UNEMPLOYMENT AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS FOR ETHIOPIA (1974/75-2013/14)

A Thesis Submitted to the School of Graduate Studies of Jimma University to Partial Fulfillment for the Requirements for the Award of the Degree of Master of Science (MSc) in Economics (Economic Policy Analysis)

By:

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JIMMA UNIVERSITY

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DECLARATION

I honestly declare that this thesis entitled "Unemployment and Economic Growth: An Empirical Analysis for Ethiopia (1974/75-2013/14)", has been carried out by me under the guidance and supervision of Dr. Krishan K. Kaushik (prof) and Mr. Haile Ademe (MSc)

The thesis is original and never submitted before for the award of any degree or diploma to any University or Institution.

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Abstract

This study attempts to explore the nexus between unemployment and economic growth by mainly focusing on the impact of unemployment on economic growth of Ethiopia over the period 1974/75 – 2013/4. The study also examines the long run as well as short run empirical relationship among the macro variables viz., real Gross Domestic Product, unemployment, investment, employment per total population, and the percentage change of total population. All the data are from 'World Development Indicators' published by the World Bank from 1974/75 to2013/14, the National Bank of Ethiopia (NBE), and Pen World data base. By utilizing Johansen's co-integration analysis and error-correction methodology, this paper examined the long-run relationship and short run dynamics between Gross Domestic Product, unemployment, investment, employment per total population, and the percentage change of total population. The present study shows that a 1% increase in unemployment lead to about 0.82 % reduction in real GDP of the country. The test results further indicate that unemployment has a significant negative impact, especially in the short run, on the country's economic growth. Similarly, the negative result of employment to the population ratio may further signify that the rapidly growing economy for almost a decade does not result in equivalent employment opportunity. Although population and investment show a positive sign, these rapidly growing population and slowly growing vibrant investment sector that absorbs the rapidly growing productive population as well as the weak employment generation capacity of the economy compared to the labor force growth, in the long ran, the result indicates, that as time passes on with this trend, negatively affects the country's economic growth. To reduce the negative impact of unemployment, and expand the employment generating mechanisms like by strengthening investment in both agricultural and non-agricultural sectors that absorb more labor force; the study recommends adoption of more employment generation mechanisms, addressing the labor market's failure & improving the labor force productivity, improving agricultural productivity & increasing its linkage with other sectors.

List of Acronyms and Abbreviations

ADF	Augmented Dickey-Fuller Test
AIC	Aikike Information Criteria
BIC	Bayeansian information Criteria
CSA	Central Statistical Authority
DF	Dickey -Fuller
ECA	Economic Commission for Africa
EEA	Ethiopian Economic Association
EFY	Ethiopian Fiscal Year
EPRDF	Ethiopian People's Revolutionary Democratic Front
FPE	Final Prediction Error
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
HQC	Hannanqunin criteria
ILO	International Labor Organization
IMF	International Monetary Fund
MDG	Millennium Development Goal
MoFED	Ministry of Finance and Economic Development
MoLSA	Ministry of Labor and Social Affairs
NBE	National Bank of Ethiopia
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary List Square
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
SIC	Schwarz Information Criteria

UNCTAD	United Nations Conference on Trade and Development
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WB	World Bank

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Unemployment is a negative phenomenon in any human society as it adversely affects a country in different dimensions and directions. In addition, it refers to an economic defect affecting the community structure, especially when there are large numbers of unemployed work forces in the community. As Aseluka (2011) indicated, the size of the workforce, those who are employed, directly influence a country's GDP (economic growth) by, not only producing manufactured goods or services or agricultural products in direct proportion, but also increasing the purchasing power, which in turn, fuels the county's economic growth.

Unemployment is said to occur when a person actively seeking for a job become unable to find. This mainly takes place, according to Tesfaye and Tegegn (2013), when the economy fails to generate adequate and well-paying job opportunities for the workforce in addition to the rapidly growing labor force. The availability of job opportunities in turn depends upon the overall performance of the economy (Asmamaw, 2004). According to ECA (2010), economic growth, on the other hand, is important for not only increasing levels of a country's income, but also for laying the foundation for sustainable poverty reduction, improving human welfare and enhancing overall development. Growth enables countries to increase the availability and distribution of basic life sustaining goods and services such as food, shelter, health, and protection. It also enables countries to generate more jobs and

better education, thereby expanding the range of economic and social choices available to individuals.

Although many African countries registered high "commodity-driven" economic growth that is highly volatile given its vulnerability to external shocks, the growth is unable to deliver meaningful job creation in their economies. These countries are currently facing a challenge to not only accelerate and sustain growth, but also, to enhance the responsiveness of employment to growth, which is essential for sustainable poverty reduction (ECA, 2010).

According to the 2013 report of IMF on the economic growth of Ethiopia, in recent years, Ethiopia has sustained high growth spurred by bold national plans. During 2005/06–2009/10, the Ethiopian government implemented the Plan for Accelerated and Sustained Development to End Poverty (PASDEP). In this period, the country achieved high economic growth with significant improvements in physical infrastructure and human capital resulting from public and private investments. The service sector has accounted for nearly half of GDP growth since 2004. Nevertheless, Agriculture is still the cornerstone of Ethiopia's economy, accounting for more than 40 percent of GDP, 75percent of exports and more than 80percent of employment.

The economic drivers, during this time, were slowly changing, but a shift to a more urbanized economy with less reliance on rainfall remains some way off. At the same time, Ethiopia has made important progress in reducing poverty. The country's headcount poverty ratio fell from 55 percent in 2000 to 39 percent in 2005, outpacing poverty reduction in sub-Saharan Africa as a whole. The incidence of income poverty declined from 38.7 percent in 2004/5 to 29.6 percent in 2010/11. The food poverty head count index

declined from 38 percent to 28.2 percent over the same period. Yet, helping the very poorest 10 per cent(more than 7 million) remains a challenge for those governing the country because of the acute vulnerability of the poorest (Brighton, 2012). In line with this argument, the country has endorsed a number of programs, to foster the economic growth and improve the people's living standard, such as the SAP and PASDEP, and currently, the GTP is being implemented with the aim of sustaining high and broad-based economic growth and achieving the Millennium Development Goal (MDG) targets by 2015. The longer-term goal is to become a middle-income country by 2020–25.

Despite the impressive economic growth in the past two decades and the various development policy efforts, the incidence of unemployment is still higher and persisting. According to the urban employment-unemployment surveys of CSA, the average urban unemployment rates of Ethiopia for people aged between 10- 64 years was 26.3 percent in 2003, and it stood at 18 percent in 2011. This means that the rates decreased only by 8 percentage points in the 8 year periods, implying a merely 1 percent average annual reduction. Given the existing efforts, the annual reduction rate is slower and unemployment is still high. Such persistent and higher incidence of unemployment suggests the urgency of a deep and rigorous examination of its relation and impact on the economic growth of the country, which might play a big role in giving a due attention and find the root causes of the problem.

1.2. Statement of the Problem

Unemployment and Economic growth are intertwined concepts because; the level of unemployment in an economy may affect the rate of economic growth, and is an indicator of the state of the economic growth of an economy. In order to sustain economic growth, high level of unemployment must be minimized (Bean, 1998). Furthermore, this association between economic growth and unemployment also seen in terms of the required output of services delivered by employees needed to withstand an economy and to encourage economic growth. When there is a high level of unemployment, the level of output also drops due to the reduction in the number of workers contributing to the output (Tesfaye and Tegegn, 2013).

Unemployment, in line with the argument by Aurangzeb and K. Asif (2013), is one of a key macroeconomic indicator that serves as primary diagnosis to test the state or health of the economy. It shows the extent to which human as well as non-human resources of the country utilized and hence the gap between the potential and the actual output that produced at a given point in time. It measures the extent to which the economy utilizes its fundamental resource and to analyze the future path of the economy.

ILO (2007) indicated that, the total number of people worldwide living on less than $1 a day declined from 1.45 billion in 1981 to 1.1 billion in 2001. In contrast, the number in sub-Saharan Africa has increased from 164 million to 314 million during the same period, of which roughly 50 percent are women and men of working age. Consequently, Africa has the largest number of working poor in total employment of any region; hence, in the face of considerable improvement in macroeconomic performance, in recent years across the region, the resulting job opportunities are not sufficient. Recent studies also show that,

while Africa has made some progress in achieving the development goals, overall the continent is yet to realize most of the eight MDG goals (Tesfaye and Tegegn, 2013). Meaning, the continent is on track to achieve only three out of the eight goals by 2015, which are achieving universal primary education, promoting gender equality and empowering women, and combating HIV AIDS, Tuberculosis and other diseases. While on the other hand, unemployment, among other problems like inequality hunger and poverty, has increased over the past decade (ECA, 2013). Hence, the implication is that if one of the MDG target is reducing, by half, extreme poverty by 2015 in the region, an employment-centered growth strategy coupled with active population policy is required.

The Ethiopian government, in line with the above statements, is encouraging people (mainly youth) to start or engage in small businesses in order to reduce the rate of unemployment especially the youth that currently estimated at around 50 percent as pointed out by Pieter, et.al (2012). According to the report by Brighton (2012), the number of unemployed people is more than 50percent where nationally, current employment (in urban area) for all ages is 17.5 percent while unemployment between 15-19 years age groups is 21.6 percent nationally rising to 29.6 percent for the 20-24 years age group. The government is trying to reduce this problem by channeling skilled labor, mainly those who are coming from education institutions to the labor market, in to the massive-scale construction projects that have been springing up across the country in such areas as hydropower, railway lines, roads, housing, water supply and irrigation.

The Ethiopian labor market is highly dominated by employment in the agriculture sector of the economy. One may strongly assert that at least 80 percent of the total labor force in the country is engaged in the agricultural sector where employment in this sector mostly

characterized as underemployment, where underemployment defined as under use of the labor force as in over-staffing. One justification for this assertion is that the contribution of this sector to the country's economy is very low (less than 50percent of the total GDP) relative to the size of the labor force engaged in this sector that, according to Admit, et al (2014) and CIA world fact book (2014), accounts for 46percent of GDP and 85percent of total employment.

In addition, Ethiopia's ambitious five-year Growth and Transformation Plan (2010–2015), which includes developing industrial cluster zones and constructing 10,000 miles of road networks, is expected, upon completion, to reduce unemployment considerably. The plan also includes increasing power generation from its current level of 2,000 megawatts to 8,000 megawatts, and building a 1,500-mile standard gauge rail line. These projects have already employed hundreds of thousands of people and further recruitment is ongoing. Official data shows that in both formal and informal sectors, over 1.4 million jobs were created between 2006 and 2010, and over 1.2 million between 2011 and 2012. Many of those hired were young people (Selamta, 2015).

Despite these and other related efforts, one can see the current picture in Ethiopia as mixed because economic vibrancy is apparent in the country as construction booms and the consumption economy grow. Yet rising unemployment is still a problem. Between 2005 and 2008, employment grew by 2.2 percent while unemployment grew by 4.4 percent. Hence, Unemployment is acute in the country, mainly in urban areas and the youth. Nationally, urban employment for all ages is 17.5 percent. Unemployment between 15-19 years is 21.6 percent nationally rising to 29.6 percent for the 20-24 years age group and in the capital city of the country; unemployment is 22.3 percent for the 15-19 year-old and

34.2 percent for those aged 20-24 (Aurangzeb and K. Asif, 2013). This shows that more than half of the country's young workers are out of job pushing people in to total desperation and hopelessness and such situations are prompting most people to use desperate and sometimes dangerous measures to find better opportunities elsewhere, including paying to be smuggled into other countries mainly to the Middle East.

These facts show that unemployment in the country is a problem and has a severe impact on the country's economic growth. One can see this impact from its economic and social cost. The economic cost of unemployment, as ECA (2005) and Getnet (2003) noted, viewed in terms of "the forgone output" that the unemployed scarce resource could have produced. Unemployment deprives the government of necessary resources needed to develop the economy. When workers are unemployed, they will not earn money, and the government will lose the income tax it would normally gain from such workers. Instead, the government might have to spend resources, which could otherwise be allocated to other development projects, in the form of various types of welfare for the upkeep of the unemployed workers. Therefore, high level of unemployment entails lost revenue to the government in terms of direct and indirect taxes and other revenue that it would have raised if more people had been working. In addition, as most of the unemployed people face with lack of financial resources and social responsibilities, they may unwillingly decide to take jobs leading to underemployment (disguised unemployment), which in turn results in the lowering of the economy's efficiency (Wikipedia, 2014). Similarly, during a long period of unemployment, workers can lose their skills; causing a loss of human capital to the nation at large. Hence, high unemployment produces an adverse economic consequence not only

to the unemployed individuals themselves and the immediate family, but also to the society that fails to utilize efficiently its scarce resources.

From the social point of view, higher level of unemployment (mainly youth, as they take the lions share in Ethiopia) has adverse social consequences. The longer the duration of unemployment, the more the resulting problem become. This is because, in attempting to overcome financial insecurity, these unemployed people tend to engage in illegal activities and antisocial behaviors such as drug trafficking, violent crime, and unsafe sex practices, which exacerbate the rate of spread of HIV/AIDS and other STDs, for example through prostitution. These leads to diversion of resources, that would have been used for other purposes like employment creation, for prevention (ECA, 2005; Getnet, 2003; UN 2003). Likewise, according to WB (2008), these unemployed workers may have a higher propensity to relocate abroad because of lower "sunk costs" and greater potential for education and, subsequently, work abroad. Furthermore, these unemployed people are readily available for anti-social and criminal activities that undermine the stability of society, by eroding social cohesion and institutions and fostering crime, as they become more exposed to conflicts and illegal activities-many of whom engage in armed and rebel conflicts as well as robbery. Similarly, as Habtamu (2013) pointed out, Unemployment (in addition to its related factors) is responsible for what economists called a 'Growth Bumps' especially in developing countries and further causing a short, middle and long term social unrest and a series of bloody regime breaks mainly in Latin America and Africa. The economist (2011) also added that these challenge was one of the main reason for the 2010 and 2011 Arab spring (such as Tunisian, Egyptian and Libyan revolution). Moreover,

unemployment, more often argued that, increases individuals' vulnerability to malnutrition, illness, mental stress, loss of self-esteem, and leads to depression.

Hence, as the economics literature argues, unemployment regarded as an element of a vicious circle with poverty, low education, poor health, and social and political marginality. Peoples, particularly those experiencing long period of unemployment, are likely to have unstable personal relationships, postpone marriage, and/or put off accepting responsibility for children. Furthermore, this unemployment problem also costs the family as the unemployed person become additional dependent on his poor family, who were supposed to looking out for his help, which further exacerbate the already high dependency ratio of Ethiopia that, according to Mundi index (2014), is currently 83.5percent. Thus, this study examines the magnitude of this problem in Ethiopia focusing on its impact on the country's economic growth over the period 1974/75-2013/14.

1.3. Research questions

1. What is the trend of unemployment and economic growth in Ethiopia over the period of study?
2. How is unemployment and economic growth related in Ethiopian context over the study period?
3. What is the impact rate (magnitude) of unemployment on the economic growth of Ethiopia?

1.4. Objectives of the study

1.4.1. General objective

The main purpose of this study is to analyze empirically the impact of unemployment on economic growth for the case of Ethiopia.

1.4.2. Specific objectives

- To overview the trend of unemployment and economic growth in Ethiopia for the period (1974/75 – 2013/14),
- To analyze the relation between unemployment and economic growth in Ethiopia with in the study period,
- To investigate the rate of impact of unemployment on the country's economy, and finally forwards recommendations based on the findings.

