NEAR EAST UNIVERSITY
INSTITUTE OF GRADUATE STUDIES
DEPARTMENT OF BUSINESS ADMINSTRATION

THE IMPAC OF UNEMPLOYMENT OF ECONOMIC GROTH OF ETHOPIA

M.Sc. THESIS

Abdiwali Omar MOHAMUD

Nicosia

July, 2023

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Nicosia
June, 2023

Approval

We certify that we have read the thesis submitted by Abdiwali Omar MOHAMUD titled **"The impact of unemployment on economic growth of Ethiopia"** and that in our combined opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Business Administration.

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Declaration

I hereby declare that all information, documents, analysis and results in this thesis have been collected and presented according to the academic rules and ethical guidelines of Institute of Graduate Studies, Near East University. I also declare that as required by these rules and conduct, I have fully cited and referenced information and data that are not original to this study.

ABDIWALI OMAR MOHAMUD

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.

Abdiwali Omar MOHAMUD

Abstract

The impact of unemployment on economic growth of Ethiopia

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The economic growth of a nation is vital and it should be in the best interest of any nation to devise ways that helps in raising the economic development of a nation. Theories provide labor, capital, technology and human capital as the major factors that are responsible for increasing the growth of economies. Amidst the importance of labor, capital, technology and human capital in fostering economic growth, other researches have depicted that the rate of unemployment and inflation rate reduces economic growth of a nation, but few researches have been done on this subject. The present research is aimed at ascertaining the role of unemployment rate and inflation rate on the economic growth of Ethiopia. The present research uses the time series data from 1990 to 2019 and uses the Autoregressive Distributive Lag technique to ascertain the short-run and long-run estimations. The present research is significant in furthering the literature body on the relationship between unemployment and economic growth, considering the few researches available on this topic. The main findings depict that inflation and unemployment rate negatively impacts economic growth in both short- a long-run, labor force positively affect economic growth in the short-run but negatively in the long-run and capital positively affect economic growth in the short-run, while the long-run results are insignificant. The present research shows that policies that are meant to lower inflation rate and unemployment through job creation must be advocated for, for the purpose of enhancing economic development of a nation.

***Key Words**:* Unemployment, Economic growth, Inflation rate

Soyut

İşsizliğin Etiyopya'nın ekonomik büyümesi üzerindeki etkisi

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Bir ulusun ekonomik büyümesi hayati önem taşır ve bir ulusun ekonomik gelişimini artırmaya yardımcı olacak yollar bulmak herhangi bir ulusun çıkarına olmalıdır. Teoriler, ekonomilerin büyümesinin artmasından sorumlu olan başlıca faktörler olarak emek, sermaye, teknoloji ve beşeri sermaye sağlar. Emek, sermaye, teknoloji ve beşeri sermayenin ekonomik büyümeyi desteklemedeki önemi arasında, diğer araştırmalar işsizlik oranı ve enflasyon oranının bir ulusun ekonomik büyümesini azalttığını ortaya koymuş, ancak bu konuda çok az araştırma yapılmıştır. Bu araştırma, işsizlik oranı ve enflasyon oranının Etiyopya'nın ekonomik büyümesi üzerindeki rolünü tespit etmeyi amaçlamaktadır. Mevcut araştırma, 1990'dan 2019'a kadar olan zaman serisi verilerini kullanır ve kısa vadeli ve uzun vadeli tahminleri belirlemek için Otoregresif Dağılım Gecikmesi tekniğini kullanır. Mevcut araştırma, bu konuda mevcut olan az sayıda araştırma göz önüne alındığında, işsizlik ve ekonomik büyüme arasındaki ilişki hakkındaki literatürü ilerletmesi açısından önemlidir. Temel bulgular, enflasyon ve işsizlik oranının ekonomik büyümeyi hem kısa vadede negatif, işgücünün ekonomik büyümeyi kısa vadede pozitif, hem de uzun vadede negatif etkilediğini ve sermayenin kısa vadede ekonomik büyümeyi pozitif yönde etkilediğini göstermektedir. koşu, uzun vadeli sonuçlar ise önemsiz. Mevcut araştırma, bir ulusun ekonomik kalkınmasını artırmak amacıyla, istihdam yaratma yoluyla enflasyon oranını ve işsizliği düşürmeyi amaçlayan politikaların savunulması gerektiğini göstermektedir.

Anahtar Kelimeler: İşsizlik, Ekonomik büyüme, Enflasyon oranı

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List of Abbreviations

ADF:	Augmented Dickey Fuller
ARDL:	Autoregressive Distributive Lag
ASEAN:	Association of Southeast Asian Nations
BRI:	Belt and Road initiative
BRICS:	Brazil Russia India China South Africa
CAP:	Capital investment
CPI:	Consumer Price Index
DOLS:	Dynamic Ordinary Least Squares
ECM:	Error Correction Model
ECT:	Error Correction Term
EU:	European Union
FDI:	Foreign Direct Investment
FE:	Fixed Effects
FGLS:	Feasible Generalized Least Squares
FMOLS:	Fully Modified Ordinary Least Squares
GDP:	Gross Domestic Product
GFCF:	Gross Fixed Capital Formation
GLS:	Generalized Least Squares
GMM:	Generalized Method of Moments
ICT:	Information Communication and Technology
IT:	Information Technology
MENA:	Middle East North Africa
OECD:	Organization of Economic and Cooperation Development
OLS:	Ordinary Least Squares regression
PP:	Phillips Peron
RE:	Random Effect

CHAPTER I
Introduction

Economic growth of the country has been identified as one of the most important factors in an economy because it resembles the economic performance of the country, whether the country is performing well in sustaining its citizens or not. While economic growth has been identified as one of the crucial factors that determine economic development of the country, there are various factors that have been identified to affect economic growth. Among these factors the major factors, of course, have been identified as a labor and capital, according to Mankiw (2010), which are they major inputs in the production function. Various production functions have been also formulated to examine the relationship that exists between the production of output level and its inputs. Among these functions of production, the most popular ones are the Cobb-Douglas production function, Cobb and Douglas (1928), the Solow production function by Solow (1956) and the Romer production function, that was postulated in the work of Romer (1990). These functions of production are very important and crucial in identifying the major factors that are responsible for enhancing the economic development of the country. There has been consensus on the importance of labor and capital in promoting economic development of the country. The other factors that have been also identified through these models of production in enhancing the economic growth level of a country are the human capital, as well as the technology. The Solow model of production and the Romer model of production identifies knowledge and then human capital as one of the most crucial factors that are responsible for promoting the output level in a country.

While the theories of production have identified labor, capital, human capital, and technology as one of the factors that are responsible for promoting economic development, the Okun's law of Okun (1962), has provided for an inverse relationship to exist between economic growth and the rate of unemployment. These factors, economic growth and the rate of unemployment, according to the Okun's law have been observed to present a significant negative relationship. The Okun's law basically provided that economic growth negatively impacts unemployment rate, indicating that when the GDP of a country is

enhanced, this is very crucial in going a long way in improving the employment level in the country. Thus, as economic growth rises it will have a tendency of being associated with a decrease in the rate of unemployment. A decrease in the rate of unemployment which entails that employment levels in the country are improved. Thus, according to the Okun's law, raising economic growth of the country is crucial and vital for providing jobs to the labor force that is present in the country. To this end, various studies have been done to ascertain the association that exists between economic growth and unemployment rate. Frankly speaking, most studies that have been done on the relationship between economic growth and unemployment rates, have been done to ascertain the existence of the Okun's law and mixed results have been observed. Thus, other studies have observed that economic growth indeed reduces unemployment rate while the other studies indicated that these indicators do not have a significant relationship. However, in as much as the effect of economic growth on unemployment rate has been assessed and very few studies have been done to ascertain the effect of unemployment on economic growth. Among the few studies that have been done to ascertain the effects of unemployment rate on economic growth, unemployment rate has been observed to negatively impact economic growth. Other studies have also identified that these factors have a bi-directional relationship, whereby economic growth affects unemployment rate and unemployment rate affects economic growth on the other side. Therefore, there is need for many research to be done to ascertain the effect of unemployment rate on economic growth across various economies of the world. Ascertaining this relationship that exists between economic growth and unemployment rate is vital for the purpose of coming up with the policies that can reduce unemployment rate in order to foster economic growth.

Among the studies that examined the impact of unemployment on economic growth, are the studies of Niken, Haile and Berecha (2023); Sadiku, Ibraimi and Sadiku (2015); Mohseni and Jouzaryan (2016) among many researches. For example, the research of Niken, Haile and Berecha (2023) depicts that the rate of unemployment rate in Ethiopia significantly impacts economic growth in this country, indicating that unemployment rate is vital in determining the economic growth of Ethiopia. Considering these findings which shows that

unemployment rate gives a significant impact on economic growth, then this means that the government has to take into consideration the rate of unemployment when making policies so that they can devise such policies that can enhance economic growth by reducing the rate of unemployment in the country. However, the postulations given in the study of Sadiku, Ibraimi and Sadiku (2015) depicts that the rate of unemployment and economic growth do not significantly affect each other. According to these postulations, when the rate of unemployment changes this does not have any significant effect on the economic growth of the of the country, hence reducing the rate of unemployment in order to foster economic growth does not provide any significant importance on economic growth. Another study that was done through the work of Mohseni and Jouzaryan (2016) shows that the rate of unemployment significantly impacts economic growth in Iran. The research of Mohseni and Jouzaryan (2016) actually shows that the rate of unemployment has a tendency of significantly reducing economic growth in Iran. This means that government and policy makers have to come up with ways on how to reduce the level of unemployment in their countries through creating employment so that the growth of the economy can be enhanced. The few findings that has been postulated above depicts that there is mixed findings observed in the literature on the effect of unemployment on economic growth, and it is observed that not much work has been done in understanding the effect of unemployment on economic growth, hence the need for many studies to be undertaken in various regions of the world to ascertain the relationship that exists between the rate of unemployment on economic growth for the purpose of making crucial and proper policies.

In addition to the findings that are provided, above which shows that turn the rate of unemployment is one of the factors among labor force, capital, technology and human capital in affecting economic growth of a country, various studies have also indicated that inflation rate is also vital in affecting the growth of the economy. Many studies have indicated that the rate of inflation gives a significant negative effect on the economic growth of the country, see for example Mohseni and Jouzaryan (2016); Niken et al. (2023). The findings provided in these researches are very crucial in indicating that while labor force, capital, technology and human capital are vital in fostering the growth of the economies

through raising the output level in the production process of the countries, inflation rate has the effect of reducing the output that is being produced in the various countries. This shows that it is vital for countries and their policymakers to come up with those policies that are meant to stabilize the rate of inflation in a country in order to raise the economic growth of a country. Leaving the rate of inflation to rise to abnormal levels is just associated with those detrimental effects on the economic growth which is going to be lowered. Therefore, we see that the rate of inflation together with the unemployment rate as provided above are the major factors that are responsible for reducing the economic level of the country. Therefore, it is very crucial to ascertain the relationship that exists between economic growth with these factors in order to come up with policy implications and this is the purpose of this research.

Aim of the research

The present research Thesis is aimed at examining the impact of unemployment and inflation rates on the Economic growth of Ethiopia, in the presence of major inputs of output production (labor force and capital), by employing the Autoregressive Distributive Lag (ARDL) technique.

Objectives

The present research set the Thesis objectives as follow:

- To ascertain the effect of unemployment rate of Ethiopia on economic growth in both the short- and long-run
- To examine the effect of inflation rate of Ethiopia on the economic growth in both the short- and long-run
- To examine the role of labor force on the economic growth of Ethiopia, considering both the short- and long-run
- To investigate the role of capital level of Ethiopia on the Economic growth, for both the short-run and long-run

Problem statement

Many researches that have been done in the past ascertains the applicability of the Okun's law which depicts that economic growth reduces the rate of unemployment of a country, while just a few researches ascertain the reverse relationship on the effects of unemployment on economic growth. Among the few researches available on the effect of unemployment rate on economic growth, mixed outcomes are presented. Therefore, there is still need for more work to be done to ascertain the role of unemployment on the economic growth of nations, for proper policies implications. There the present research is an attempt to further the literature body on the effects of unemployment rate on economic growth in the case of Ethiopia and this is the novelty and originality of the research.

Research questions

The present research is done for the purpose of answering the following research questions:

1. What is the effect of unemployment rate of Ethiopia in the short-term?
2. What is role of unemployment rate on economic growth in the long-term?
3. Does inflation rate impact economic growth of Ethiopia in the short-run and in What way?
4. Does inflation rate of Ethiopia affect economic growth in the long-run and in What way?
5. What is the effect of labor force on the Economic growth of Ethiopia in the short-run?
6. What is the role of labor force of Ethiopia on economic growth in the long-run how can the government take advantage of labor force in fostering economic growth?
7. What is the role of capital level on the Economic growth of Ethiopia in the short-run?

8. Is capital level vital in raising economic growth of Ethiopia in the long-run and what can be done to make the best out of capital?

Research strengths

The strength of the present research can be presented as follows:

- The ARDL technique which presents the short-run estimations and the long-run estimations are presented and it is helpful in comparing if the explanatory factors present asymmetric effects on the economic growth of Ethiopia
- The present research presents long-run outcomes which are fundamental for giving policy implications
- The present research is presented at a time when there are few researches available in the literature on the effects of unemployment on economic growth

Research limitations

The research just like any other studies in various ways as presented below:

- The present research only specifies the dataset of Ethiopia, a single country, hence making the findings difficult to be generalized to other world nations. Of course, the outcomes can be specified to other nations whose economic conditions are similar to Ethiopia.
- The present research also does not specify human capital and technology in the model, as postulated in the theories of production, due to the unavailability of data of these variables do Ethiopia.

CHAPTER II

Literature Review

Unemployment rate and its effects

There In the present section of the research, we begin by providing the effects of unemployment on various individuals and sectors of the economic. Unemployment rate comes along with quite a good number of detrimental effects that ranges from, low-income levels, suicidal effects which causes the mortality rate to decrease and decreases the health life styles of people. According to the postulations presented in the study of Ahn (2023) who utilized the Bayesian trend-cycle and the Laguerre function model for the dataset of United States of America (USA) during the time frame of 1980 to 2019, the duration profile of unemployment has three main features, that is, curvature, slope and level. Ahn (2023) depicted in their research that the rate of unemployment is observed to decrease by 3 points considering the trend, between 1980 to 2019. The short-term time element is also observed to drop, while the long-term increases, hence the trend mean unemployment period rises, Ahn (2023). The research study of Ahn (2023) also depicts that the frictional unemployment is observed to be falling, while structural seem to be rising. This shows that in the USA ways that are meant to reduce the frictional type of unemployment are effective, people are being matched with the right types of jobs through the provision of information that is fairly equal across all people, hence they identify the best job and no need to move from job to job. However, structural unemployment is observed to be notorious as it is observed to continue rising. The government should therefore work towards sorting out wage rigidities and sectoral shifts problems to correct structural unemployment in the USA.

