2 Specific objective

- To analyze the trend of income inequality at national level
- To analyze determinants of income inequality in study area
- To identify the main determinants of income inequality

1.4 Significance of the Study

The study was providing essential information to bring sustainable and fair distribution of income among residents. Identifying its determinants of income inequality is necessary for a number of reasons. It is important from the view point of fair distribution of income and to alleviate the poverty from the society. In addition the identification of the key determinants of income inequality helps policy makers with appropriate ways of intervention for controlling income inequality and this research was provide a conclusion and policy recommendations and advice the responsible body who formulate economic policy to give a heavy attention to the determinants that affect income inequality the most

1.5 Scope and Limitations of the Study

Income inequality is abroad topic. However, the scope of this study would be to examine trends and determinants of income inequality using the data for the period 1988 to 2018. Years of 1988 to 2018 ware selected based on data availability. The researcher faced obstacle which is difficult to accomplish the paper successfully. The limitation of this study was the one associated with data availability. There are shortages of data, particularly, on Gini coefficient and trade openness, specially, for the early period. The main aim of this study is to analyze the macroeconomic determinants of income inequality and its trends. However, there are also another factors that affecting income inequality like high political stability, governance effectiveness, rules of economic regulation (monitoring and fiscal policy), and rules of law (property right) structure of the economy, government expenditure, external debit and financial aid, foreign reserve and exchange rate, growth of population, privatization and level of tax, are not addressed here and might be consider other limitations of this study. Despite the above difficulty, the researcher uses maximum effort to accomplish the research paper comprehensively.

1.6 Organization of the Thesis

The study was organized in to five chapters. Chapter one covered the introduction, statement of the problem, objective of the study, scope of the study, significance of the study , limitation of the study and organization of the study, second chapter contained review of literature, the third chapter included methodology of the study and chapter four provided descriptive and econometrics results. Finally, the last chapter included conclusion and recommendation of the study.

CHAPTER TWO

LITERATURES REVIEW

2.1 Theoretical Literature

2.1.1 Income Inequality and Its Measurement

Income inequality: is the unequal distribution of household or individual income across the various participants in an economy. Income inequality is presented as the percentage of income to a percentage of population. For example, a statistics may indicate that 70% of a country's income is controlled by 20% of that country's residents. It is associated with the idea of income "fairness". It is generally considered "unfair" if the rich have a disproportionally larger portion of a country's income compared to their population. Income inequality is the state of an economy in which the share of total income earned by the rich and the poor are highly unequal the distribution. Economic policy makers can face a tradeoff between promoting equality and economic growth. As income shares become more equal, the incentive for individuals to accumulate skills, work hard, and take risks might become smaller, thus shrinking the size of the economy.

Income Inequality and Lorenz Curve: It is a graphical representation of the distribution of income or of wealth. It was developed by Max O. Lorenz in 1905 for representing inequality of the wealth distribution. The curve is a graph showing the proportion of overall income or wealth assumed by the bottom x% of the people. It is often used to represent income distribution, where it shows for the bottom x% of households, what percentage (y %) of the total income they have. The percentage of households is plotted on the x-axis, the percentage of income on the y-axis. It can also be used to show distribution of assets. In such use, many economists consider it to be a measure of social inequality. If all individuals are the same size, the Lorenz curve is a straight diagonal line, called the line of equality. If there is any inequality can be summarized by the Gini coefficient (also called the Gini ratio), which is the ratio between the area enclosed by the line of equality and the Lorenz curve, and the total triangular area under the line of equality. The degree

of asymmetry around the axis of symmetry is measured by the so-called Lorenz asymmetry coefficient.

Income inequality and Gini Coefficient: It is one of the most widely used measures of inequality and its measures the extent to which the Lorenz curve departs from the line of equality. It is defined as a ratio with values between 0 and 1: the numerator is the area between the Lorenz curve of the distribution and the uniform distribution line; the denominator is the area under the uniform distribution line. It was developed by the Italian statistician Corrado Gini and published in his 1912 paper "Variabilita e mutabilita" ("Variability and Mutability"). The Gini coefficient is often used to measure income inequality. Here, 0 corresponds to perfect income inequality (everyone has the same income) and 1 corresponds to perfect income inequality (i.e. one person has all the income, while everyone else has zero income). The Gini coefficient can also use to measure wealth inequality. It is also commonly used for the measurement of discriminatory power of rating systems in the credit risk management. The Gini Index is the Gini coefficient expressed as a percentage, and is equal to the Gini coefficient multiplied by 100. The Gini coefficient is equal to half of the relative mean difference (www.Gini coefficient .org).

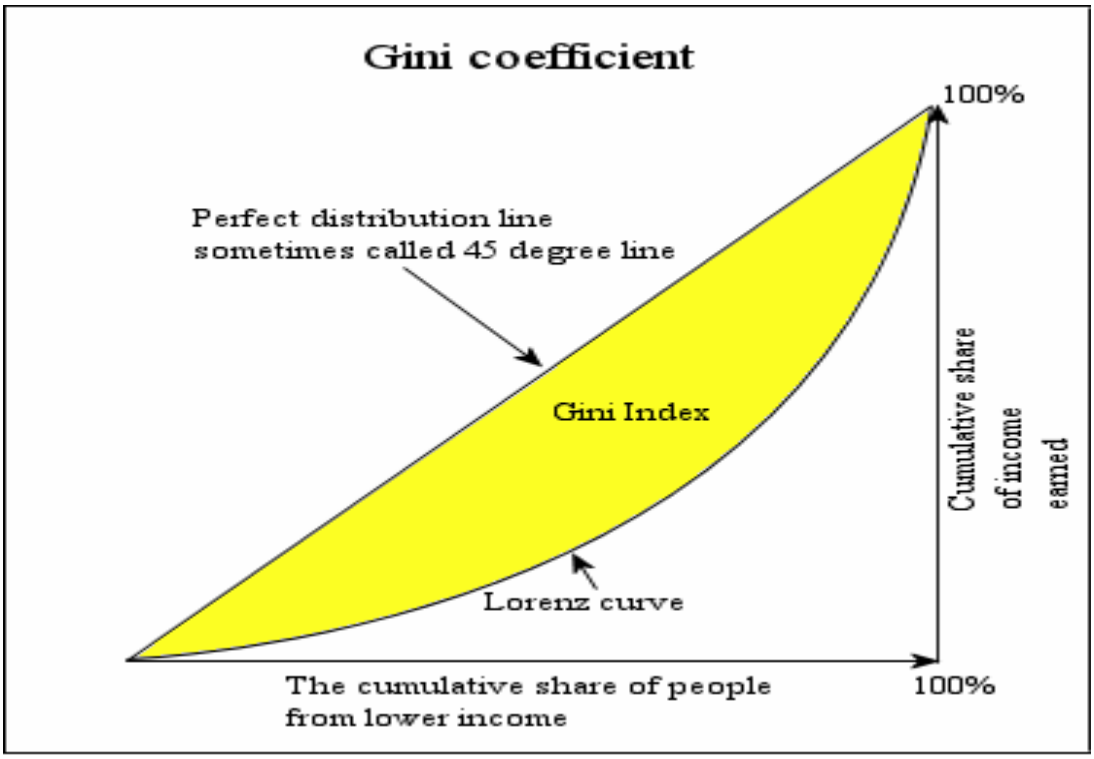

Figure 2-1: Gini coefficient

Gini coefficient is defined as a ratio of areas on the Lorenz curve diagram, i.e.

$$\text{Gini coefficient} = \frac{ShadedArea}{Unsheded\ Area}$$

If the Lorenz curve is represented by function Y =L(x), then the value /area of under the Lorenz curve can be found withe integration i.e.

$$\textbf{Gini coefficient} = 1 - 2\int_0^1 L(x)dx \quad \text{----------(2.1)}$$

Income Inequality and Gini index: It measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Gini index is a multiple of Gini index by 100. (Data. world bank. Org 2017)

Income Inequality and Coefficient of variation: To find out the imbalance between the different states in terms of per capita incomes, this measure is given by Yotopoulous and Lau. Coefficient of variation is based on mean and dispersion. It is an average index of inequality for all regions. It measures the variation of observation from the mean. If its value is positive, it means observations are more than mean value as well as, if its value is high, it means that distances from the mean value is high. Disparity occurs when its value is positive and increases during the time period.

Income Inequality and Theil Index: This measure was developed by Theil (1967) and used by Cuadrardo, Dehesa and Precedo (1993) to study income inequalities among the member states of the European Economic Community. Under this measure relative inequality among the regions, in economic indicators such as income, is best explained by a simple ratio which compares shares of the states in that indicator (say, income) with their respective shares in population. By comparing the ratios it provides a good description of inequality among regions. For example; if we take income indicators, we can compare the ratios Yi/Pi across regions, where Yi and Pi is respectively the i^{th} share in total income and the region's population. The regions which have

Yi/Pi above unity are better off states and the regions which have Yi/Pi below unity are not doing well.

2.1.2 Income Inequality and Its Determinants

Economic growth**:** There is a conceptual difference between economic growth and economic development. A country's economic growth is usually indicated by an increase in that country's gross domestic product, or GDP. Gross domestic product is an economic model that reflects the value of a country's output. In other words, a country's GDP is the total monetary value of the goods and services produced by that country over a specific period of time. Economic growth is the increase in the inflation- adjusted market value of the goods and services produced by an economy. It is measured as the percent rate of increase in real gross domestic product, or real GDP, the growth of the ratio of GDP to population (GDP per capita, which is called per capita income. An increase in growth caused by more efficient use of inputs (such as labor, physical capital, energy as materials) is referred to as intensive growth. GDP growth caused only by increase in the amount of inputs available for use (increased population, new territory) is called extensive growth. While, economic development is a process where low income national economies are transformed in to modern industrial economies. It involves qualitative and quantitative improvements in a countries economy. Political and social transformations are also included in the concept of economic development in addition to economic change. A country's economic development is usually indicated by an increase in citizen's quality of life. 'Quality of life' is often measured using the Human Development Index, which is an economic model that considers intrinsic personal factors not considered in economic growth, such as literacy rates, life expectancy and poverty and poverty rates. (Study.com 2014-2016)

There have been attempt to establish links between GDP per capita and economic growth on one side and inequality on the other since the mid -1950's. Kuznets hypothesis (1963) postulates that in the early stages of development, both a country's economic growth and its inequality increase. A country grows and develops the income gap between the rich and the poor should decrease. Indeed, according to Kuznets, there is a gradual shift from a low-inequality, low-income, agricultural economy, towards a high income and medium- inequality economy characterized by industrial production. These shifts would lead to the inverted u- shaped relationship between real

GDP per capita and inequality. Kuznets argues that in the initial period, agriculture represents the bulk of a country's economy, which is also characterized by low levels of inequality. A shift towards the secondary and the tertiary sectors has two effects in the short run. The first effect is that it can accelerate economic growth leading to higher levels of GDP per capita. The second and most dramatic effect is that this increases the level of inequality. Consequently, in the initial stages of economic development, the level of GDP per capita and inequality are positively correlated. As countries develop they shift more and more resources from agriculture to industry (and later to service), and this will in time decrease the income gap between the industry and agriculture simply because there will be more and more workers working in the industrial sector. Consequently, the long run relationship between inequality and GDP per capita is negative. Kuznets' hypothesis examined in terms of quadratic equation which is used to test this hypothesis. The Kuznets curve is a curve that graphs economic inequality (represented by Gini coefficient) against income per capita over the course of economic development (which was presumed to correlate with time). This curve is meant to illustrate economist Simon Kuznets hypothesis about the behavior and relationship of these two variables as an economy develops from a primary rural agriculture society to an industrialized urban economy. The curve implies that as a nation undergoes industrialization (especially the mechanization of agriculture) the center of the nation's economy will shift to the cities. As internal migration by farmers looking for better- paying jobs in urban hubs causes a significant rural urban inequality gap (the owners of firms would be profiting, while laborers from those industries would see their incomes at a much slower rate and agricultural works would possibly see their income decrease), rural populations decrease as urban populations increase. Inequality is then expected to decrease when a certain level of average income is reached and the processes of industrialization-democratization and the rise of welfare state – allowing for the trickle-down of the benefits from rapid growth, and increase the per capita income. In general, Kuznets believed that inequality would follow an inverted "U" shape as it rises and then fails again with the increase of income per capita (www.Kuznetcurve)

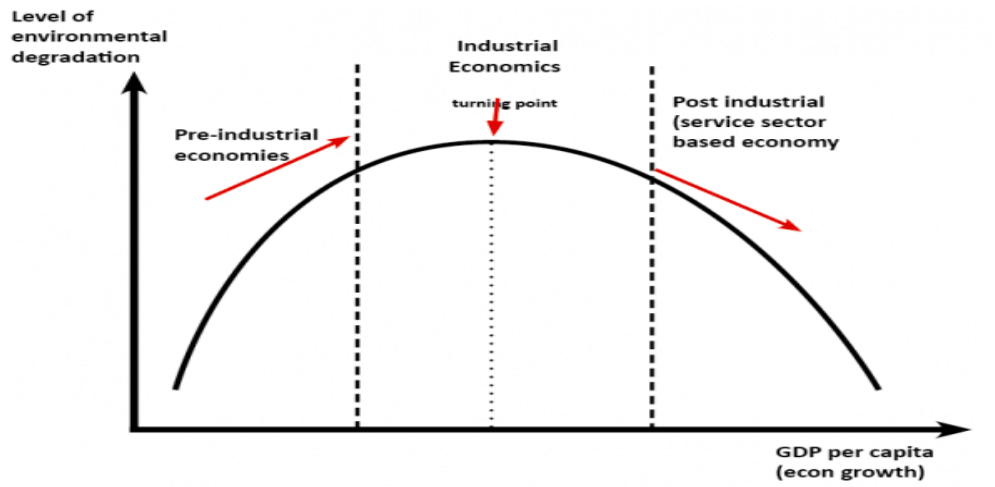

Figure 2-2: Kuznets curve

There have been a number of critics for Kuznets curve. The first arguments of critics are based upon the countries used in Kuznets' data set. Critics say that Kuznets curve does not reflect an average progression of economic development for an individual country, but rather it is representation of historical differences in economic development and inequality between countries in the data set. The critics hold that when controlling for this variable, the inverted U–shape of the Kuznets curve begins to diminish. Other criticisms have come to light over time as more economists have developed hypothesis with more dimensions and more countries had undergone rapid economic growth that did not necessarily follow Kuznets' hypothesized pattern.