1.5. Significance of the Study

Most of the studies on unemployment in Ethiopia focused on the urban areas and further limiting to the youth, causes and determinants of unemployment in that area. Thus the impact of unemployment on economic growth, at a country level, is found less explored in the literatures. Therefore, this study empirically analyzes the impact of unemployment on Economic growth, in Ethiopian context. Firstly, understanding the trend at the country level is important to see how prevalent the problem is and in further investigating its characteristics in the country, which is fundamental for appropriate intervention. Thus, this study can be used in understanding and reassessing the trend and concentration of the problem in the country. Secondly, understanding the relation between unemployment and economic growth in Ethiopia can help to reveal the underlying effects or impacts that unemployment has on the economic growth. Hence, this study can be an input for concerned bodies at different levels who are interested in the issue. Thirdly, this study can supplement the existing empirical studies on unemployment and serve as a reference material for teaching as well as for others who will conduct related studies in the future. Fourthly, this study may encourage other researchers to undertake further studies, focusing on, like the

root causes of unemployment in the past and current Ethiopian context, to fill the existing gap in depth.

1.5. Scope of the Study

This study is delimited to analyze the impact of unemployment on economic growth in Ethiopia, by using a 40 year annual time series data from 1974/75 – 2013/14 based on the availability of recorded data for the variables under study. This period is believed to be long enough to capture, if exist, both the long run and short run dynamics .

1.6. Organization of the Study

The study organized into five chapters. Following the introductory chapter, Chapter two presents the theoretical and empirical literature reviews. Chapter three discusses the data and methodology of the study, followed by Chapter 4, which present and discusses the result of both descriptive and econometric analysis. Finally, Chapter 5 presents the conclusions and recommendations of the study.

CHAPTER TWO

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1. Theoretical Literatures

2.1.1. Concept of Unemployment and Economic growth

2.1.1.1. Concept and Types of Unemployment

1. Concept of Unemployment

The labor market, like any other markets, has both supply and demand sides. The supply side comprises the labor force or the economically active population that includes both employed and unemployed. The demand side, on the other hand, consists the jobs (or the filled posts) and job vacancies (or those unfilled posts) (WB, 2007). The prevailing situation in countries around the world is that, the demand for labor is less than the supply that means there is excess supply of labor. This gap between the supply and demand for labor referred as unemployment (Olsson, 2009). Unemployment further more conceptualized as a situation where a worker or workers are involuntarily out of work. This means, workers are willing and able to work but they are unable to find thejob. Moreover, The International Labor Organization (ILO) defines the unemployed as numbers of the economically active population who are without work but available for and seeking work, including people who have lost their jobs and those who have voluntarily left work (WB, 2007). The international standard definition of unemployment relies on three criteria that have to be considered simultaneously. According to the definition, the unemployed comprise all persons above the age specified for measuring the economically active population whom, during the reference period, were: (a) "without work", i.e. those who were not in a paid or self-employment, as defined by the international definition of

employment. (b) "currently available for work", i.e. those who were available for paid employment or self-employment during the reference period; and (c) "seeking for work", i.e. those who had taken specific steps in a specified recent period to seek paid employment or self-employment.

Unemployment can therefore be, described as a number of active population, willing and able to work, but unable to find job. When the supply of labor outstrips the demand for labor, it causes joblessness and unemployment. Given the lack of sufficient employment opportunities in a country, people may engage, involuntarily, in casual work and other unorthodox livelihood sources, thus leading to underemployment (Deribe et al. 2015).

A person without a job is said to be involuntarily unemployed as long as he/she is available and willing to be employed at the going wage rate; otherwise, he/she is considered as voluntarily unemployed and does not appear in the official statistics as he/she has dissociated himself from the labor force. The unemployment rate is therefore, the share of the unemployed over the labor force population aged between15 and 64 years. However, this standard definition is different from Ethiopia's official definition of unemployment by the CSA. The CSA definition, therefore, relaxes the criterion of "seeking work" and adopts a relaxed definition, which leads to higher unemployment rates. The main rationale for relaxing the definition in Ethiopia is attributable to the unorganized nature of the country's labor market, in which job search media are not well developed or quite limited and not accessible to the majority of job seekers.

The population not currently active (economically inactive populations) refers to the residual category comprising those without work but were neither seeking nor available for

work, such as students, home keepers and the retired, as well as those below the minimum age specified for measuring the economically active population.

Thus, those employed and unemployed categories together make up the labor force (or the currently active population), which gives a measure of the number of persons furnishing the supply of labor at a given moment in time. The third category (not in the labor force), to which persons neither seeking nor available for work plus those below the age specified for measuring the economically active population are included, represents the population not currently active.

2. Types of Unemployment

The theoretical literature identifies various types of unemployment categories based on their sources. Although there are more, the most frequently stated classifications are Demand Deficient or Cyclical, Frictional, Structural, Seasonal, Technological, and Hidden unemployment (EEA, 2007; Henderson, 1991).

Cyclical or Keynesian unemployment, also known as deficient-demand unemployment, occurs when there is not enough aggregate demand in the economy to provide jobs for everyone who wants to work. It is involuntary unemployment arising from the business cycle effect because of insufficient effective aggregate demand for goods and services. When there is a recession or a severe slowdown in economic growth, economies face with a rising unemployment because of plant closures, business failures and an increase in worker lay-offs and redundancies. This is due to a fall in demand leading to a contraction in output across many industries. This type of unemployment coincides with unused industrial capacity; and as traditional Keynesian economics suggests, its cure lies in policies that succeed in increasing the level of aggregate demand.

Frictional unemployment is the period between jobs when a worker is searching for or transitioning from one job to another. It sometimes known as search unemployment and can be, voluntary, based on the circumstances of the unemployed individual. Frictional unemployment is always present in an economy. Transitional and temporary unemployment arises because a person may take time to find a new job after losing or quitting a job, or after entering or reentering the labor force following schooling, illness, or some other reason for being out of the labor force. It usually occurs due to imperfect information in the labor market (Henderson, 1991; Mankiw, 2001). Frictional unemployment may not pose much threat to individual's welfare as long as it is temporary and does not last long. There may be little that could be done to reduce this type of unemployment, other than provide better information to reduce the search time. This suggests that full employment is impossible at any one time because some workers will always be in the process of changing jobs.

Structural unemployment refers to a mismatch of job vacancies with the supply of labor available. It occurs when a labor market is unable to provide jobs for everyone who wants one because there is a mismatch between the skills of the unemployed workers and the skills needed for the available jobs. Structural unemployment is hard to separate empirically from frictional unemployment, except to say that it lasts longer. It is caused by long-run changes in the structure of the economy, which give rise to changes in the demand for labor in particular regions, industries or occupations. For instance, technological progress may make an industry capital intensive from a purely labor intensive one. The release in labor from such an industry gives rise to the problem of unemployment. Although workers are available for employment, they may lack the skills that the available vacancies

required or they may be in the wrong location to take the available jobs (EEA, 2007; Henderson, 1991). Since structural unemployment lasts longer, demand management instruments alone may not be effective remedies to the problem. Besides, other instruments such as facilitating training programs and subsidizing mobility of workers are required along with demand management policies to reduce significantly its incidence (EEA, 2007).Structural unemployment can arise from labor immobility. In an economy, industries that are growing and need labor are not necessarily able to employ the same workers who have been displaced in the declining industries. This situation can be attributable to the problem of labor immobility. Labor immobility includes geographical immobility, industrial immobility, and occupational immobility. Geographical immobility occurs when workers are not willing or able to move from region to region, or town to town. Industrial immobility occurs when workers do not move between industries. Occupational immobility arises when workers find it difficult to change jobs within an industry. Industrial and occupation immobility are most likely to happen when skills are not transferable between industry and job. Information failure also contributes to labor immobility because workers may be immobile because they do not know where all the suitable jobs for them are. A resulting problem with labor market immobility is that it can create regional unemployment, which is a type of structural unemployment. This means that a change in the structure of industry leaves some people unable to respond by changing location, industry, or job and as a result, they remain temporarily or permanently unemployed.

Seasonal unemployment occurs because of normal and expected changes in the economic activities over the season of a year. Seasonal unemployment exists because certain industries only produce or distribute their products at certain times of the year. Workers in

the agriculture and construction sectors as well as in the tourism industry, who are often out of work during the winter months, are typical examples of seasonally unemployed people. Indeed, such phenomena are common in most Sub Saharan African economies where seasonal unemployment following the end of harvesting season is inherent in the agricultural sector.

Technological unemployment occurs due to the replacement of workers by machines. Technological unemployment might refer to the way in which steady increases in labor productivity mean that fewer workers needed to produce the same level of output every year.

Hidden or covered unemployment is the unemployment of potential workers that not reflected in official unemployment statistics, due to the way the statistics are collected. In many countries, only those who have no job, but are actively looking, considered as unemployed.

2.1.1.2.Concept of economic growth

Economic growth is the increase in the capacity of an economy to produce goods and services over time. It can be measured in nominal terms, which include inflation, or more conventionally measured by adjusting inflation in real terms (real GDP) and economic growth typically refers to this growth of potential output (Wikipedia, 2014).

As stated by ECA (2010), Economic growth is important for not only increasing a country's level of income, but also for laying the foundation of sustainable poverty reduction, improving human welfare and enhancing overall development. Growth enables countries to increase the availability and distribution of basic life sustaining goods and services such as food, shelter, health, and protection. It also enables countries to generate more jobs and

better education, thereby expanding the range of economic and social choices available to their citizens.

2.1.2. Theoretical literatures on Unemployment and Economic Growth

2.1.2.1.The Okun's Law

Economic study and thought has been around for centuries, and when it comes to studying the economy, growth and jobs are two primary factors that economists must consider. There is, clearly, a relationship between the two, and many economists have framed the discussion by trying to study the relationship between economic growth and unemployment levels. An economist called 'Arthur Okun' first started tackling the discussion in the 1960s, and his research on the subject, since then, known as Okun's law (Ryan, 2012). He examined an inverse relation between the unemployment and economic growth for the post-war years in the United States. His estimations showed that a 3 % increase in the real GDP was associated with a 1 % reduction in unemployment. More specifically, recently accepted versions of Okun's law states that, a 1 % decline in unemployment, in the course of a year, is related to approximately a 2% faster growth in real GDP over that period (Abel, 2008).

A fall in the economic growth does not lead to an instantaneous increase in the unemployment rate because there are other factors intervening in this relationship such as rigid labor policies or uncertainty. After the financial crises of 2008, the response rate of unemployment to growth dramatically disrupted in some developed countries. Scholars believed that social, technological and normative transformations of the past 30 years are behind the erratic behavior of the coefficient during the last recession in the United States (Daly et al. 2010). Hence, the unresponsiveness of unemployment to growth could be due

to factors such as intensive flexibility of the labor markets, and technological change. Many scholars are still trying to understand the variability of the response rate of unemployment to growth, and some have argued that it varies because technological change and social infrastructure differs from one region to another. Neely (2010), noted that industrialized countries, with less regulated labor markets tend to have smaller response rate. This is because, unemployment is more sensitive to changes in output since it is easier to lay off workers; and hence, the response rate varies over time because the relationship of unemployment to output growth depends on laws, technology, preferences, social customs, and demography of the country.

2.1.2.2. Other related theoretical literatures

1. The Classical view

Concerning Economic Growth, the classical economists like Adam Smith, 'David Ricardo' and 'Mill', who were the exponents of the classical growth theory assigned the rate of investment as the main factor for fostering growth. Growth is a function of the share of profits in the national income. There exist a positive relationship between higher rates of profit and higher rates of growth. Higher growth achieved via profits effective on the rate of investment. According to the classical economists, the increased division of labor and specialization made possible by increase in growth rate of capital would result in increase in both profits and wages. However, it is argued that, such increase may trigger off income and population growth that may lead to diminishing returns given that land is fixed. 'Classical models' like 'Ricardian growth model', emphasized the limits to growth imposed by the ultimate scarcity of land.

The classical economists often define unemployment as the "excess supply" of labor over the demand for labor that caused by adjustment in real wage. The Classical or real-wage unemployment occurs when real wages for a job are set above the market-clearing level, causing number of job seekers to exceed the number of vacancies. In this theory, unemployment regarded as situation where the smoothly functioning labor market obstructed in some way. In a smoothly functioning market, market forces would set the equilibrium wage and quantity of labor. The Classical approach assumes that markets behave as described by the idealized supply and demand model. The labor market characterized by perfect competition, in which, it is assumed that, every unit of labor services is the same, and every worker in this market will get exactly the same wage. Because such a Classical (idealized) market for labor is free to adjust, there is 'no involuntary' unemployment and everyone who wants a job at the going wage gets one. Thus, the only thing that can cause true unemployment is something that interferes with the adjustments of the free market, such as a legal minimum wage and other regulations. Nevertheless, this seems far from the reality. As Solow (1980) puts, the labor market segmented in that not everyone in it is in competition with everyone else, among others due to the obvious differences in abilities, experience and skills.

According to the classical economists view, an increase in labor supply will tend to raise employment although it dampens productivity increases because, the higher labor supply will lead to lower average wages and consequently to an increase in demand for labor (Kapsos, 2005). Thus, the classical theory of labor markets depends on quick market adjustment by elimination of any labor surplus through falling wages and resulting full employment equilibrium at a lower wage rate. However, the question of 'to what extent is

this realistic?' comes to mind. According to the well-known explanation of Keynes, based on the experiences of the Great Depression, certain aspects of real world human psychology and institutions make it unlikely that wages will fall quickly in response to a labor surplus. Thus, Keynesian-oriented economists developed 'sticky wage' theories, which hypothesize that wages may stay at a level above equilibrium for some time. Wages may eventually adjust in the way shown in the Classical model, but too slowly to keep the labor market always in equilibrium. In addition to psychological resistance to wage cuts, a minimum wage might also make wages sticky. Wages may also become set at particular levels by long-term contracts, such as many large employers negotiate with labor unions.

2 The Keynesians view

For Keynesian economists, unemployment is a situation in which the number of people who are able and willing to work at prevailing wage exceeds the number of available jobs. When the number of unemployed is significant, the demand in the product market will negatively be affected , and as a result, firms become unable to sell all their goods. Businesses respond to a declining demand for goods and services by cutting employment in order to control costs and restore some of their lost profitability. Consequently, the higher unemployment will tend to delay the growth of gross output, implying a vicious circle.

In the Keynesian model, aggregate employment depends on the level of aggregate demand in the economy as a whole. If total spending is low and businesses unable to sell their goods, they will tend to cut back on their investments and on the number of workers they employ. Prices as well as wages may fall (as was observed during the Great Depression), keeping real wages constant and thus giving employers no incentive to hire more workers. Low aggregate demand for goods and services could lead to a vicious cycle of

unemployment, low incomes, and low spending in the economy as a whole. The Keynesians recommendation, for fixing the problem of unemployment, is stimulating aggregate demand in the economy, and making labor markets work more smoothly.

3 New Keynesians View

Based on the major assumptions of Orthodox Keynesians, prices and wages are rigid for New Keynesians as well. These rigidities play an important role in exaggerating economic shocks that arise from either the demand or the supply side (Blanchard, et al 2005). If money supply is tightened then aggregate demand declines leading to lower economic growth and higher unemployment. The fall in the aggregate demand is the reason for lower productivity by firms and unlike the New Classical it is not the price that is discouraging production but it is the lack of demand. Firms produce only up to the point where they get demand for their production. If firms exceed this production, then, there will be no market for the additionally produced goods even at lower price because price takes a long time to adjust (Ball, et al 1988).

Based on the above theories, one could easily see that the situation is different in developing countries, mainly in Africa, where the demographic transition is lowest and the population growth rate is still around 2.4 %. Over the past 20 years, the economically active population of Africa has grown at an average rate of 3 per cent, rising from 231 million in 1990 to 403 million in 2009. This represents a 43 % increase just in two decades, one of the highest increases among all regions of the world (ECA, 2010). Therefore, high population growth and growing labor participation, among others, has rather resulted in excessive supply of labor, which has continued to outstrip the demand for labor (EEA, 2007).