In different research that was conducted through the work of Azzollini (2023), which made use of the three-level multilevel models, during the period 2008 to 2018 of the European Social Survey of twenty-nine countries and among the two-hundred and twenty-seven regions, contextual and individual rate of unemployment are significantly related with less trust level, while only cross-sectional unemployment is significant at the macro-level stage. The research of

Azzollini (2023) also further show that the individual association is significantly associated with the unemployment rate, which is cross-sectional and lower at the macro-micro level, and at high cross-sectional rates this is not true.

The postulations given in the research of Botha and Nguyen (2022) through the use of the ARDL technique for the dataset that ranges from 1990 to 2018 of Australia, depicts that suicide rate and unemployment are positively related, whereas suicide rate and consumer sentiments are negatively related. The postulations also further depict that the effects of sentiment and the rate of unemployment on the rate of suicide are non-linear, while differences are also observed among different genders, Botha and Nguyen (2022). Botha and Nguyen (2022) depict that the rate of suicide is exacerbated by rising rate of unemployment among men, while its decrease does not give any significant effect. Women are observed to give opposing findings to those of men which shows that rising unemployment among women do not raise the rates of suicide. Furthermore, increase in sentiment strongly affects the rate of suicide among men, compared to the effects of sentiment decrease, Botha and Nguyen (2022), while women are observed to have different outcomes. Suicidal rate is strongly predicted through the expectations of forward-looking sentiments than present conditions sentiment. The rate of suicide on male is strongly impacted by sentiment, compared to that of female, Botha and Nguyen (2022).

Furthermore, Bianchi, Bianchi and Song (2023) in research which used the VAR model in the dataset of the USA, gives the postulations which shows that the Covid-19 related unemployment significantly decreases the life expectancy and raises mortality rate, and its size is between two to five times greater than the normal rate of unemployment shock before the pandemic, and this depends on the gender and race. In the short-term women and African-Americans are impacted by the shock and in the long-term, white man will be impacted too, Bianchi, Bianchi and Song (2023). These postulations depict how the pandemic played a role in exacerbating unemployment rate, hence worsening the death rate. Therefore, while unemployment rate is detrimental, combining it with the pandemic is even worse. Thus, policies that are meant to curb the rate of unemployment, together with lessening the effects of the pandemic are essential.

The postulations of Lewanczyk et al. (2023) in survey research that was carried out in May 2021 and May 2022 in the United Kingdom (UK) observes that people from socio-economic backgrounds that are at risk of unemployment or are unemployed, are supported by the community-based programs that allows people to engage themselves in regular physical activities, which is programmed for ten weeks. Lewanczyk et al. (2023) depicts that the program helps in enhancing the health of people who are at risk to be unemployed or are unemployed. Such programs are crucial considering the high rate of suicide among unemployed people. Unemployment is a serious problem and one that causes depression among people; hence they end up trying to take their lives. Thus, the mind of idle people who have no employment should at least be occupied by something to prevent them from committing crimes and/or taking their lives. The postulations of Lewanczyk et al. (2023) which shows the importance of activities in maintaining the health of unemployed people is vital considering the high rates of suicides among unemployed people as postulated above.

The research of Ahmed and Cassou (2021) through a survey and data analysis through the use of Cholesky decomposition, Vector Autoregressive (VAR) and Heteroskedasticity and Autoregressive methods in the USA depicts that under circumstances of a hawkish stance on inflation rate by the Fed, macroeconomic activities, both future and current are impacted strongly by shocks expectation. Ahmed and Cassou (2021) further highlights that in times of policy periods that are characterized by low unemployment and rising rate of inflation (hawkish), a boom is predicted by the findings of the forecast error variance tool, and impulse responses during the hawkish period, which explains greater variations in inflation and unemployment over a longer period. The findings also depict that during the period of rising unemployment and dropping rate of inflation, that is, the dovish policy time, shocks in expectations are small and less persistent, Ahmed and Cassou (2021). Forecast error variation that are less are explained in the rate of inflation and unemployment, as compared to policy periods of hawkish, Ahmed and Cassou (2021). The postulations depicted here depicts that unemployment and inflation rate are significantly related and should be examined to understand their link for correct policy implications.

In support of the postulations given above, Jung and Pyun (2023) which utilized the matching model for the data that ranges from 1955 to 2007 of the USA, depicts that inflation and the rate of unemployment are positively related in the long-run. It is observed that the equity prices and the rate of unemployment are negatively related in the long-run, while equity prices are inflation rate are negatively related in the long-run, Jung and Pyun (2023). Jung and Pyun (2023) provides that the trivariate association which is documented in past researches is reconfirmed with extended dataset presented in the research. The United States (US) monetary policy constitutes of a 29.8% and 62.9% long-run variations in the real Equity prices and rate of unemployment of the US, Jung and Pyun (2023).

Moreover, Lin, Chen and Jhang (2023) in research which used the Partial Adjustment Valuation during the period 1993 to 2011 of the eleven countries, depicts significant complementary, as well as substitutability on the associations of rate of inflation, unemployment and information technology (IT). The findings also show that the IT returns are dependent upon the complementary resources available, Lin, Chen and Jhang (2023). The paradox of IT is observed to be very strong in the developed nations when compared to the developing nations.

Unemployment rate has also been observed to be significantly related with uncertainties, while race and ethnicity played a vital role too. For example, Elder and Payne (2023) in research that used the GARCH and SVAR models to analyze the data of Columbia for the period 1990 to 2019, depicts that the rate of unemployment is increased strongly by the rising uncertainty of oil prices among the Hispanics and Blacks, compared to Whites. The research of Elder and Payne (2023) depicts that the effect on unemployment by uncertainty in the prices of oil is strongly with thirteen basis points, and during periods of high uncertainties this is significant at thirty-five bases. The research further depicts that the rate of unemployment on Hispanics and Blacks is double large, Elder and Payne (2023), and that Black teenagers are more impacted through unemployment by uncertainty, followed by Hispanics and then Whites. In line with the gender, males respond more on unemployment due to the uncertainty in oil price shocks, compared to females among the similar ethnic and racial group. Moreover, uncertainty raises unemployment and worsens employment differences, Elder and

Payne (2023). From these findings, it is crystal clear that uncertainties among people is one of the main factors of raising the rate of unemployment. Therefore, uncertainties must be lowered through creating confidence among people for the purpose of enhancing economic growth.

According to the work of Ayala et al. (2023), in research that used the synthetic control method with the data from 2004 to 2019 of the European Union, the deprivation of material is strongly impacted through the shocks of unemployment, as opposed by the traditional assumptions. The findings of Ayala et al. (2023), are consistent over longer time horizons, different material deprivation factor or under a different unemployment shock definition. These findings are crucial in presenting the role played by the rate of unemployment in affecting the material deprivation in a country.

The research that was done through the work of Chletsos and Sintos (2023) through employing the error correction model (ECM) with the data that ranges from 1980 to 2014 of selected world countries, has the findings which depicts that the participation of International Monetary Fund (IMF) program raises the rate of unemployment of receiving countries. The research depict that the conditions presented by the IMF negatively impacts the impact of rate of unemployment, Chletsos and Sintos (2023). The IMF's negative effects in the short-run are also strong in the long-run. Chletsos and Sintos (2023) depicts that unemployment rate is negatively impacted through four policies as per the IMF conditions, that is, the reformation in the privatization of state-owned enterprises, the deregulation of the labor market, government expenditure restricted reforms in fiscal policy. Therefore, the IMF program is observed to give rather worse outcomes to the economics of performance of nations instead of enhancing them. Thus, it is crucial to evaluate the policies enacted in a country and understand their effect on the economy before fully adopting them.

Economic growth, Unemployment, Inflation rate and other factors on Economic growth

This section of the research examines the link that exists between economic growth, unemployment inflation rate and other factors that are linked with economic growth. The research of Niken, Haile and Berecha (2023) which utilized the VAR, ECM, and ARDL techniques for the data that ranges from 1980 of 2020 of Ethiopia, depicts that the growth of the Ethiopian economy is slightly impacted by the rate of unemployment and inflation in the long-run. Moreover, the growth of the economy and inflation are strongly related in the long-term, while the rate of inflation is negatively related with rate of unemployment. The agricultural sector of Ethiopia can be renovated through reducing spikes in the prices and sustaining the growth of income, through productivity incentive giving to the sectors and ventures that are labor intensive, Niken, Haile and Berecha (2023). The findings of Niken, Haile and Berecha (2023) are vital in depicting that employment and inflation rate strongly affect the economic growth of Ethiopia. However, the direction of the effect of unemployment on economic growth in Ethiopia by unemployment and inflation rate is not ascertained. Therefore, there is need for more work to be done in order to ascertain this association. Inflation rate and unemployment rate are however, observed to be negatively related supporting the postulations of the Phillips Curve, which depicts that the rate of inflation and unemployment are negatively linked in the short-run, whereby raising employment is associated with raising prices, hence a dilemma in policy making.

The research of Sadiku, Ibraimi and Sadiku (2015), which used the ECM and VAR to analyze the data which stretches from 2000 to 2012 of Macedonia, depict that the rate of unemployment and the growth of the growth are not significantly inversely related, and this opposes the postulations of the Okun's law. The postulations depict that unemployment and economic growth do not significantly cause each other, and real economic growth do not impact the rate of unemployment and the reverse is not significant too, Sadiku, Ibraimi and Sadiku (2015). Structural unemployment and large rate of informal employment are the explanation behind the outcomes. Moreover, the reduction in the rate of unemployment and economic development are not significantly fostered by the

economic policies of the country, Sadiku, Ibraimi and Sadiku (2015). Public sector is the main employment source and not the private sector. These findings further depicts that the rate of unemployment and economic growth are not significantly related, which is in opposite of the postulations given above which shows that unemployment strongly affect economic growth of a country. Different economic regions always give different outcomes because of the economic conditions prevailing in such countries which might differ to those of other nations.

Unlike the postulations presented above which shows that unemployment and inflation rate gives strong effect on economic growth, but without ascertaining the direction of the link, Niken et al. (2023), and the postulations of Sadiku et al. (2015) which depicts no strong link between unemployment and economic growth, Mohseni and Jouzaryan (2016) by employing the ARDL technique on the data of the period 1996 to 2012 of Iran depicts that in the long-run, it is observed that the rate of unemployment and inflation negatively affect the growth of the economy, hence the importance of inflation and the rate of unemployment in decreasing economic growth. The research recommends controlling and reduction of unemployment and inflation rates. The Iranian authorities can adopt this research findings to foster growth of the economy through reducing unemployment and inflation, Mohseni and Jouzaryan (2016).

In addition to the postulations given above, Pekarcikova et al. (2022) in research which used the Random effects technique during 1980 to 2019 on the OPEC countries, shows that the factors examined are significantly correlated, and this gives significant negative and positive relations with GDP. The GDP is positively impacted with prices of oil, exports of oil and production of oil, leading to economic growth, Pekarcikova et al. (2022). Furthermore, is observed that the rate of unemployment, together with exchange rate negatively impact economic growth. GDP, demand of oil, growth of the population and rate of inflation are not significantly correlated, Pekarcikova et al. (2022). The analysis has crucial implications on the OPEC nations.

In research of Sturn and Epstein (2021) which used the dynamic growth regression for the period 1965 to 2009 of the one-hundred and thirty countries and twenty Organization of Economic Community Development (OECD) countries, growth is strongly impacted by finance. A significant inverted U-shaped association between growth and financial development is observed, Sturn and Epstein (2021). Growth is raised through enhancement of financial development until a certain limit is observed, at the limit financial development do not significantly impact growth, while after the limit is surpassed, further raising financial development reduces growth. Private credit is observed to raise growth, hence financial development enhances growth in the long-term, Sturn and Epstein (2021). The postulations presented here shows the importance of understanding the level of finance to use in order tom foster economic growth, since excessive use have a tendency of ending up lowering growth.

The research of Liotti (2020) which uses the ARDL tool during the period 2001 to 2016 of Italy, depicts that the young people are negatively impacted through the economic crisis. Liotti (2020) shows that the outcomes of unemployment on youth are not strongly affected by the flexibility in the labor market. The rate of unemployment and youth recession is mitigated through regional productivity, investment in the private sector, average wage increases, participation in the politicians of the region, ALMPs, and exports in the region, see Liotti (2020). Fuerthermore, the research of Dergiades, Milas and Panagiotidis (2022) which used the VAR model from February 2020 to January 2021 of the USA, depicts that the labor market is negatively impacted by the interventions of non-pharmaceutical, while its effects are immediate. The losses in economic welfare are partially eased by economic stimulus, which takes just a month. The market reaction is the main dependent on the support of economic policies than the pandemic severity, Dergiades, Milas and Panagiotidis (2022).

In a research of Hashimoto, Ono and Schlegl (2023) which adopted the Cobb-Douglas matching function with the data which ranges from 1980 to 2018 of Japan and USA, gives the findings which depicts that in the case of secular stagnation, the major economic slack measure is underemployment, in the labor market, and not necessarily unemployment. In the search and matching models, there is significant shortfall of working hours which results in underemployment,

which is involuntary and this can only hold if the satisfaction of households is from the holding of wealth, or if they may under stagnation dominates quickly the employment gap, Hashimoto, Ono and Schlegl (2023). The research depicts that the conventional policy policies must be used with caution because they stretch the gap in the labor market, in as much as they have a crucial role to play in decreasing unemployment. The working hours and the rate of unemployment are improved by the aggregate demand increases. Underemployment is worsened through labor productivity, while the rate of unemployment is not improved, Hashimoto, Ono and Schlegl (2023).

The research of Rodriguez-Pueblo, Chavez and Trujillo (2022) which used the simultaneous equation models and the difference-in-difference approach during the period 2003 to 2011 of Chile, shows that shocks give significant adverse effect on education's wage premium. The rate of school enrollment has significantly decreased, while the young people aged fifteen to eighteen have increased in their rate of labor force participation and this increase is going mainly towards the mining municipalities. There is a strong long-term possibility that after the shock these young persons may not be qualified for employment, hence raising their rate of unemployment, Rodriguez-Pueblo, Chavez and Trujillo (2022).

Furthermore, Hegelund and Taalbi (2023) in a study that used the band spectrum regression for the data which ranges from 1913 to 2016 of the ten countries, depicts that there is a strong correlation between the rate of unemployment and investment, which is negative. The formation of capital is observed to give a significant explanation on the rate of unemployment for both the short-run and long-run, Hegelund and Taalbi (2023). Investment must be considered to be significant in the long-run models of the labor market and unemployment policies, Hegelund and Taalbi (2023).

The research of Huynh (2023) which used the baseline models on the data that stretches from 1992 to 2021 of Australia, shows that the indicators of unemployment give strong effect, together with rate of unemployment that is forecasted, as well as the actual gap of unemployment, on the Australian stock returns. Risk adjusted and higher excess stock returns are generated in the

lowest unemployment beta, while higher ones generate a relatively lower one, when the two beta decides are compared, Huynh (2023). In the case if aggregate returns, unemployment's predictive power is strong within the thirty-six-month time frame, while cross-sectional returns are significant within the twenty-four months' time frame. Huynh (2023) gives a significant correlation of unemployment premiums with the leverage ratio of a company, economic, uncertainties in politics and financial.