Level of Unemployment: the countries employment level is determined by the performance of institutions and the policies of the country. The role of institutions and labor market polices, such as the union coverage and the setting of the minimum wage has a great role for the distribution of income. For example, the effect of changing employment protection legislation (EPL) on income inequality is ambiguous. This is because the overall effect is dependent on two contrasting channels: (1) the effect of EPL on the employment rate and (2) the effect of EPL on the earnings inequality among the entire working age population (i.e. inequality between workers and non-workers or between full time and part- time workers). A weakening of employment protection, in particular the liberalization of temporary contracts is expected to contribute to higher wage inequality. To generalized, employment protection legislation (EPL) is expected to exert a positive impact on income inequality when the effect of EPL on wages dispersion prevails,

Whereas is expected to exert a negative impact when the corresponding effect on the unemployment rate appears to be larger.

Education: Another important factor in the creation of inequality is variation in individuals' access to education. Education, especially in an area where there is a high demand for workers, creates a high wages for those with this education, however, increase in education first increase and then decrease growth as well as income inequality. As a result, those who are unable to afford an education, or choose not to pursue optional education, generally receive much lower wages. The justification for this is that a lack of education leads directly to lower incomes, and thus lower aggregate savings and investment. Conversely, education raises incomes and promotes growth because it helps to increase the productive potential of the poor. Education is very important for the growth of the economy; however educational inequality in gender also influence towards the economy. Gender inequality in education can result to slow economic growth, and continued gender inequality in education, thus creating a poverty trap. It is suggested that a large gap in male and female may indicate backwardness and so may be associated with lower economic growth, which can explain why there is economic inequality between countries. In addition, labor market success is linked to schooling achievement, the consequences of widening disparities in schooling is likely to be further increases in earnings inequality. By increasing the efficiency of the labor force education create better conditions for good governance, improving health and enhancing equality. (Abdul j. and others 2011)

Trade openness: A simple Hecksher-Ohlin model says that countries export those factors (in goods bundles) that they are relatively well endowed with. This increases the demand for their abundant factors and through that raises relative prices of these factors. In general, developed countries can be said to be well endowed with capital and developing countries with unskilled labor. From this theoretical standpoint we can predict that openness would benefit unskilled labors in developing countries and capital owners in developed countries. If more factor of production and more countries than in the simple two goods- two factor- two countries- model are included comparative advantages become more complicated. Depending on the distribution of factor of production between countries we may define different hypothesis from this setting. (Satheesh A. and others).

Other determinants: The country's natural resource, democratic system, tax system, globalization, technological change and other demographic, political, historical, cultural and natural factors determine the distribution of income of that country. But, such factors have little power to determine income inequality.

2.1.3 Effects of Income Inequality on Economic Growth

Higher inequality lowers growth by depriving the ability of lower income households to stay healthy and accumulate physical and human capital. Increasing concentration of incomes could also reduce aggregate demand and undermine growth, because the wealthy spend a lower fraction of their incomes than middle – and lower – income groups. Therefore, inequality affects growth drivers (IMF, 2015). For instance, it can lead to underinvestment in education as poor children n ends up in lower quality schools and are less able to go on to college. As a result, labor productivity could be lower than it would have been in a more equitable world (Stiglitz, 2012). In the same vein, Corak (2013) finds that countries with higher levels of income inequality tend to have lower level of mobility between generations, with parents earning being a more important determinant of children's earnings. So, it also affects the future growth perspective.

2.1.4 Effects of Income Inequality on Human Capital

Income inequality affects human capital negatively. It decreases the efficiency of people in different ways. If children's are less effective at school, they are less likely to become highly skilled workers. Their productive capacity and the productive capacity of the economy are diminished. Inequality reduces performance because of its segregation effects. If schools are segregated, children's from socioeconomically disadvantaged households mix with other disadvantage children who do not perform well at school. Segregation with more likely in an unequal society, the negative effects of poor children associated with less gifted are greater than any positive effects of poor children associating with more gifted children. So, inequality may cause a net reduction in education attainment.

The other way is higher rates of health and social problems (obesity, mental illness, homicides, teenage births, incarceration, child conflict, drug use, and lower rates of social goods (life

expectancy by country, educational performance, trust among strangers, women's status, social mobility, even numbers of parents issued) in countries and states with higher inequality. inequality and social stratification leads to higher levels of psychologically stress and status anxiety. which can lead to depression, chemical dependency, less community life, parenting problems amid stress related diseases. And, if people are not healthy, they will not work to their full productive capacity.

High and persistent unemployment, in which inequality increases, has a negative effect on subsequent long run economic growth. Unemployment can harm growth not only because it is a waste of resources, but also because it generates redistributive pressures and subsequent distortions, drives people to poverty, constrains liquidity limiting labor mobility, and erodes self-esteem promoting social dislocation, unrest and conflict.

2.1.5 Effects of Income Inequality on Policies of the Country

Inequality can lead to policies that hurt growth. For example, it can lead to a backlash against growth, enhancing economic liberalization and fuel protectionist pressure against globalization and market oriented reforms (Claessens and Perotti, 2007). At the same time, enhancing power by the elite could result in a more limited provision of public goods that boost productivity and growth, and which disproportionately benefit the poor (Bourguignon and Dessus, 2009). In addition, the policies may not be based on poverty reduction. Growth is less efficient in lowering poverty in countries with high initial levels of inequality or in which the distributional pattern of growth favors the non-poor. Moreover, to the extent that economies are periodically subject to shocks of various kinds that undermine growth, higher inequality makes a greater population vulnerable to poverty.

Higher income inequality led to less of all forms of social, cultural, and civil participation among the less wealthy. When inequality is higher the poor do not shift to less expensive forms of participation. Following the utilitarian principle of seeking the greatest good for the greatest number of economic inequality is problematic. An additional dollar spent by a poor person will go to things providing a great deal of utility to that person, such as basic necessities like food, water and health care; while, an additional dollar spent by a much richer person will very likely go to luxury items providing relatively less utility to that person. Thus, the marginal utility of

wealth per person ("the additional dollar") decrease as a person becomes richer. From this stand point, for any given amount of wealth in society, a society with more equality will have higher aggregate utility.

2.1.6 Effects of Income Inequality on the Market Structure

Grater income inequality can lead to monopolization of the labor force, resulting in fewer employers requiring fewer workers. Remaining employment can consolidate and take advantage of the relative lack of competition, leading to less consumer choice, market abuses, and relatively higher real prices. A number of economists have argued that inequality leads to economic instability. One mechanism by which this happens is that the rich consume a smaller proportion of their income than the poor. They save money which people on lower incomes would spend. This leads to a reduction in aggregate demand. This in turn leads to unemployment. In response, governments take measures to stimulate demand, such as lowering interest rates. This feeds into asset bubbles -for example unsustainably high housing prices. (IMF, 2015).

2.1.7 Effects of Income Inequality on Environment

The smaller the economic inequality, the more waste and pollution is created, resulting in many cases, in more environmental degradation. This can be explained by the fact that as the poor people in the society become wealthier, it increases their yearly carbon emissions. This relation is expressed by the environmental Kuznets curve (EKC). It should be noted here; however that in certain case, with great economic inequality, there is nonetheless not more waste and pollution created or the waste/ pollution is cleaned up better after words (water treatments, filtering…). Also note that the whole of the increase in environmental degradation is the result of the increase of emissions per person being multiplied by a multiplier. If there were fewer people however, this multiplier would be lower and thus the amount of environmental degradation would be lower as well. As such, the current high level of population has a large impact on this as well. If population levels would start to drop to a sustainable level, human inequality can be addressed /correlated, while still not resulting in an increase of environmental damage (IMF, 2015).

2.1.8 Effects of Income Inequality on National Stability and Social Cohesion

Extreme inequality may damage trust and social cohesion and thus is also associated with conflicts, which discourage investment. Conflicts are particularly prevalent in the management of common resources whose; for example, inequality makes resolving disputes more difficult. More broadly, inequality affects the economies of conflict, as it may intensify the grievances felt by certain groups or can reduce the opportunity costs of initiating and joining a violent conflict (Lichbach, 1989). Researchers have shown an inverse relationship between income inequality and social cohesion. In more equal societies, people are much more likely to trust each other, measures of social capital (the benefits of goodwill, fellowship, mutual sympathy and social connectedness among groups who makes up social units) suggest greater community involvement, and homicide rate are consistently lower.

2.1.9 Effects of Income Inequality on Finance

A prolonged period of higher inequality in advanced economies was associated with the global financial crisis by intensifying leverage, overextension of credit, and a relaxation in mortgage, underwriting standards, and allowing lobbyists to push for financial deregulation (Acemoglu, 2010).

2.2 Empirical Literatures Review

Getasew Alemu (2014): this paper examines the trend and extent of income inequality at rural, urban, and national level and economic growth, with a focus on trends of income inequality at a national level and the relationship between income inequality and economic growth. The result showed that there is a slight increment in income inequality since 2004/05 up to 2010/11; urban inequality is higher than rural and national income inequality. There is a negative relationship between income inequality and economic growth.

Abdurahman Hassen (2014): the paper investigates the relationship between economic growth and income inequality in case of Ethiopia for the period 1996-2011. It also tries to examine the determinants of income inequality and applicability of Kuznets inverted U-hypothesis in the Ethiopian case. The study employs OLS estimation techniques and to overcome statistical

problems of these method different techniques was employed. The findings of the study reveal that economic growth; trade openness and general government expenditure has negative impact.

Jesper R., Jonas V. and Daniel W. (2009): this paper studies determinants of income inequality using a newly assembled panel of 16 countries over the entire 20^{th} century. It focuses on three groups of income earners: the rich, the upper middle class and the rest of population. The result shows that periods of high economic growth disproportionately increases the top percentile income share at the expense of the rest of top deciles. Financial development is also pro-rich and the out breaking crises are associated with reduced income shares of the rich. Trade openness has no clear distributional impact (if anything openness reduces top shares). Government spending, however, is negatively for the upper class and positive for the nine lowest deciles but does not seem to affect the rich. Finally, tax progressivity reduces top income shares and when accounting for real dynamic effects the impact can be important over time.

Zlatko N. (2006); used panel dataset covering 81 countries. The paper analyze and empirically testes the relationship between inequality and its political and economic determinants. The study find strong statically evidence that natural resource abundance/measured through the oil and gas production as well as ores and metal exports/ is associated with increase inequality. There were also strong statistical evidences that industrialization and economic growth are associated with lower inequality. The study also shows weak evidence for the existence of the Kuznets curve.

Antonio A., Ludger S. and Vito T., (2008): this paper examines empirically the role and efficiency of public spending policies in affecting income distribution from cross-country perspective. This study first discuss conceptually the determinants of income inequality: initial conditions and public policies affect income distribution directly, it then studies the relation between distribution indicators on the one hand and public spending (except pensions) and education performance have a significance effect on income distribution as reflected in stylized facts and in the regression analysis. Results for the role of institutions and personal income taxes point in the right direction but are not robust while more open countries do not have less equal income distributions.

Abebe Fenta (2006): the main focus of this paper is to analysis the determinants of income inequality among sampled households who find themselves at the bottom and top of the income

/consumption distribution in urban centers in South Wollo Administrative Zone, Ethiopia. The result of this thesis indicates that the role of education in consumption expenditures is strongly significant. The result of OLS and quantile regression analysis also shows that the household, adult equivalent family size, household head main employment status or income sources, quality of houses, household energy sources, durable goods/assets, wastes and sanitation and place of residence are the main determinants of expenditure/income inequality of per adult equivalent consumption expenditure across all quantiles distribution.

Inflation has an effect on income distribution due to its outcome on economic growth. Tobin-Sidrauski portfolio shift model shows that inflation increases capital accumulation or diminish capital accumulation. Tyson (1998) concluded that income of the poor, decline with the increase of inflation which grinds down real minimum wages. There for the income distribution increase while inflation increase. Some of the researcher agreed with that negative relationship exists between Gini co-efficient and Inflation, on the contrary some agree with the negative relation of Gini co-efficient and inflation while some examined with the aim of there is no alliance between income inequality and inflation but in our the country the relationship of inflation and income inequality is expected to positive relationship.

2.3 General Conceptual Framework

Income Inequality is the degree to which distribution of economic welfare generated in an economy differs from that of equal shares among its nations that means income inequality is the unequal distribution of total income among the population (Sid, 2014, Gehring and Kulkarni (2016).Reconciling the three objectives of income inequality i. e, trends of income inequality, determinants of income inequality and identifying of main determinants of income inequality in less developed countries by using macro variables are challenging target. It is generally believed that income inequality is world problem. Conceptual frame work shows how the dependent and independent variables are related ; accordingly, this research have one dependent and five independent variables ,where income inequality is dependent variable ,where as real GDP capital squared, unemployment rate, inflation rate , trade openness, education, are the independent variables .The dependent and independent variables are related in the following way shown on the conceptual framework (Figure 2-3).