2.2. Empirical Frame Literatures

The relation between economic growth and unemployment has been a topic of interest in economic research for decades. The problem of unemployment is still a major problem for economists to handle while every economy aims to achieve higher economic growth and reduce level of unemployment in the country. A number of empirical studies, conducted to investigate the relation, and impact, between unemployment and economic growth, presented as follows.

Arthur Okun, in 1962, investigated the relation between unemployment and economic growth of USA. The result indicated a significant negative relation, and recommended an increase in output level for achievement of full employment level (Prachowney, 1993). Moosa (1997) investigated the impact of economic growth on unemployment for G7 countries, using Okun's law. The study revealed that the impact was high for North America and low for Japan, and he concluded that, this resulted from the differences of labor market rigidities. Furthermore, Malley et al (2008) used quarterly data for G7 countries between the years of 1960 to 2001 and they found that the relationship between economic growth and unemployment was more significant in the case of Germany.

Seyfried (2005) investigated the relation between economic growth and employment level over the period 1990 up to 2003, for ten selected developed countries. His results confirmed a significant negative relation between economic growth and unemployment. He found that the unemployment level reduces from to 0.61 percent because of one percent increase in economic growth. Hussain, at al. (2010) also examined the relation between economic growth and unemployment in Pakistan for the period 1972 - 2006 using Johansen

cointegration and VECM. The result conform existence of both long run and the short run negative relation between unemployment and economic growth.

Tunah (2010) investigated the macroeconomic variables that cause unemployment in Turkey using a quarterly data (2000 – 2008). The study employed Augment Dickey Fuller test (ADF), Phillip-Perron test, Johansen's co-integration, and granger causality techniques. The results showed that there is a significant impact of real GDP, consumer price index and previous unemployment rate on the unemployment rate. Whereas real effective exchange rate has no impact on the unemployment. Eita et al (2010) also investigated the causes of unemployment in Namibia over the period of 1971 to 2007, using Engle-Granger two-step estimation techniques. The estimated results confirmed that, economic growth have significant negative effect on unemployment in Namibia.

El-Agrody et al. (2010) emphasized the economic study of unemployment and its impact on Egypt's GDP (1994-2004), applying Simple and multiple linear regression analysis. Variables used in the study were privatization, population, consumption expenditure, interest rates, exchange rates, technology, agricultural domestic product, real wage rates, and agricultural investment. The results revealed a significant positive impact of national unemployment, national investment, exchange rate and average per capita share of GDP on the GDP. The results also highlighted privatization and increasing population as the main reasons of increasing unemployment; and recommended that, privatization policies need to be revised and to reduce interest rates in order to lower the agricultural unemployment. Osinubi (2005) also investigated the impact of economic growth on the unemployment and the poverty for Nigeria using annual time series data (1970-2000) and with an objective of investigating the relation among growth, unemployment and poverty

and finding solutions to overcome these shortcomings. The study applied three stages least square (3SLS) estimation. Variables selected for the study were unemployment, inflation, and index of agricultural production, index of petroleum production, money supply, exchange rate, and changes in real GDP, savings, work stoppages and trade disputes. The result showed that growth is negatively related to the poverty and positively related to the unemployment. The study finally recommended policy makers to reduce the inequality of levels of income to overcome poverty and low growth. Noor et al., (2007) also investigated the impact of economic growth on the unemployment level of Bangladesh over the period of 1970 to 2004, using ordinary least squares. His estimated result indicates the economic growth having a significant negative impact on the level of unemployment. Other researchers also investigated empirically the impact of unemployment on economic growth such as Aminu, et al (2013) for Nigeria, UK Essay (2008) for EU countries, Maria J., et al (2012) for Peru, Rafiq M., et al (2010) for Pakistan, to say the list.

The above empirical studies conformed significant negative impact of unemployment on economic growth. Hence, taking the above literatures as a hint and base line, this study empirically investigates the impact of unemployment on economic growth in Ethiopia.

CHAPTER THREE

DATA AND METHODOLOGY

This chapter outlines the empirical framework employed to achieve the objectives of this study, where the main purpose of the study is to analyze the impact of unemployment on economic growth in Ethiopia based on annual time series data. The study has adopted a descriptive statistics, ratio analysis, and econometric method to achieve the objectives. The descriptive statistics was mainly used to overview the trend of unemployment and economic growth in Ethiopia.

3.1.Study Design and Strategy

Study design is the structure and strategy for investigating the relationship between the variables of the study. This study has adopted both descriptive statistics and econometric method to achieve the objectives. The descriptive statistics used to overview the trend of unemployment and economic growth while the econometric method used to meet the remaining objectives. In the descriptive part, averages as well as annual growth rate used to see the trend and finally a percentage change point used to see the change in the variables growth rate between the past and current government. The econometric method employs the ADF test, Johansen (cointegration and VAR), and Vector Error Correction (VECM) to check variables stationarity and then capture the long run and short run dynamics respectively.

3.1.1. Type and Sources of Data

This study uses annual time series data pertaining to the period from 1974/75 to 2013/14 fiscal years (i.e. 1967 – 2006 EC). The required data for this study collected from the National Bank of Ethiopia (NBE), and The Next Generations Penn World and World Bank

(WDI) databases. In order to investigate the impact of unemployment on economic growth in Ethiopia, this study has used Real GDP (RGDP) as proxy for economic growth and concentrates on the general (aggregate) unemployment due to data availability over the period of investigation.

Dependent variable: Real GDP (RGDP)

Real GDP at factor cost, expressed in constant 2010/11 (base year) prices. The Gross Domestic Product is the market value of the goods and services produced by labor and property located in the country and during a specific period.

Independent variable: Unemployment (UEMP)

It is a prevailing situation in countries around the world that the demand for labor is less than the supply indicating an excess supply of labor; and this gap between the supply and demand for labor captured by a term referred to as "Unemployment" (Olsson, 2009). ILO (2007) has also defined unemployment as the proportion of the labor force who is not employed but actively seeking for a job. Unemployment, therefore, could be described as the number of active population, willing and able to work, but cannot find any. When the supply of labor outweighs the demand for labor, it causes joblessness and unemployment.

3.1.2. Expectations of this Study

Unemployment is expected to have negative impact on economic growth. Investment in the country is expected to foster growth and development. Thus, total investment is expected to have positive sign mainly because an increase in investment represents capital formation and this is expected to cause increase in national output as well as opening more job opportunities for those unemployed in the country.

3.2. Estimation Technique

The empirical investigation this study consists three main steps. First, the Augmented Dickey-Fuller (ADF) tests of stationarity. Second, the Johansen test of coin-integration (the long run relation). The concept of co-integration implies that if there is a long run relationship between two or more non-stationary variables, deviations from this long run part are stationary. Thirdly, the vector error correction model (VECM) analyzed. The secondary data processed using E-view version 7.1 for windows econometric packages.

3.2.1. Model Specification

Based on the previously conducted studies, to investigate the impact of unemployment on economic growth, by different people and different countries (discussed in the literature), the basic regression equation between unemployment and economic growth is presented as follows: model one or the bivariate -

RGDP = f (UEMP) ---------- (1)

Various previously conducted studies have used a number of other variables to investigate unemployment. For example, Lulit (2011), have incorporated demographic challenges that mainly attributed to the exponential growth rate of the population; enrollment rates and quality of education; health status that mainly attributed to the lack of health and medical services limiting the percentage of population that would otherwise be employed. Also, the global financial crisis that mainly attributed to the investment side; and migration patterns that attributed to finding better educational and work opportunities and way out of poverty to investigate the unemployment factors in Africa. Rafiq, et al. (2010), used population growth; investment (foreign direct); and inflation to investigate the determinants of unemployment in Pakistan between 1998 up to 2008.Daniel (2011), have used the labor force participation rate; employment to population ratio (to provide information on the

extent to which the population is engaged in productive activities). Economic or productive activities that attributed to the production and distribution of goods and services intended for sale or exchange on the market, and labor force status to investigate the trends of urban unemployment in urban Ethiopia.

Therefore, this study incorporates only the demographic challenges such as the rate of percentage change of total population (PTPOP), employment per total population (EPTP), and total investment (SINV) and omits the others (like health status, migration, education or school enrollment), as the corresponding required data are not fully unavailable for the specified period. The labor force data disaggregated as employed and unemployed to be included in the model. This means:

UEMP = *f* (PTPOP, EPTP, SINV)

Thus, the second model (or the multivariate model) becomes:

RGDP = *f* (PTPOP, EPTP, SINV) ---------- (2)

Where:

RGDP – represents economic growth (real GDP, taken as a proxy variable for economic growth);

UEMP– represents Unemployment;

PTPOP – represents the percentage change in number of total population

EPTP - represents employment per total population

SINV – represents total investment (total of private plus government investment).

Therefore, $RGDP_t = \alpha + \beta UEMP_t + \mu_t$ ---------- (1a)

Accordingly, the second model can also be rewritten as:

$RDP_t = \alpha_o + \beta_1 PTPOP_t + \beta_2 EPTP_t + \beta_3 SINV_t + \mu_t$ ---------- (2a)

As all the variables converted to log form, the above equations (1a and 2a) written as:

$lnRGDP_t = \alpha_o + \beta_1 lnUEMP_t + \varepsilon_t$ ---------- (1b)

$lnRGDP_t = \alpha_o + \beta_1 lnPTPOP_t + \beta_2 lnEPTP_t + \beta_3 lnSINV_t + \varepsilon_t$---------- (2b)

Where:

μ: is the error term (white noise), and

α & β's : are parameters

3.2.2. Stationarity Test

A time series data said to be stationary if it has zero mean, constant variance and the covariance between any two time periods depends only on the distance, or lag between the two periods and not on the actual time. However, in reality most macroeconomic variables are non-stationary. A non-stationary series has a different mean at different points in time and its variance increases with the sample size. If these non-stationary variables used for estimation, the result would be spurious. In such cases, in order to avoid the problem associated with spurious regression, pre-testing the variables for the existence of unit roots (i.e. non-stationary) becomes compulsory.

Unit root Test

Most Time series data have a characteristic of stochastic trend (that is, the trend is variable which; therefore, cannot be predicted with certainty). In such cases, in order to avoid the problem associated with spurious regression, pre-testing the variables for the existence of unit roots (i.e. non-stationary) becomes compulsory. In general, if a variable has stochastic trend, it needs to be differenced in order to obtain stationarity. Such process is known as difference stationary process (Gujarati, 1995). The number of unit roots a given variable possess determines how many times that variable differenced in order to attain stationarity.

There are several ways of testing for the presence of unit root such as the Dicky-Fuller (DF) approach and Augmented Dicky-Fuller (ADF) approaches are the most common and popular one in econometric amalysis (Wondaferahu, 2006). Hence, the emphasis here will be on using the Dickey-Fuller (DF) approach to testing the null hypothesis that a series contains a unit root (i.e. it is no stationary) against the alternative of stationarity. The simplest DF test starts with the following first order autoregressive model:

$Y_t = \beta Y_{t-1} + \mu_t$ ---------- (3)

This implies that the variable Y_t is not stationary. In principle, one can run this regression and check for a non-stationary random walk (unit root) process but a model cannot be estimated by regressing the series on its lagged value because in the presence of a unit root, the t-statistics for the coefficient is severely biased. Therefore, the above equation reformulated by subtracting the lagged value from both sides. Hence, subtracting Y_{t-1} from both sides gives:

$Y_t - Y_{t-1} = \beta Y_{t-1} - Y_{t-1} + \mu_t$ or simply written as

$\Delta Y_t = (\beta-1) Y_{t-1} + \mu_t$ which can further be simplified as

$\Delta Y_t = \gamma Y_{t-1} + \mu_t$ where $\gamma = (\beta-1)$ ---------- (3.1)

The test for stationarity conducted on the parameter γ. If γ = zero or (β =1) it implies that the variable Y_t is not stationary. The hypothesis formulated as follows:

H0: $\gamma = 0$ or (β =1)

H1: $\gamma < 0$ or (β <1)

Generally, the DF test is based on the assumption that the data generating process of the variable being tested is a random walk (auto regressive process of order one). If however, the variable follows a higher order auto regressive process, the error term (residuals) will

be auto correlated (serially correlated) which will invalidate the use of the DF distribution. Therefore, it is inappropriate to use DF distribution with the presence of auto-correlated errors because the error terms will not be white noise. Autocorrelation of the error terms is the result of failure to adequately specify the dynamic structure of Y_t (Harris, 1995). To resolve this weakness, the DF model augmented with additional lagged first differences of the dependent variable. This is called Augmented Dickey Fuller (ADF).This study relies on ADF test as it solves the above DF problem (autocorrelation among the residuals) by augmenting the preceding DF equations and adding the lagged values of the variable, to the specifications to eliminate the serial correlation. It is suggested to allow both an intercept and time trend in the regression model used to test the presence of unit root. In both tests the null hypothesis is that, the variable is non-stationary against the alternative stationary. The null hypothesis rejected only when there is strong evidence against it at the conventional levels of significance. The general form of the ADF equation where only an intercept is included is as follows:

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \varepsilon_t \quad (3.2)$$

Where α is constant

If a variable has zero mean, it implies that $Y_t = 0$ when $t = 0$ (i.e., there is no constant term). Nevertheless, it is impossible to know whether the true value of Y_0 is zero or not. For this reason, including a constant (drift) to the regression suggested. However, if a series contains intercept and a trend, testing for stationarity using the above equation is invalid. Because if γ = zero, the null hypothesis is accepted that the series contains a stochastic trend when there exists deterministic trend. Therefore, it is important to incorporate time trend in the regression as follows

$\Delta Y_t = \alpha_o + \gamma_1 T + \gamma Y_{t-1} + \varepsilon_t$---------- (3.3)

Where, Y_t is any variable in the model to be tested for stationarity, ε_t is white noise and Δ is the first difference operator, γ is the lagged order of auto regressive process, and T is the trend element.

Equations (3.2) and (3.3), as well as the parameter γ used while testing for stationarity where the decision is made using the p-values and t-statistics. After observing the insignificancy of the p-value, if the calculated value of the t-statistics become less than the critical value (as reported by Dickey and Fuller), the null hypothesis will be accepted and not if otherwise. Hence, rejecting the null hypothesis implies that there exists stationarity and does not exist otherwise.

3.2.3. Optimal lag-length Selection

Many econometric model-testing procedures such as unit root tests, causality tests, co-integration tests and linearity tests involved the determination of autoregressive lag length. According to Ng., et al (2001), estimates of a model would become inefficient and inconsistent if the selected lag length is not correct or different from the true lag length. In addition, selecting a higher order of lag length than the true lag, over estimates the parameter values and increases the forecasting errors and selecting a lower lag length usually underestimates the coefficients and generates auto-correlated errors. Therefore, accuracy of parameters and forecasts heavily depend on selecting the true lag length. There are several statistical methods used to select the correct lag length, which includes Schwarz (SIC) and Akaike Information Criteria (AIC) among the others. Akaike Information Criterion (AIC), that developed by Hirotugu Akaike in 1971 (Greene, 2003), has been found to be nearly unbiased estimator of selecting lag order and also it is used in measuring

a large sample size (30 or more observations); while the Schwarz Information Criterion (SIC) is a small sample measure (for less than 30 observations). The Criterions that used to be tested in this study are as follows:

Optimal Lag length selection criteria ---------- 3.4

Criteria 1:- Akaike's Information Criteria

$$AICp = nln(\hat{\sigma}^2) + 2p - 3.4.a$$

Criteria 2:- Schwarz Information criteria

$$SICp = nln(\hat{\sigma}^2) + n^{-1}pln(n) - - - - - - - - - - - - - - - - - - 3.4.b$$

Criteria 3:- Hannan-Quinn criteria

$$HQCp = nln(\hat{\sigma}^2) + 2n^{-1}\rho \ln(\ln(n)) - - - - - - - - - - - - - - - 3.4.c$$

Criteria 4:- Final prediction error

$$FPEp = \ln(\hat{\sigma}^2)(n+\rho)(n-\rho)^{-1} - - - - - - - - - - - - - - - - 3.4.d$$

Where *n* is the sample size,

$$\hat{\sigma}^2 = (n-p-1)^{-1}\sum_{t=1}^{n} \varepsilon t^2$$

Where ε_t is residual of the model.