According to the study of Rahman (2021) among the ASEAN, as well as the BRICS countries, economic growth among these regions is significantly fostered by the use of energy. Rahman (2021) provides that energy is one of the factors that is essential for improving the economic growth of the ASEAN and the BRICS countries. Specifically, the findings depicted in the research of Rahman (2021) suggest for the existence of a bi-directional causal link between the use of energy and economic growth in these regions. Thus, the postulations of Rahman (2021) depict that while energy improves the economic growth of these nations, economic growth has a similar tendency of fostering energy improvement in these regions. Therefore, it is very essential for countries to enhance improvement in the energy resources of the country for the purpose of attaining economic development among these nations. Another study that was done in the EU countries by Dogan et al. (2020), the importance of energy in raising economic growth was ascertained. The research that was undertaken in the EU nations by Dogan et al. (2020) depicts that the types of energy, that is non- and the renewable sources of energy fosters economic development in the EU region. These two sources of energy have been observed to positively enhance economic development in this region. The research of Dogan et al. (2020), depicted that while both types of energy foster economic growth, renewable energy was observed to provide strong link with economic growth when compared with non-renewable energy, which had slightly lower positive effects on economic growth.

Different findings have been also observed by various studies that has been undertaken across the globe, which shows that economic growth and energy gives a significant negative link (Tiwari et al., 2022). The findings that were obtained in research that was done in the Asian nations by Tiwari et al.,

2022), depict that the growth in the economies of these nations decreases the use of energy by way of technical impact, as well as it is also observed that the initiatives that are meant for fostering renewable energy sources can be advanced through the improvement independence of the market. The findings that are presented in another study that was done in Turkey on the association between economic growth and energy shows that, the prices of oil have been determined to reduce economic growth of Turkey (Faisal et al., 2021). The research of Faisal et al., 2021) in Turkey which shows that oil prices negatively impact economic growth in this country is important in encouraging nations to stabilize the prices of oil in order to foster economic growth. High prices of oil among oil importing countries deteriorates the financial resources of the country, hence economic development is deterred. On the other hand, a study that was done among the hundred nations by Yin et al. (2021) depicts that the growth among these nations provides a means by which emissions of carbon is enhanced. This is supported by the postulations that are given in the research of Zameer et al. (2020) in the case of India which indicated that the combined effects of energy and economic growth promotes the emission of carbon in the air. Therefore, it can be observed that while energy is vital in fostering the growth of the economy, this has a significant impact on the emission of carbon which is not favorable to the environment, hence exacerbates health issues. Thus, it is crucial to come up with green technologies that encourages the use of clean energy in fostering economic growth for the purpose of avoiding emitting pollutants to the air.

According to the populations of various studies that are provided in the above section, the complexity in economic growth in a country has been observed to present a negative but significant effect on the Foreign Direct Investment (FDI) of the forty countries that were studied in the research of Nguyen and Su (2021). On the other hand, the research that was done by Nguyen and Su (2021) in these forty countries also depicts the importance of FDI in reducing the severity of economic complexities among these nations. The research of Nguyen and Su (2021) also depicts that after the economic complexities have been reduced through raising FDI in the country, then the growth of the economy is also going to be improved. The research shows that when FDI is enabled to rise in a country this will lower the level of complexities

that are arising in the economy of a country. Therefore, FDI is observed to be vital in reducing various complicated situations that may arise in a country through promoting economic growth, reducing the level of unemployment, as well as stabilizing the economy in various ways.

A study that was undertaken by Driffield and Jones (2013), depicts that the growth in the economic performance of a nation is fostered through raising foreign capital. The study of Driffield and Jones (2013) shows that foreign capital is a significant factor that is responsible for raising the economic growth of various developing nations. Driffield and Jones (2013) also further provided that the inflow of FDI among developing countries is vital for enhancing the development of these economies. This shows that the capital being brought by foreigners to developing countries is essential in raising economic growth, since these developing countries does not have sufficient amount of money to foster the industrialization of a nation, which in turn will increase the output level that is being produced in the country. The research findings are clear in that they show that the inflow of FDI into the developing countries come along with foreign capital that is being brought by foreigners in the country, hence the impact of encouraging economic development in the nation. Therefore, FDI inflow is vital for encouraging the development of the country and developing countries should work towards coming up with a conducive environment that attracts foreign investors. Moreover, it is also observed in the study that was done in the MENA region, that is, the 17 Middle East and North African countries, that FDI is a major factor that is responsible for improving the growth of these economies, Abdouli and Hammami (2015).

Table 1.

Summary of past research outcomes

Author and Methodology	Region and Period	Fundings
Ahn (2023) Bayesian trend-cycle; Laguerre function	1980 – 2019 USA	➢ The duration profile of unemployment has three main features, that is, curvature, slope and level. ➢ The rate of unemployment is observed to decrease by 3 points considering the trend, between 1980 to 2019 ➢ The short-term time element drops, while the long-term increases, hence the trend mean unemployment period rises. ➢ Frictional unemployment is observed to be falling, while structural seem to be rising
Azzollini (2023) Three-level multilevel models	2008 – 2018 European Social Survey of 29 countries and 227 regions	➢ Contextual and individual rate of unemployment are significantly related with less trust level, while only cross-sectional unemployment is significant at the macro-level stage ➢ The individual association is significantly associated with the unemployment rate which is cross-sectional which is lower, at the macro-micro level, and at high cross-sectional rates this is not true
Lewanczyk et al. (2023)	May 2021 and May	➢ People from socio-economic backgrounds that are at risk of

Survey	2022 UK	unemployment or are unemployed, are supported by the community-based program that allows people to engage themselves in regular physical activities, which is programmed for ten weeks. ➢ The program helps I enhancing the health of people who are at risk to be unemployed or are unemployed.
Niken, Haile & Berecha (2023) VAR; ECM; ARDL	1980 – 2020 Ethiopia	➢ The growth of the Ethiopian economy is slightly impacted by the rate of unemployment and inflation in the long-run ➢ The growth of the economy and inflation are strongly related in the long-term, while the rate of inflation is negatively related with rate of unemployment ➢ The agricultural sector of Ethiopia can be renovated through reducing spokes in the prices and sustaining the growth of income, through productivity incentive giving to the sectors and ventures that are labor intensive [3]
Sadiku, Ibraimi & Sadiku (2015) ECM; VAR	2000 – 2012 Macedonia	➢ The rate of unemployment and the growth of the growth are not significantly inversely related, and this opposes the postulations of the Okun's law ➢ Unemployment and economic do not significantly cause each other, and real economic growth do not impact the rate

		of unemployment and the reverse is not significant too ➢ Structural unemployment and large rate of informal employment are the explanation behind the outcomes ➢ The reduction in the rate of unemployment and economic development are not significantly fostered by the economic policies of the country ➢ Public sector is the main employment source and not the private sector
Pekarcikova et al. (2022) Random effects	1980 – 2019 OPEC	➢ The factors examined are significantly correlated, and this gives significant negative and positive relations with GDP ➢ The GDP is positively impacted with prices of oil, exports of oil and production of oil, leading to economic growth ➢ The rate of unemployment, together with exchange rate negatively impact economic growth ➢ GDP, demand of oil, growth of the population and rate of inflation are not significantly correlated ➢ The analysis has crucial implications on the OPEC nations
Mohseni & Jouzaryan (2016)	1996 – 2012	➢ In the long-run it is observed that the rate of unemployment and inflation negatively affect the growth of the

ARDL	Iran	economy, hence the importance of inflation and the rate of unemployment in decreasing economic growth ➢ The research recommends controlling and reduction of unemployment and inflation rates ➢ The Iranian authorities can adopt this research findings to foster growth of the economy through reducing unemployment and inflation
Sturn & Epstein (2021) Dynamic growth regression	1965 – 2009 130 countries; 20 OECD countries	➢ Growth is strongly impacted by finance ➢ A significant inverted U-shaped association between growth and financial development is observed. ➢ Growth is raised through enhancement of financial development until a certain limit is observed, at the limit financial development do not significantly impact growth, while after the limit is surpassed, further raising financial development reduces growth ➢ Private credit is observed to raise growth, hence financial development enhances growth in the long-term
Ahmed & Cassou (2021) Survey; Cholesky decomposition; VAR;	USA	➢ Under circumstances of a hawkish stance on inflation rate by the Fed, macroeconomic activities, both future and current are impacted strongly by shocks expectation ➢ İn times of policy periods that are

Heteroskedasticity and Autoregressive		characterized by low unemployment and rising rate of inflation (hawkish), a boom is predicted by the findings of the forecast error Variance tool, and impulse responses during the hawkish period, which explains greater variations in inflation and unemployment over a longer period ➢ The findings also depict that during the period of rising unemployment and dropping rate of inflation, that is, the dovish policy time, shocks in expectations are small and less persistent. ➢ Forecast error variation that are less are explained in the rate of inflation and unemployment, as compared to policy periods of hawkish
Liotti (2020) ARDL	2001 – 2016 Italy	➢ The Young people are negatively impacted through the economic crisis ➢ The outcomes of unemployment on youth are not strongly affected by the flexibility in the labor market ➢ The rate of unemployment and youth recession is mitigated through regional productivity, investment in the private sector, average wage increases, participation in the politicians of the region, ALMPs, and exports in the region.

Elder & Payne (2023) GARCH; SVAR	1990 – 2019 Columbia	➢ The rate of unemployment is increased strongly by the rising uncertainty of oil prices among the Hispanics and Blacks, compared to Whites ➢ The effect on unemployment by uncertainty in the prices of oil is strongly with thirteen basis points, and during periods of high uncertainties this is significant at 35 bases. ➢ Rate of unemployment on Hispanics and Blacks is double large. ➢ Black teenagers are more impacted by through unemployment by uncertainty, followed by Hispanics and then Whites ➢ In line with the gender, males respond more on unemployment due to the uncertainty in oil price shocks, compared to females among the similar ethnic and racial group ➢ Uncertainty raises unemployment and worsens employment differences
Botha & Nguyen (2022) ARDL	1990 – 2018 Australia	➢ Suicide rate and unemployment are positively related ➢ Suicide rate and Consumer sentiments are negatively related ➢ The effects of sentiment and the rate of unemployment on the rate of suicide are non-linear, while differences are also observed among different genders ➢ The rate of suicide is exacerbated by rising rate of unemployment among men, while its decrease does not give

			any significant effect. Women gives opposite findings ➢ Increase in sentiment strongly affects the rate of suicide rate among men, compared to the effects of sentiment decrease. Women have different outcomes. ➢ Suicidal rate is strongly predicted through the expectations of forward-looking sentiments than the present conditions sentiment ➢ The rate of suicide on male is strongly impacted by sentiment, compared to that of female
Jung & Pyun (2023) Matching model	1955 – 2007 USA		➢ Inflation and the rate of unemployment are positively related in the long-run ➢ Equity prices and the rate of unemployment are negatively related in the long-run ➢ Equity prices are inflation rate are negatively related in the long-run ➢ The trivariate association which is documented in past researches is reconfirmed with extended dataset ➢ The US monetary policy constitutes of a 29.8% and 62.9% long-run variations in the real Equity prices and rate of unemployment of the US.
Lin, Chen & Jhang (2023)	1993 – 2011		➢ Significant complementary as well as substitutability on the associations of

		rate of inflation, unemployment and IT is present
Partial Adjustment Valuation	11 countries	➢ IT returns are dependent upon the complementary resources available ➢ The paradox of IT is strong in the developed nations
Ayala et al. (2023) Synthetic control method	2004 – 2019 European Union	➢ The deprivation of material is strongly impacted through the shocks if unemployment, as opposed by the traditional assumptions ➢ The findings are consistent over longer time horizons, different material deprivation factor or under a different unemployment shock definition
Bianchi, Bianchi & Song (2023) VAR	USA	➢ The Covid-19 related unemployment significantly decreases the life expectancy and raises mortality rate, and its size is between two to five times greater than the normal rate of unemployment shock before the pandemic, and this depends on the gender and race ➢ In the short-term women and African-Americans are impacted by the shock and in the long-term, white man will be impacted too
Dergiades, Milas & Panagiotidis (2022)	February 2020 – January	➢ The labor market is negatively impacted by the interventions of non-pharmaceutical, while its effects are

	2021	immediate
VAR	USA	➢ The losses in economic welfare are partially eased by economic stimulus, which takes just a month ➢ The market reaction is the main dependent on the support of economic policies than the pandemic severity
Hashimoto, Ono & Schlegl (2023) Cobb-Douglas matching function	1980 – 2018 Japan; USA	➢ The findings depict that in the case of secular stagnation, the major economic slack measure is underemployment, in the labor market, and not necessarily unemployment. ➢ In the search and matching models, there is significant shortfall of working hours which results in underemployment, which is involuntary and this can only hold if the satisfaction of households is from the holding of wealth, or if they may under stagnation dominates quickly the employment gap. ➢ Conventional policy policies must be used with caution because they stretch the gap in the labor market, in as much as they have a crucial role to play in decreasing unemployment ➢ The working hours and the rate of unemployment are improved by the aggregate demand increases ➢ Underemployment is worsened through labor productivity, while the rate of unemployment is not improved.