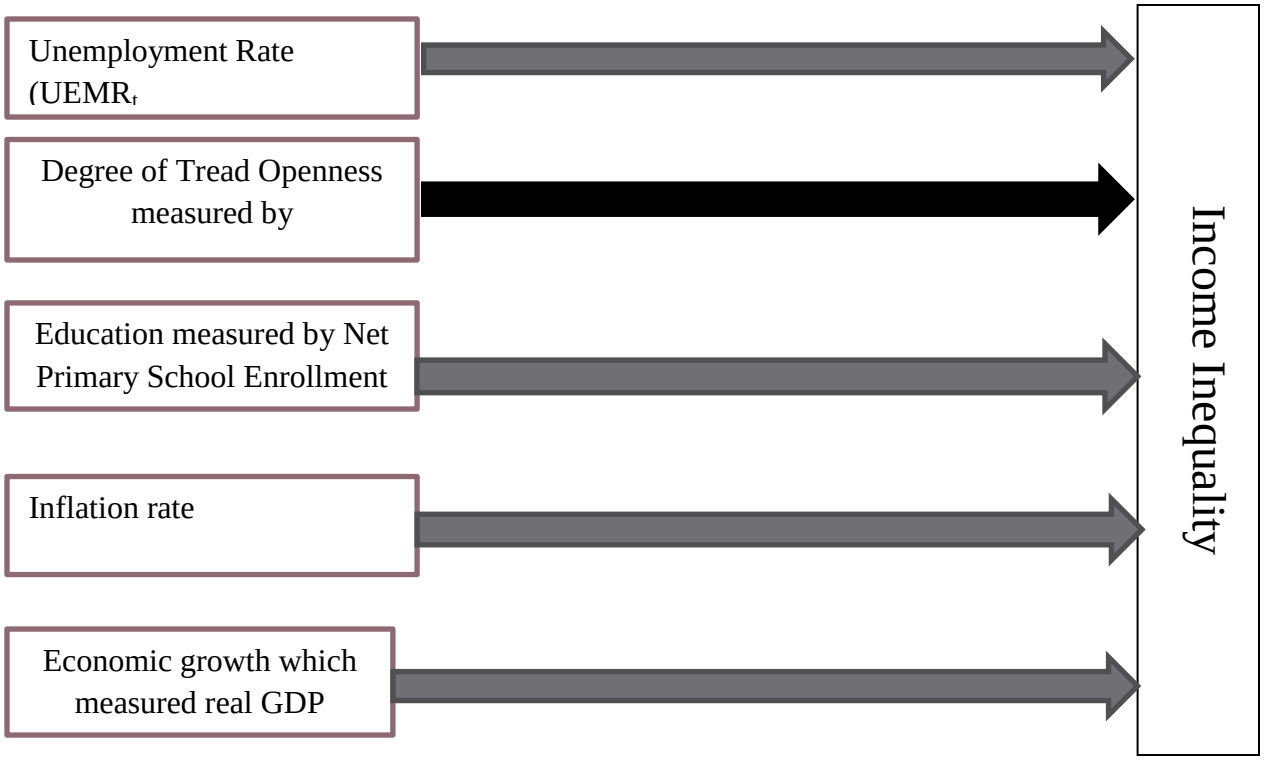

Figure 2-3: Conceptual frame work of the study

Source: Own construction based on literature

CHAPTER THREE

RESEARCH METHODOLOGY

This part of the study gives details on how the research activities would carried out. Therefore, the researcher concentrates on the methods that were adopt throughout the study to accomplish the research objectives. It includes the research design, the type of data and source of data would use the model specifications, types of model, estimation techniques, data analysis and methodology.

3.1 Research Approach and Design

The research was use a quantitative research approach to analysis trends and determinants of income inequality case of Ethiopia. Furthermore, the study was employing an explanatory

research design in order to achieve its objectives. It is the most appropriate design for identifying the relationships between income inequality and its determinants by using macro variables.

3.2 Data Source and Types of Data

The study employs secondary data that were collect (1988 to 2018) from World Bank Indicter(WBI),World Bank(WB),National bank of Ethiopia (NBE) Ethiopia Economic Association (EEA),Central Statistical Agency (CSA), Ministry of Finance and Economic Development (MOFED), International Monetary Fund (IMF), dataset, the United Nation Conference on Trade and Development (UNCTAD) dataset websites.

3.3 Econometrics Model Specification

There are a lot of factors that affect income inequality. Such factors have been studied by many researchers from different countries. Because of difference in the levels of economic development and characteristics of the economic system, the determinants of income inequality are not the same from one country to another even within the country. The most common determinants are GDP per capita, the technological progress, financial development, openness to trade, education, unemployment, inflation, urbanization, structure of the economy, government expenditure, external debit and financial aid, foreign reserve and exchange rate, growth of population, privatization and level of tax etc .In fact there are many determinants, these paper select five of them based on their relevance for developing countries like Ethiopia. With this framework the mathematically relationship between income inequality and its major macroeconomic determinant are expressed as follows:

$$GINI_t = f\ (Y_t^2,\ \ PSER_t,\ TO_t,\ UEMR_t,\ \ INF_t) \quad \text{.....(3.1)}$$

Whereas $GINI_t$ – Income Inequality, Y_t^2 - Real GDP per capita squared according to many studies on the same study area, there is a non-liner relationship between income inequality and economic growth (like Kuznets).Based on this, this paper expects a non-liner relationship between them and economic growth of Ethiopia is not reach at maximum .So, it takes the squared real GDP per capita variable. $PSER_t$- education, TO_t Degree of Tread Openness, UEMRt

UEMRt Unemployment rate and INFRT Inflation rate. Thus, an explicit estimable econometric model is formulated as follows**;**

$$LnGini=\beta_0+\beta_1 lnY^2_t+\beta_2 lnPSER_t+\beta_3 lnTO_t+ \beta_4 lnUEMR_t + \beta_3 lnINF_T + e_t \ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

Researcher transformed all the variables into Log data to convert nonlinear to linear and avoid hetroscedasticity (Gujarati, 2004) and to show elasticity of the variables. Where all variables are defending previously except, et, white noise process/marginal errors and t, time. Log transformation can reduce the problem of heteroscedasticity because it compresses the scale in which the variables are measured; thereby reducing a tenfold difference between two values to a twofold difference (Gujarati, 2004).It is important to note that the model is a multiplicative one where all parameters (coefficients) represent constant Elasticties.

3.4 Estimation Procedure

To test the long run relationship between dependent variable (income inequality) and independent variables (Real GDP per capita squared, , education, Degree of Tread Openness, Unemployment Rate and Inflation Rate). The study was first investigating the time series properties of our data / unit root tests of our data /by using Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests. After testing unites root test researcher was use ARDL model based on unit root test result.

3.5 Model Specification

To time series data we have three main types of models, Vector Error Correction (VECM) model, Auto Regressive Distributed Lag model (ARDLM) model and Vector Auto Regressive (VAR) model. All the variables in a VAR model are endogenous, there is no exogenous variable. Based on data researcher was use one of among models. Researcher was chosen model after testing of data. The variables were integrated of different order, that is a model having combination of variable with I(0) and I(1) order of integration, due to this reason researcher was used ARDL model .ARDL model uses a combination of endogenous and exogenous variables ,unlike a VAR model thet's strictly for endogenous variables ,from the boundl test of the result .Because of the variables are integrated of different order ,that is a model having

combination of variable with I(0) and I(1) order of integration ,which are not integrate order two and co integrated ,researcher was apply both long run (ARDL) and short run (VECM) models. ARDL model is relatively more efficient in the case of small and finite sample data sizes.

According to Gujarati, Fourth Edition (2004), the ARDL modeling of unrestricted error correction model using Ordinary Least Square (OLS) can be representing as follows**.**

$$\Delta Yt=\beta_{0+}\sum_{i=1}^{p}\beta 1\Delta X_t+\sum_{i=1}^{P}\beta 2\Delta Xt-1+\beta 3\Delta Xt-1+\beta 41Xt-1+\beta 5Xt-1+ut \quad \dots\dots\dots\dots\dots (3.3)$$

Where Δ denotes for first difference operation, **Yt** is for a vector of dependent variables, $\mathbf{X_t}$ is a vector of independent variables ,**p** is optimal leg length, $\mathbf{u_t}$ is the residual term which is assumed to be white noise.

In order to test the existence of long-term relationship among the variables, the following equation will estimate by applying OLS.

$$\Delta \boldsymbol{GINt}=\beta_{o+} \sum_{i=1}^{p}\beta 1\Delta ln\,Y^2t-1+\sum_{i=0}^{p}\beta 2\Delta lnP\,SEPt-1+\sum_{i=0}^{p}\beta 3\Delta ln\,TOt-1+\sum_{i=0}^{p}\beta 4\Delta lnUNEMt-1+\sum_{i}^{p}\beta 5lnINFt-1+u\,t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3.4)$$

Where asGINI$_t$- Income Inequality Y_t^2-Real GDP per capita squared, PSER$_t$-education, TO$_t$-Degree of Tread Openness ,UEMR$_t$ –Unemployment Rate and General inflation rate-INFt ,ut is the residual term, which is assumed to be white noise, p is the optimal lag length and ln is natural logarithm. To test the significance of lagged level of the variables under consideration, the appropriate statistic is F or Wald test as Pesaranet al. (2001) proposed for bound test approach was applied. The bounds test is mainly based on the joint Wald test or F- test which its asymptotic distribution is non-standard under the null hypothesis of no co integration. The null hypothesis for no co-integration in the long-run among the variables in equation [3.4] is:-

Ho $\boldsymbol{=\theta_o=\theta_1=\theta_2=\theta_3=\theta_4=\theta_5=0}$ (meaning no long run relationship among the variables) against the alternative one:

$\mathbf{H_1\#\theta_o\#\theta_1\#\ \theta_{2\,\#}\,\theta_{3\ \#}\,\theta_4\#\ \theta_5\#\ 0}$The F-test has no standard distribution which

depends on (i) whether the variables include in the model are I(0), or I(1), (ii) the numbers of regressors, and (iii) whether the model contains an intercept and/or a trend (Nara yan, 2008). According to Gujarati: (2004), there are two sets of critical value bounds for all classifications of regressors' namely upper critical bound value and lower critical bound value. The critical values for I (1) series are referred to as upper bound critical values; while the critical values for I (0) series are referred to as lower bound critical values. If the calculated F statistic is greater than the upper bound critical values, we reject the null hypothesis of no long run relationship among the variables. If the calculated F statistic is less than the lower bound critical values, we can't reject the null hypothesis rather accept the null hypothesis of no co integration among the variables. However, if the calculated F statistic is between the upper and lower bound critical values, inference is inconclusive and we need to have knowledge on the order of integration of underling variables before we made conclusive inference (Gujarati, 2004).However, in this study we are not going to follow the bound critical value developed by Pesaran because of the computed critical values are based on large sample size (500 and more). Rather, a relatively small sample size in this study of 31 years observations, researcher was use the critical values which are get from Eview's result .There is an evidence of long-run relationship (co integration) and the variables are integrated of different order, the following Long-run ARDL(P_1,P_2,P_3,$P_{4,}$,P_5) model would be estimated.

$$lnGINIt = \beta o + \sum_{i=1}^{p} \beta olnGINIt - 1 + \sum_{i=0}^{p} \beta 1lnY^2t - 1 + \sum_{i=0}^{p} \beta\, 2lnTOt - 1 + \sum_{i=0}^{p} \beta 3lnUNEMt - 1 + \sum_{i=0}^{p} \beta\, 4INFt - 1 + \sum_{i=0}^{p} \beta 5lnPsert - 1 + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

Here all variables are as previously defined. The orders of the lags in the ARDL Model is selected by the Akaike Information Criterion (AIC) .Researcher was use the Akaike Information Criterion (AIC) in lag selection because of its advantages for small sample size (Tsadkan, 2017). Determination of the optimal lag length is two, so it is crucial in ARDL model, because of it helps us to address the issue of over parameterizations and to save the degree of freedom (Taban, 2010) as cited in Tsadkan (2013). For annual data, Pesaran and Shin(1999) recommend choosing a maximum of 2 lags. From this, the lag length that minimizes Akaike Information Criterion (AIC) is selected. In the presence of co integration,

short-run elasticity's/dynamics/ can also be derived by constructing an Error Correction Model of the following Form:

$$; \quad \Delta lnGINIt = \beta o + \sum_{i=1}^{p} \beta o \Delta lnGINI - 1 + \sum_{i=0}^{p} \beta 1 \Delta lnY^2 t - 1 + \sum_{i=0}^{p} \beta 2 \Delta lnPSEPt - 1 + \sum_{i-0}^{p} \beta 3 \Delta lnTOt \ - 1 \ \sum_{i=0}^{p} \beta 4 UNMt - 1 + \sum_{i}^{p} \beta 5 INFt - 1 + YECT - 1 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.6)$$

Where ECTtis the Error Correction Term, defined a

$$: \ YECTt = lnGINI - (\beta o \ + \sum_{i=1}^{p} \beta olnGINIt - 1 \quad \sum_{i=0}^{p} \beta 1 lnY^2 t - 1 \quad + \sum_{i=0}^{p} \beta 2 lnPSEPt - 1 + \beta 3 lnTOt - 1 \beta 4 lnUNEMt - \ 1 + \beta 5 INFt - 1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

Here Δ is the first difference operator; **β's** are the coefficients relating to the short -run dynamics of the model's convergence to equilibrium, and **Y** measures the speed of adjustment.

3.6 Unit Root Test

It is fundamental to test for the statistical properties of variables when dealing with time series data. Time series data are rarely stationary in level forms. Regression involving non-stationary (I.e., variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression. This occurs when the regression results reveal a high and significant relationship among variables when in fact, no relationship exist. Moreover, Stock and Watson (1988) have also shown that the usual test statistics (t, F, DW, and $R^{2)}$ will not possess standard distributions if some of the variables in the model have unit roots. The other necessary condition for testing unit root test when we applying ARDL model is to check whether the variables enter in the regression are not order two (I.e. I(2)), which is precondition in ARDL model. Therefore, it is necessary to test for time series variables before running any sort of regression analysis. Non-stationarity can be tested using Augmented Dickey-Fuller (ADF) test, Phillips Perron (PP) test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. However, to ensure reliable result of test for stationarity, the study employs both Augmented Dickey-Fuller (ADF) test and Philip Perron (PP) tests.

The testing procedure for the ADF unit root test is specified as follows:

$$\Delta Yt = \acute{\alpha} + \beta t + \Delta Yt - 1 + \sum_{i}^{p} \lambda \Delta Yt - 1 + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.8)$$

Where $\mathbf{Y_t}$ is a time series variables under consideration in this model at time t is a time trend

Variable, λ speed of adjustment, Δ denotes the first difference operator; ε_t is the error term; **p** is the optimal lag length of each variable chosen such that first -differenced terms make a white noise. Thus, the ADF test the null hypothesis of no unit root (stationary).

That is: H0: = 0; H1: # 0

If the t value or t -statistic is more negative than the critical values, the null hypothesis (I.e. H0) is rejected and the conclusion is that the series is stationary. Conversely, if the t -statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary.