Regarding AIC and SIC, Liew, et al (2004) have provided useful insights for empirical researchers. First, these criteria managed to pick up the correct lag length at least half of the time in small sample. Second, this performance increases substantially as sample size grows. Third, for relatively large sample size or number of observations (120 or more), HQC is more preferred from the rest in correctly identifying the true lag length. In contrast, AIC and FPE should be a better choice for smaller sample. Fourth, AIC and FPE are found

to produce the least probability of under estimation among all criteria under study. Finally, the problem of over estimation, however, is negligible in all cases.

Hence, the ordinary least Squares regression model has been run starting with lag zero upwards, since, according to (Engle et al, 1995), it is the mostly used and recommended methodology to determine the lag length. Accordingly, a lag that provides the minimum value is chosen as the optimal lag length, in other words, among the information criteria, the one that provides majority lag has been chosen as optimal lag length.

3.2.4. The Long Run Dynamics (Co-integration Test)

In the case where variables are difference stationary, it is possible to estimate the model by first difference. However, this gives only the short run dynamics in which case valuable information could be lost, concerning the long run equilibrium properties of the data. Hence, in order to obtain both the short run and long run relationship, one can go to what is known as co integration. Co-integration among the variables reflects the presence of long run relationship in the system.

Previously, the usual procedure for testing hypotheses concerning the relationship between non-stationary variables was to run OLS regressions on data that had initially differenced [I(1)]. The data differenced in order to reduce non-stationary series to stationary. Although this method is correct in large samples, it may give rise to misleading inferences or spurious regressions in small samples. Moreover, estimation of a single equation framework with integrated or non-stationary variables tends to create the following problems: non-standard distribution of the coefficient estimates generated by the process not being stationary, explanatory variables generated by the process that display autocorrelation, the existence

of more than one co-integrated vector. There are two approaches mostly used in testing for Co integration: the Engle-Granger (Two-step algorism) and the Johansen Approach.

A. Engle-Granger (two step algorism)

The Engle-Granger method requires that for co-integration to exist, all the variables must be integrated of the same order. Hence, once the variables found to have the same order of integration, the next step is testing for co integration. This needs to generate the residual from the estimated static equation and test its stationary. By doing so we are testing whether the deviation (captured by the error term) from the long run are stationary or not. If the residuals found to be stationary, it implies that the variables are co integrated. This in turn ensures that the deviation from the long run equilibrium relation dies out with time. Hence, the presence of Co-integration makes it possible to model the variables (that are in first difference) through the error correction model. In the model, a onetime lagged value of the residual holds the error correction term where its coefficient captures the speed of adjustment to the long run equilibrium.

If the Engle-Granger procedure implemented, it becomes subject to the following important limitations. First, in tests using three or more variables there may be more than one co-integrating vector. In fact, if there are *n* variables in a model there may be *n* co-integrating vector or less. Hence, this method has no systematic procedure for separate estimation of the multiple co integrating vectors. This method makes the implicit assumption that the co integrating vector is unique, which means that we are bound to end with a model that is a linear combination of independent co integrating vectors. Second, this method or approach relies on a two-step estimator. The first step is to generate the error series and the second step uses the generated errors for estimation, thereby carrying over

errors obtained from regression using the residuals. Hence any error introduced in the first step is carried in to the second step. Third, co integration test may depend on the variable put in the left side of the co integration. Finally, the method does not allow the variables in the right hand side to be potentially endogenous (Harris, 1995). Therefore, this paper chooses to use the Johansen maximum Likelihood Procedure (1988) since it addresses the above stated weakness of the E-G method.

B. Johansen (1988) Maximum Likelihood

The Johansen (1988) procedure enables estimating and testing for the presence of multiple co-integration relationships, in a single step procedure. Moreover, it allows estimation of the model without prior restriction of the variables as endogenous and exogenous. Under this procedure, a vector of potentially endogenous variables represents the variables of the model. The starting point in this procedure is formulation of unrestricted vector autoregressive (VAR) model in the following form; considering 'p' lags of Y_t:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + BX_t + \varepsilon_t \quad \text{---------- (3.5)}$$

Where Y_t is a k-vector of the differenced or integrated of order one [i.e. I(1)] endogenous variables. X_t is a d-vector of exogenous deterministic variables. $A_1 \ldots . A_p$ and B are matrices of coefficients to be estimated and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right hand side variables. Since most economic time series are non-stationary, the above stated VAR model generally estimated in its first-difference form as:

$$\Delta Y_t = \Gamma_1 \Delta Y_{t-1} + \Gamma_2 \Delta Y_{t-2} + \ldots + \Gamma_{p-1} \Delta Y_{t-p} + BX_t + \varepsilon_t \quad \text{---------- (3.6)}$$

Then, simplifying the above equation gives

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-1} + BX_t + \varepsilon_t \text{ ---------- (3.6a)}$$

Where: $\Gamma_i = -\sum_{j=i+1}^{k} A_j$ ---------- (3.6b)

And

$$\Pi = \sum_{i=1}^{p} A_i \text{ ---------- (3.6c)}$$

The long run relationship among the variables is captured by BX_t. In the Johansen procedure, determining the rank of Π (i.e., the maximum number of linearly independent stationery columns in Π) provides the number of co-integrating vector between the elements in Y. In this connection, there are three cases worth mentioning. First, If the rank of Π is zero it indicates that the matrix is null which means that the variables are not co-integrated. In such case, the above model used void of long run information. Second, if the rank of Π equals the number of variables in the system (say n) then Π has full rank, which implies the vector process, is stationary. Therefore, the VAR tested in levels. Thirdly, If Π has a reduced rank (i.e., $1 < r(\Pi) < n$) it suggests that there exists $r \leq (n-1)$ co-integrating vector where r is the number of co-integration (or the co-integrating rank) in the system. Therefore, if the matrix Π has reduced rank $r < n$, then there exists nxr matrices of α and β each with rank r. Such that $\Pi = \alpha\beta'$ and $\beta' Y_t$ is $I(0)$ where each column of β' represents the co-integrating vector (co-integration parameters) with α showing their corresponding error correction parameters or adjustment mechanism, that measures the speed of adjustment in ΔY_t to equilibrium (that means, it shows the speed with which disequilibrium from the long run path is adjusted).

In identifying the number of co-integrating vectors, the Johansen procedure provides n eigen-values denoted by λ (also called characteristics roots) where its magnitude measures the extent of correlation of the co-integration relation with the stationery elements in the model. Generally speaking, to determine the number of co-integrating vectors in the system, the Johansen co-integration test is based on two test statistics which are the trace test statistic (λ_{trace}) and the maximum eigenvalue test statistic ($\lambda_{\max}$) (Johansen, 1988 and Oseterwald-Lenum, 1992). They obtained using the following formulas:

Trace Test Statistic:

The likelihood ratio statistic (LR) for the trace test (λ_{trace}) specified as:

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{k}\log(1-\hat{\lambda}_i) \quad \text{---------- (3.7)}$$

Where, $\hat{\lambda}_i$ is the i^{th} largest eigenvalue of matrix Π and T is the number of observations. In the trace test, the null hypothesis is that the number of distinct co-integrating vector(s) is less than or equal to the number of co-integration relations (r). In this statistic λ_{trace} will be small when the values of the characteristic roots are closer to zero.

Maximum Eigenvalue Test:

The maximum eigenvalue test ($\lambda_{\max}$) examines the null hypothesis of exactly r co-integrating relations against the alternative of $r+1$ co-integrating relations with the test statistic:

$$\lambda_{\max}(r, r+1) = -T\ln(1-\hat{\lambda}_{r+1}), \text{ r = 0, 1, 2 …N-1} \quad \text{---------- (3.8)}$$

Where T is the sample size (number of observations) and $\hat{\lambda}_i$ is estimated eigen-values. $\hat{\lambda}_{r+1}$ is the $(r+1)^{th}$ largest squared eigenvalue. In the trace test, the null hypothesis of $r=0$ is tested against the alternative of $r+1$ co-integrating vectors. If the estimated value of the characteristic root is close to zero, then the λ_{trace} will be small. ($\lambda_{\max}$) Statistics tests the null hypothesis that there is 'r' co integrating vectors against the alternative of 'r+1'. The trace statistics, on the other hand, tests the hypothesis of less than or equal to 'r' co integrating vectors against the alternative of 'r+ 1. The distributions of both test statistics follow Chi-square distributions (Enders, 1995).

After detecting the number of co-integration, the normalized co-integration coefficients of the models along with the test of significance of the variables is examined by imposing a general restriction on each variable($\beta_i = 0$) in the regression models. Finally, the Wald test applied to examine the joint significance of the variables coefficients in the model.

3.2.5. The short Run Dynamics (VECM model)

If two time series are co-integrated, in other words, if there exists a long-run relation between them, then the VECM will represent them in evaluating their short run properties (Engle-Granger, 1987). However, if the variables are not co-integrated, VECM is no longer required and one can directly proceed to Granger causality test to establish causal links between these variables.

An error correction model is a dynamic model in which the movement of a variable in any period related to its previous period gap from the long-run equilibrium. Although it is possible to estimate the long run or co-integrating relationship, economic systems are rarely in equilibrium as they are affected by institutional and or structural changes that might be

temporary or permanent. Hence, as in this case, equilibrium is rarely observed, the short-run evolution of variables (i.e. short-run dynamic adjustment) is important.

The dynamic relationship includes the lagged value of the residual from the co-integrating regression (ECT_{t-1}) in addition to the first difference of variables which appear in the right hand side of the long-run relationship. A simple dynamic model of a short-run adjustment model given by:

$$y_t = \alpha_0 + \delta_0 x_t + \delta_1 x_{t-1} + \alpha_1 y_{t-1} + \varepsilon_t \text{ ---------- (3.9)}$$

Where y_t is the dependent variable, x_t is the independent variable, y_{t-1} and x_{t-1} are lagged values of y_t and x_t respectively. $\alpha_0, \alpha_1, \delta_0, \& \delta_1$ Are parameters, and ε_t is the error term assumed to be $\varepsilon_t \sim iN(0, \sigma^2)$.

The next step is to specify and estimate a vector error correction model (VECM) including the error correction term to investigate dynamic behavior of the model. The 'VECM' describes how the examined model is adjusting in each period towards its long-run equilibrium. The size of the error correction term indicates the speed of adjustment of any disequilibrium, towards a long-run equilibrium state (Engle and Granger, 1987). The general form of the vector error correction model (VECM) for the bivariate and multivariate models specified as follows:

$$\Delta ln\text{RGDP}_t = \alpha_0 + \sum_{i=1}^{k} \beta_0 \Delta ln\text{UEMP}_t + \sum_{i=1}^{k} \beta_1 \Delta ln\text{UEMP}_{t-1} + \sum_{i=1}^{k} \alpha_1 \Delta ln\text{RGDP}_{t-1} + \gamma \text{ECT}_{t-1} + v_t \text{ ---------- (3.10a)}$$

$$\Delta ln\text{RGDP}_t = \beta_0 + \sum_{i=1}^{k} \alpha_1 \Delta ln\text{RGDP}_{t-1} + \sum_{i=1}^{k} \beta_1 \Delta ln\text{PTPOP}_t + \sum_{i=1}^{k} \beta_2 \Delta ln\text{EPTP}_t + \sum_{i=1}^{k} \beta_3 \Delta ln\text{SINV}_t + \gamma \text{ECT}_{t-1} + v_t \text{ ---------- (3.10b)}$$

Where Δ is the first difference operator, ECT_{t-1} is the error correction term lagged one period, γ is the short-run coefficient of the error correction term $(-1 < \gamma < 0)$, v_t is the white noise terms of the respective models. The coefficient of v_t should be negative in sign in order for the system to converge to equilibrium. The size of the error correction term indicating the speed of adjustment towards equilibrium state in that:

- Small values, tending to negative one, indicate that the economic agents remove a large percentage of disequilibrium in each period.
- Larger values, tending to zero, indicate that the adjustment is slow.
- Extremely small values, less than negative two, indicate an overshooting of economic equilibrium.
- Positive values would imply that the system diverges from the long-run equilibrium path.

3.3. Summary

This study has used annual Time series macro data for the period 1974/75 to 2013/14 that obtained from different domestic and international secondary sources. This chapter presented in depth the methodology adopted to achieve the objectives of the study. First, the study has used the ADF test to check stationarity of all the variables. Then, the Johansen multivariate co-integration approach adopted to investigate the long run relationship between unemployment and economic growth.

The estimation procedure indicates that the existence of a statistical relationship among the variables carried out in five steps. Initially the order of integration of the variables investigated using standard ADF test for the presence of unit roots. The second step involved test of co-integration using the Johansen maximum likelihood approach after

determining the appropriate lag length using the information criteria. Thirdly, the long-run elasticity of both the bivariate (RGDP & UEMP) and other control variables included in the Johansen multivariate co-integration model estimated. Wald-test also applied to see the joint significance of the variables in the model. Although co-integration implies the presence of Granger-causality it does not necessarily identify the direction of causality. Thus, the fourth step involves the estimation of the vector error-correction modeling (VECM). A number of authors observed that in the presence of co-integration, there exists always a corresponding error correction representation. This implies that changes in the dependent variable is a function of the level of disequilibrium in the co-integrating relationship, captured by the error-correction term (ECT), as well as by changes in other explanatory variables. The non-significance of the ECT referred as long-run non-influence, which is equivalent to saying that the variable is weakly exogenous with respect to the long-run parameters. The estimated parameters stability checked using recursive residuals.

CHAPTER FOUR

ESTIMATION AND INTERPRETATION OF RESULT

4.1. Descriptive Results:

4.1.1. Overview of the trend of unemployment and economic growth in Ethiopia (1974/75-2013/14) fiscal year

4.1.1.1. The Trend under 'Dergue' (1974/75 – 1990/91)

In the aftermath of the revolution that toppled the Imperial regime, the government has undertaken a number of policy measures that include nationalization of the financial institutions such as Banks and Insurance, and private properties such as extra houses and manufacturing firms, and implemented a land reform.

The country's economic growth performance during the 'Dergue' regime was generally gloom because of its dependence on volatile agricultural sector and negative shocks from political instability. In line with Ofcansky et al. (1991), Ethiopia's economic performance during the Dergue regime grouped in to four periods:

Table 4.1: average growth of the macroeconomic variables under the four period

EFY	1974/5-1978/9	1978/9-1980/1	1980/1-1985/6	1985/6-1990/1
%ΔRGDP	0.54	4.337	-0.95	4.095
%ΔUEMP	10.087	4.067	5.369	-0.115
%ΔTINV	1.19	12.69	10.494	6.482
%ΔPTPOP	2.001	1.401	2.66	3.266
%ΔEPTP	-0.044	0.969	-0.20	0.62

Source: Own computation

In the first phase (1974/75-78/79) period of the revolution that characterized by internal political movement or unrest, armed conflict, and radical institutional reforms, the country witnessed low economic growth performance that could be attributed to the government's nationalization measures and the highly unstable political climate caused economic displacement. There was also high military budget. As a result, the average growth in real GDP, investment, growth in total population and employment per total population, during this period, stood at about 0.54%, 1.2%, 2%, and -0.044% respectively while growth in unemployment was high at 10.1%.