Rodriguez-Pueblo, Chavez & Trujillo (2022) Simultaneous equation models; Difference-in-difference approach	2003 – 2011 Chile	➢ Shocks gives significant adverse effect on education's wage premium ➢ The rate of school enrollment has significantly decreased, while the young people aged 15 to 18 have increased in their rate of labor force participation and this increase is going mainly towards the mining municipalities ➢ There is a string long-term possibility that after the shock these young persons may not be qualified for employment, hence raising their rate of unemployment
Hegelund & Taalbi (2023) Band spectrum regression	1913 – 2016 10 countries	➢ There is a strong correlation between the rate of unemployment and investment, which is negative ➢ The formation of capital is observed to give a significant explanation on the rate of unemployment for both the short-run and long-run ➢ Investment must be considered significantly in the long-run models of the labor market and unemployment policies
Chletsos & Sintos (2023) ECM	1980 – 2014 Selected world countries	➢ The study findings depicts that the participation of IMF program raises the rate of unemployment of receiving countries. ➢ The conditions presented by the IMF negatively impacts the impact of rate of

		unemployment ➢ The IMF's negative effects in the short-run are also string in the long-run ➢ Unemployment rate is negatively impacted through four policies as per the IMF conditions, that is, the reformation in the privatization of state-owned enterprises, the deregulation of the labor market, government expenditure restricted reforms in fiscal policy
Huynh (2023) Baseline models	1992 – 2021 Australia	➢ The indicators of unemployment give strong effect, together with rate of unemployment that is forecasted, as well as the actual gap of unemployment, on the Australian stock returns ➢ Risk adjusted and higher excess stock returns are generated in the lowest unemployment beta, while higher ones generate a relatively lower one, when the two beta decides are compared ➢ In the case if aggregate returns, unemployment's predictive power is strong within the thirty-six-month time frame, while cross-sectional returns are significant within the 24 months time frame ➢ A significant correlation of unemployment premiums with the leverage ratio of a company, economic, uncertainties in politics and financial
Li et al. (2020)	Five	➢ There is little openness in trade in the

	countries	economy of China, since the year 2001
Experiments	1996 – 2014	➢ The decrease on the trade as well as high costs of FDI are the reasons behind the rise in current account balances as well as global trade, by almost half.
Rahman (2021) Quantile regression; Causality test	BRICS and ASEAN 1990 – 2017	➢ The causal link which is single way is observed from trade openness to FDI; Energy to FDI; economic growth to the openness of trade, as well as FDI ➢ A significant association I the long-run is observed between the growth of the economy, openness of trade, energy and FDI ➢ Factors, such as the growth of the economy and energy; energy and the openness of trade; Labor and the growth of the economy; openness of trade and labor, are linked in a two-way strong association ➢ The growth of the economy has been observed to be significantly impacted positively through the enhancement of energy, the openness of trade, capital and FDI
Irandoust (2016) VAR method, and Causality test of Toda-Yamamoto	Estonia; Lithuania; Latvia 1993 – 2014	➢ The positive effect of growth promotions through structural reform policies has the effect of promoting the inflow of FDI, FDI which later tends to promote the growth of the economy ➢ A strong causal effect among currency

		volatility, real exchange rate and FDI ID determined ➢ Among the regions studied, the causal effect of FDI and growth of the economy is ascertained I both Lativia and Lithuania, while in Estonia these factors are linked in a significant two-way association
Muller (2021) Feasible GLS model	SSA nations (47) 1996 – 2017	➢ The investment in the home country by citizens, together with exports deters industrialization ➢ The process of industrialization and the country's GDP are linked in an association that is U-shaped ➢ SSA nations' process of industrialization is deterred by rising FDI inflows
Kalai & Zighidi (2019) ARDL; VECM	MENA 15 nations 1999 – 2012	➢ The growth in the economy of nations is impacted through rising FDI inflows ➢ The favorable spillovers from FDI inflow are observed to be gained.
Nguyen & Lee (2021) GMM	One hundred and sixteen countries 1996 – 2017	➢ Investors look for what are known ad safe haven countries, thereby shunning risk ones ➢ The uncertainties in the country are the major cause of scaring away foreign investors ➢ The major factor which attracts the inflow of FDI is the strong financial system, and countries with such markets

		gain more from FDI inflows
Crescenzi et al. (2021) Difference-in-differences technique	EU region 2003 – 2017	➢ The promotion agency of investment plays a vital role in attracting firms locally and abroad to invest I the EU region ➢ The enhancement in the economic growth of EU nations, together with rising FDI are enhanced by investment agencies
Magazzino & Mele (2022) Causality test of Toda-Yamamoto	Malta 1971 – 2017	➢ The growth in the economy of a nation is significantly linked with the inflow of FDI ➢ Neutrality hypothesis is ascertained

CHAPTER III

Methodology and Data

Research Model and Theoretical framework

The research model of the present research thesis is based on the theoretical framework of the Solow production function, Solow (1956), the Cobb-Douglas of production, Cobb and Douglas (1928), as well as the Romer function of production, Romer (1990). These theories of production depicts that the output level in any economy is largely affected by capital and labor force of the nation. Therefore, the Solow production function, Cobb-Douglas function of production, as well as the Romer production function gives labor force and capital as the major inputs of output level in an economy. Therefore, the present research which seeks to investigate the impact of unemployment rate in Ethiopia, on economic growth of Ethiopia considers the major inputs of output level, as given by the theories of production, that is, in this research thesis we consider labor force and capital as the main factors that are responsible for influencing economic growth in Ethiopia. Thus, the model that is presented in this research thesis specifies economic growth as a function of labor force and capital.

The present research also considers unemployment rate in modelling economic growth of Ethiopia. The theory which shows the relationship between economic growth and unemployment rate is known as the Okun's law, Mankiw (2010). The Okun's law depicts that raising economic growth by at least 4% in an economy will have the tendency of reducing the rate of unemployment by 1%, Okun (1962). Therefore, the Okun's law shows that it is economic growth that is responsible for reducing the rate of unemployment, whereby rising economic growth in a nation has a tendency of reducing the level of unemployment, that is, creating more jobs in the country. The present research seeks to investigate the reverse process, that is, examining if unemployment rate significantly impacts economic growth in Ethiopia. While economic growth has a tendency of reducing unemployment rate, as per the postulations of the Okun's law, Okun (1962), unemployment rate might significantly impact economic growth in the reverse way. In the event that unemployment rate is

found to significantly impact economic growth, then one may conclude that unemployment rate and economic growth exhibit for a bidirectional relationship, whereby economic growth impacts unemployment rate and unemployment rate also impacts economic growth. Generally speaking, unemployment rate should significantly impact economic growth, due to the fact that unemployment rate is linked with labor force which is a major factor of economic growth. Unemployment rate is calculated as a ratio between the number of the unemployed people with the total labor force, whereby the total labor force consists of the number of unemployed people and the employed ones, Mankiw (2010).

$$\textit{Labor force} = \textit{Unemployed} + \textit{Employed} \qquad (1)$$

$$\textit{Unemployed} \div \textit{Labor force} \times 100 = \textit{Unemployment rate} \qquad (2)$$

The equation presented in Equation 1 shows the relationship between level of labor force, number of unemployed and the number of employed people, Mankiw (2010), while the equation presented in Equation 2 also depicts the formula of calculating the rate of unemployment, thereby showing the relationship that exists between the rate of unemployment and labor force, Mankiw (2010). Therefore, since labor force gives a significant impact on economic growth, as per the postulations of the traditional theories of economic growth, Solow (1956); Cobb and Douglas (1928); Romer (1990) therefore, unemployment rate should significantly impact economic growth. The present research model in this research thesis also specifies the rate of inflation is a control variable in the model. The present research thesis also seeks to investigate the link that exists between the rate of inflation and economic growth. Therefore, the model of this research presented as a function is given in Equation 3.

$$EG = f(CAP, LF, INFL, UE) \qquad (3)$$

In the Equation 3 is the research model function, EG represents economic growth of Ethiopia from 1990 to 2020; CAP represents the capital level of Ethiopia during the period 1990 to 2020; LF represent the labor force of

Ethiopia during the period 1990 to 2020; INFL represents the rate of inflation of Ethiopia during the period 1990 to 2020; while UE represent the rate of unemployment of Ethiopia during the period 1990 to 2020. This research model function presented in the Equation 3, can also be presented is a mathematical or statistical model, such as the one given in Equation 4.

$$\boldsymbol{EG_t = \beta_0 + \beta_1 lnCAP_t + \beta_2 LF_t + \beta_3 INFL_t + \beta_4 UE_t + \ et} \qquad (\mathbf{4})$$

In the Equation 4 $\boldsymbol{\beta_0}$ is the constant value of the statistical model in this present research, $\boldsymbol{\beta_1}$ to $\boldsymbol{\beta_4}$ are the explanatory series' coefficients of the statistical model presented in this research, ***et*** is the noise error value of the statistical model, while ***t*** represents the time variant in this research, it is yearly time period.

Data Collection

As presented in the section above, the present research uses economic growth, capital level, labor force, inflation rate and unemployment rate of Ethiopia are the variables of the research in the research model under consideration. The data of all the series presented in this research thesis are obtained from the database of the World Bank. Economic growth is the dependent variable as indicated in the Equations 3 and 4, since it is presented on the left-hand side of the equation. Economic growth is dependent variable because the present research model seeks to ascertain the impact of the other series on economic growth of Ethiopia. Capital level, labor force, inflation rate and unemployment rate are the independent series of the research model presented in this study, and are the ones that are used to explain economic growth of Ethiopia. Economic growth refers to the rate at which the Gross Domestic Product of a nation, Ethiopia to be specific in this research, changes overtime. Therefore, economic growth is the percentage change in the GDP of a nation, such that a positive change in GDP depicts an increase in economic growth, whereas a negative change in GDP depicts a decrease in economic growth. Capital refers to the value of physical items such as machinery, buildings, equipment, furniture, among many others, that are used in the production of goods and services. Capital level in this present research is represented by the Gross Fixed Capital Formation (GFCF) of Ethiopia.

Labor force is the total number of people that are willing to work or are available for work. Thus, total labor force is obtained by summing up the total number of unemployed people and the employed people. It follows that, people that are not actively looking for a job are not counted as part of labor force since they are not counted as part of the unemployed people (Mankiw, 2010). Inflation rate is the rate at which the prices of goods and services of a country are changing overtime. An increase in the prices of goods and services depicts rising inflation rate whereas a decrease in the price of goods and services depicts a decrease in inflation rate. The present research uses the percentage change in the Consumer Price Index (CPI) of Ethiopia to denote inflation rate. Unemployment rate refers to the percentage of the unemployed people in relation to those of total labor force. It measures the number of people that are actively looking for a job but cannot find one, Mankiw (2010). It therefore, follows that high rate of unemployment means that a large number of people who are looking for a job does not have one. Unemployment rate is a major concern among government and policy makers. Table 2 of this present research presents a summary of all the variables presented in this research.

Table 2.

Summary of indicators used in the research model

Variable	Abbreviation	Measurement	Source
Economic growth	EG	% change in GDP	World bank
Capital	CAP	Value of GFCF	World bank
Labor force	LF	Number of people in labor force	World bank
Inflation rate	INFL	% of Consumer Price Index	World bank
Unemployment	UE	% of GDP	World bank

Method

The methodology that is used to analyze the series data in the present research is known as the Autoregressive Distributive Lag (ARDL) model. However, before concluding on whether to use the ARDL model, there are various pretesting techniques that needs to be undertaken. Firstly, it is essential to ascertain the order of integration of the series that are employed in the research. The order of integration of this series is examined by employing what is known as the tools of unit root. The present research uses the two major tools of testing unit root in series, that is, the Augmented Dickey Fuller (ADF) And the Philips Perron (PP) tools of investigating the presence of unit root in the series. The PP as well as the ADF tools of investigating the presence of unit root in a series are considered as the traditional tools of analyzing unit root in a series. The ADF tool was adventured through the study of Dickey and Fuller (1979), while the PP tool of investigating the presence of unit root in a series was adventured through the study of Phillips and Perron (1988). Therefore, the present research relies on these major traditional tools of investigating the presence of unit root in a series. The reason why it is very crucial to investigate the presence of unit root in a series is because the ARDL tool works with series that have a unit root in the level form, but no unit root after having been difference once, as well as with series that have no unit root in the level form. The ARDL tool therefore, accepts only those series whose order of integration is either to zero or one. Therefore, it doesn't work with series which have higher order of integration, such as, two and above. Therefore, it is very crucial to investigate the order of integration of each and every series that is used in this research to ensure that their order of integration is not above two. In the event that the order of integration of each and every series employed in the present research meet the pretesting requirements of the ARDL tool, then this model is used to investigate the association that exists between economic growth and its major factors.

The ARDL technique is a technique that was first adventured by the study of Pesaran, Shin and Smith (1997). The ARDL tool was adventured to overcome the limitations of prior methodologies which required all the series that are employed in the research to be stationary in order to avoid the problems of spurious regressions. It was also introduced to overcome the limitations of prior methodologies, the long-run estimation methodologies, which required all

the series to be integrated of one order. Thus, the ARDL technique is a hybrid methodology which accepts series that have zero order of integration, as well as those who have a one order of integration, and is capable of presenting both the short-run estimates, as well as the long-run estimates of the model. The ARDL tool was modified in the study of Pesaran et al. (1999), and later by the work of Pesaran et al. (2001). In the research of Pesaran at al. (2001), the ARDL tool was modified to include the bounds test technique which is responsible for ascertaining the existence of a long-run association among the series. Therefore, the bounds test tool of the ARDL model is vital for ascertaining if the series that are specified in the model presents for a strong association in the long-run estimations or not, which will enable us to run both the short-run estimates and the long-run estimates of the model or not. The statistical representation of the ARDL tool used in this research is presented in the Equation 5.

$$
\begin{aligned}
EG_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta EG_{t-i} \\
+ \sum_{i=1}^{q} \beta_{2i} \Delta lnCAP_{t-i} + \sum_{i=1}^{q} \beta_{3i} \Delta LF_{t-i} + \sum_{i=1}^{q} \beta_{4i} \Delta INFL_{t-i} \\
+ \sum_{i=1}^{q} \beta_{5i} \Delta UE_{t-i} + \beta_{6i} EG_{t-1} + \beta_{7i} lnCAP_{t-1} + \beta_{8i} LF_{t-1} + \beta_{9i} INFL \\
+ \beta_{10i} UE_{t-1} + \beta_{11i} ECT_{t-1} \\
+ et
\end{aligned}
\tag{5}
$$

In the Equation 5 of this research thesis, β_0 is the constant of the model specification, Δ is the first difference operator in the short-run estimates of the ARDL technique, $t - i$ represents the number of times at which the series can be lagged, β_{1i} to β_{5i} are the coefficients of the explanatory variables in the short-run estimation of the ARDL tool, β_{6i} to β_{10i} are the coefficients of the long-run estimates of the ARDL technique, β_{11i} represents the error correction term (ECT)'s coefficient of the model, while *et* represents the noise error value of the a ARDL tool.

CHAPTER IV

Data analysis and results

Descriptive Statistics

This present section begins by providing the descriptive statistics outcomes of the data set of Ethiopia for the period that ranges from 1990 to 2020. Table 3 of this research provides all the outcomes of the series' descriptive statistics, that are considered in this research, that is, capital, economic growth, inflation rate, labor force and unemployment rate. Table 3 of this research present the total number of observations of each variable that is presented in this research study as 31. This is so because the annual data set of Ethiopia for the period that ranges from 1990 to 2020 is presented. Therefore, subtracting 1990 from 2020 gives a total of thirty-one observations.

The descriptive statistics outcomes presented in Table 3 are the values of the mean, maximum, median, minimum, sum, standard deviation and the total number of observations in this study. Starting with capital, it is presented that its mean value is 14.9 billion. The mean value of capital is the average value of this indicator is obtained after having summing up all the observations of capital for their period under study and then divide the sum value by the number of observations. This means that if we say the sum value of capital that is presented in Table 3 divided by the total number of observations which is 31, we obtain the mean value of capital. Secondly, the median value is also presented for the indicator Capital, in Table 3. The median value works hand in hand with the mean value, since both of them depicts the average value of the indicator. The median value of capital as presented in Table 3 of this research study is given as 10.3 billion and is obtained by arranging all the observations of the indicator, capital, either in ascending or descending order then pick the value which falls at the middle. Thus, on average capital has been observed to have an average of value of 10.3 billion considering the median value or an average of 14.9 billion taking into consideration the mean value. The maximum value of capital as depicted in Table 3, for Ethiopia during the period that is considered in this research is 33.8 billion. The maximum value in this case is the highest value of

capital that has been observed during the period that ranges from 1990 to 2020. Thus, during this period capital had been observed to have a highest value of around 33.8 billion. The minimum value of capital during the period 1990 to 2020 of Ethiopia is depicted as 10.3 billion, see Table 3. The minimum value in this case is the lowest value of capital indicator that has been observed during the time that is specified in this research period. It is the lowest possible value that has been observed during the period and it helps us to understand the minimum possible value of capital that has been experienced in Ethiopia during this time. Table 3 also presents that the standard deviation of capital of Ethiopia considering the time period under study is given as 8.18 billion. The standard deviation of an indicator depicts the rate at which a variable has a tendency of diverting from the mean value, such that a high standard deviation means that the observations of the variable has been diverting much from the mean value, while a low value standard deviation depicts that the rate of diversion from the mean by the observations has been low. However, it is difficult to conclude on the rate of diversion from the mean in absolute terms, the value needs to be converted to percentage. The sum value of capital indicator in Ethiopia during the period under study is given as 462 billion. Thus, during the period of the study Ethiopia's capital had a total value of 462 billion.