3.7 Description of variables

The dependent variable is income inequality. There are many types of measurements that measures income inequality in the global, country and regional level. Gini coefficient is the most common or popular measures of income inequality in the world duo this it used. The model includes five explanatory variables. One of the independent variable is economic growth. This variable is measured by real GDP per capita. GDP per capital is growth domestic product products divided by midyear population. According to many studies on the same study area, there is a non-liner relationship between income inequality and economic growth (like Kuznets). Based on this, this paper expects a non-liner relationship between them. So, it takes the squared real GDP per capita variable. For the case of Ethiopia, it expects a positive relationship between them. Second independent variable of this study is education. When we take education for the purpose of this study, it can be measured by many measurements. Primary school enrollment rate is the most common measurement of the countries education level. Net primary school enrollment rate is defined as the number of children enrolled in primary school that belongs to the age group that officially corresponds to primary schooling, divided by the total population of the same age group. Education creates a high wages for those with this education, and then it leads to higher competition in the labor market. Thus, uneducated peoples will be unemployed

and they can't generate income. Finally, the income gap between the educated and uneducated increased. Therefore, net primary school enrollment rate expected to affect income inequality negatively. Third independent variable of this study is Trade openness. Trade openness is a measure of economic policies that either restrict or invite trade between countries .It can be calculated as the simple average of total trade (i.e. the sum of exports and imports of goods and services) relative to GDP. According to Hecksher- Ohlin model, developing countries are thought to have more unskilled labor relative to skilled labor (and/or relative to capital) is assumed to be unequally distributed across the population and the increase in the relative demand for skilled labor (capital) in developed countries as a result of trade the distribution of income between rich and poor are not equal .But, within one developing country trade used to efficiently utilizing the hidden resource and the poor's with unskilled labor start generate a better income. So it is expected to get a negative relationship between income inequality and Trade openness. The fourth independent variable of this study is Unemployment Rate. Unemployment occurs when people who are without work are actively seeking work. The most frequently used measure of unemployment is the unemployment rate. The unemployment rate is a measure of the prevalence of unemployment and it is calculated as a percentage by dividing the number of unemployed individuals by all individuals currently in the labor force. The rise in unemployment rate results high dependency ratio and lower per capita GDP. In one family, if the number of unemployed members is larger than the employed, the overall income of that family will be lower when we compare it with the family with most of the family members with job. As a result, the gap between the rich with a job (employed) and the poor without job (unemployed) widen with increased unemployment rate. So, it is expected to get a positive relationship between income inequality and unemployment rate. The least independent variable of this study is general Inflation (INF), Inflation is defined as an increase in the overall price level in a country and measured in percent (CPI). Therefore to analyze its effect on income inequality, it is the other interest of the researcher's, which is included in this study as independent variable. The coefficient of this variable would be expected a positive sign. Inflation is measured in percent (CPI). Inflation reduces the purchasing power of individual as a result demand of goods produced by individuals will significantly increase. This implies that income inequality is increase. Therefore, positive sign is expecting for the estimated coefficient of the inflation variable in the regressions.

Table 3-1: Description of variables

Variables	**Short name**	**Expected sign**	**Results of sign**	**Description**
Income Inequality	$GINI_t$	Dependent Variable	Dependent Variable	Measured by GINI coefficient
Economic growth	Yt^2	+	+	Measured Real GDP per capita squared
Education	$PSER_t$	-	-	Measured by net primary school enrollment Rate
Tread Openness	TO_t	-	-	Measured by (Tread/GDP
Unemployment Rate	$UEMR_t$	+	+	Measured by unemployment/total labor force in the market
Inflation rate	INF_t	+ or -	+	Measured by CPI

3.8 Methods of Data Analysis

The study was using both the descriptive and econometric methods of data analysis. To analyze the data, in descriptive part, the researcher was use tables; figures and trend of graphs to describe the given data. On the other hand standard econometrical technique would apply to analyze the major determinants income inequality under the study period. In econometric part researcher was use the following multivariate models i.e, Auto Regressive Distributed Lag model (ARDL) model and Vector Error Correction (VEC) model. Finally, Eview 10.0 versions have been used as statistical software package for the entire analyze running this study.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

The main aim of this section is to provide results of the study as well as to discuss each one of them rigorously. All the variables were tested using descriptive and econometric methods of data analysis. In addition in line with the objectives of the paper secondary data from National bank of Ethiopia (NBE), World Bank (WB), Ethiopia Economic Association (EEA), Central Statistical Agency (CSA), Ministry of Finance and Economic Development (MOFED), International Monetary Fund (IMF), dataset, the United Nation Conference on Trade and Development (UNCTAD) dataset, etc.as used to study the trends of income inequality in Ethiopia and its determinants by using macro variables. This section begins with the discussion of recent trends in Ethiopia‘s income inequality. Eventually this section presents the final results of the study supported by econometric analysis. This chapter contains both the descriptive and econometrics analysis. Under the descriptive statistics the trends and overall performances of the variables of interest are presented. The statistical tools such as tables and graphs are used to describe the variables used in the model. The econometric analysis begins by testing the necessary tests such as stationary tests, diagnostic tests and bound test. After passed the necessary testes both the long run and short run model are estimated using ARDL model and VECM model respectably. Because of the variables are integrated of different order , that is a model having combination of variable with I(0) and I(1) order of integration and two variables are co-integrate. Estimation has been made the interpretation and discussions are continued based on the models result.

4.1 Descriptive analysis

4.1.1 Trend of Income Inequality

According to World Bank report Gini coefficient of Ethiopia was 0.35 in 2015. This records an increase from the previous numbers of 0.33 for 2010. The GINI coefficient 2001 and 2002, 1988 and 1989, 1990 and 1991, 1992 and 1993 are 0.30, 0.37, 0.38and 0.39 respectably. The trend of

income inequality from 2003 to 2018 is fluctuating year to year.The minimum and maximum value of Gini is 0.29 in 2000 and 0.44 in 1995 respectably.

According to Todaro (2012) The Gini coefficient of countries with highly unequal income distribution typically lies between 0.50 and 0.70, relatively equal distributions, it lies between 0.20 and 0.35 and it is approximately 0.44 for a relatively unequal distribution . The average (mean) value of Gini in Ethiopia which is 0.34 lies between 0.20 and 0.35, so, this represents there is relatively equal distribution. A trend of income inequality in Ethiopia from 1988 to 2018 is given graphically below.

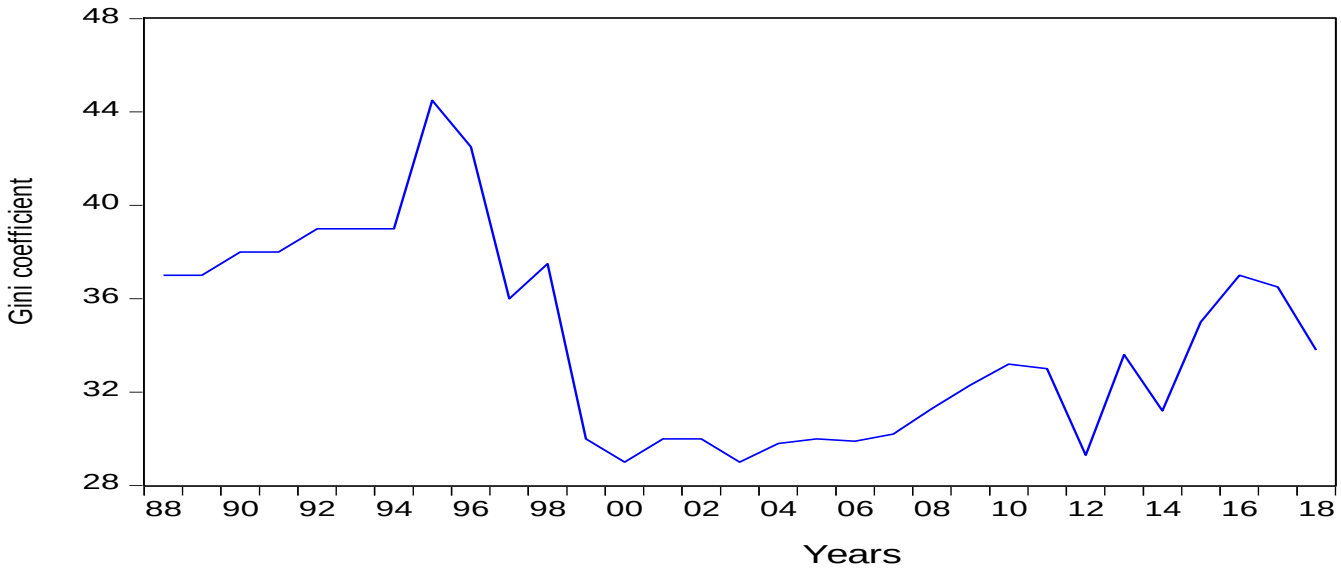

Figure 4-1: Trends of income inequality in Ethiopia from 1988 to 2018

Source: Computed based on WBI data (2020)].

4.1.2 Trends of GDP per capital or Economic growth

According to World Bank , the real GDP per capital of Ethiopia was 504.533 million birr in 1988 and it reach 20,143.0933 million in 2018 . Figure 4.1.2 below showed that from 1988 to 2018 the sharply up wards that indicates higher rate is attributed due to a combination of pro poor growth policy (since 2003 on wards) and state led development program (since 2005 on wards) and the present government implementing a development program aimed at poverty reduction through rapid economic growth and macroeconomic

stability(Zerayehun,,2013) .This indicates that the probability of achieving high future real GDP growth rate is high. A trend of GDP per capital in Ethiopia from 1988 to 2018 is given graphically below.

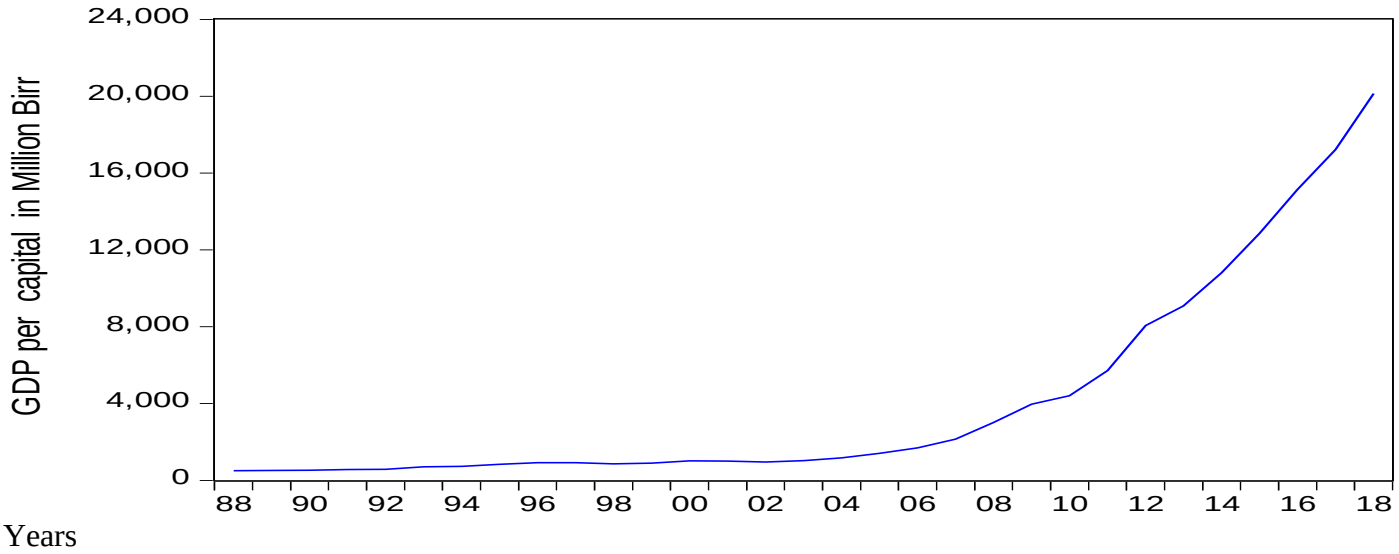

Figure 4-2: Trends of GDP per capital in Ethiopia from 1988 to 2018

Source: Computed based on WB data (2020)].

4.1.3 **Trend of net primary school enrollment rate or Education**

The countries level of education measured by primary school enrollment rate shows ups and downs from 1988 up to 2015.The net primary school enrollment rate shows a good improvement, it increases dramatically from 2016 to 2018.According to World Bank and UNESCO, School enrollment, primary (% net) in Ethiopia was 29.97% in 1988. The average value of Ethiopia during period was 52.50 percent with minimum of 19.18 percent in 1994 and a maximum of 89.45 percent in 2018 .This means at this time most of the children's get a primary school education. A trend of School Enrollments rate, Primary Ethiopia from 1988 to 2018 is given graphically below.

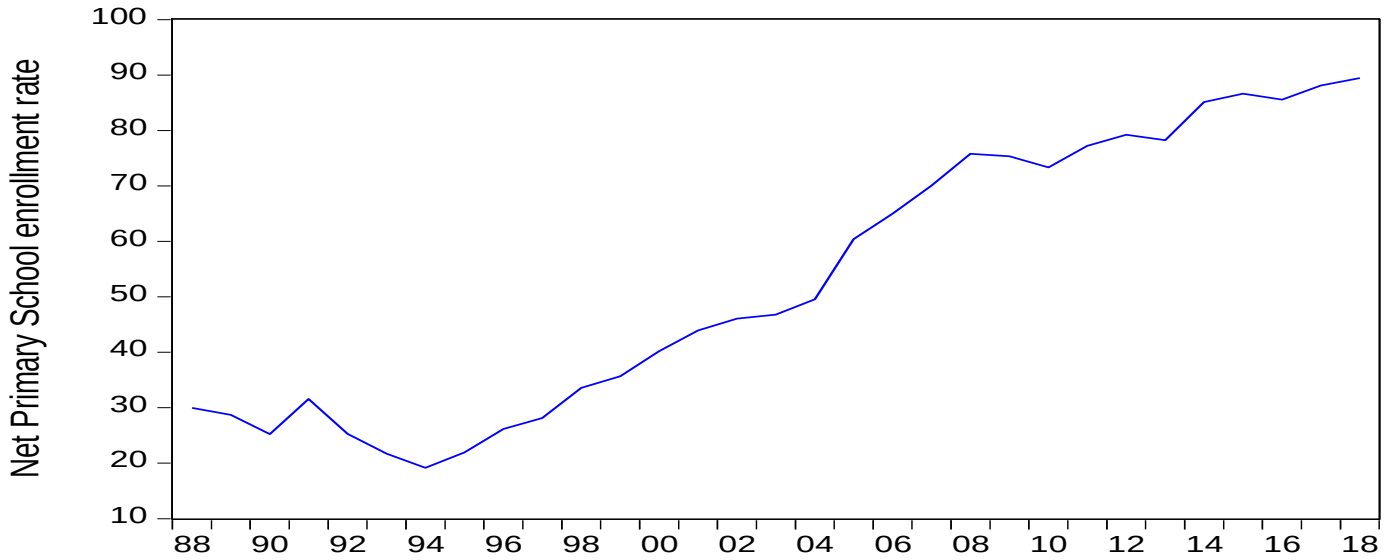

Figure 3-3: Trends of Net Primary School Enrollments rate in Ethiopia from 1988 to 2018

Source: Computed based on WBI data (2020)].