In the second phase (1978-80/81), the economy began to grow, as the government consolidated power and began to implement institutional and economic reforms such as the cooperation campaign. Security conditions also improved in this period, as internal and external conflicts declined compared to previous years. In the aftermath of the 1977-78 war with Somalia, the country's economic conditions improved. As a result, during this period, average growth in real GDP, investment, and employment per total population increased to about 4.34%, 12.69%, and 0.97% respectively. On the other hand, unemployment and population declined to about 4.07% and 1.4% respectively.

The country has suffered many obstacles in the third phase (1980-85) leading the growth in real GDP, investment and employment per total population decline to an average of -0.954%, 10.49%, and -0.2% respectively; while Unemployment raised to 5.37%. According to Ofcansky, et al. (1991), four factors were accountable. First, the 1984-85 droughts severely affected the country. As a result, the government committed most of its resources to famine relief efforts. Secondly, the agricultural outputs decreased. Thirdly, the lack of foreign exchange and declining investment aggravated the problem. Finally,

Ethiopia's large military establishment created a major burden on the economy as defense expenditures during this time were absorbing 40 to 50 percent of the government's current expenditure.

Despite an improvement in the weather in l985/86 and l986/87, as discussed by Ofcansky et al. (1991), which helped reverse the agricultural decline and GDP increased at an average annual rate of 5 percent. During this period, the country's growth in real GDP, and employment per total population stood at an average of 4% and 0.62% while both unemployment and investment stood at -3.1% and 6.5% respectively compared to the previous period. The trend in annual growth rate of the macroeconomic variables under the period of investigation (1974/75-2013/14) summarized in 'table 4.2' (see appendix 1).

Finally, recurrent drought, internal (and external) conflicts, and the command economic system policy were among the major factors that contributed for the poor economic growth performance under the Dergue regime. Although the government declared the failure of the Marxist economic system in March 1990 and announced the adoption of a mixed economy in which the both private and public sectors would play complementary roles, this policy change was not materialized. As discontent of people towards the regime grew, EPRDF removed the regime from power in May 1991 through military action.

4.1.1.2. The current Trend (1991/92 up to present)

After overthrowing the Dergue regime in 1991, EPRDF openly adopted a market-oriented economic policy. This could be, attributed to both political and economic factors. According to Geda (2001), due to the peoples' dissent toward socialism and collapse of the USSR, and the deep-rooted dichotomy in the Ethiopian elites, the government implemented the reform to get external endorsements and use macro policy

instruments (such as fiscal decentralization) to fight the hostile bureaucracy and promote equitable distribution. In addition to these political factors, the government implemented the reform to stimulate the crippled socialist economy by encouraging the participation of private sectors.

The current government has carried out a number of strategies and programs such as Structural Adjustment Program (SAP), the Plan of Action for Sustainable Development and Eradication of Poverty (PASDEP), and currently, the Growth and Transformation Plan (GTP) to foster the country's economic growth and improve the living standard of the people. The macroeconomic variables average growth rate, under the current government, in line with Tadese (2011), categorized under five periods and summarized in table 4.3.

Table 4.3: average growth rate of the variables under the five period's interval

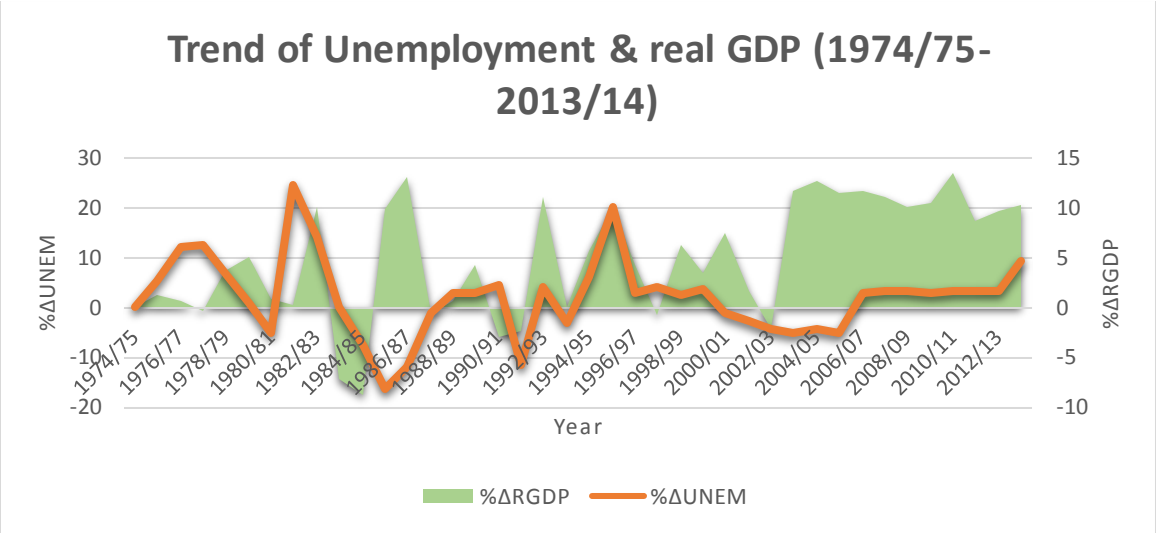
EFY	1991/2-1994/95	1995/6-1999/00	2000/1-2004/5	2005/6-2009/10	2010/11-2013/14
%ΔRGDP	3.66	4.66	6.265	11	10.6
%ΔUEMP	-1.06	6.73	-3.5	1.53	4.83
%ΔTINV	25.6	14.276	12.489	27.8	37.54
%ΔPTPOP	3.47	3.008	2.87	2.7	2.59
%ΔEPTP	-1.4	-0.4	0.599	0.63	0.67

Source: Own computation

In the 1990's, there was a decline in the GDP growth because of following poor rainfall. As indicated by Tadese (2011), GDP growth performance of Ethiopian economy was mainly determined by what was happening in the agriculture and Ethiopia's fluctuating growth during these periods is best reflected by its dependence in rain-fed agriculture. In the early 1990s, specifically until 1992/93, Investment was very low. This could be attributed to the low investment as the economy transits from socialist to relatively liberalized economy, and high government consumption to rehabilitate the economy.

Hence, in the transitional period (1991- 94), the country's average growth rate in real GDP, investment, and percentage change of total population stood at 3.66%, 25.6%, and 3.47% respectively. On the other hand, the country's average growth rate in unemployment and employment to population ratio was -1% and -1.4% respectively.

Figure 4.1: Trend of growth in Unemployment and Real GDP



Source: Own computation

After the transitional period ended, the following period (1995/96-2000/1) shows, on average, a sluggish improvement in the country's growth rate in real GDP as well as employment per total population and percentage change of total population that stood at 4.66%, -0.4%, and 3% respectively. On the other hand, investment declined to an average of 14.3% and unemployment raised as high as 6.7%. Some of the contributing factors for the declined trend during this period could be, as Tadese (2011) indicated, because of improvement in tax collection, large revenue mobilized from privatization and international assistance to implement structural adjustment program. In addition, the negative effect of the high military expenditure during the war with Eretria (1998-2000). The country's real GDP growth shows improvement in 1995/96 that attributes to the good

rain seasons in that year, as Tadese (2011) indicated, improved the agricultural production that led the GDP to grow. As indicated in figure 1, unemployment reached its lowest point, under the current government, during 1991/92, and its highest rate in 1995/96. Although it shows a sharp reduction in 1996/97, the declining trend further continues but slowly until 2005/6. The average growth rate in unemployment, investment, and percentage change of total population during the period 2000/1-2005/6 was about -3.5%, 12.49%, and 2.87% respectively compared to their previous period's (1995/6-2000/1) average rate of 6.7%, 14.3%, and 3.0% respectively. On the other hand, the average growth rate of real GDP increased to 6.3% compared to the previous period of 4.66%. Employment per total population also increased at 0.6% compared to the reduced 0.4% rate in the previous period.

The year after 2005/6 up to 2007/8, show a sharp increment in the unemployment that then follows almost a normal trend of 3% growth annually until 2012/13. The year 2013/14 indicates a further sharp increment of unemployment rate of about 9.3%. Furthermore, from 2004/5 onwards, both the growth in real GDP and investment shows an increasing trend.

Overall, since the year 2005, the country has witnessed a rapid increment in all of the macroeconomic variables under the next two periods. For example, during the period 2005/6-2010/11, the average growth rate real GDP, investment, and employment per total population stood at 11%, 27.8%, and 0.63% respectively. although the population growth rate continued its improvement in this period, the country's unemployment rate during this period increased to an average of about 1.5% compared to the smallest rate, among the five periods, that decreased by 3.5% during the period 2000/1-2005/6.

4.1.2. Average Growth and percentage change point for Unemployment and Economic Growth [between (1974/75-1990/91) & (1991/92-2013/14)]

During the 'Dergue' regime, unemployment has reached its highest rate in the first period (1974/75-1978/79) growing on average at more than 10% while the lowest point was in the last period (1985/86-1990/91) growing on average by -3%. On the other hand, the country's average growth rate of real GDP, reached its peak in the second period (1978/79-1980/81). Its lowest rate was during the third period (1980/1-1985/6), growing at an average rate of 4.3% and -0.9% respectively. Under the current government, unemployment reached on average reached its highest rate in the second period (1995/6-1999/0) and its lowest rate in the third period (2000/1-2004/5) growing on average by 6.7% and -3.5% respectively. On the other hand, the country's real GDP growth rate reached its highest rate in the fourth period (2005/6-2010/11) and lowest rate in the first period (1991/2-1994/5) growing at an average rate of 11% and 3.6% respectively.

The percentage change point can be, used to compare unemployment and economic growth under the two governments.

Table 4.4: Average growth in macroeconomic variables and percentage change point

	Regime	RGDP	UEMP	TINV	POPGR	EPR
Average	Dergue	1.88063	2.909689	8.250688	2.56782	0.282498
	EPRDF	7.252219	1.683166	22.84624	2.922934	0.049612
%Δ point		5.371589	-1.22652	14.59555	0.355114	-0.23289

Source: own computation

As indicated in the above table, between the periods 1974/75-1990/91, the country's real GDP and unemployment have been growing on average by 1.88% and 2.9% respectively.

On the other hand, from 1991/92-2013/14, real GDP and unemployment is growing at an average of 7% and 1.68% respectively. This shows that, under the current government, real GDP highly improved with a percentage change point of about 5%. Similarly, unemployment at the country level, highly improved under the current government with a percentage change point of -1.2%.

4.2. Econometric Results

4.2.1. Unit Root Tests Result

Before any meaningful regression is performed with the time series variables, it is essential to test the existence of unit roots in the variables and hence to establish their order of integration. The variables used in the analysis need to be stationary and/or should be co-integrated in order to infer a meaningful relationship from the regression. Prior to the stationarity or unit root tests, the logarithm (*ln*) of all the variables ware taken because, according to Maddala (1992), log variables give us elasticity and reduce the impact of outliers and smooth out the time series. A necessary but not sufficient condition for co-integration to check the non-stationary behavior of the individual time series is a test for unit root. Hence, prior to conducting the long run estimation among variables concerned, the time series characteristics of the data is examined using ADF test to all the variables in levels and in first difference. The results summarized in Table 4.5.A. and 4.5.B.

The Augmented Dickey Fuller (ADF) unit root test results indicates that, for none of the series at level, the null hypothesis of the unit root can be rejected at 1, 5 and 10 per cent level of significance (see Table 4.5.A.). However, the ADF result in Table 4.5.B. shows that the null hypothesis of the unit root shall be rejected for all the variables at 1, 5 and 10

per cent level of significance. Thus, it is possible to conclude that all the variables are integrated of order one I (1).

Table 4.5: Stationarity taste

Table 4.5.A.:- Unit root test of variables at level.

Variable	Augmented Dickey Fuller test												Dec.
	Without constant				Constant only				Constant & Trend				
	Test stat	1%	5%	10%	Test stat	1%	5%	10%	Test stat	1%	5%	10%	
lnRGDP	1.161574	-2.636901	-1.951332	-1.610747	2.895415	-3.615588	-2.941145	-2.609066	0.230680	-4.211868	-3.529758	-3.196411	Non
lnUEMP	0.852869	-2.627238	-1.949856	-1.611469	-2.309788	-3.610453	-2.938987	-2.607932	-2.384882	-4.211868	-3.529758	-3.196411	Non
lnPTPOP	-0.413499	-2.627238	-1.949856	-1.611469	-2.544347	-3.661661	-2.960411	-2.619160	-1.105270	-4.211868	-3.529758	-3.196411	Non
lnEPTP	0.519304	-2.627238	-1.949856	-1.611469	-1.521531	-3.615588	-2.941145	-2.609066	-1.442889	-4.219126	-3.533083	-3.198312	Non
lnSINV	0.139067	-2.625606	-1.949609	-1.611593	-2.093823	-3.615588	-2.941145	-2.609066	-3.126862	-4.219126	-3.533083	-3.198312	Non

Source: - own computation using EVIews for Windows package version 6.

Since, the Johansson test of co-integration and VECM rely upon strict unit-root assumptions or need a root close to unity that all the variables should be stationary at first difference, ADF test conducted in order to confirm the unit root characteristics of the variables at first difference. The following table shows ADF test of variables at first difference.

Table 4.5.B:- Unit root test of variables at first difference.

Variable	Augmented Dickey Fuller test												Dec.
	Without constant				Constant only				Constant & Trend				
	Test stat	1%	5%	10%	Test stat	1%	5%	10%	Test stat	1%	5%	10%	
ΔlnRGDP	-2.910574	-2.627238	-1.949856	-1.611469	-4.329644	-3.615588	-2.941145	-2.609066	-6.235008	-4.226815	-3.536601	-3.200320	I(1)
ΔlnUEMP	-3.708487	-2.627238	-1.949856	-1.611469	-3.800032	-3.615588	-2.941145	-2.609066	-3.727785	-4.219126	-3.533083	-3.198312	I(1)
ΔlnPTPOP	-3.585008	-2.630762	-1.950394	-1.611202	-3.758444	-3.626784	-2.945842	-2.611531	-5.837202	-4.234972	-3.540328	-3.202445	I(1)
ΔlnEPTP	-2.802478	-2.630762	-1.950394	-1.611202	-4.085844	-3.615588	-2.941145	-2.609066	-4.120269	-4.219126	-3.533083	-3.198312	I(1)

ΔlnSINV	-8.209055	-2.627238	-1.949856	-1.611469	-8.135542	-3.615588	-2.941145	-2.609066	-8.074268	-4.219126	-3.533083	-3.198312	I(1)

Source: - own computation using EVIews for Windows package version 6.

Thus, Based the ADF test result of table 4.5.B, the null hypothesis of a unit root test rejected at all level of significance and the model is accepted as the variables in all cases are stationary. Unless, all the variables are integrated of same order, i.e., I(1), the Johansen test of co-integration and the vector error correction models cannot be run. Hence, the above ADF test of unit root result confirmed all the variables are stationary at first difference.

4.2.2. Co-integration Analysis

4.2.2.1. Optimal lag length selection

In the Johansson maximum likelihood approach, the first step towards the co- integration analysis is the determination of an appropriate lag length that applied in the VAR estimate. Moreover, determining the model's lag length and checking the model's parameter stability are the two important issues in constructing a model. When there is no structural break, the lag length of an Auto Regression (AR) process is estimated using any of the criteria discussed under the methodology part. On the other hand, when the lag length is known, the parameter stability may be tested by employing various testing procedures (Ng et al, 2001).

In order to determine the optimal lag length for the model under this study, lag structure is run up to four lags to include. Tables 4.6.A. and 4.6.B. show the Lag length determination procedures according to the five-information criterion.