Moreover, Table 3 presents the outcomes of the descriptive statistics of economic growth. The mean value of economic growth according to the findings that are presented in Table 3 is given a 6.82%. The mean value of economic growth is the average value that has been observed in economic growth during the period that ranges from 1990 to 2020 and is obtained by summing up all the values of economic growth during that whole period and divide the total value by the number of observations, which is 31. Alongside the mean value is the median value, and the median value of economic growth of Ethiopia from 1990 to 2020 is given as 8.65%. The mean value and the median value serve almost the same purpose but they are calculated in a different way. While the mean value is obtained by summing up all the total observations of the variable and divide by the total number of observations, the median value is obtained by arranging the observations in ascending or descending order and then pick the value that falls at the middle. Thus, the medium value of economic growth, 8.65 percent, is the

observation of the economic growth that was observed to be at the middle, after having arranged all the observations in either ascending or descending order. The maximum value of economic growth is also observed to be 13.57% and this is the highest value of economic growth that has been observed during the period 1990 to 2020 in Ethiopia. The maximum value of economic growth is the highest value of economic growth that has been presented in Ethiopia during the period considered. The minimum value of economic growth is also depicted as - 8.67%, and is the lowest value of economic growth, that has been presented for this series in this period. The minimum value of economic growth is therefore, the lowest value that has been observed in the series representing Ethiopia's growth of the economy during this study period. The standard deviation of economic growth is also depicted as 5.8% and is the rate at which economic growth has been diverting from its mean value.

Table 3.

Results of descriptive statistics

	CAP	EG	INFL	LF	UE
Mean	1.49E+10	6.822113	101.3323	34986187	2.6974
Median	1.03E+10	8.647812	44.84305	33507107	2.5000
Maximum	3.38E+10	13.57260	319.0194	53950175	3.7100
Minimum	1.03E+10	-8.672480	18.53138	20025169	0.0000
Std. Dev.	8.18E+09	5.800290	94.54770	10644051	0.6958
Sum	4.62E+11	211.4855	3141.300	1.08E+09	83.6180
Observations	31	31	31	31	31

In addition to that, Table 3 presents the descriptive statistics of inflation rate. It is observed in Table 3 that the mean value of inflation rate in Ethiopia during this period is 101.33%. As it's been mentioned earlier on, the mean value is obtained by adding up all observations of an indicator and then divide by the total number of observations, and in this case is the rate of inflation rate for all the years that ranges from 1990 to 2021, that has been summed up and divided by 31,

which is the total number of observations. The median value of inflation rate is also depicted as 44.84% and is obtained by arranging all the observed values of inflation rate of Ethiopia during this period, in ascending or descending order, and then pick the value that falls at the middle. Both mean and median values try to explain the average value of in indicator, but the methods of calculating both differs. Therefore, on average the inflation rate of Ethiopia during the period 1990 to 2020 is depicted as 101.33%, considering the value given by the mean, or 44.84% considering the median value. The mean value is more preferred than the median value in calculating the average value of an indicator. Table 3 also depicts that the maximum value that was observed on the inflation rate of Ethiopia during this period is 319.02%. This is the highest value of inflation rate which has been presented during this period. Therefore, we can observe that Ethiopian had a very high rate of inflation during the period 1990 to 2020, and as a result the nation should work towards reducing the rate of inflation. The minimum value of inflation rate is also observed to be 18.53% and is the lowest value of inflation rate of Ethiopia that has been observed during the period 1990 to 2020. The standard deviation which is the rate at which the indicator's observations divert from the mean value is given as 94.55%. As has been mentioned earlier on, a high standard deviation depicts that the observations have been diverting at a larger rate, whilst a lower standard deviation shows that the rate of diversion has been low.

The descriptive statistics outcomes of labor force of Ethiopia during the period 1990 to 2020 are given in the Table 3. The outcomes presented in Table 3 depicts that the mean of labor force of Ethiopia during this period is observed to be around 34.99 million. This depicts that on average the labor force in Ethiopia was around 34.99 million people. The median value of labor force that is observed in Ethiopia during the period 1990 to 2020 is given as 33.51 million people. As explained in the section above the mean and the median values are presented to show the average value of an indicator. While the mean value considers the average value of an indicator by summing up the total values observed and then divide by the number of observations, the median value arranges the observations of all the values in ascending or descending order and pick the middle value. Of great importance is the mean value in calculating the

average of an indicator and in the case of labor force the average value of labor force is 34.99 million people. The maximum value of labor force observed in Ethiopia during the period 1990 to 2022 is given as 53.95 million people, while the minimum value is observed to be 20.03 million people. The maximum value represents the highest value of labor force that is observed in Ethiopia during the period under consideration while the minimum value is the lowest possible value of labor force that is presented in Ethiopia during the period under study. The standard deviation which shows the rate of diversion of each observed value from the average is given is 10.64 million people. As explained above the standard deviation can be best interpreted if it is given as a percentage not as an absolute value. The total value of labor force in Ethiopia during the period 1990 to 2020, according to Table 3 is given as 1.08 billion people.

Table 3 also presents the descriptive statistics of the unemployment rate of Ethiopia during the period 1990 to 2020. The mean value of unemployment in Ethiopia during this period is given as 2.697%, while the median value is presented as 2.5%. Therefore, on average unemployment rate in Ethiopian during this period is between 2.697% or 2.5% depending on whether you prefer to use the mean or the median value. The maximum value of unemployment that is observed in Ethiopia during this period is given as 3.71%. This shows that the unemployment rate in Ethiopian wasn't very high considering that its highest value was not much, around 3.71%. The minimum value of unemployment rate in Ethiopia during this period is 0% whilst its standard deviation is 0.69 6%.

Figure 1.

Economic growth of Ethiopia during 1990 to 2020 (Source: Author's own estimation)

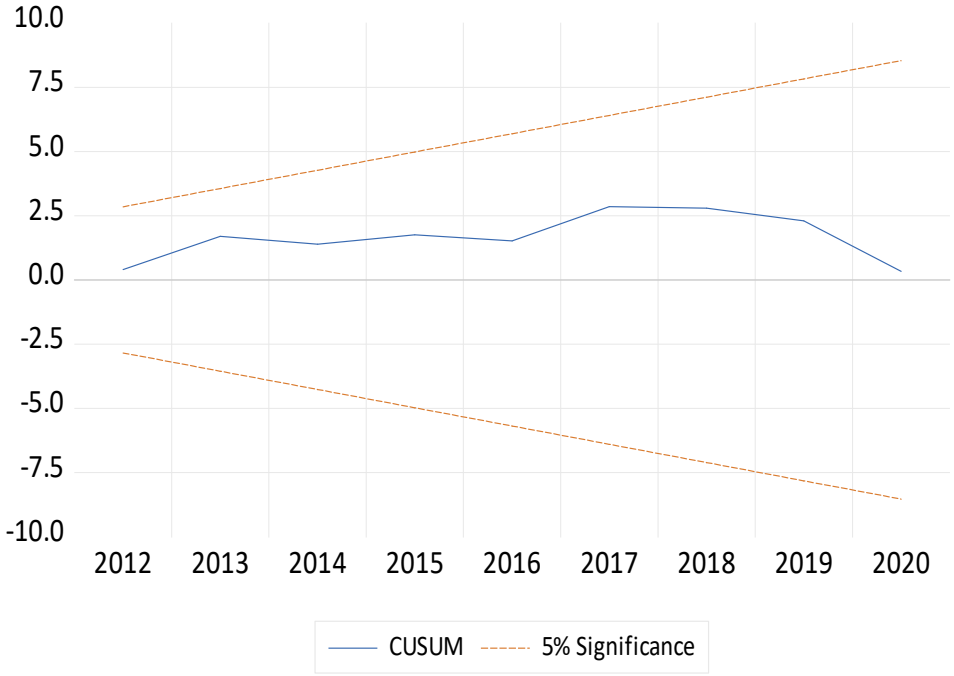


Figure 1 presented in this research thesis gives the outcomes of economic growth and is a diagrammatical exposition of economic growth of Ethiopia during the period 1990 to 2020. It is very crucial to present indicators by use of a graph in order to visualize the behavior of each indicator. Figure 1 shows that in 1990 the economic growth of Ethiopia was around 2.5% and it dropped to around - 8% by 1992, after which it rose sharply to around 13% by 1993. The figure also shows that after 1993 economic growth started to fluctuate, it dropped a little between 1994 to 1995 to around 4%, later on it rose again back to around 7%, after which it drops back to close to - 3% in 1998. The graph shows that economic growth in Ethiopia has been fluctuating at a very high rate during the period 1990 to 2005. The economic growth in Ethiopia during this period has been fluctuating from the lowest to the highest values obtained in this country during the period 1990 to 2020, but after 2005 economic growth in Ethiopia has been observed to have stabilized a bit with is small download trend until 2020.

Figure 2.

Inflation rate of Ethiopia during 1990 to 2020 (Source: Author's own estimation)

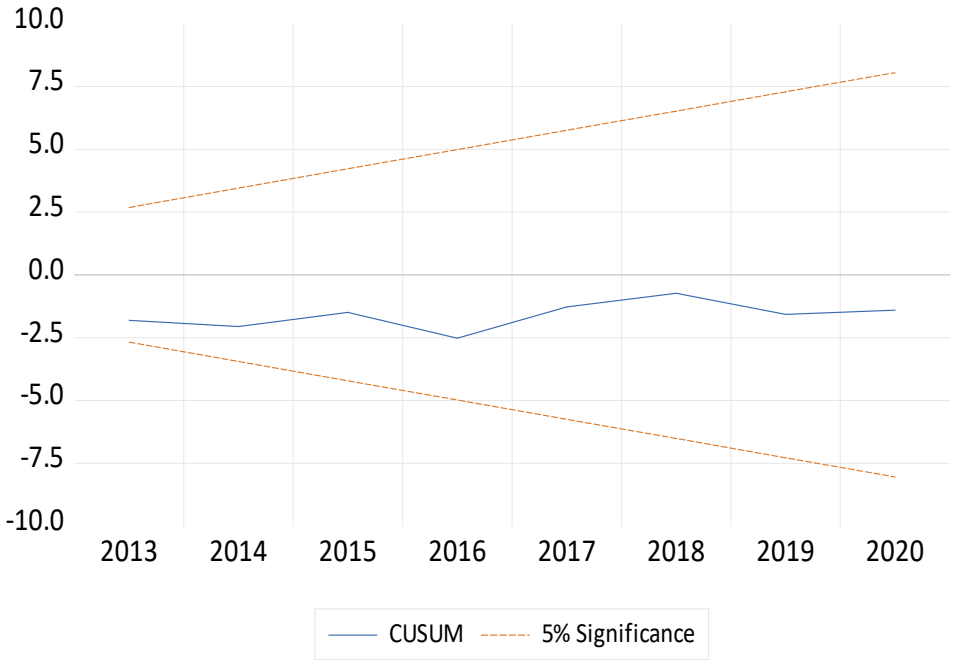


Figure 2 also presents the outcome observations of inflation rate of Ethiopia during the period 1990 to 2020. The graph shows an upward trend depicting that inflation rate in Ethiopia was rising since 1990 until 2020. The graph shows that by 1990 the inflation rate in Ethiopia was around 18% and started rising steadily until year 2005 or 2006 where the inflation rate was around 50%. After 2006 the Figure 2 depicts that inflation rate rose sharply such that by 2020 the rate of inflation rate observed was around 300%. This shows that the rate of inflation in Ethiopia is rising sharply and may tend to continue rising in the future.

Figure 3.

Labor force of Ethiopia during 1990 to 2020 (Source: Author's own estimation)

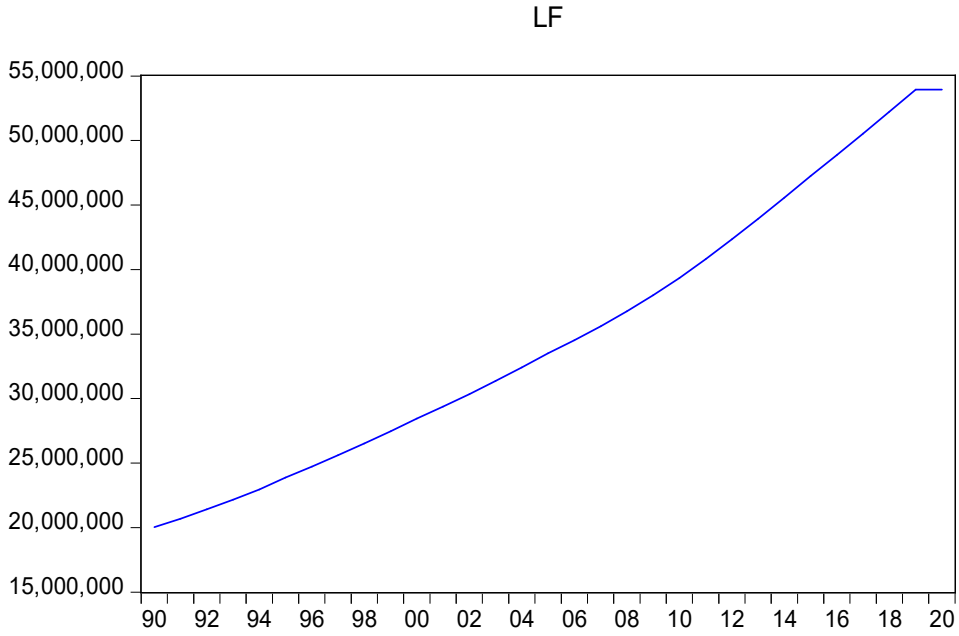


Figure 3 also presents the finding observations of labor force in Ethiopia during the period 1990 to 2020. The graph shows that labor force by 1990 was around 20 million and it started to rise steadily as depicted by an upward trend which shows that, with the passage of time labor force has been rising sharply and steadily. By 2020 labor force had reached its maximum value of around 54 million people. Figure 3 which is the graph of labor force shows that the labor force in Ethiopia is going to continue rising most probably due to the rise in the population size in this country.

Figure 4.