4.1.4 Trend of Trade openness

Trade openness refers to the outward or inward orientation of a given country's economy. Outward orientation refers to economies that take significant advantage of the opportunities to trade with other countries. Inward orientation refers to economies that overlook taking or are unable to take advantage of the opportunities to trade with other countries. Trade openness is exports plus imports as percentage of GDP. For that variable, researcher provides data of Ethiopia from 1988 to 2918. The average value of a data was 35.70 percent with a minimum of 23.45 percent in1994 and a maximum of 59.532 percent in 2018.This shows that the sum of the export and imports of goods and services relative to GDP is ups and downs from the 1988 up to 2001. Some of the trade policy decisions made by countries that empower out ward or inward orientation are trade, barriers, import, export, infrastructure technologies, scale economies and market competitiveness.

The trends of the graph indicates that the transaction of import-export between the years 1988 to 2001's show ups and downs, it had a little fluctuation; however, since the beginning of the year 2002 up to 2006 was increasing. Starting from 2007 up to 2013 its up's and down's, finally starting from 2014 up to 2018 is significantly increasing. A trend of trade openness in Ethiopia from 1988 to 2018 is given graphically below.

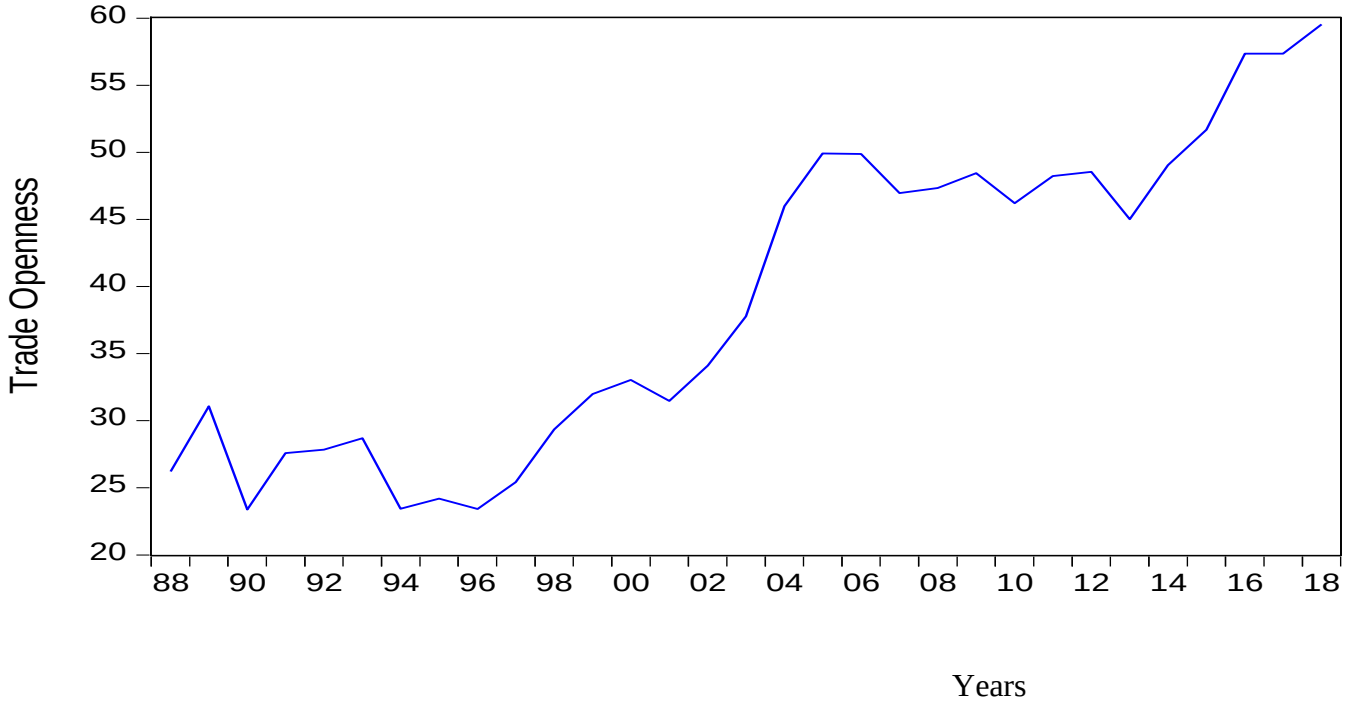

Figure 4-4: Trends of Trade openness in Ethiopia from 1988 to 2018

[Source: Computed based on WBI data (2020)].

4.1.5 Trend of Unemployment rate

In 2018, unemployment rate of Ethiopia was 2.1%. Unemployment rate of Ethiopia was fell gradually from 5.3% in 1990 to 2.1 % in 2018 .Ethiopia unemployment rate for 2019 was 2.08, a 0.01 increasing from 2018 and a 0.04 decline from 2017 . Ethiopia unemployment rate in 2017 was 2.12 %, a 0.05 decline from 2016. Ethiopia unemployment rate in 2016 was 2.17%, a 0.03 % decline from2015. The average value of a data was 2.9 percent with a minimum of 2.1 percent in 2018 and a maximum of 5.3 percent in 2011. A trend of unemployment rate in Ethiopia from 1988 to 2018 is given graphically below.

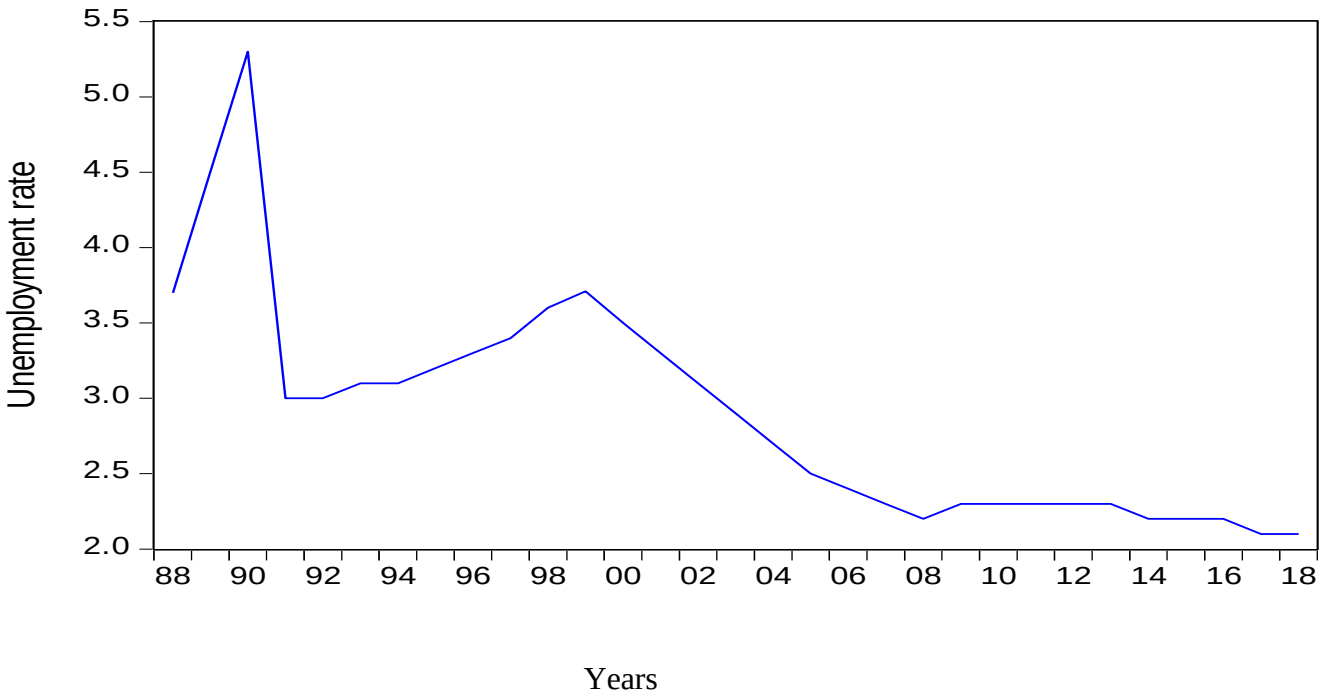

Figure 4-5: Trends of unemployment rate in Ethiopia from 1988 to 2018

Sources: https://www.macrotrend.net/countries/Ethiopia/unemlyomentrate

http://www.statista.com/statistics/unemployment rate in Ethiopia
https://tradingeconomic.com/Ethiopia/unemploymenrtrate and
http://Knoma.com/atlas/ethiopa/unemployment rate

4.1.6 Trend of Inflation in Ethiopia

Trends of inflation show the change in the inflation over the years. Inflation remained at a reasonable low level rate before 2000/03. However, post 2003/04 sow sharp increase despite rapid economic growth during the same period (Alemayehu and Kibrom, 2008). According to Alemayehu and Kibrom (2008), the sharp increasing of general inflation was caused primarily by food inflation, which is the effect of food demand triggered and international food price hike.

The official headline inflation during 2008 stood at about 33 percent with food inflation being about 44.4 percent. This was huge macroeconomic shock in the history of Ethiopia for the last five decades and until 2003, was below 5 percent per annum (Ibid). This high rate of inflation continued until 2017/18.

In 2018, inflation rate of Ethiopia was 13.8%. Though Ethiopia inflation rate fluctuated substantially in years, it tended ups and downs, through 1988 to 2018 period ending 13.8% in 2018. The inflation rate of consumer price in Ethiopia moved over the 31 years between 2.2 % in 1988 and 44.4 in 2008.The average value of a data was 10 .38 percent with a minimum of -8.2 percent in 2001 and a maximum of 44.4 percent in 2008. A trend of inflation rate in Ethiopia from 1988 to 2018 is given graphically below.

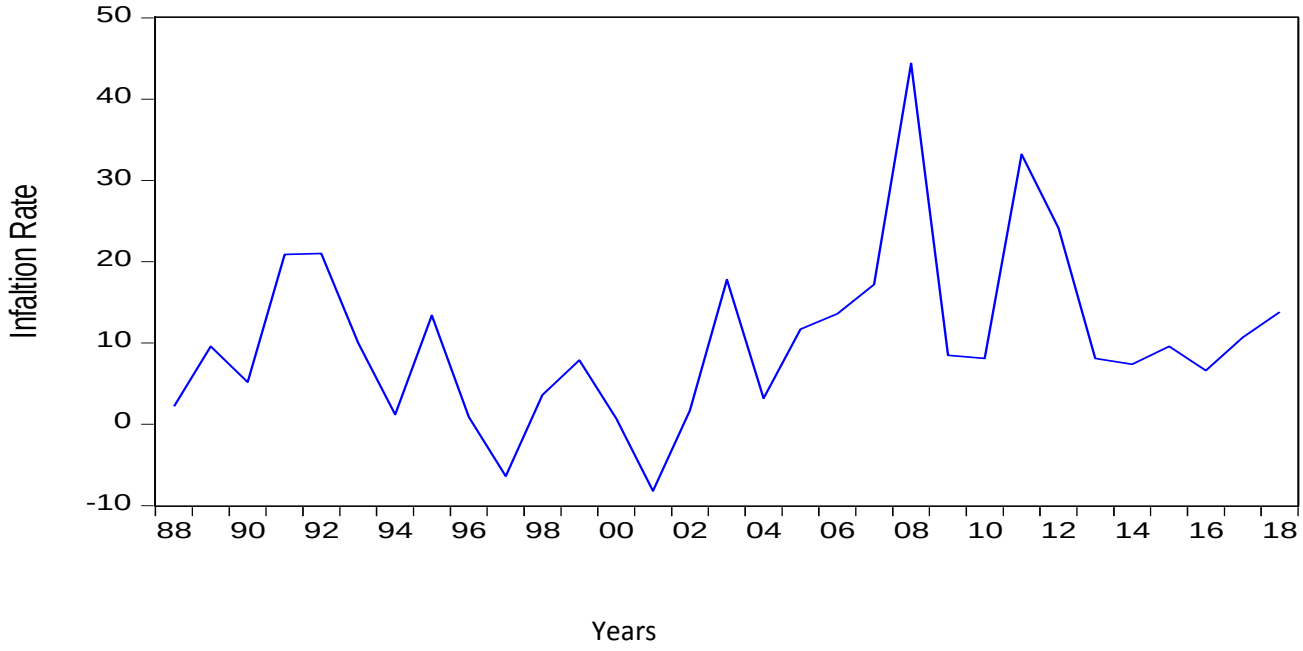

Figure 4-6: Trends of Inflation rate in Ethiopia from 1988 to 2018

[Source: Computed based on WBI data (2020)].

4.2 Econometric Analysis

4.2.1The Unit Root Test Analysis

In order to determine the degree of integration, a unit root test is carried out using the standard Augmented Dickey-Fuller (ADF) and Phillips-Person test statistic (PP) test. Moreover in applying ARDL model all the variables entered in the regression should not be integrated of order two. To check these conditions, unit root test is conducted before any sort of action taken. Even though the ARDL framework does not require per-testing variables to be done, the unit root test could convenience us whether or not the ARDL model should be used. The result in Table 4-1 shows that there is a mixture of I (0) and I (1) but not any order two.