Table 4.6:- lag order selection criteria

Table 4.6.A:- lag order for the bivariate system

VAR Lag Order Selection Criteria
Endogenous variables: LNRGDP LNUEMP
Sample: 1 40
Included observations: 37

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-11.32649	NA	0.008752	0.936567	1.197797	1.028663
1	104.6249	200.5646	2.07e-05	-5.114861	-4.679478*	-4.961368
2	109.9983	8.713615	1.93e-05	-5.189099	-4.579562	-4.974209
3	118.9927	13.61308*	1.49e-05*	-5.459064*	-4.675374	-5.182776*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: - own computation using EVIews for Windows package version 6.

Therefore, after checking up to five-lag order, the 5% significance level suggests that lag 3 would be the correct lag length. LR, FPE, AIC, and HQ have confirmed this in all lag orders. Thus, it is taken to estimate the johansen test of co-integration, VAR and VECM models for unemployment and economic growth in Ethiopia.

Table 4.6.B:- lag order for the multivariate system

VAR Lag Order Selection Criteria
Endogenous variables: LNRGDP LNSINVLNPOPGR LNEPR
Sample: 1 40
Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	75.64458	NA	3.34e-07	-3.560241	-3.215486	-3.437580
1	246.9294	288.4797	9.53e-11	-11.73313	-10.69886	-11.36514
2	280.6684	49.72067*	3.90e-11*	-12.66676*	-10.94298*	-12.05345*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: - own computation using EVIews for Windows package version 6.

Therefore, as indicated in the above table, the 5% significance level suggests lag 2 as the correct lag length. LR, FPE, AIC, and HQ have confirmed this in all lag orders. Thus, lag

two taken to estimate the johansen test of co-integration, VAR and VECM models for the components factors of unemployment and economic growth in Ethiopia.

4.2.2.2. The Long Run Relation (Johansen Co-integration result)

Economic theory often implies equilibrium relationship between the level of time series variables that are best described as integrated of order one [i.e. I(1)]. So, after all the variables become integrated of order one, johansen test of co-integration followed. For trace statistic, the null hypothesis is the number of co-integrating vectors less than or equal to (≤) the co-integrating vectors (r) against an unspecified alternative. While in the maximum Eigen-value case, the null hypothesis is the number of co-integrating vectors (r) against the alternative of 1 + r (Ng et al, 2008). If the trace statistic is greater than the Eigen-value (critical value), we conclude that the model contains at least one co-integrating equation. Where this condition is violated at a higher order, determines the maximum number of co-integrating equations. Therefore, the procedures in accordance with the Johansen approach were conducted and the number of co-integrating equations corresponding to this row of data selected.

Based on the Johansen test of co-integration result, the long run relationship (or equilibrium relationship) among the variables under investigation; in other words, the co-integration result between the bivariate system (unemployment and economic growth), as well as the multivariate variables employed in this study are summarized in table 4.7. (The Johansen co-integration results based on Eveiws version 6, for both the bivariate and multivariate systems are attached in appendix 2).

Table 4.7: Johansen Co integration test

4.7.B:- Unrestricted co-integration Rank Test for the bivariate system						
Hypotheses		Eigenvalue	Johansen's test statistics			
H_0	H_1		Max Eigenvalues ($\lambda_{\max}$)	Critical Value (5%)	Trace Statistics (λ_{trace})	Critical Value (5%)
$r = 0$	$r \geq 1$	0.539979	27.95336*	19.38704	29.33876*	25.87211
$r \leq 1$	$r \geq 2$	0.037752	1.385403	12.51798	1.385403	12.51798
4.7.B:- Unrestricted co-integration Rank Test for themultivariate system						
$r = 0$	$r \geq 1$	0.675919	41.69021*	27.58434	67.84521*	47.85613
$r \leq 1$	$r \geq 2$	0.366794	16.90748	21.13162	26.15500	29.79707
$r \leq 2$	$r \geq 3$	0.182947	7.475886	14.26460	9.247523	15.49471
$r \leq 3$	$r \geq 4$	0.046754	1.771637	3.841466	1.771637	3.841466

Source: - own computation using EVIews for Windows package version 6.

Note: - r indicates the number of co-integrating relationships;

Number of lags used in the analysis: 3 for table 3a, and 2 for table 3b;

**: Indicates Statistical significance at 5%.*

Thus, based on the Johansen co-integration result in the above table, one can conclude that the null hypothesis of no co-integration ($r = 0$) against the alternative of presence of one or more co-integrating vector ($r = n$) is rejected at the 5% level of significance in both techniques (trace test and maximum eigenvalue). In other words, it means co-integration exists among the variables under investigation, since the null hypothesis of no co-integration ($r = 0$) is rejected. This implies that co-integration exists between the variables under investigation and the null hypothesis ($r \leq 1$), ($r \leq 2$) and ($r \leq 3$) against the alternative of the existence of two or three or four co-integrating vectors is not rejected by both tests. Both the trace and max-eigenvalue test results in the above table indicate one co-integrating

equation at 5% significance level. Hence, based on the Johansen et al (1990) recommendation of trace and max Eigen-value tests in making the inference of the number of co-integrating vectors, it has been confirmed that the variables share a common stochastic trend, that is they move on the same wave length in the long run. Thus, it is possible to examine both the long run and short run relationship between these variables in Ethiopia for the period under investigation.

4.2.3. The long run impacts of the variables on economic growth

4.2.3.1. The bivariate model (Unemployment and Economic Growth)

After the level of co-integration rank order determined, in order to identify how much unemployment encourage or discourage economic growth in Ethiopia, VAR estimated using OLS. The normalized co-integration coefficient (standard error in parenthesis) is as follows.

Table 4.8:- Normalized co-integrating coefficient

Normalized cointegrating coefficients (standard error in parentheses)	
LNRGDP	LNUEMP
1.000000	-0.814905
	(0.20370)

Source: - own computation using EVIews for Windows package version 6.

The above table proved that unemployment is negatively affecting Ethiopia's economic growth as expected. As indicated in the above table, a 1% increase in unemployment leads to a 0.815 % reduction in the economic growth (in real GDP) of the country. The negative impact of unemployment in the above result is also consistent with related findings as for example Photious (2004) found that 50% of those working people in rural Ethiopia were unpaid family workers.

Astatike (2003) also stated that unemployment in the long run has a scary effect. It has a discouraging effect on future participation in the labor force, earnings and welfare in general. Childrens affected by their unemployed parents. This is because, according to him, childrens of jobless parents tend to perform less in their education in the short run; while in the long run, a parent's lost income due to unemployment reduces the child's earning prospect. Similarly, according to Abebe (2011), Rafiq et al (2010), and Eita et al (2010), unemployment is one of the costly challenges today not only for Ethiopia but also in the world. And when it is further incorporated with the rapid population growth and increased poverty, it has a significant impact on the economic growth as it causes a waste of economic resources such as productive labor force and affects the long run growth potential of the economy. Hence, in general, unemployment affects health, household income, government revenue and so GDP and development at large.

Moreover, estimation of parameter coefficient variability whether or not drive macroeconomic time series data to change over the pre-determined lag interval has to be checked. The result for the bi-variate system with lag order 3 is summarized in the below table.

Table 4.9:- VAR estimation for the bivariate system

D(LNRGDP)	Coefficient	Standard Error	Prob:
LNRGDP(-1)	0.938893	0.032252	0.0000**
LNUEMP(-1)	-0.092259	0.052802	0.0920
LNRGDP(-2)	-0.318242	0.038435	0.0000**
LNUEMP(-2)	-0.250583	0.076725	0.0030**

LNRGDP(-3)	0.468319	0.078675	0.0000**
LNUEMP(-3)	0.298131	0.056297	0.0000**
constant	-0.916299	0.321382	0.0082**

R-squared	0.995351	Mean dependent var	12.12431
Adjusted R-squared	0.993802	S.D. dependent var	0.540910
S.E. of regression	0.042585	Akaike info criterion	-3.249151
Sum squared resid	0.048965	Schwarz criterion	-2.813767
Log likelihood	70.10929	Hannan-Quinn criter.	-3.095658
F-statistic	642.3398	Durbin-Watson stat	2.002541
Prob(F-statistic)	0.000000		

Source: - own computation using EVIews for Windows package version 6.

*Note: * indicates 1% level of significance.*

The above 'unrestricted VAR estimation' for the bivariate system shows that, using the optimal lag length provided, real GDP at lag one and three is significant at 1% while in lag two, it is moderately significant at 10% significance level. On the other hand, unemployment is significant at 1% under all specified three lags. Hence, the coefficients of this value could be explained, using the above result, in elasticity concept as if they have an impact on the current period. In all the three cases, that is, real GDP and unemployment in the previous one, two, and three years, have a significant impact on the current period.

According to the above result, real GDP of the previous one and three lag period shows a positive influence or relation to the current period while the second lag period have a negative relation to the current. Concerning Unemployment, the first and second lag periods have a negative influence or relation to the current period while unemployment in the lag length of three positively influences the current period. This could be attributed to the fact that the longer period people become unemployed, the more they become fade up of waiting for employers to get a job and engage in other alternatives of income generation

mechanisms like going to other countries outside Ethiopia or engaging themselves in the informal sectors and self-employment. In line with this argument, Mulu (2007) indicated that, the informal sector is a large source of employment and livelihood. Similarly, according to the ILO (2002) estimates, informal employment, outside of agriculture, comprised employment in informal enterprises that are small and or unregistered, and wage employment (i.e. without secure contracts, worker benefits, or social protection) represents nearly half or more of the non-agricultural employment in developing countries. Although this is the case, they begin generating income on the area they engaged themselves in that may contribute for the betterment of their livelihood.

In addition to the above result, weighing the statistical significance of two coefficient should be done in order to clearly see whether the variables at the given lag length are jointly significant or not. To do this, Wald test of coefficient restriction is examined and summarized in the below table.

Table 4.10:- Wald coefficient restriction

Wald-coefficient restriction	Year effect	Prob (chi2)
C(1)=c(2)=0	1	0.0000**
C(3)=c(4)=0	2	0.0847
C(5)=c(6)=0	3	0.0003**

Source: - own computation using EVIews for Windows package version 6.

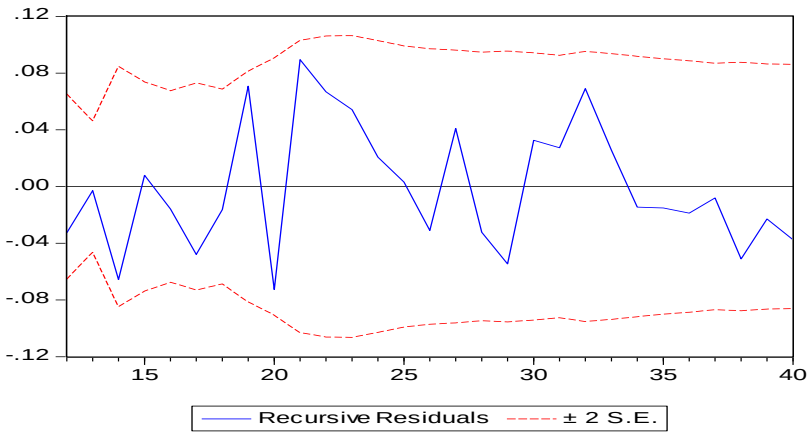
*Note: - ** indicates statistical significance at 1%;*

- number of lag used in this analysis is 3 based on the information criteria.

The above Wald coefficient restriction result provided the joint significance of the two variables (real GDP and unemployment) at a given three lag periods. According to the result, real GDP and unemployment at lagged one and three years highly significant at 1% while in lag two moderately significant at 10% level, meaning in all the three lag periods, they jointly affect the economic growth for the period under investigation.

Besides, the model can further be verified by its ability to justify a maintained hypothesis that the coefficients of the model are stable over a sample interval. The parameter stability test for bivariate system model is presented in the below figure.

Figure 4.2:- Parameter stability test for the long run bivariate system



Source: - own computation using EVIews for Windows package version 6.

Therefore, according to the above figure, the null hypothesis of parameter stability cannot be rejected since the plot bounds within the 95% critical boundaries. This test shows that the parameters are stable at the 5 percent level of significance. Likewise, the bivariate system diagnostic tests of residuals show that the model has the desirable properties of OLS. In addition, the Residuals test of normality, serial correlation LM test and heteroskedasticity test was conducted and the result is presented under appendix 3 (sub 3.1).

All in all, while identifying whether unemployment have a positive or negative impact on the economic growth of Ethiopia, the result indicted that in the long run unemployment negatively influences the country's economic growth. Similar studies such as Astatike (2003), Noveria (1997),Serneels (2004), and Abebe (2011) have also found a negative impact of unemployment that further aggravated by the rapidly growing labor force, poor to modest macro-economic performance, low level of job creation, and low level of aggregate demand in the economy.

4.2.3.2. The multivariate model

After the level of co-integration rank order determined, in order to identify how the population, the employment per total population, and total investment encourage or discourage economic growth in Ethiopia, VAR estimated using OLS. The parameter estimate of all the variables on economic growth is presented in the below table. The normalized co-integration coefficient (standard error in parenthesis) is as follows.

Table 4.11:- Normalized co-integrating coefficient

Normalized cointegrating coefficients (standard error in parentheses)			
LNRGDP	LNPTPOP	LNEPTP	LNSINV
1.000000	1.576861	0.201701	0.043049
	(0.21206)	(0.14189)	(0.02089)

Source: - own computation using EVIews for Windows package version 6.

The result in the above table shows the long run coefficients of the multivariate system that, in elasticity concept, a 1% growth in total investment (private plus government) and the population leads to an increase in real GDP by 0.043% and 1.577% respectively. In addition, a 1% increase in the number of employed people per total population is increasing the real GDP by 0.2%. This result shows that in the long run, further improvement of the

investment sector in the country is important as it absorbs more active and productive population in the country. In addition to improving its accessibility for the working group by creating more job opportunities, improvements in its productivity must also be taken in to consideration so that the above positive impact on the country's economic growth further improved. This finding corroborates findings of other previously conducted studies. For example, according to Denu et al. (2005), the Ethiopian labor market (mainly dominated by the rural labor as greater than 80% of the people live in rural area) is characterized by "disguised unemployment". This exists when there is over employment (i.e. when few jobs are filled by many people) in which case productivity will become low. Furthermore, as indicated by the CSA (2008), in addition to the Ethiopian labor market that characterized by rapidly growing labor supply (due to high population growth) than labor demand (due to the limited employment generation capacity of the economy), the high dependency ratio (i.e. number of dependents per 100 working age population) greater than 90. This high dependency means there is high pressure on public services, high unemployment, low level of domestic saving and asset accumulation, and this further result in low percapita income contributing to the reduction in the economic growth.

In addition to the above reasons, UNDP (2014) indicated that although Ethiopia has shown impressive performance over the last decade with average annual growth rate of 11%, which is about double of the Sub-Saharan and triple of the world. and has marked success (especially in 2012/13) in maintaining macroeconomic stability and fiscal management as witnessed by inflation falling to a single digit, in achieving the MDG by 2015 and become a middle income country by 2025, the country faces challenges that could impede on the GTP agenda. These challenges, as outlined by UNDP, include foreign exchange shortage

and limited financial options, low levels of domestic saving and financial intermediation, decline in export value due to vulnerability to international commodity price fluctuations, and the need to nurture a competitive private sector to drive the growth and transformation agenda.

Table 4.12:- VAR estimation for the multivariate system

D(LNRGDP)	Coefficients	Standard Error	Prob:
LNRGDP(-1)	0.931582	0.024814	0.0000*
LNPTPOP(-1)	0.013552	0.014890	0.3705
LNEPTP(-1)	-0.021171	0.474354	0.9647
LNSINV(-1)	-0.002636	0.008693	0.7639
LNRGDP(-2)	0.070887	0.018278	0.0006*
LNPTPOP(-2)	-0.070911	0.028193	0.0179**
LNEPTP(-2)	-0.133137	0.398110	0.7406
LNSINV(-2)	0.004702	0.014758	0.7524
CONSTANT	0.968261	0.443525	0.0376**

R-squared	0.992369	Mean dependent var	12.10811
Adjusted R-squared	0.989916	S.D. dependent var	0.542813
S.E. of regression	0.054509	Akaike info criterion	-2.759964
Sum squared resid	0.083195	Schwarz criterion	-2.329020
Log likelihood	62.43932	Hannan-Quinn criter.	-2.606638
F-statistic	404.5703	Durbin-Watson stat	2.222781
Prob(F-statistic)	0.000000		

Source: - own computation using EVIews for Windows package version 6.