Capital of Ethiopia during 1990 to 2020 (Source: Author's own estimation)

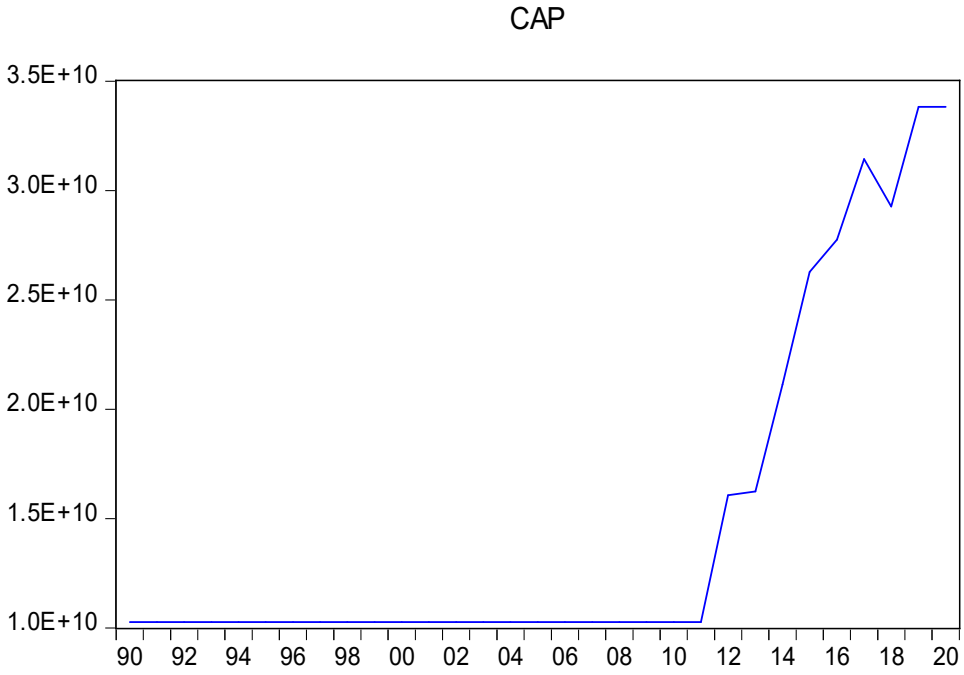


Figure 4 presents the capital value of Ethiopia during the period 1990 to 2020. The graph shows that from 1990 to 2011 the level of capital in the country was not changing at a higher rate as shown by a flat curve. From 2011 the capital size of Ethiopia started rising sharply until it reached its maximum value by 2020. By 2020 the capital size of Ethiopia has risen to above 33 billion. Considering this trend, the capital level of Ethiopia is going to continue rising in the future.

Figure 5.

Unemployment of Ethiopia during 1990 to 2020 (Source: Author's own estimation)

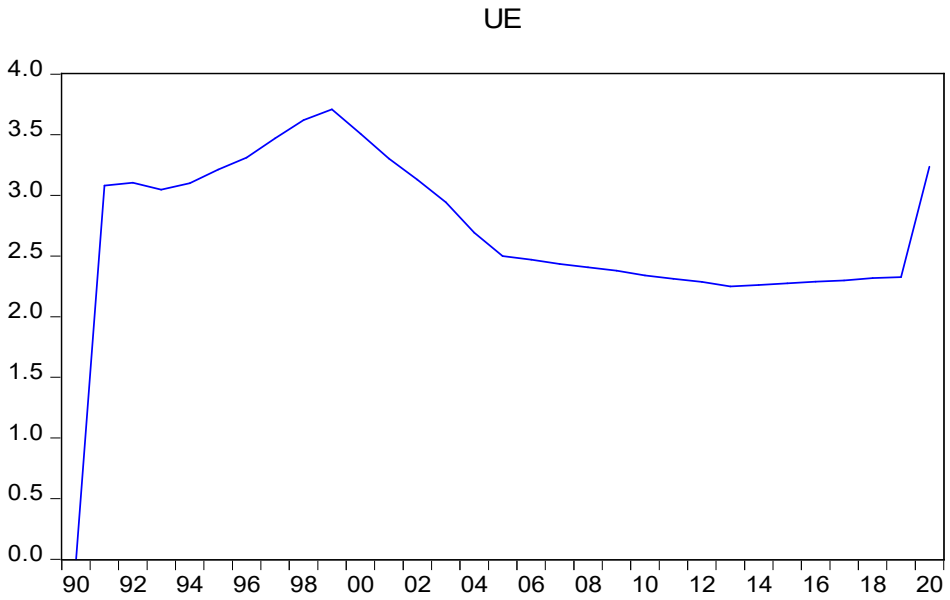


Figure 5 in this research presence the indicator unemployment rate of Ethiopia from 1990 to 2020. It shows how unemployment rate in Ethiopia has been behaving since 1990 until 2020. The graph presented in Figure 5 shows that by 1990 the rate of unemployment in Ethiopia was zero percent which rose to around 3% by 1991. After 1991 the rate of inflation has been increasing at a steady rate up until it reached a maximum of around 3.6% by 1999 and later dropped sharply from year 2002 to year 2005. From year 2005 to year 2018, the unemployment rate in Ethiopia has been steady with a slight drop being observed in the graph. In 2019 and 2020 the rate of inflation in Ethiopia started to rise again. On average Ethiopia does not exhibit a very high rate of unemployment.

Unit root results

Table 4 in this research thesis gives the outcomes of the unit root test by employing PP and the ADF tests. The findings of the PP and the ADF tests of unit root are given in Table 4. Starting with economic growth, it is observed according to the findings of both the PP, as well as the ADF tests that this variable does not have a significant unit root at level. The outcomes of the PP test as well as those of the ADF test depicts that economic growth is statistically significant at 1%, hence it is stationary at level and this shows that economic growth in Ethiopia

during this period is integrated order 0. Moreover, the findings depicted in Table 4 also shows that unemployment rate according to the findings of the PP, as well as the ADF tests has no strong unit root in its level form. The outcomes of the PP, as well as the the ADF tests are strong at the level of 1%, depicting that unemployment rate is stationary and integrated of order 0. In addition to that, Table 4 shows that inflation rate of Ethiopia during this period has a significant unit root at level, according to the findings of the PP and the ADF tests. Capital level after having been converted to its log form is also observed to have a significant unit root in its level form, according to the findings of the PP and the ADF tests. In addition to that, labor force in Ethiopia according to the outcomes presented in Table 4 has a significant unit root, according to the PP test outcomes.

Table 4.

Unit root test results

	PP		**ADF**	
	t-Statistics	***p-value***	***t-Statistics***	***p-value***
EG	-4.4223	0.0074	-4.4223	0.0074
INFL	0.4161	0.9984	0.2388	0.9972
lnCAP	-0.9599	0.9349	-0.8377	0.9504
LF	-1.4877	0.8115	-3.6374	0.0459
UE	-7.0507	0.0000	-8.7881	0.0000
ΔINFL	-4.0640	0.0175	-4.5920	0.0054
ΔlnCAP	-5.8056	0.0003	-5.7758	0.0003

However, the ADF test shows that labor force has no significant unit root at level. The findings of the ADF test shows that at 5% significant level labor force is stationary, hence depicting that this variable is integrated of order 0. Therefore, this shows that inflation rate and capital of Ethiopia has significant unit root in their level form. Thus, they are not integrated of order 0, they need to be differentiated in order for them to become stationary. Table 4 shows that inflation rate and capital level after having been differentiated once becomes stationary.

The outcome shows that at the level of 5% significant, inflation rate and capital of Ethiopia considering the data set observed obtained from 1990 to 2020 have no significant unit root. Therefore, inflation rate and capital are integrated of order one.

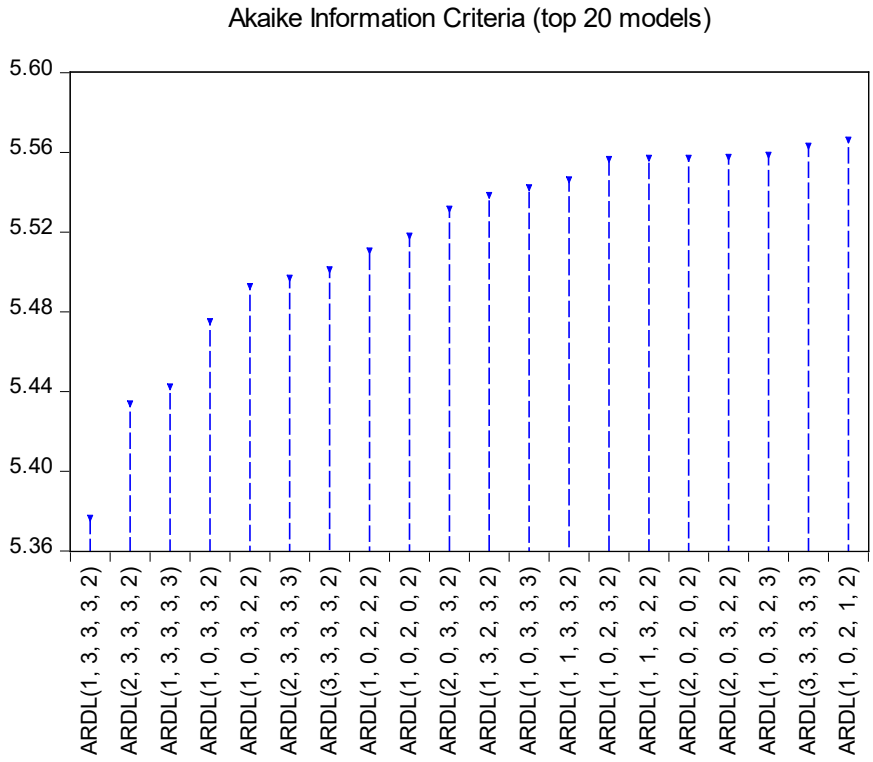
The unit root checking is essential in determining the best method of data analysis to employ, since other models requires all indicators to be stationary, whereas other models require all indicators to be non-stationary in their level form, but stationary after differencing once, and other methods can work with variables that are either stationary in their level form or either stationary after having been different. In this case we observe that economic growth, labor force and unemployment are integrated of order 0, which means that they don't have any unit root at level, while inflation rate and capital are integrated order one, which means that they have unit root at level, but no unit root after having been differenced once. As a result, we employ the ARDL model which accepts variables that are integrated of different orders, that is, zero and one.

Model selection and Bounds test ARDL

The present research uses the Akaike Information Criterion to determine the most appropriate ARDL model to specify and use in the research. Figure 6 presents the outcomes of a Akaike Information Criterion in selecting the most appropriate ARDL model to specify and use in the data analysis. According to Figure 6, ARDL(1,3,3,3,2) is the most appropriate ARDL model to specify. The ARDL(1,3,3,3,2) is observed as the first best model amongst the top 20 models. Therefore, the present research uses the ARDL (1,3,3,3,2) model to ascertain the relationship that exists between economic growth and unemployment, together with other control variables employed in the present research.

Figure 6.

Akaike Information Criterion, model selection (Source: Author's own estimations)



The ARDL technique consists of the short-run estimates, as well as the long-run estimates, therefore, it is very crucial to ascertain the presence of levels relationships in the model before ascertaining the long-run estimates of the ARDL model. Table 5 of this present research presents the bounds test results of the ARDL technique. The bounds test technique serves the same purpose as the cointegration technique by asserting the existence of a long-run association among the variables. The bounds test outcomes provided in Table 5 are the F-statistics and the t-statistics outcomes. The bounds tests technique of ARDL model depends on the lower bounds and the upper bounds, such that if the F-statistics or the t-statistics values are less than the lower bound and the upper bound values, then this shows that the variables presented in the model have no significant long-run association. However, if the F-statistics or the t-statistics values are greater than the lower bound and the upper bound of the ARDL technique then we can conclude that the indicators presented in the model have a significant long-run association. In the event that the F-statistics and the t-statistic outcomes lies between the value of the lower bound and the value of the upper bound, then one can be indecisive on whether to conclude the existence a long-run link or no link

among the indicators, hence the tests of cointegration can be employed to ascertain the true position of the model.

Table 5.

ARDL Bounds analysis

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	14.2334	10%	2.45	3.52
		5%	2.86	4.01
		1%	3.74	5.06
t-statistic	-7.3556	10%	-2.57	-3.66
		5%	-2.86	-3.99
		1%	-3.43	-4.6

The findings of the F-statistic bound tool presented in Table 5 depicts that the value of the F-statistic is greater than the lower bound and the upper bound, thus presenting for a strong link in the long-run estimates among the indicators. Table 5 also depicts that the t-statistic value is greater than the lower bound and the upper bound values hence the model presented in this research thesis depicts a strong link in the long-run model estimates. Since, the model presented in this thesis has a strong long-run association, therefore, both the long-run and short-run estimates of the ARDL tool are presented.

ARDL results

Table 6 presents the outcomes of the short-run estimates, as well as the long-run estimates of the ARDL tool. We start by commenting on the short-run estimates of the ARDL tool, in this research. According to the findings of the short-term estimates of the ARDL tool, inflation rate provides a strong on economic growth which is negative. The findings depict that raising inflation rate by a single unit is associated with a decrease in economic growth by 516.42 units within the short-term. These outcomes shows that inflation rate is not favorable for improving economic development in European. As a result, is it is important to stabilize the prices of goods and services in Ethiopia in the short-run, in order

to improve economic growth in this region. The first lag of inflation rate, as well as the second lag of inflation rate are observed to provide for a positive effect on the growth of the economy. While the first lag of inflation rate is not statistically significant, the second lag of inflation rate is statistically significant at 5% level, showing that past values of inflation rate have the effect of raising economic growth in Ethiopia. The outcomes of the short-run ARDL tool in Table 6 depicts that when the second lag of inflation rate rises by a single unit, this will have the effect of raising economic growth of Ethiopia by 0.226 units. However, the present value of inflation rate negatively impacts economic growth which entails that, inflation rate is not favorable or suitable for raising economic development in Ethiopia, while the past values of inflation rate raise economic growth in Ethiopia, but not by a large value.

The Table 6 results of this research thesis also depicts that labor force in Ethiopia gives a strong impact on the growth of the economy which is string during the short-run. The short-term outcomes depict that when labor force is raised by a single unit this will have the effect of raising economic growth in Ethiopia by 0.39 units in the short-run. The outcomes which show the association between labor force and economic growth of Ethiopia in the short-run are observed to be statistically strong at 1%, depicting that labor force is vital for enhancing economic development in Ethiopia. Therefore, it is very crucial to encourage a rise and development in the labor force of Ethiopia for the purpose of raising economic growth in this nation. The findings of Table 6 also depicts that the first lag of labor force strongly and negatively affect the growth of the Ethiopian economy within the short-run, while the second lag of labor force is observed to provide a positive significant impact on economic growth of Ethiopia. The findings of the short-term estimates of the ARDL model in Table 6 depicts that raising the first lag of labor force by a single unit has the effect of decreasing economic growth of Ethiopia by 0.0000264 units, while raising the second lag of labor force by a single unit in the short-run has the effect of raising economic growth of the economy by 0.0000692 units. While the association of the first lag of labor force and the second lag of labor force is statistically significant, their coefficient value is very low depicting that the link that exists between these two

lags of labor force with economic growth is not very high. Therefore, it is crystal clear that labor force promotes economic development of Ethiopia in the short-run.