Table 4-1: Unit root test (Augmented Dickey-Fuller test

	Augmented Dickey-Fuller test statistics (ADF-Test)					
Variables	**With Intercept**			**Trend and Intercept**		
	At Level	At first difference	Order [ ]	At Level	At first difference	Order **( )**
Gini Coefficient(LGini)	-1.79	-6.177	I[0]at1,5 and 10 %	-1.86	-6.088	I[0]at1,5 and 10 %
GDP Per Capital (LY)	0.747	3.11	I[0] at 1, 5 and 10 %	-1.581	-3.085	I[0]at1,5 and 10 %
Net Primary School Enrollment Rate(LPSER)	-0.1144	-4.248	I[0] at1, 5 and 10 %	-2.07	-4.1257	I[0] at1, 5 and 10 %
Unemployment Rate (LUEMR)	-1.680	-4.422	I[0] at1, 5 and 10 %	-3.83	-2.895	I[1]at1,5 and 10 %
Inflation Rate (LINFR)	-1.887	-7.598	I[0] at1, 5 and 10 %	-3.35	-3.083	I[1]at1,5 and 10 %
Trade Openness(LTO)	-3.48	-2.065	I[1] at 1, 5 and 10 %	-2.546	-3.2205	I[0]at1,5 and 10 %
MacKinnon (1996) with constant, no trend Test critical values:1% level = -3.67 5% level = -2.96 10% level = -2.62 **Note:** If absolute value of t- Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary **i.e** we accept null hypothesis				with constant and trend Test critical values: 1% level = --4.2967 5% level = -3.5683 10% level = -3.2183 **Note:** If absolute value of t- Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary **i.e** we accept null hypothesis		

Source: Eview 10.0 results

As we have seen form **Table 4-1**. Gini coefficient, real GDP per capital, primary school of enrolment rate, inflation rate, and unemployment rate are integrated of order zero (I.e. I(0)) while trade openness is integrated of order one (I(1)). Meaning Gini coefficient, real GDP per capital, primary school of enrolment rate, inflation rate and unemployment rate are stationary in level

where as trade openness is stationary in first difference (with intercept). However, with trend and Intercept, except unemployment rate and inflation rate, all the variables are stationary in level.

Table 4-2: Unit root test (Phillips-Perron test statistic test)

	Phillips-Perron test statistic (PP Test)					
Variables	**With Intercept**			**Trend and Intercept**		
	At Level	At first difference	Order [ ]	At Level	At first difference	Order [ ]
Gini Cofficient (LGINI)	-1.83	-6.165	I[0]at1,5 and 10 %	-1.98	-6.0844	I[0]at1,5 and 10 %
GDP per Capital (LY)	11.09	0.516	I[1] at 1, 5 and 10 %	6.32	-1.789	I[1]at1,5 and 10 %
Net Primary School Enrollment rate (LPSER)	-0.2722	-4.25	I[0] at1, 5 and 10 %	-2.08	-4.134	I[0] at1, 5 and 10 %
Unemployment Rate (LUEMR)	-1.517	-7.09	I[0] at1, 5 and 10 %	-3.624	-2.923	I[1]at1,5 and 10 %
Inflation Rate (LINFR)	-1.887	-7.598	I[0] at1, 5 and 10 %	-3.082	-3.783	I[0]at1,5 and 10 %
Trade Openness (LTO)	-1.338	-4.894	I[0] at 1, 5 and 10 %	-0.496	-4.91949	I[0]at1,5 and 10 %
MacKinnon (1996) with constant, no trend Test critical values:1% level = -3.679 5% level = -2.967 10% level = -2.622 **Note:** If absolute value of t - Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary **i.e** we accept null hypothesis				with constant and trend Test critical values:1% level = --4.31 5% level = -3.57 10% level = -3.22 **Note:** If absolute value of t - Statistics is less than Test of critical values then the data is stationery or if probability is greater than 5% then data is stationary **i.e** we accept null hypothesis		

Source: Eview 10.0 results

Similarly, the PP test shows that there is a mixture of integration order zero and order one. That is, Gini coefficient , primary school of enrollment rate , unemployment rate , inflation rate and trade openness are stationary in level while real GDP per capital is e stationary in first difference (with intercept only). However, except unemployment rate and real GDP per capital all the variables are stationary at level with intercept and trend. Form table 4-1 and 4-2 we can conclude that none of the variables entered in the regression are order two, which are not desire in applying ARDL model. So ARDL co integration technique proposed by Pesaran*et al.* (2001) is the most appropriate method for estimation or to check the long run relationship among the variables.

4.3 Model Stability and Diagnostic Test

To check the verifiability of the estimated long run model, some diagnostic tests are undertaken. Priority in doing any analysis, researcher required to check the standard property of the model. In this study researcher carried a number of model stability and diagnostic checking, which includes Functional form (Ramsey's RESET) test Normality (Jaque-Bera test), Multicolinearity (Variance Inflation Factor test), Autocorrelation test (Durbin-Watson test) and Hetroscedasticity (Breusch-Pagan-Godfrey test .) In addition to the above diagnostic tests, the stability of long run estimates has been tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. Such tests are recommended by Pesaran*et al.* (2001). In order to reject or accept the null hypothesis, we can decide by looking the p-values associated with the test statistics. That is the null hypothesis is rejected when the p-value are smaller than the standard significance level (I.e. 5%).

4.3.1 Test of Multicolinearity

Multicolinearity refers to the condition that variable are correlated and it's the features of sample for the population. The classical linear regression models assume that there is no multicollearnity among the explanatory variables. If the perfect multicolinearity exist, the regression coefficient of the explanatory variable are indeterminate and there standard errors are infinite cannot be estimated the coefficient with greater accuracy. In order to test multicolinearty, the paper used Variance Inflation Factor (VIF). The larger the mean value of VIF, the more some variable

occurred. As the rule, if the mean of VIF is greater than 5 (VIF>5), that variable is highly collinear between explanatory variable (Gujarati, 2004).

*Table **4**-3: VIF test for Multicolinearity*

Variables	**VIF**	**1/VIF**
Constant	11.49	0.0870
GDP per capital (LY)	7.56	0.1323
Net Primary School Enrollment Rate (LPSER)	2.74	0.3651
Unemployment rate (LUEMR)	2.0	0.4897
Inflation rate (LINF)	1.12	0.8890
Trade Openness (LTO)	1.38	0.7270
Mean of VIF		**4.39**

Source: Eview 10.0 results

From the above table the mean of VIF shows that there is no a problem of multicollinearty or linear relationship between a given explanatory variables. If the mean value of VIF greater than 5, then we would say there is a problem of multicolinearity. However, it is far less than 5 implying there is no the problem of multicollinearity.(Gujarati,2004).

4.3.2 Functional form (Ramsey RESET test)

Ramsey RESET test is stands for regression specification error test and was proposed by Ramsey (1969). The Ramsey Regression Equation Specification Error Test (RESET) test is a general specification test for the linear regression model. More specifically, it tests whether non-linear combinations of the fitted values help explain the response variable. The intuition behind the test is that if non-linear combinations of the explanatory variables have any power in explaining the response variable, the model is misspecified in the sense that the data generating process might be better approximated by a polynomial or another non-linear functional form so, when we test the specification of the functional form the following result was obtained.

*Table **4**-4: Functional form (Ramsey RESET Test)*

	Value	Df	Probability
t- statistics	1.8326	24	0.0724
F- statistics	3.3584	(1,24)	0.0724
Likelihood ratio	3.4995	1	0.0614

Note: Decision criteria of RESET test ,if t- statistics ,F- statistics and likelihood ratio are not significant since the probability value are greater than 0.05. It means the estimated model is free from specification errors.

Source: Eview's 10.0 results

We could not reject the null hypothesis test for Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. As the test result indicates above we can't reject the Ramsey's test, which means that the model is correctly specified.

4.3.3 Test of Hetroscedasticity

To test Hetrscdasticity, the Breusch-pagenGodfrey test is used. The result shows as follows; as an important assumption of the classical linear regression model is that the disturbance μi appearing in the population regression function is homoskedastici.e. They all have the same variance but when there is exist an outlying observation in relation to the observation in the sample the assumption of constant variance is violated. This violation refers to as hetroscedastisticity which leads to estimator to be inefficient and, estimated variance to be biased.

Table 4-5: Test of Hetroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.4783	Prob. F(8,20)	0.8571
Obs*R-squared	4.6580	Prob. Chi-Square(2)	0.7934
Scaled explained SS	3.1214	Prob. Chi-Square(8)	0.9265

Source: Eview 10.0 results

As we have seen from the above table, we can reject alternative hypothesis at 5% significant level due to its p-value associated with the test statistics are greater than standard significance level(I.e. 0.7934> 0.05).From the above result the prob (chi (2)>5% level of significant that is accept the null hypothesis so, the error term is not hetroscedasticity that means there is the problem of homoscedastic.

4.3.4 Tests for Autocorrelation

The disturbance term of any observation is not influence by the disturbance term of any other observations. However, if there is such dependence there is autocorrelation. The simplest and widely used model is one where the error term μt and μt-1 have correlation p. For this model one can testing hypothesis about p based on estimated correlation coefficient between the residuals. A common used statistic for this purpose is the Durbin-Watson (DW) denoted by DW. When the DW statistic is zero DW=0, there is a series positive autocorrelation. When the Durbin-Watson statistic (DW) = (1.5<DW<2.5), there is no autocorrelation problem. If the DW closes to 4, there is a series negative autocorrelation. In addition to this, to test a correlation R can be used. If R is greater than Durbin- watson statistic, there is a series problem of autocorrelation. From the regression result DW=1.98 it is found between 1.5 and 2.5 (1.5<1.98<2.5) so, there is no the problem of autocorrelation.

4.3.5 Test for normality

The model assumes that the random variable u has a normally distributed. Symbolically: $u \sim N(0, \delta^2 U)$, which reads as: u is normally distributed around zero mean and constant variance $\delta^2 u$. This means that small values of u's have a higher probability to observed than large values. This assumption is necessary for constructing confidence intervals. If the assumption of normality is violated, the estimates of parameters are still unbiased but the statistical reliability by the classical tests of significance of the parameters cannot be assessed because these tests are based on the assumption of normal distribution of the u. The null hypothesis is that has normal distribution against the alternative hypothesis that the u is not normally distributed.

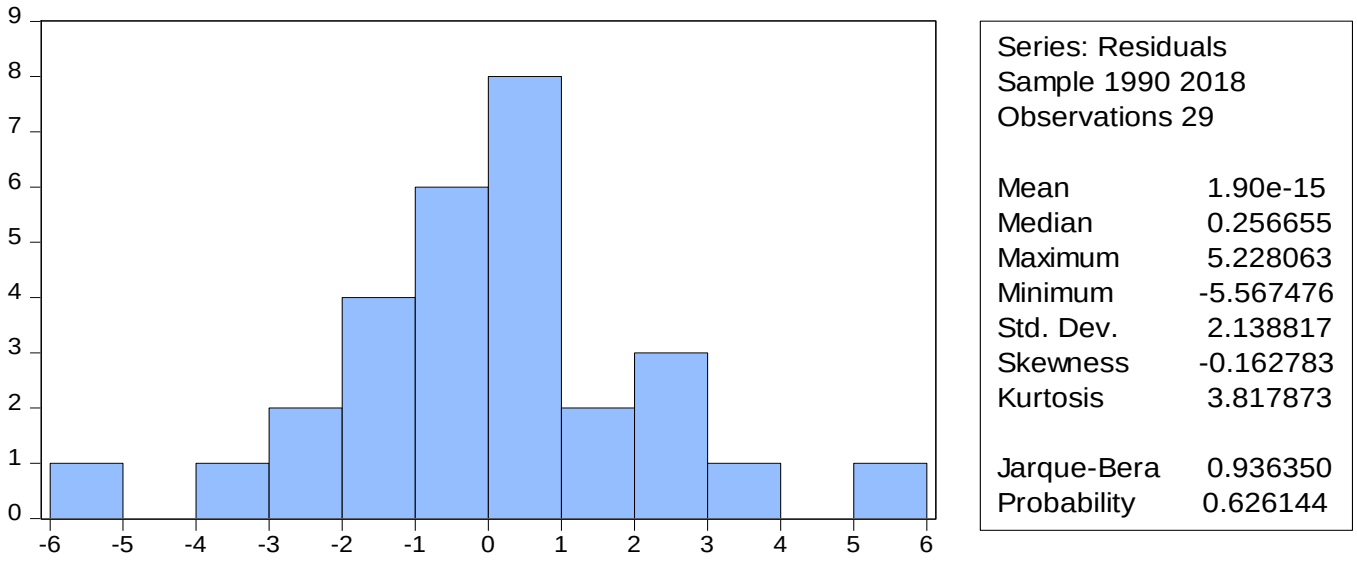

Figure 4-7: Normality Test

Source: Eviews 10.0 results

As the result indicates that we could not reject the null hypothesis which says that the residuals are normally distributed, for the reason, that the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (I.e. 0.937>0.05) ,then error term is normally distributed. Moreover, the stability of the model for long run and short run relationship is detected by using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests. The test finds serious parameter instability if the cumulative sum goes outside the area (never returns back) between the two critical lines.

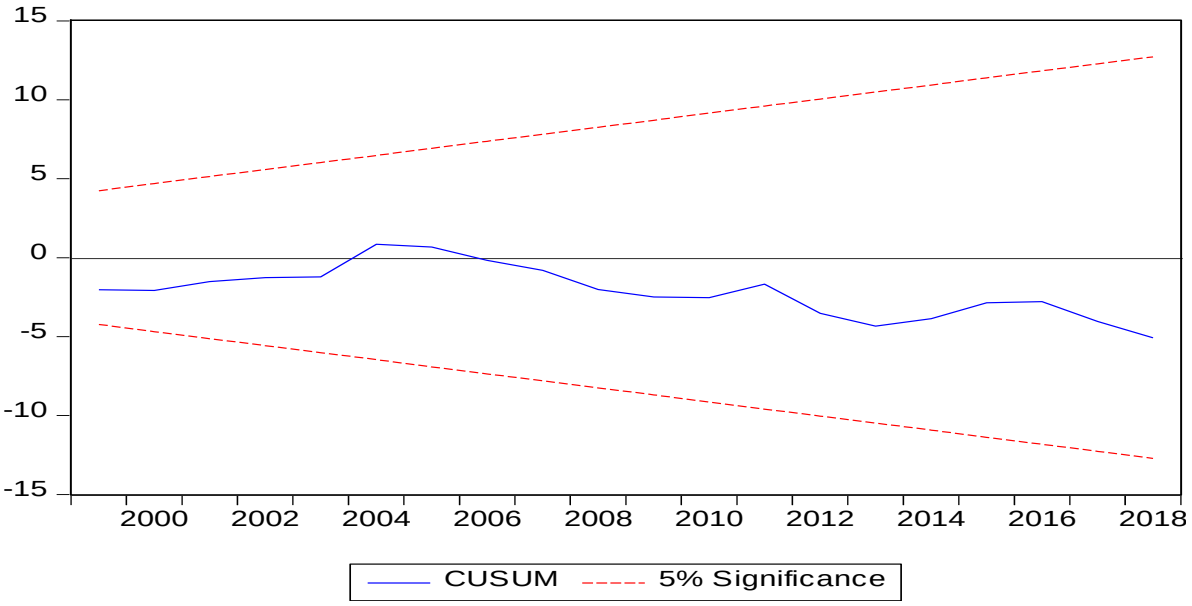

Figure 4-8: Plot of Cumulative Sum of Recursive Residuals

Source: Eview's 10.0 results

The straight lines represent critical bounds at 5% significance level.