*Note: *and ** indicates statistical significance at 1% and 5%.*

The result in the above table indicated the summary of long run relationship of real GDP (LNRGDP), total investment (LNSINV), total people employed per total population (LNEPTP), and the total population (LNPTPOP) with their previous or lag period in Ethiopia over the period under investigation.

By using lag two for all the variables, only real GDP and the population result came statistically significant at one and five percent significance level. Hence, real GDP at lag one and two is statistically significant with positive impact, by 93% and 7% respectively, on the current period. On the other hand, the result indicates the population at lag two negatively affects the current period by 7.1%.

The remaining variables are not statistically significant that means their lagged or previous period values do not have high impact on the current period. To further strengthen the above result, measuring the statistical joint significance these variables would be very important in order to clearly say whether these variables at a given lag length are jointly significant or not. To do this, Wald test of coefficient restriction is examined with null hypothesis of two coefficients "cannot jointly influence" the dependent variable, against the alternative hypothesis of "jointly influence" the dependent variable and is summarized in the below table.

Table 4.13:- Wald coefficient restriction

Wald-coefficient restriction	Year effect	Prob (chi2)
C(1)=c(2)=0	1	0.0000*
C(2)=c(3)=0	1	0.6039
C(3)=C(4)=0	1	0.9493
C(5)=c(6)=0	2	0.0011*
C(6)=C(7)=0	2	0.0009*
C(7)=c(8)=0	2	0.8428

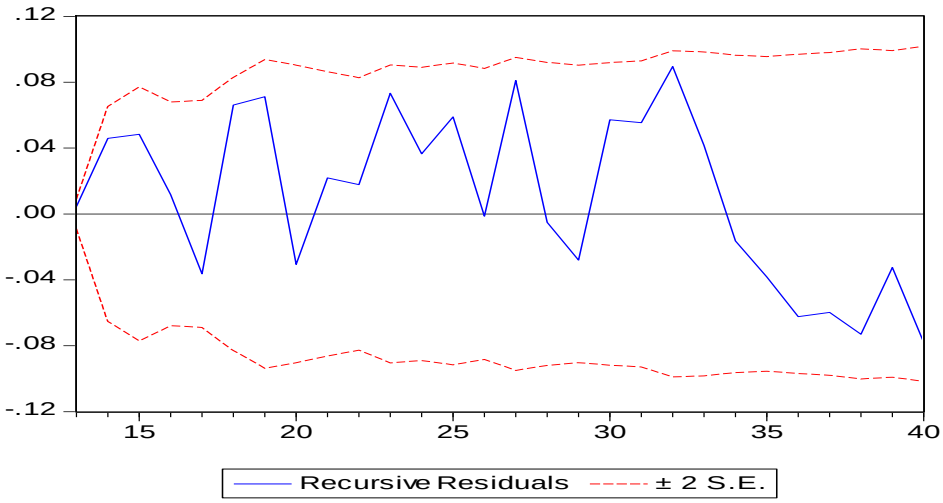
Source: - own computation using EVIews for Windows package version 6.

*Note: - *indicate statistical significance at 1%.*

Likewise, the result of the joint significance of the variables provided that, real GDP and the population result at lag period (year) one and two jointly affects the current period for the period under investigation. In addition, the percentage change of total population and employment per total population under lag two are jointly significant and hence have a joint influence on the current period.

Furthermore, examining the stability of the regression coefficients has a paramount importance. Unless, the model can be verified by its ability to justify a maintained hypothesis that the coefficients of the model are stable over a sample interval, a shift from one regression scheme to another cannot be located easily. Hence, the parameter stability test for multivariate system model is presented in the below figure.

Figure 4.3:- Parameter stability test for the long run Multivariate model



Source: - own computation using EVIews for Windows package version 6.

Therefore, the above figure proved that the plot bounds within the 95% critical boundaries, meaning, the parameters are stable at 5 percent level of significance. Similarly, the multivariate system diagnostic test of residuals proved that the model has the desired

properties of OLS. The results for the normality test of residuals, serial correlation LM test, and heteroskedasticity tests presented under appendix 3 (sub 3.2).

In general, while identifying whether component factors of unemployment have a positive or negative impact (or influence) on Ethiopia's economic growth, from the normalized co-integrating coefficient, one can see that although all variables, that is, investment, the percentage change in total population, and employment per total population generally have a positive impact on the country's economic growth, the result indicates that investment and employment per total population needs improvement.

4.2.4. The short run dynamics

From the johansen test of co-integration of Table (4.7.a) and (4.7.b), it is clear that there exists a long-run relationship between both component factors of unemployment and unemployment with real GDP, which then the long run relation for both cases investigated using VAR. Hence, now VECM can be applied in order to evaluate the short run properties of both the bi-variate and multi-variate systems.

4.2.4.1. The short run impact of unemployment on economic growth

In the bivariate system, the short run impact of unemployment on the economic growth in Ethiopia examined using VECM and the result is presented in the below table. In the estimation of this dynamic short-run model (similar to the case of VAR), a three period autoregressive distributed lag order as determined by the information criterion is imposed on the variables and the following table presents the parameters coefficient estimation of VECM.

Table 4.14:- VECM estimation for the bi-variate system

D(LNRGDP)	Coefficient	Standard Error	Prob:

C(1)	-0.132593	0.063286	0.0465*
LNRGDP(-1)	0.378915	0.131297	0.0079**
LNUEMP(-1)	-0.096550	0.163945	0.5612
LNRGDP(-2)	-0.152359	0.126087	0.2382
LNUEMP(-2)	-0.303016	0.137285	0.0367*
LNRGDP(-3)	0.522716	0.086975	0.0000**
LNUEMP(-3)	0.001011	0.102843	0.9922
constant	-0.974355	2.424657	0.6912

R-squared	0.564495	Mean dependent var	0.051188
Adjusted R-squared	0.390293	S.D. dependent var	0.058345
S.E. of regression	0.045558	Akaike info criterion	-3.093207
Sum squared resid	0.051888	Schwarz criterion	-2.609354
Log likelihood	66.67772	Hannan-Quinn criter.	-2.924329
F-statistic	3.240463	Durbin-Watson stat	2.119975
Prob(F-statistic)	0.008256		

Source: - own computation using EVIews for Windows package version 6.

*Note: ** and * indicates level of significance at 1% and 5% respectively.*

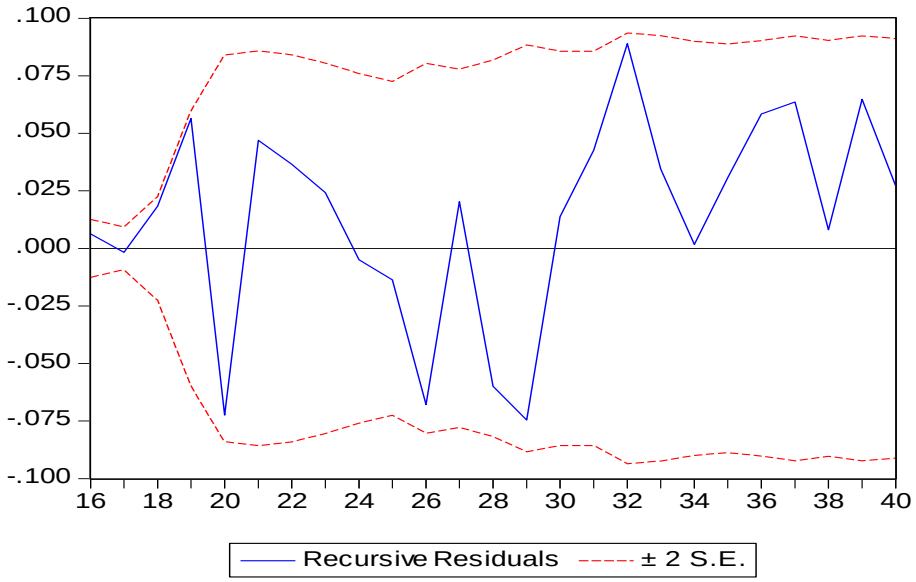
The results in the above table indicate that, in the short run, the one and three year lagged value of real GDP are statistically significant, at one percent, in influencing the current real GDP. Thus, in elasticity concept, a 1% increase in real GDP of the lagged one and three year positively influences the current real GDP by 0.379% and 0.523% respectively. On the contrary, the above result indicate that unemployment adversely affects real GDP at 5% level of significance in the first and second lag periods. Hence, a 1% change of unemployment in the first and second lag periods has a 0.097% and 0.303% negative effect respectively on the current period. The impact of unemployment is positive in the third lag

period, which could be attributed to the fact that the longer the period people become unemployed, the higher they start engaging themselves in other ways of income generation.

The speed of adjustment or the error correction term in the above bivariate VECM estimation is represented by c(1) and came up with the desired sign and level of significance. Thus, the speed of adjustment in the above result implies that 13.26% of the disturbance in the short run is corrected each year or adjust any disequilibrium towards long run equilibrium state. In addition, the coefficient of determination (R- Squared) value indicates 56% variation in the real GDP is explained by the independent variable included in the regression. Even though it is lower than the conventional 60%, it can be taken as granted. Moreover, the overall significance of (F-test) proved that all variables are jointly significant.

Similarly, in order to strengthen the analysis, the stability of the estimated parameters in the model is examined using stability test of Recursive residuals and the result presented in the below figure confirmed that the coefficients of the model are stable over the sample interval.

Figure 4.4:- Parameter stability test for the short run bivariate system



Source: - own computation using EVIews for Windows package version 6.

Likewise, the bivariate system diagnostic test of residuals is examined and it shows that the model has desirable properties of OLS. The Residuals test of normality, serial correlation and heteroskedasticity test was further conducted and confirmed the desired outcome. The test results are presented under appendix 4 (sub 4.1).

4.2.4.2. Short run impacts (relation) of the multivariate model

First estimating the short run impact of component factors of unemployment in Ethiopia, (i.e., the employment to the population ratio, total investment, and the population growth rate taken for this study) on the economic growth (real GDP) is estimated. In the estimation of the dynamic short-run model, a two period autoregressive distributed lag order as determined by the information criterion is imposed on all the variables and the following table presents the parameters coefficient estimation of VECM.

Table 4.15:- VECM estimation for the multivariate system

D(LNRGDP)	Coefficients	Standard Error	Prob:
C(1)	-0.206932	0.027044	0.0000**
LNRGDP(-1)	-0.076392	0.107951	0.4852
LNPTPOP(-1)	-0.442874	0.115154	0.0007**
LNEPTP(-1)	0.246783	0.484552	0.6147
LNSINV(-1)	0.171748	0.034752	0.0000**
LNRGDP(-2)	-0.496337	0.110630	0.0001**
LNPTPOP(-2)	0.413960	0.113901	0.0012**
LNEPTP(-2)	2.224292	0.486640	0.0001**
LNSINV(-2)	0.105446	0.030163	0.0017**
CONSTANT	0.072423	0.008237	0.0000**

R-squared	0.783608	Mean dependent var	0.049708
Adjusted R-squared	0.711477	S.D. dependent var	0.058229
S.E. of regression	0.031277	Akaike info criterion	-3.866389
Sum squared resid	0.026413	Schwarz criterion	-3.431006
Log likelihood	81.52820	Hannan-Quinn criter.	-3.712896
F-statistic	10.86371	Durbin-Watson stat	2.382450
Prob(F-statistic)	0.000001		

Source: - own computation using EVIews for Windows package version 6.

*Note: ** indicates 1% level of significance.*

The VECM test result of the above table indicates that, in the short run, almost all of the variables with the specified lag are significant in affecting current economic growth (real GDP). The result of those employed per total population with lag one was not statistically significant implying those employed in the previous one year are not significant in affecting the current economic growth (real GDP).

The speed of adjustment or the error correction term of the multivariate system presented in the above model is represented by C(1) and come up with the desired sign and level of significance. In an empirical sense, it implies around 21% of the disturbance in the short run is corrected each year or adjust any disequilibrium towards the long run equilibrium state. In addition, the coefficient of determination (R-Squared) indicated that 78% of the dependent variable (real GDP) is explained by the explanatory variables included in the regression. The overall significance of (F-test) has also established that all the variables are jointly highly significant.

Similarly, in order to strengthen the above analysis, stability of the estimated parameters in the model examined using stability test of Recursive residuals. The following figure affirms a maintained hypothesis that the variables included in the model are stable over a sample interval.

Figure 4.5:- Parameter stability test for the short run Multivariate system

Source: - own computation using EVIews for Windows package version 6.

Moreover, the multivariate system diagnostic test of the residuals was examined and it indicated that the model has desirable properties of OLS.

The Residuals test of normality, serial correlation LM test, and heteroskedasticity test was conducted. The heteroskedasticity test result of the residuals proofed the non-existence of heteroskedasticity problem. The result fir the residuals test is presented under appendix 4 (sub 4.2).

In addition to the long run results, after testing both the bivariate and multivariate systems, the VECM result revealed that unemployment negatively affects the country's economic growth. This result has further justified and strengthened by the unemployment's contributing factor variables, included for investigation, that their results, except employment to population ration, become highly significant in influencing the economic growth.

Hence, the study result concludes that, unemployment negatively influences the country's economic growth in general. Economically, it leads to a waste of productive resources, such as active labor force, there by affecting the long run growth potential of the economy. It highly contributes for the increase in crimes, poverty, and dependency to say the least, where these problems produce a cost and channel resources to their prevention which rather could have been used for other developmental purposes. Socially, it has a discouraging effect on future participations in labor force. Childrens will be affected by the situation of their unemployed parents. This is because, childrens of unemployed parents may tend to perform in their education in the short run; while in the long run, a parent's lost income due to unemployment may reduce the child's earning prospect. Furthermore, it has adverse effect on health and mortality because of its socio economic effects on the unemployed.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Unemployment is one of the costly challenges today not only for Ethiopia but in the world; and when it is accompanied by high rate of population growth, low employment to population ratio, low income and increased poverty, it leads to adverse impact on the economic growth and development at large. It causes, in the short run, a waste of economic resources such as productive and active labor force, and affects the long run growth potential of an economy.

Despite the recent encouraging economic growth in Ethiopia, unemployment is still one of the major problems in the country. This study is an empirical attempt to examine the impact of unemployment on the country's economic growth, utilizing a 40 years' annual time series data collected from various domestic and international sources. Specifically, to examine the trend, investigate the relation and impact of unemployment on the country's economic growth. Johansen's co-integration analysis and Vector error-correction methodology, utilized to capture the long-run as well as short run dynamics of unemployment, percentage change of total population, employment per total population, investment in Ethiopia's and real GDP, over the period 1974/75-2013/14.

The trend indicated that unemployment declines with an increase in economic growth (real GDP) during healthy climate. In some of the years, both unemployment real GDP go the

same direction. This happened in the years that the country witnessed obstacles such as war and conflicts, famine and drought. From 2005 onward, unemployment shows a normal trend with an average annual growth rate of 3%. The country's real GDP on the other hand, since 2004, has witnessed continues growth with an average of 11% annual growth rate, with which, employment per total population improved compared to its previous value.

Both VAR and VECM estimation results indicate that unemployment in the first and second lag period has a negative relation while a positive relation in the third lags period. Investment and employment per total population in the short run (both first and second lag periods) and the long rung run.