In addition to that, the short-run estimate outcomes of the ARDL tool given in Table 6 depict that capital level of Ethiopia gives a positive strong impact on economic development. The findings provided in Table 6 depicts that when capital level is enhanced to rise by a single percentage, this will have the impact of raising economic growth in Ethiopia by 0.0000444%. The outcomes are significant at the level of 1%, which is evidence of a strong positive association between capital and economic development in Ethiopia. The first lag and the second lag of capital are observed to give a significant negative effect on economic growth of Ethiopia in the short-run. A rise in the first lag of capital level by a single percentage in the short-run is associated with a decrease in economic development by 13.2%, while a rise in the second lag of capital by a single percentage in the short-run is associated with a decrease in economic development by 44.1%. While the coefficient value of the first lag of capital is very high, it is not statistically significant at 5% level, hence the first lag of capital which shows a negative association with economic development is not statistically significant. However, the second lag of capital at 1% level is strongly significant, depicting that it strongly reduces economic growth in Ethiopia.

Moreover, the short-run outcomes of unemployment and economic growth relationship are also provided in Table 6 and they show that unemployment rate has a significant negative effect on economic development, considering the time under study. The outcomes presented in Table 6 depicts that raising unemployment rate by a single unit reduces economic growth of Ethiopia in the short-run by 22.79 units. The outcomes which show the association between unemployment rate and economic growth of Ethiopia are statistically significant at 5% level, depicting that unemployment rate strongly discourages economic development in this region. We also observed that the first lag of unemployment rate gives a statistically significant negative impact on economic growth of Ethiopia in the short-run. The outcomes presented in Table 6 depicts that a rise in the first lag of unemployment rate has the effect of decreasing economic growth of Ethiopia in the short-run by 37.48 units. The outcomes are

also statistically significant at the level of 1% depicting that this association is strong and statistically significant

Table 6.

Long- and Short-run estimates of ARDL

Dependent variable: Economic growth				
Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***p-value***
	Short-run estimates			
D(INFL)	-516.4211	53.9503	-9.5722	0.0000
D(INFL(-1))	0.1445	0.1013	1.4256	0.1817
D(INFL(-2))	0.2256	0.0968	2.3300	0.0399
D(LF)	0.3922	0.0912	4.2986	0.0013
D(LF(-1))	-2.64E-05	5.39E-06	-4.8951	0.0005
D(LF(-2))	6.92E-05	1.30E-05	5.3047	0.0003
D(lnCAP)	4.44E-05	1.34E-05	3.3125	0.0069
D(lnCAP(-1))	-13.2061	6.3099	-2.0929	0.0603
D(lnCAP(-2))	-44.0999	9.3452	-4.7190	0.0006
D(UE)	-22.7879	8.9320	-2.5513	0.0269
D(UE(-1))	-37.4776	7.6428	-4.9037	0.0005
ECT(-1)	30.425	7.4675	4.0744	0.0018
	Long-run estimates			
INFL	-0.2139	0.1213	-1.7646	0.1053
LF	-2.12E-06	7.17E-07	-2.9589	0.0130
lnCAP	20.6139	12.8043	1.6099	0.1357
UE	-15.2944	3.5026	-4.3665	0.0011
R^2			0.9111	
Adjusted R^2			0.8399	
F-statistic			12.8055	0.0000

Selected Model: ARDL(1, 3, 3, 3, 2)

This research thesis also provides the outcomes of the ECT of the ARDL tool. The ECT outcomes presented in Table 6 depicts that its coefficient value is positive 30.43%, whereas it is statistically significant at the level of 1%. An ECT that has a positive coefficient and is statistically significant depicts that the indicators specified in the ARDL technique will have a tendency of diverging in the long-run. If the coefficient value of the ECT was negative and statistically significant then one would conclude that the indicators specified in the model will have a tendency of converging to an equilibrium in the long-run, but in this case, this is not so. Moreover, the long-run findings of the ARDL tool provided in Table 6 depicts that inflation rate and economic growth are not statistically related. The findings show that, in as much as the coefficient value of inflation rate, according to the long-run estimates is negative, it is not statistically significant at the level of 5%. Inflation rate is observed to have a negative coefficient which implies that it should reduce economic growth in the long-run, but this is not statistically significant, hence there is no strong association between inflation rate and economic development in Ethiopia in the long-run. While the findings of the long-run estimates depict that inflation rate does not have a statistically significant effect on economic development of Ethiopia, the short-run outcomes depict for a negative impact on the growth of the Ethiopian economy by inflation rate of Ethiopia, which is strong. This means that there are significant asymmetric effects of inflation rate on economic growth of Ethiopia, whereby low levels of inflation have a tendency of reducing economic development while persistent and high levels of inflation rate will tend to have a negligible impact on economic development.

Further to that, the long-run findings depicted in Table 6 of the ARDL technique depicts that labor force and economic growth of Ethiopia have statistically significant long-run association. The outcomes depict that raising labor force by a single unit in the long-run would have a tendency of reducing economic growth by 0.00000212 units. This shows that labor force reduces economic development in Ethiopia in the long-term. While the findings of labor force in the long-run are observed to be statistically significant at the level 5%, the coefficient value is very small such that it provides a negligible effect on economic development of Ethiopia, in the long-run. While the long-run outcomes

depict that labor force negatively affects economic development, the short-run findings depict that labor force positively affects economic development of Ethiopia. This shows that there are significant asymmetric effects of labor force in Ethiopia, whereby low levels of labor force tend to raise economic development in this country, while high levels of labor force do not raise economic development, but rather tends to reduce economic growth. The long-run estimate findings on capital and economic growth link of Ethiopia depicts that it has an insignificant impact. The outcomes show that, while capital has a positive coefficient term which implies that the capital level of Ethiopia might raise economic development in this region, this is not statistically significant, hence there is no strong effect of capital level of Ethiopia on economic development in the long-run. We also observe the existence of asymmetric capital effects on the growth of the economy of Ethiopia, whereby high levels of capital do not statistically impact economic growth, while low levels of capital strongly impact economic growth in Ethiopia.

The findings of the relationship between unemployment rate and economic growth according to the long-run estimates of the ARDL technique depicts that there is a significant negative association between unemployment rate and economic growth in the long-run. The outcomes provided for in Table 6 of this research thesis depicts that. A rise in unemployment rate by a single unit is associated with a decrease in economic development of Ethiopia by 15.29 units. These outcomes are significant at the level of 1% depicting the existence of a strong negative association between unemployment rate and economic growth. Therefore, the long-run estimates of the ARDL tool depicts that reducing the level of unemployment rate in Ethiopia have a tendency of increasing economic development in this region. Therefore, it is crucial to raise the rate of employment by creating more jobs for the level of labor force of the country in order to promote economic development in Ethiopia. The long-run estimates findings, as well as the short-run findings on the association between unemployment rate and economic development of Ethiopia show the existence of symmetric effects of unemployment rate on economic development. Unemployment rate reduces economic development of Ethiopia in both the short-run, as well as the long-run. This depicts that high- and low-level rate of unemployment decreases economic

development of Ethiopia. The findings of the R-squared as well as the adjusted R-squared is very high at 91.11% and 83.99%, respectively. A high R-squared and adjusted R-squared as given in Table 6 depicts the presence of goodness of fit of the model. The F-statistic is also statistically significant at the level of 1% depicting that all independent series of the model have a joint effect on the dependent series.

Residual diagnostic results

The present research Thesis gives the outcomes of the residual diagnostics of the ARDL technique used for data analysis in Table 6. The residual diagnostic outcomes of the ARDL tool are given in Table 7. Heteroskedasticity in the residuals is tested by employing the Breusch-Pagan-Godfrey test, serial correlation is tested by using the Breusch-Godfrey test, while normality test is tested by using the Jarque-Berra test. The Ramsey reset test is also used to investigate model stability.

Table 7.

Results of residual diagnostics

	F-statistic	**p-value**
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.0365	0.4885
Breusch-Godfrey Serial Correlation LM Test	1.2093	0.3426
Jarque-Bera normality test	6.2863	0.0631
Ramsey RESET Test	0.8450	0.3796

The outcomes of the heteroskedasticity test presented in Table 7 shows that the residuals of the ARDL technique used in this research thesis are homogeneous. The F-statistic value of the Breusch-Pagan-Godfrey test is not statistically significant at 5% level; hence the residuals are homogeneous. Moreover, the F-statistic value of the Breusch-Godfrey test is not statistically significant at 5%, indicating that the residuals have no serial correlation issues.

The Jarque-Bera statistic is also not strongly significant at 5% level showing significant normal distribution in the residuals, whereas the F-statistic value of the Ramsey reset test is not statistically significant at 5%, depicting the stability in the model provided in the present research. Therefore, the findings given in this research are robust and can be used for policy implications in Ethiopia.

Figure 7.

CUSUM stability test graph (Source: Author's own estimations)

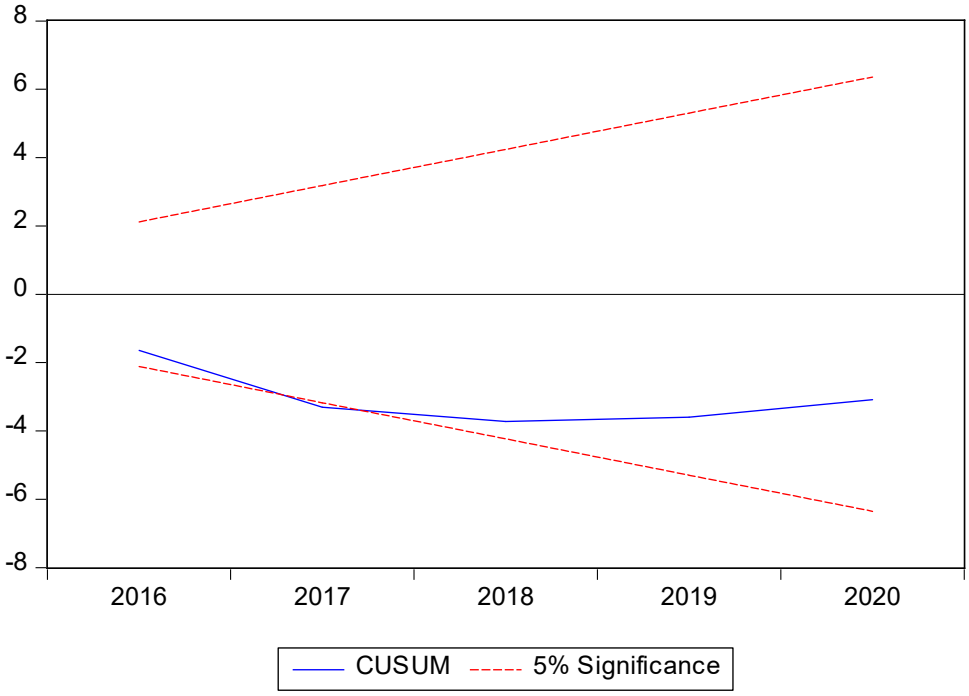
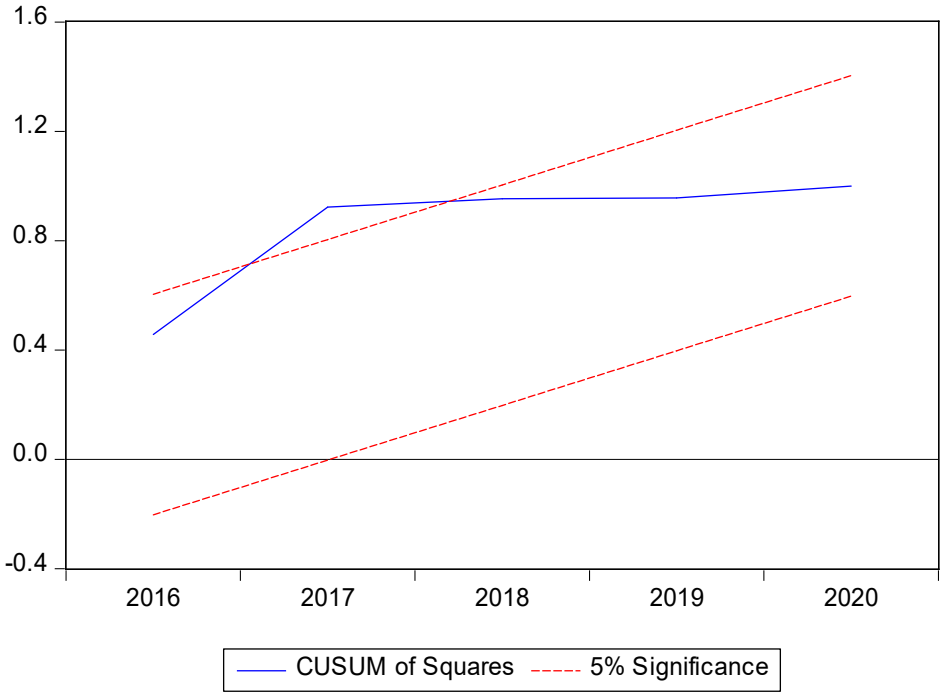


Figure 8.

CUSUM of square stability test graph (Source: Author's own estimations)



In addition to the residual diagnostic test outcomes presented in Table 7, Figure 7 and Figure 8 presents the findings of the CUSUM and CUSUM of square test of stability. The graphs presented in Figure 7 and Figure 8 shows that the CUSUM graph and the CUSUM of squares graph lies between the 5% significant band which shows that the model specified in this research thesis is stable. Therefore, the outcomes presented in this research are reliable and can be used for the purpose of making policies which are meant to improve economic development in Ethiopia.

CHAPTER V
Discussion

The findings that are provided in the present research are very important and vital for the purpose of answering the research questions that are outlined in the introduction section of this study. These findings are also essential because they try to satisfy the aims and objectives of the research, as outlined in the introduction section of the of the study. In addition to that, the findings that are presented in the present research also help in answering the research questions that are presented in the introduction section of this research. After having answered the research questions of this research, as well as fulfilling the aim and objectives of the research, the present research helps in understanding the relationship that exists between economic growth and unemployment, with other indicators, such as inflation rate, labor, and capital. It is vital to ascertain the factors which are responsible for affecting the economic growth of a country in order to come up with the best policies that can enhance economic development in your country. While various previous studies have indicated the importance of labor force and capital in fostering economic growth, the present research goes a step further in ascertaining the effect of these inputs on the economic growth of Ethiopia. The major aim of the present research, however, is to ascertain the impact of the rate of unemployment on the growth of the Ethiopian economy. Various researches have indicated that unemployment rate and economic growth are significantly related, however few studies have been ascertained to understand the effect of unemployment on economic growth, rather the effect of economic growth on unemployment has been widely done. We also present the findings that shows the effect of inflation rate on the economic growth of a nation.