As can be seen from the above figure, the plot of CUSUM test did not cross the critical limits.

So, we can conclude that long run estimates are stable.

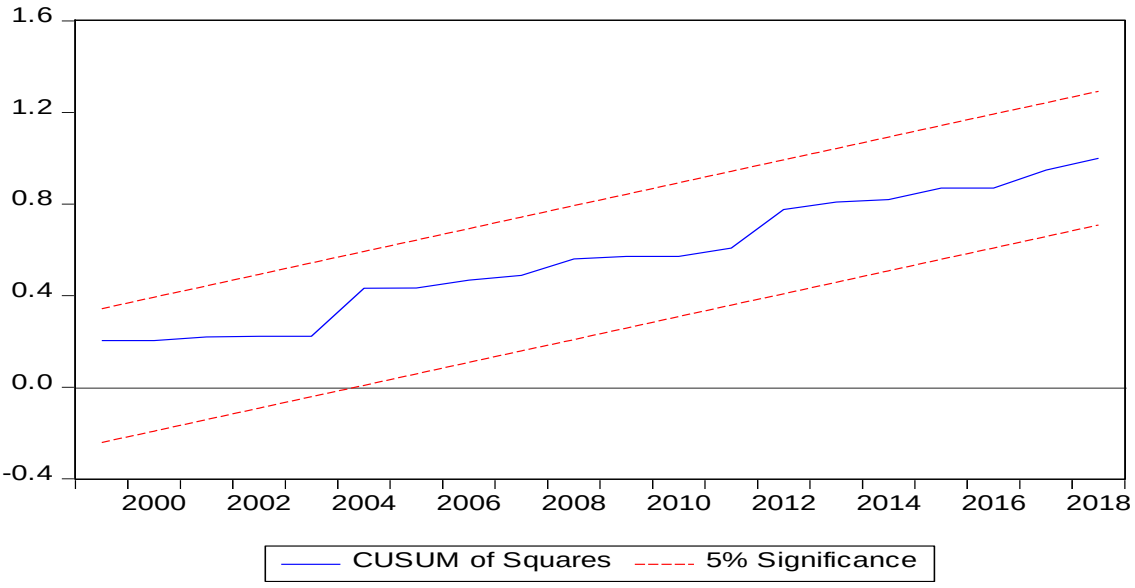

Figure 4-9: Plot of Cumulative Sum of Squares of Recursive Residuals

Source: Eview's 10.0 results

The straight lines represent critical bounds at 5% significance level.

As can be seen from the first figure, the plot of CUSUM test did not cross the critical limits. Similarly, the CUSUM of squares test shows that the graphs do not cross the lower and upper critical limits. So, we can conclude that long run estimates are stable and there is no any structural break. In addition to the model stability 75.6 percent of the model has been explained by the regressors. Hence the results of the estimated model are reliable and efficient.

4.4 Long Run ARDL Bounds Tests for Co-integration

Since researcher determined the stationary nature of the variables, the next task is the bounds test approach of co-integration is estimating the ARDL model specified in equation (3.5) using the appropriate lag-length selection criterion. According to Pesaran and Shine (1999), as cited in Narayan (2004) for the annual data are recommended to choose a maximum of two lag lengths. From this, a lag length that minimize AIC is 2. In addition to this, researcher have also used AIC to determine the optimal lag because it is a better choice for smaller sample size data as this study. Apart from this, AIC found to produce the least probability of under estimation among all criteria available (Liew*et al.,* 2004) as cited in Tsadkan (2014). As we discus in the third part of this study, the F-test through the Wald-test (bound test) is performed to check the joint significance of the coefficients specified in equation (3.5). The Wald test is conducted by imposing restrictions on the estimated long-run coefficients of Gini coefficient, real GDP per capital, primary school of enrollment rate, unemployment rate, trade openness and inflation rate. The computed F-statistic value is compared with the lower bound and upper bound critical values provided byEview's 10.0 result

Table 4-6: F-Bounds test

F-Bounds test statistics value	Lag length	Critical value	Lower Bound Or I(0)	Upper Bound Or I(1)
6.100904	2	1 percent	3.06	4.15
		5 percent	2.39	3.38
		10 percent	2.08	3

Note : Decision criteria for Bounds test , If the calculated F-statistics is greater than the critical values for upper bound I(1), than we can conclude that there is co integration. That is along run relationship. Reject the null hypothesis. Estimate the long run model which is the error correlation model (ECM).

If the calculated F- statistics is lower than the critical value for lower bound I(0), then we conclude that there is no co-integration, hence no long run relationship. Do not reject the null hypothesis. Estimate the short run model which is Autoregressive Distribute Lag (ARDL) model.

If the F-statistics falls between the lower bound I(0) and the upper bound I(1).the test is considered inclusive.

Source: Eview's 10.0 results

As it is depicted in Table 4.6 above, with an intercept and trend, the calculated F statistics (6.100904) is higher than upper bound critical values at 1% 5% and 10% level of significance. This implies that the null hypothesis of no long-run relationship is rejected; rather accept the alternative hypothesis (there is long-run relationship) based on the above critical values at 1%, 5 % and 10% level of significance. Therefore, there is co integration relationship among the variables in long run. Then researcher must estimate the short run model which is the Error Correlation Model (ECM).

4.5 ARDL Model Estimation

After confirming the existence of long-run co-integration relationship among the variables, the next step is running the appropriate ARDL model to find out the long run coefficients and ECM model to find out short - run coefficients, which are reported the following tables below.

Table 4-7: Estimated long run Coefficients

Dependent variable is Gini Coefficient			
Regressors	**Coefficient**	**Standard Error**	**T- Ratio [Prob]**
GDP Per Capital [LY]	0.2998***	0.0780	3.8435[0.0001]
Net Primary School enrollment rate [LPSER]	-0.0840***	0.0230	-3.6521[0.0013]
Unemployment rate [LUEMR]	0.2579*	0.0696	3.7054[0.0116]
Inflation rate [LINFR]	0.0830	0.0567	1.4638[0.1590]
Trade openness [LTO]	-0.1291	0.1973	-0.6538[0.5201]
Constant [C]	0.0103***	0.0015	6.8666[0.0000]
R-Squared =0.7560		Adjusted R- Squared =0.6590	
Durbin –Watson statistics =1.9819		P (F- Statistics) =0.0009	

NOTE: Decision criteria for significance , If the Absolut value of t- ratio or t-critical is greater than t-statistics , for some chosen level of significance(Usually 1,5 or 10%) then the null hypothesis is can be rejected and variables are significant .

Source: Eview's 10.0 results

Note: *, **, *** indicate significance at the level 10%, 5% and 1%, respectively.

From chapter three the model has the following specification.

$LnGini = \beta_o + \beta_1 lnYt^2 + \beta_2 lnPser_t + \beta_3 lnTo_t + \beta_4 lnUemr_t + \beta_5 lnIfr_t + ei$. From the above ARDL estimation result the following regression model is obtained.

$Gini = 0.0103 + 0.2998Yt^2 - 0.084Psert - 0.1291Tot + 0.2579Uemr + 0.0830Infr_t$

$SE = (0.0015)\quad (0.0780)\quad (0.0230)\quad (0.1973)\quad (0.0696)\quad (0.0567)$

$t = (6.6500)\quad (3.7452)\quad (-3.4525.)\quad (-0.7546)\quad (3.6018)\quad (1.8731)$

But researcher was put only significant variables as follows.

$\boldsymbol{LNGini = 0.0103 + 0.2998Yt^2 + 0.2579Uemr_t - 0.0840Pser_t}$

$\boldsymbol{SE = (0.0015)\quad (0.0780)\quad (0.0696)\quad (0.0230)}$

$\boldsymbol{t = (6.6500)\quad (3.7062)\quad (3.6018)\quad (-3.4525)}$

4.5.1 Interpretation of the ARDL model estimation coefficients

As the ARDL model estimation shows, all the variables have a sign as expected by the paper. Real GDP per capita, unemployment rate, inflation rate and constant term have a positive sign. When the variables unit increased the GINI coefficient also increased, vice versa. On the other hand, primary school enrollment rate and trade openness a has a negative sign. This means, when this variables unit increased the GINI coefficient decreased, it changed in the opposite direction. As we have discussed in the theoretical and empirical literature parts, Real GDP per capita, unemployment rate, and inflation rate have positive impact on income inequality while primary school enrollment rate and trade openness have an inverse impact on income inequality regardless of significant. As the ARDL model estimated result of the above table showed, unemployment rate have a positive impact on income inequality and statistically significant at 10 % percent level of significance. Holding other things constant, the GINI coefficient will be increased by 0.2579 when unemployment rate increased by 1%. The real GDP per capita coefficient, which is 0.2998, has a positive value and it is statically significant at 1%, 5% and 10% percent significant level. Holding other variables constant, the GINI coefficient will be increased by 0.2998, when the real GDP per capita increased by 1birr. This result supports the Kuznets hypothesis. This hypothesis says that in the initial stages of development income inequality and real GDP per capita increases in the same direction. After achieving maximum stages of economic growth income inequality reaches its maximum point and starts to decline with a high economic growth. Ethiopia is one of the least developed countries. Then, based on this hypothesis the paper gets a positive relationship between them. Finally, the results of the paper show that the Kuznets hypothesis is applicable for Ethiopia. The thread significant variable

is primary school enrollment rate. The coefficient of primary school enrollment rate, which is 0.0840, has a negative sign and it is statically significant at 1%, 5% and 10% level of significant. Other things remains constant, if the proportion of the number of children enrolled in primary school that belongs to the age group that officially corresponds to primary schooling to the total population of the same age group increased by 1%, the GINI coefficient will decrease by 0.0840.R-squaredis 0.7568**:** This implies that75.68 % of the income inequality function is explained by the selected explanatory variables. In other words, 75.68 % of variation of the dependent variable is due to the variation of the independent variables which included in the model and the remaining variation 24.32% is explained by the variables which are not included the model. If the value of R-Squared is higher, than model is the greatest the goodness of fit. There for, is R- Squared in the regression model reveals that there is good fitness of value for a given result. The overall model is statistically significant because of P (F- Statistics) is 0.0009, which is less than 5% percent. Real GDP per capital and unemployment rate are the main factors that determine the income inequality this because of coefficient is high and also statistically significant and the result support kunzites hypothesis.

4.6 Short-Run Error Correction Model (ECM)

After the acceptance of long-run coefficients of the growth equation, the short-run ECM model is estimated. The error correction term (ECM), as we discussed in chapter three, indicates the speed of adjustment to restore equilibrium in the dynamic model. It is a one lagged period residual obtained from the estimated dynamic long run model. The coefficient of the error correction term indicates how quickly variables converge to equilibrium. In short run there may be disequilibrium even if there is a long-term equilibrium relationship between the dependent variable and the independent variable means that there is co-integration. In order to correct this disequilibrium and to determine the short run relationship between variables researcher use the Vector Error Correction Model because of data is co-integration. The dynamic short run equilibrium is obtained by regressing the first difference of the dependent variable with the first difference of the explanatory variable and one period lagged error term to capture the adjustment towards the long run equilibrium. The coefficient of the error correction term indicates how quickly variables converge to equilibrium. Moreover, it should have a negative sign and statistically significant at a standard significant level (i.e. p-value should be less than 0.05).

Table 4-8: Error Correction Representation for the Selected ARDL

Dependent variable is First Difference of Gini coefficient [DLGini]

Regressors	**Coefficient**	**Standard Error**	**T-Ratio [Prob]**
Difference of Constant [DCONS]	1.9414***	1.0902	-1.78067[0.000]
The Error Correlation Coefficient [ECM-1)]	-0.8427**	0.4232	-1.9912[0.008]
Difference of GDP Per Capital [D(LNY)]	0.0033***	0.0016	2.0625 [0.003]
Difference of Unemployment Rate [D(LNUEM)]	2.3549	1.2256	-1.9214[0.569]
Difference of Net Primary School Enrollment rate [D(LNPSER)]	-0.1083**	0.1603	-0.6756[0.056]
Difference of Trade Openness [D(LNTO)]	-0.1974	0.1825	-1.0816[0.281]
Difference of Inflation rate [D(LNINFR)]	0.0138**	0.0415	-0.3325[0.047]

R-Squared = 0.6647 Adjusted R- Squared =0.6227

Durbin –Watson statistics = 2.0800 P (F- Statistics) =0.0032

Source: Eview's 10.0 results

*, **, *** indicate significance at the level 10%, 5% and 1%, respectively

From the above table, similar to the log run result, real GDP per capital, unemployment rate and inflation rate have positive impact on income inequality.Net primary school enrollment rate and trade openness have negative impact on income inequality in Ethiopia. The short run impact of unemployment rate on income inequality in Ethiopia is positive but insignificant

The error correction coefficient, estimated at -0.8427 is highly significant, has the correct negative sign, and imply a very high speed of adjustment to equilibrium. According to Bannerjee *et al*. (2003) as cited in Kidanemarim (2014), the highly significant error correction term further confirms the existence of a stable long-run relationship. Moreover, the coefficient of the error

term (ECM-1) implies that the deviation from long run equilibrium level of income inequality in the current period is corrected by 84.27% in the next period to bring back equilibrium when there is a shock to a steady state relationship. The short run coefficients of real GDP per capital indicate a positive and significant effect on income inequality, at 1, 5 and 10 percent significant level. That is when real GDP capital increase by one unites or one birr, income inequality is increase by 0.0033. As one can understand form the above tables,(4-7) and (5-8) trade openness is not significantly affect income inequality during the study period, despite their relationship is negative both short run and long run. From this we can understand that under the study period, both in the long run and in the short run, trade openness, does not have significant effect on income inequality. Unlike the long run, the inflation rate variable significantly affects income inequality in the short run at 5 and 10 percent significance level. Even though, the sign is positive. The constant term is positive, which is 1.9414. This indicates, if all variables are zero at the same time, the GINI coefficient becomes 1.9414. The short run R-squared is 0.6647. This implies that real GDP per capita, net primary school enrollment rate, unemployment rate, trade openness and inflation rate explained 66.47 % of variations on GINI coefficient. The overall model is statistically significant in the short run because of P (F- Statistics) is 0.0032, which is less than 5% percent. As the result indicates, the error correction term is statistically significant. Therefore, there is adjustment in the short run.