The estimation results indicated that unemployment adversely affects the country's economic growth where a 1% increase in unemployment reduces the growth by 0.815%. In addition, the VAR estimation result shows that a 1% change of unemployment in the first and second lag periods has a 0.0923% and 0.25% negative effect respectively on the current period. The effect is positive in the third lag period, which could be attributed to the fact that the longer the period people become unemployed, the higher they start engaging themselves in other ways of income generation. The Wald test further confirmed that both unemployment and real GDP in all the previous lag three periods are jointly significant (where the first and third lag shows highly significant) in influencing the current period. The speed of adjustment in the VECM estimation result implies that 13.26% of the disturbance in the short run is corrected each year or adjust any disequilibrium towards long run equilibrium with full adjustment taking as much as seven years and five months.

The normalized cointegrating equation result for the multivariate model shows that a 1% growth in total investment (private plus government), the population and employment per

total population leads real GDP to increase by 0.043%, 1.577% and 0.2% respectively. The VAR estimation result shows that only real GDP and the population are statistically significant in affecting the current period where real GDP at both lag one and two positively influences, by 93% and 7% respectively, the current period while the population at lag two negatively affects the current period by 7.1%. The remaining variables are statistically insignificant that means their lagged or previous period values do not have high impact on the current period. Hence, joint significance of variable checked using Wald test and the result indicate that real GDP and the population at both lag one and two jointly affects the current period for the period. While the increasing number of population in the country and employment per total population in the previous lag two period are jointly significant and hence have a joint influence on the current period. The speed of adjustment in the VECM estimation result implies that 20.69% of the disturbance in the short run is corrected each year or adjust any disequilibrium towards long run equilibrium with full adjustment taking as much as four years and eight months.

Although investment has a positive impact on the country's economic growth, the normalized cointegrating result indicated that its value is much lower compared to the others. This indicating more to be done in adopting and implementing a development strategies for directing resources to investment in high value added sectors that generate more employment opportunities, especially for the poor, and to empower the poor to compete in the labor market. this is clear as the country's growth rely on the labor intensive sectors, the associated increase in employment will have a positive effect on the unemployed people and their dependents.

5.2. Recommendations

Ethiopia has recently witnessed rapid economic growth but still unable to create more job opportunity that absorb the rapidly increasing labor contributing for the increased unemployment. This creates a challenge not only to accelerate and sustain the country's economic growth but also to enhance the responsiveness of employment to the growth, which is also essential for the process of poverty reduction. Hence, based on the findings, the recommendations of the study are:

- Reducing unemployment by addressing the labor market's failure & improving the labor force productivity through increased level of education & training, skills, & access to capital & productive assets that will enable the poor take advantage of the employment generating opportunities.
- As most of the labor force in the country is in the agricultural sector, improving agricultural productivity & increasing its linkage with other sectors through value chain development & other policies that stimulate increased investment & employment.
- More employment generation mechanisms have to be adopted because, how far economic growth reduces poverty depends on how much the growth increases opportunities for employment and on the extent to which the poor can join economic process and take advantage of the improved employment potential.
- Further research can be done by desegregating the general unemployment in to urban, rural, youth, educated and the like to further investigate where the problem.

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APPENDICES

Appendix 1:- Trend of Unemployment and Economic Growth

Table 4.2: Trend in growth rate of the macroeconomic variables (1974/75-2013/14)

Year	%ΔRGDP	%ΔUNEM	%ΔINV	%ΔTPOP	%ΔEPR
1974/75	#VALUE!	#VALUE!	#VALUE!	2.629873015	#VALUE!
1975/76	1.212377281	5.457975788	5.591985428	2.214867018	-0.027505652
1976/77	0.763279288	12.24704537	-12.10971192	1.753189347	-0.174468195
1977/78	-0.357719851	12.55739105	10.08832188	1.40657491	0.068597466
1978/79	3.653461171	7.044638881	-2.763415939	1.297871111	0.718985829
1979/80	5.020991837	1.090300037	28.14448111	1.503684171	1.219033717
1980/81	0.83034434	-4.97836108	22.19201603	1.921411809	1.523078363
1981/82	0.22978576	24.74859334	7.93911007	2.392228549	-2.041483054
1982/83	10.10481871	14.41665524	6.569898452	2.774897075	-1.593869594
1983/84	-7.143218334	0.296248114	-1.437554921	3.050008778	0.039997494
1984/85	-8.79170299	-7.637188488	28.90506373	3.175143457	1.069930279
1985/86	9.928568751	-16.20596861	-24.67566151	3.198394525	1.97196226
1986/87	13.13622802	-11.90112387	59.65552862	3.194792513	1.228671923
1987/88	-0.533140257	-0.896639061	0.854589487	3.217052881	0.20672107
1988/89	0.739930035	2.996517831	36.34686922	3.256661857	0.021965472
1989/90	4.310316067	2.792804132	-25.85451444	3.325257981	0.162599914
1990/91	-3.014242156	4.526132924	-7.436002521	3.403085938	0.125742821
1991/92	**-2.291400122**	**-11.64498092**	**-4.95646254**	**3.479615766**	**-3.876358338**
1992/93	11.16787944	4.304698249	-4.271731835	3.519239592	-0.827223843
1993/94	0.049258582	-2.902967512	98.42499084	3.494152985	-0.211492705
1994/95	5.717199489	6.008383532	13.22749927	3.394067479	-0.712701551
1995/96	10.11742689	20.28950028	29.70165591	3.250169493	-2.086561931
1996/97	4.233298265	2.785218765	15.00089783	3.093509993	-0.345773778
1997/98	-0.785486676	4.161694584	10.06651677	2.963644125	-0.221846317
1998/99	6.30977186	2.669700857	9.10045254	2.879155592	-0.244170841
1999/00	3.424228703	3.752943598	7.509167035	2.853572229	0.834121817
2000/01	7.417989888	-1.03768081	1.979898647	2.865871019	0.144531271
2001/02	1.633920436	-2.770999542	8.352908073	2.885185404	-1.487470237

2002/03	-2.098516935	-4.444458218	9.604946526	2.88838464	1.44678959
2003/04	11.72934991	-5.089871477	1.576127585	2.876555416	1.515135668
2004/05	12.64421116	-4.35581186	40.93222938	2.843599137	1.379635964
2005/06	11.53937591	-4.983899603	10.07006397	2.797287668	1.486552675
2006/07	11.79489556	3.140114298	31.16672597	2.749672159	0.34273492
2007/08	11.18716024	3.189198589	14.67325778	2.709219588	0.431106689
2008/09	10.041315	3.219669711	45.91525602	2.67458187	0.495566707
2009/10	10.56711288	3.106024942	37.24059663	2.647774766	0.41183507
2010/11	13.5340634	3.219226691	24.0362276	2.625877046	0.544093279
2011/12	8.699509616	3.324245765	37.59686131	2.60403808	0.668373104
2012/13	9.820947282	3.452864014	73.39465168	2.579384766	0.818537365
2013/14	10.34752522	9.319999359	15.12074329	2.552914882	0.635668537

Source: own computation

Appendix 2:- Johansen co-integration test result

2.1. The bivariate system Johansenco-integration test result

Sample (adjusted): 5 40
Included observations: 36 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: LNRGDP LNUEMP
Lags interval (in first differences): 1 to 3
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.539979	29.33876	25.87211	0.0178
At most 1	0.037752	1.385403	12.51798	0.9939

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.539979	27.95336	19.38704	0.0022
At most 1	0.037752	1.385403	12.51798	0.9939

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: own computation using EVIews version 6

2.2. The multivariate system Johansen co-integration test result

Included observations: 37 after adjustments
Trend assumption: Linear deterministic trend
Series: LNRGDP LNSINV LNPOPGR LNEPR
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.675919	67.84521	47.85613	0.0002
At most 1	0.366794	26.15500	29.79707	0.1241
At most 2	0.182947	9.247523	15.49471	0.3430
At most 3	0.046754	1.771637	3.841466	0.1832

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.675919	41.69021	27.58434	0.0004
At most 1	0.366794	16.90748	21.13162	0.1764
At most 2	0.182947	7.475886	14.26460	0.4345
At most 3	0.046754	1.771637	3.841466	0.1832

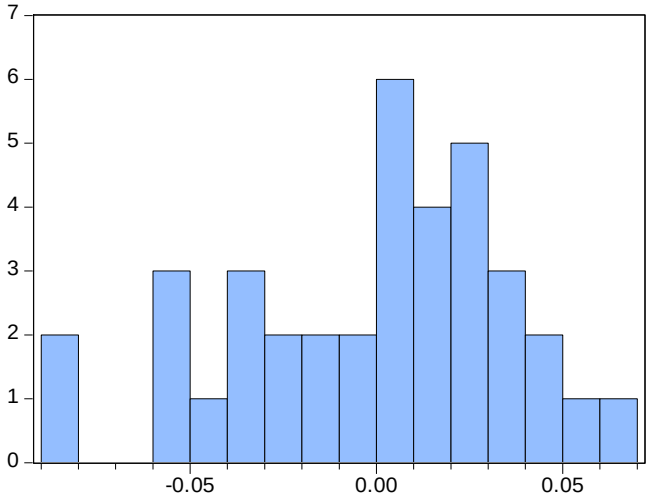
Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: own computation using EVIews version 6

Appendix 3:- Residuals diagnostics test result (VAR)

3.1.Residuals diagnostics test result of the bi-variate system

3.1.1. Residuals test of normality



Series: Residuals	
Sample 4 40	
Observations 37	
Mean	-7.68e-16
Median	0.008208
Maximum	0.067993
Minimum	-0.083319
Std. Dev.	0.036880
Skewness	-0.528260
Kurtosis	2.657143
Jarque-Bera	1.902088
Probability	0.386338

3.1.2. Serial correlation LM test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.389953	Prob. F(3,24)	0.7613
Obs*R-squared	1.719709	Prob. Chi-Square(3)	0.6326

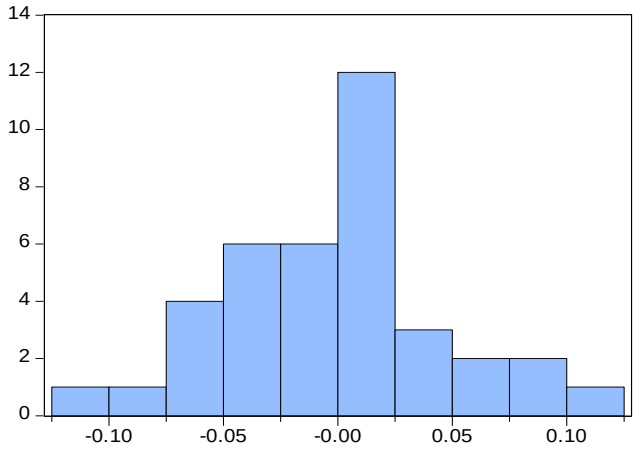
3.1.3. Heteroskedasticity test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.155121	Prob. F(9,27)	0.3612
Obs*R-squared	10.28598	Prob. Chi-Square(9)	0.3278
Scaled explained SS	4.538368	Prob. Chi-Square(9)	0.8726

3.2.Residuals diagnostics test result of the multivariate system

3.2.1. Residuals test of normality



Series: Residuals	
Sample 3 40	
Observations 38	
Mean	2.85e-15
Median	0.001580
Maximum	0.109573
Minimum	-0.102042
Std. Dev.	0.047418
Skewness	0.154408
Kurtosis	2.854501
Jarque-Bera	0.184517
Probability	0.911869

3.2.2. Serial correlation LM test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.453654	Prob. F(2,21)	0.2563
Obs*R-squared	4.499477	Prob. Chi-Square(2)	0.1054

3.2.3. Heteroskedasticity test result

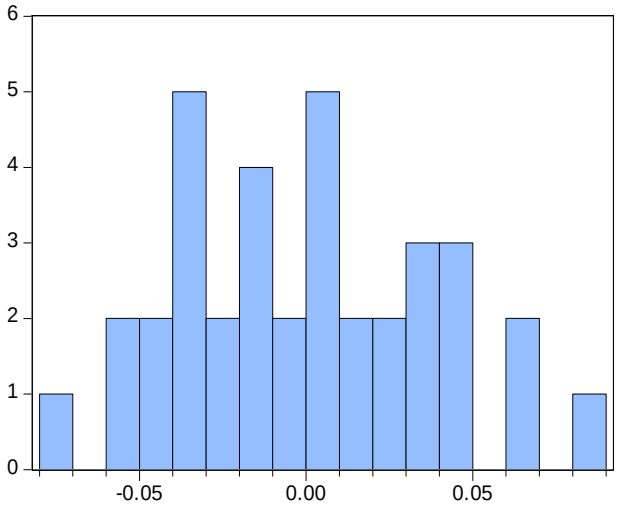
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	4.046833	Prob. F(8,29)	0.0025
Obs*R-squared	20.04471	Prob. Chi-Square(8)	0.0102
Scaled explained SS	12.33202	Prob. Chi-Square(8)	0.1370

Appendix 4:- Residuals diagnostics test result (VECM)

4.1. Residuals diagnostics test result of the bi-variate system (VECM)

4.1.1. Residuals test of normality



Series: Residuals	
Sample 5 40	
Observations 36	
Mean	-1.54e-16
Median	-0.001666
Maximum	0.083815
Minimum	-0.072732
Std. Dev.	0.038492
Skewness	0.216438
Kurtosis	2.243696
Jarque-Bera	1.139065
Probability	0.565790

4.1.2. Serial correlation LM test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.095570	Prob. F(3,22)	0.9617
Obs*R-squared	0.463126	Prob. Chi-Square(3)	0.9269

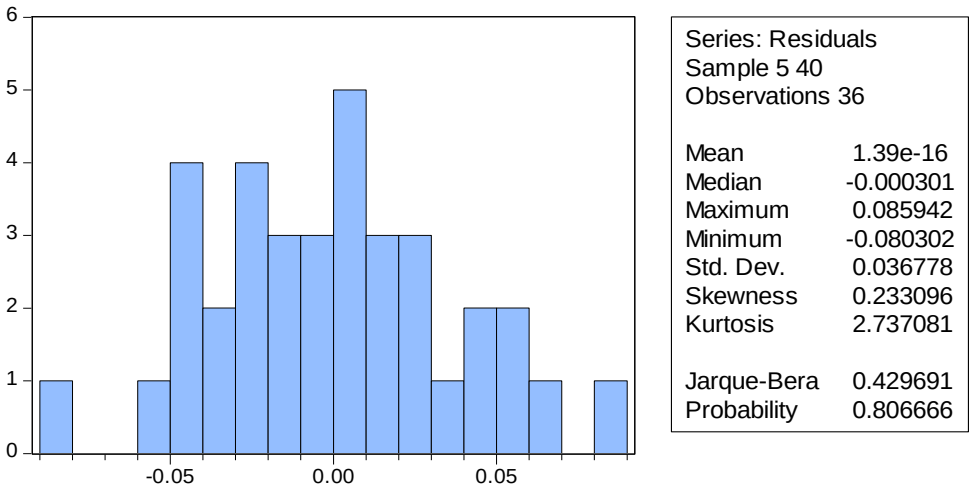
4.1.3. Heteroskedasticity test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.544858	Prob. F(11,24)	0.1798
Obs*R-squared	14.92345	Prob. Chi-Square(11)	0.1860
Scaled explained SS	4.475366	Prob. Chi-Square(11)	0.9539

4.2. Residuals diagnostics test result of the multivariate system

4.2.1. Residuals test of normality



4.2.2. Serial correlation LM test result

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.097089	Prob. F(2,25)	0.3494
Obs*R-squared	2.985367	Prob. Chi-Square(2)	0.2248

4.2.3. Heteroskedasticity test result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.555245	Prob. F(12,24)	0.1724
Obs*R-squared	16.18568	Prob. Chi-Square(12)	0.1829
Scaled explained SS	7.027791	Prob. Chi-Square(12)	0.8558