To begin with, the outcomes that are presented in this thesis study gives that rate of inflation on the Ethiopian economy provides for a significant negative impact on the economic growth of Ethiopia in the short-run. The findings presented in the research model that is adopted in this thesis depicts that the rate of inflation in Ethiopia gives a significant and crucial effect on the growth of the Ethiopian economy. This shows that the rate of inflation is responsible for reducing economic development in Ethiopia. Therefore, it is very crucial to come

up with policies that are responsible for lowering the rate of inflation or stabilizing it in order to foster economic development in this region. The findings which show that the rate of inflation is significant in reducing economic growth in Ethiopia supports the findings that are presented in the past researches which shows that rate of inflation strongly affect economic growth, Niken et al. (2023), and the findings of past studies which shows that the rate of an inflation negatively affects economic growth of a nation in a significant way, Mohseni and Jouzaryan (2016). Therefore, it is of paramount importance for nations to come up with ways on how to stabilize the rate of inflation or rather reduce it and this is going to go a long way in enhancing the growth of the economies. The findings which show that the rate of inflation in Ethiopia negatively affects economic growth in the short-run answers the third research question outlined in the introduction section by showing that indeed inflation rate reduces economic growth. While the short-run findings presented in this research shows a significant and strong negative relationship between inflation rate and economic growth, the long-run findings shows that inflation rate do not significantly impact economic growth of Ethiopia. In as much as the sign of the coefficient value is negative depicting that inflation rate should negatively impact economic growth in Ethiopia, this association is not significant. Therefore, we ascertain that inflation rate in the long-run do not give a significant impact on the economic growth of Ethiopia. These findings which shows that the association of inflation rate is only significant in the short-run and insignificant in the long-run answers the fourth research question outlined in the introduction section by depicting that in the long-run inflation rate do not affect economic growth. There is significant asymmetric on the effect of inflation rate on the economic growth of Ethiopia. Low rate of inflation is observed to significantly reduce economic growth while high rates of inflation do not have any significant effect on the economic growth.

In addition to that, the postulations that are given in the present research depicts that labor force is one of the significant factors that is responsible for affecting the economic growth of a country. The short-run findings depict that labor force gives an effect which is positive on the growth of the Ethiopian economy. This shows that labor force is essential in fostering economic growth of Ethiopia in the short-run. Therefore, it is important to enhance labor force of the

country in order to promote the economic growth of the country. The postulations given in the present research on the short-run outcomes are supported by the theories of production, that is, the Cobb-Douglas production function of Cobb and Douglas (1958), the Romer production of model that was postulated in the postulations of Romer (1990), and the Solow production model through the postulations of Solow (1956). The present research findings shows that labor force remains one of the most important factors that is responsible for enhancing the output level of the country. Therefore, nations should work towards raising the labor force of their countries. The postulations are given in the short-run estimations answers the fifth research questions presented in the introduction section by showing that labor force is one of the most important factors that is responsible for fostering economic growth of the country. While the short-term findings depict that labor force positively impact economic growth, the long-run outcomes shows that labor force of Ethiopia presents a negative significant effect on the economic growth in this country. The findings presented by the long-run estimations are not in support of the theories of production as outlined above, which shows that labor force is one of the important inputs in the production function. Moreover, the long-run outcomes which shows that labor force negatively affect economic growth of Ethiopia answers the sixth research question outlined in the introduction section of this study by presenting a significant negative effect of labor force on economic growth in the long-run. We also observe significant asymmetries on the impact of labor force on the economic growth of Ethiopia. While low level labor force gives significant positive effects on the economic growth of a nation, high levels of labor force tend to reduce the economic growth of this country. The negative effect of high labor force on Ethiopia as presented in the outcomes of this research can only be supported by the high rates of unemployment in these developing nations, whereby when the level of labor increases in a country this will simply increase the rate of unemployment rather than the employed people which are responsible for producing products in the country.

Moreover, the present research gives that capital level as one of the factors that is crucial and vital in fostering the economic growth of Ethiopia. The positive effect of capital on the economic growth of Ethiopia as presented by the

findings of this research supports the postulations that are given in the theories of production, for example, the Cobb-Douglas production function by Cobb and Douglas (1928), the Solow production model of Solow (1956) and the Romer production model of Romer (1990). These theories of production depicted that, on top of labor force, capital is also one of the factors of production that is essential in enhancing the level of capital of the country. Therefore, it is important for Ethiopia and other countries with almost the same economic conditions, for example the developing country, to consider enhancing the level of capital for the purpose of raising economic growth in these countries. The findings presented by the short-run estimations of this research answers the seventh research question presented in the introduction section of this study, by depicting that capital plays a significant role in raising the economic growth of a nation. However, in the long-run capital is observed to provide an insignificant impact on the economic growth of Ethiopia, considering the long-run outcomes that are presented in this research. The finding shows that while the coefficient value has a positive sign, depicting that capital level should foster economic growth in Ethiopia, this association is not statistically significant. Therefore, the long-run outcomes that are presented in this research answers the eighth research questions by showing that capital do not give any significant effect on economic growth in the long-run. However, it is observed that the different outcomes that are presented in the short-term estimations and the long-run estimations on the effect of capital on economic shows that capital level of Ethiopia gives significant asymmetries on its impact on the growth of the economy. While low level capital positively impacts growth of the Ethiopian economy, the high levels of capital do not present any significant effect. The present research outcomes on the effect of capital on economic growth also supports the postulations that are presented in the findings of past studies, Stern and Epstein (2021), which shows that financial development positively affect economic growth. However, the effect of financial development on economic growth, in as much as it is positive linked through a U-shaped relationship, such that when financial development is increase, initially it will tend to raise economic growth until a limit is arrived at, once the limit is arrived at further increases in financial development we have no effect on economic growth, and after the limit is passed further increases in financial development is associated with reduction in economic growth, Stern and Epstein

(2021). Therefore, the short-run outcomes which shows that capital level positively affect economic growth, depicts the initial stage in the increase in financial development, whereas the long-run outcomes that shows that there is no significant impact of capital on economic growth is a representative of the threshold that we have arrived at in increasing financial development for the purpose of fostering economic growth. Therefore, there is need for caution to be taken into account when raising the level of capital to promote economic growth.

In addition to that, the present findings that are depicted in this research shows that the level of unemployment in Ethiopia present significant negative effect on the economic growth of this country. Both the long-run and the short-run outcomes depicts that unemployment rate of Ethiopia negatively affect the economic growth in this country. This shows that the rate of unemployment is not good for fostering economic growth of a country. Therefore, it is very crucial for countries to come up with policies that are responsible for reducing the rate of unemployment in their country and this can be achieved through enhancing employment levels of the country by creating more jobs for the people, as well as reducing the factors that lead to structural unemployment. The negative effects of unemployment rate in both the short-un and long-run estimates of the present research support the findings that are presented in the researches that were done in the past, which shows that unemployment rate significantly affect economic growth, Sadiku et al. (2015), and negatively affect economic growth, Mohseni and Jouzaryan (2019). The negative effects of unemployment rate on economic growth that are presented in the present research answers the first and second research questions presented in the introduction by showing that the rate of unemployment provides a significant negative impact on the economic growth of a country. However, the findings which shows that both short-run and long-run unemployment rate negatively affects economic growth postulates that there are insignificant asymmetries on the effect of unemployment on economic growth. These findings shows that both low- and high-level unemployment gives significant negative effects on economic growth. Therefore, it is vital to lower the level of unemployment by creating more jobs in a country if economic growth is to be enhanced.

CHAPTER VI

Conclusion and Recommendations

Conclusion

The present research uses the Autoregressive Distributive Lag model which is significant in providing both short-run estimations, as well as the long-run estimations, thereby enabling us to compare and contrast if the indicators employed presents any asymmetric on their effect on economic growth. The data set of Ethiopia for the period that ranges from 1990 to 2019 is also employed. The present research findings are crucial for furthering the postulations that are provided in the traditional theories of economic growth. This means that the findings of this research provide major theoretical implications by showing the importance of capital and labor force in enhancing economic growth of a country. We show that capital and labor force play a vital role in promoting economic growth of the country. Therefore, this indicates that it is important to enhance the capital level for country, as well as the labor force of the country for the purpose of raising the output level of the country, hence the economic growth is also enhanced. However, the postulations given in this research shows that it is only low level of capital, as well as low level of labor force that is significant in raising economic growth of the country. The high level of labor force is observed to reduce economic growth in Ethiopia, hence there is need to minimize on the rate of labor force since increasing labor force in this country may sometimes tend to raise the rate of unemployment due to the high level of unemployment in this country. The rate of unemployment which is not responsible for fostering economic growth since these people who fall under the rate of unemployment are not employed to raise output of the country. Moreover, the use of high level of capital should be shunned since using capital that exceeds the threshold has a tendency of presenting insignificant effect on the economic growth of the country. Of great importance is the relationship between unemployment rate and economic growth, and the present research shows that high and low rate of unemployment significantly reduces economic growth. Unemployment do not present any asymmetries on its impact on economic growth both low and high rate of

unemployment is not good. This shows how important it is to foster employment rate in a country for the purpose of raising economic growth.

Policy recommendations

The policy recommendations of the present research study are given as follows:

- The rate of inflation in Ethiopia and other countries, especially developing countries that have the same economic conditions as Ethiopia, should be stabilized or lowered for the purpose of raising economic growth in these countries. Great care needs to be taken on the low levels of inflation which give significant negative effect on the growth of the economy, while very high levels of inflation rates have a tendency of not providing any strong impact on the growth of the economy.
- Labor force of Ethiopia and other countries that have almost the same economic conditions as this country should be improved for the purpose of fostering economic growth. Of great importance is the low level of labor force which gives positive effects, while high levels of levels have a tendency of reducing economic growth but this is due to the high levels of employment in this country.
- Capital level of Ethiopia and other countries with the economic conditions that are almost the same must be raised for the purpose of raising economic growth, but great care has to be taken in identifying the threshold at which capital level gives significant impacts, because after having passed this threshold capital level gives insignificant effect economic growth.
- The rate of unemployment in Ethiopia must be lowered through ways of creating employment in this country for the purpose of raising the economic growth of the country. Both high and low levels of unemployment are detrimental to economic growth of Ethiopia. They significantly reduce the economic growth of this

country since part of the labor force is left out and is not involved in the production process which is responsible for producing the output level of the country.

Recommendations on future studies

For the purpose of future studies, the following points can be taken into consideration:

- A study that considers panel data of quite a good number of countries should be considered, since a study that only concentrates on one country may produce findings that might be difficult to generalize to other countries due to different conditions prevailing in the economy in those countries.
- The effect of unemployment on economic growth requires must be done in each and every country to come up with policies that are specifically meant for each and every nation, since the policies that can be formulated from the present research may not be generalized to other countries for example developed countries with different conditions to with your field.
- The factors of production such as technology and human capital may also be considered in the future studies that examine this relationship for the purpose of producing robust results.

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Appendices

Appendix A
Ethics Committee Approval

NEAR EAST UNIVERSITY

SCIENTIFIC RESEARCH ETHICS COMMITTEE

27.04.2023

Dear Abdiwali Omar Mohamud

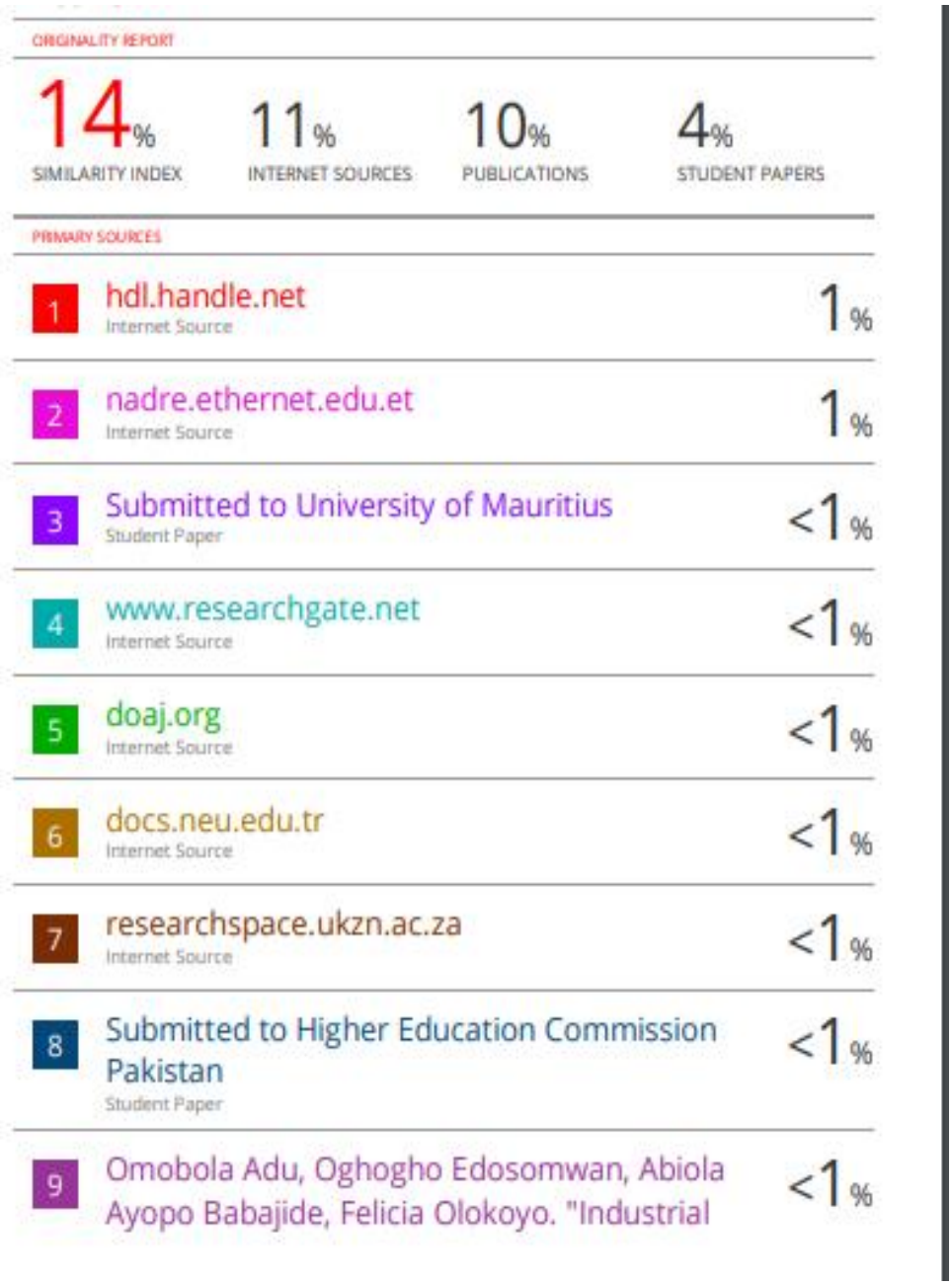
Your project **"Impact of unemployment on economic growth of Ethiopia"** has been evaluated. Since only secondary data will be used the project does not need to go through the ethics committee. You can start your research on the condition that you will use only secondary data.

Prof. Dr. Aşkın KİRAZ

The Coordinator of the Scientific Research Ethics Committee

Appendix X

Turnitin Similarity Report



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