4.7 Summary of results

The findings of econometrics analysis summarized as follows:

- Real GDP per capita which is a measure of economic growth has a positive effect on income inequality both in long run and short run. It is statically significant in both the long run and short run
- In both analyses, unemployment rate has a positive effect. But, it is statically significant in the long run and statically insignificant in the short run.
- Education which is measured by net primary school enrollment rate has a negative and statically significant impact on income inequality both in short run and long run.
- Trade openness calculated as the proportion of total value of trade that a country transact with the rest of the world in a year to annual GDP of the country has a negative effect and it is statically insignificant in both analysis.
- Inflation rate measured consumer price index is found to have a positive impact on income inequality and it is statically insignificant in the long run and statically significant in the short run.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The main objective of this study is to analyze income inequality and its determinants by using macro variables during the specified period. As the descriptive analysis shows the trend of income inequality measured by GINI coefficient and its determinants are shows some fluctuations. All determinants have a sign as expected by this paper based on theoretical framework. To determine the long run and short run relationship among the variables, Autoregressive Distributed Lag (ARDL) and ECM model were applied. Before applying the ARDL model, all the variables are tested for their time series properties (stationariety properties) using the ADF and PP tests. As a result, Gini coefficient, real GDP per capital, primary school of enrolment rate, inflation rate and unemployment rate are stationary in level where as trade openness is stationary in first difference (with intercept). However, with trend and Intercept, except unemployment rate and inflation rate, all the variables are stationary in level. Next to testing for time series property, the model stability was done by testing the diagonal testing techniques. The result revealed that, no functional form problem (the model is correctly specified), the residual is normally distributed, no multicolinearity, no autocorrelation and hetroscedasticity problem. The dependent variable that was the being income inequality was regressed against five explanatory variables. As discussed above, this study applied the methodological approach called ARDL model also known as bound test approach. As the result indicted the calculated F-statistics is greater than the critical values for upper bound I(1), than we can conclude that there is co integration. That is along run relationship between income inequality and its determinants (real GDP per capital, school of enrollment rate, unemployment rate, trade openness and inflation rate in long run during the study).As we have discussed in the theoretical and empirical literature parts, Real GDP per capita, unemployment rate, and inflation rate have positive impact on income inequality while primary school enrollment rate and trade openness have an inverse impact on income inequality. In the long run unemployment rate, have a positive impact on income inequality and statistically significant at 10 % percent significance

level. The empirical result showed that unemployment rate, inflation rate and real GDP per capita are found to have positive impact on income inequality during the study period .Unemployment rate have a positive impact on income inequality and statistically significant at 10 % percent significance level. A one percent increase in unemployment rate results in 0.2580 and 2.3550 percent increase in income inequality in long run and short run, respectively. Likewise, a one percent increase in real GDP per capital will result in 0.2998 and 0.0035 percent increase in real GDP in long run and short run, respectively. According to the result, economic growth measured by real GDP per capita and unemployment rate are the major determinant of income inequality. In the long run, a coefficient of real GDP per capita is 0.2998, it is also statistically significant and it affects it positively as expects .In the short run, like in the long run it has a positive effect. Ethiopia is at initial level of economic development, so according to Kuznets hypothesis it is expects to have a positive relationship between them. Therefore, the result supports Kuznets hypothesis. Primary school enrollment rate and trade openness also has negative impact in income inequality during the study period in both long run and short run. A one percent increase in primary school enrollment rate will result in 0.0840 and 0.1083 percent decline in income inequality in long run and short run, respectively. It is statically significant at 1%, 5% and 10% percent level of significant in the long run and it is statically significant at 10% percent level of significant in the short run. However, the study found out trade openness has statistically insignificant impact on income inequality with negative sign in the both long run and short run. Inflation rate has statistically insignificant impact on income inequality in the long run but it is statistically significant impact on income inequality in the short run at 10 % percent level of significance.

5.2 Recommendations

Based on the finding of the Study the Following Recommendations are forwarded.

- Though inflation is one a problem in income inequality, the federal government should work to reduce the inflation rate if possible; otherwise, it should sustain the existing inflation rate by financing of budget deficit from non-inflationary sources and implementation of price stabilization program by subsiding basic food items and by controlling money supply.

- Education creates a high wages for those with this education, and then it leads to higher competition in the labor market. Thus, uneducated peoples will be unemployed and they can't generate income. Then, educational level was negative influence income inequality. These clearly indicate that when education increases income inequality is decrease, so to reduce income inequality, responsible body gives more attention for expansion of education and the responsible bodies should have provide more equal access to basic education (by spending on public education that benefits the poor) to reduce inequality by facilitating the accumulation of human capital and making educational opportunities less dependent on socio economic circumstances and have to provide better job related training and education for low- skilled workers (on- the job- training).
- As the paper result indicates, real GDP per capital had positively and a highly significant effect on income inequality of the country. Based on Kuznets hypothesis after some high economic development level the relationship changes inversely (when the economy grows the income gap diminish). So, to reduce income inequality the country must grow very fast to reach at that high economic development level. In order to grow very fast, the government should implement some policies like, Pro poor growth strategy to participate all people from the benefits of growth, Well- targeted income support policies and Policies that encourage innovations, skill- intensive production techniques, and formulate a better market that initiate competition, technology diffusion and create a good chain to products movement.
- When the unemployment rate decrease the income gap also decrease. If the country aims at decreasing income inequality the government should, create accessible, productive and rewarding jobs, facilitate and encourage access to employment by formulating a policy that reduces market imperfection and institutional failure. For instance; minimum wage, spending on well- designed active labor market policies aimed at supporting job searching people, reducing the gap in employment protection like permanent and temporary workers, legalizing informal workers by giving some training and expanding formal sectarian employments by reducing tax, financial and regulatory constraints.
- This research can be used as a bench mark for further researches, therefore, anyone who are interested can assess the effect through adding additional variables which could be considered as a determinants of income inequality. Further studies should be conducted with a wider coverage as this study only confined 31 years data.

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APPENDIX:I

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.084277	0.042322	-1.991318	0.0486
C(2)	-0.118967	0.202228	-0.588285	0.5574
C(3)	0.003359	0.001601	2.098419	0.0379
C(4)	-2.354937	1.225658	-1.921366	0.0569
C(5)	-0.108326	0.160373	-0.675465	0.5006
C(6)	-0.197443	0.182547	-1.081600	0.2815
C(7)	-0.018474	0.041545	-0.444672	0.6573
C(8)	-1.941432	1.090280	-1.780672	0.0774
C(9)	-2.68321	5.454382	3.792035	0.0002
C(10)	-1.356159	26.06262	-0.052035	0.9586
C(11)	0.259887	0.206289	1.259821	0.2101
C(12)	259.3838	157.9600	1.642086	0.1031
C(13)	-15.64007	20.66849	-0.756711	0.4506
C(14)	9.150366	23.52627	0.388942	0.6980
C(15)	12.62289	5.354262	2.357540	0.0199
C(16)	564.7923	140.5128	4.019507	0.0001
C(17)	-0.015195	0.006557	2.317350	0.0221
C(18)	-0.021639	0.031331	-0.690662	0.4910
C(19)	-0.000323	0.000248	-1.302377	0.1952
C(20)	0.136249	0.189891	0.717511	0.4744
C(21)	-0.011639	0.024847	-0.468440	0.6403
C(22)	0.095895	0.028282	3.390650	0.0009
C(23)	-0.001225	0.006437	-0.190345	0.8493
C(24)	0.116162	0.168917	0.687684	0.4929
C(25)	-0.017358	0.056746	0.305883	0.0602
C(26)	0.085330	0.271149	0.314696	0.7535
C(27)	-0.002353	0.002146	-1.096416	0.2750
C(28)	3.301241	1.643377	2.008816	0.0467
C(29)	0.479128	0.215030	2.228192	0.0276
C(30)	-0.144779	0.244762	-0.591512	0.5552
C(31)	-0.062448	0.055704	-1.121059	0.2644
C(32)	2.497750	1.461861	1.708610	0.0900
C(33)	-0.081845	0.049952	1.638486	0.0038
C(34)	-0.320226	0.238684	-1.341634	0.1821
C(35)	-0.005039	0.001889	-2.667165	0.0087
C(36)	0.093798	1.446610	0.064840	0.9484
C(37)	0.040709	0.189284	0.215068	0.8301
C(38)	-0.122932	0.215456	-0.570566	0.5693
C(39)	0.019439	0.049035	0.396427	0.6925
C(40)	2.848239	1.286828	2.213380	0.0287
C(41)	-0.215771	0.208257	1.036079	0.0021
C(42)	-0.203278	0.995113	-0.204277	0.8385
C(43)	-0.012874	0.007876	-1.634551	0.1046
C(44)	0.552109	6.031169	0.091543	0.9272
C(45)	0.398218	0.789157	0.504612	0.6147
C(46)	-1.146753	0.898271	-1.276622	0.2041
C(47)	-0.284169	0.204434	-1.390025	0.1670
C(48)	7.140692	5.365009	1.330975	0.1856

APPENDIX: II

Variables	Obs	Mean	Std.Dev	Minimum	Maximum
Gini- index	31	0.34245	.7640982	29.0	44.6
GDP per capital (current LCU)	31	4174.447	994.4169	504.533	20,1430933
Inflation	31	10.38	1.920533	-8.2	44.4
Unemployment rate	31	2.9067	.1356572	2.1	5.3
Trade openness	31	35.7	1.631436	23.448	48.23
Primary school of enrollment rate	31	52.5	4.290362	19.188	85.10

Source: Own estimation based on World Bank data sets (2020)

APPENDIX: III

```
. mean lngini lny lnpser lnto lnuemr lninfr

Mean estimation                   Number of obs    =      31
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	Mean	Std. Err.	[95% Conf.	Interval]
lngini	34.24516	.7640982	32.68466	35.80566
lny	4174.447	994.4169	2143.577	6205.317
lnpser	52.48199	4.290362	43.7199	61.24408
lnto	35.69174	1.631436	32.35991	39.02358
lnuemr	2.906774	.1356572	2.629725	3.183823
lninfr	10.37742	1.920533	6.455169	14.29967

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APPENDIX: IV

Data of dependent variable and independent variables from 1988 to 2018

Year	Gini coefficients (%)(GINI)	Real GDP per capital (Y_t) In million Birr	School of enrollments, primary(%) net ($PSER_{t\ )}$	Trade openness at constant price, percent	Unemployment rate in (%) (UERT)	Inflation rate in percentage (%) ($INF_{t)}$
1988	37.0	504.533	29.974	26.21986	3.7	2.2
1989	37.0	513.407	28.703	31.08399	4.5	9.6
1990	38.0	526.284	25.256	23.38600	5.3	5.2
1991	38.0	561.786	31.556	27.58489	3.0	20.9
1992	39.0	571.851	25.281	27.84407	3.0	21.0
1993	39.0	707.792	21.708	28.69366	3.1	10.0
1994	39.0	726.091	19.188	23.44896	3.1	1.2
1995	44.6	840.073	21.947	24.20362	3.2	13.4
1996	42.5	917.208	26.192	23.42700	3.3	0.9
1997	36.0	919.58	28.123	25.41995	3.4	-6.4
1998	37.5	860.774	33.6	29.34442	3.6	3.6
1999	30.0	898.935	35.684	31.98112	3.71	7.9
2000	29.0	1,014.119	40.172	33.04811	3.5	0.7
2001	30.0	1,005.713	43.938	31.47233	3.3	-8.2
2002	30.0	956.161	46.064	34.11079	3.1	1.7
2003	29.0	1,025.287	46.784	37.77908	2.9	17.8
2004	29.8	1,176.271	49.578	45.99167	2.7	3.2
2005	30.0	1,405.303	60.386	49.91167	2.5	11.7
2006	29.9	1,690.062	65.014	49.86843	2.4	13.6

2007	30.2	2,148.251	70.0713	46.95410	2.3	17.2
2008	31.3	3,017.582	75.78	47.8065	2.2	44.4
2009	32.3	3,965.149	75.362	48.44308	2.3	8.5
2010	33.2	4,402.974	73.352	46.20343	2.3	8.1
2011	33.0	5,714.211	77.234	48.2375	2.3	33.2
2012	29.3	8,059.43	79.25	48.4087	2.3	24.1
2013	33.6	9,088.577	78.242	45.47974	2.3	8.1
2014	31.2	10,814.236	85.10	49.0450	2.2	7.4
2015	35.0	12,872.074	86.620	51.6740	2.2	9.6
2016	37.0	15,135.56	85.564	54.0240	2.2	6.6
2017	36.7	17,225.48	88.098	57.3451	2.1	10.7
2018	33.8	20,143.098	89.453	59.5320	2.1	13.8
Sources	**World Bank, World DevlopmentIndicater**	**World Bank ,World DevlopmentIndicater(WDI)**	**World development indicator , UNESCO/ http:/uis.unesco .org**	**FRED, Global economy.com ,World Bank ,University of Pennsylvania**	**World Bank , World (WB),Development Indicter (WDI)**	**CSA,WB**