COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

INSTITUTIONAL QUALITY AND ECONOMIC GROWTH IN ETHIOPIA: EVIDENCES FROM AN ARDL MODEL.

BY

EHITNESH DEMELASH

FEBRUARY, 2023

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DEPARTMENT OF ECONOMICS

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This is to certify that the thesis/dissertation entitled: INSTITUTIONAL QUALITY AND ECONOMIC GROWTH submitted in partial fulfillment of the requirements for the degree of Masters of Science in Economics with specialization in Development Economic Policy Analysis of the Graduate Program of the Department of Economics, College of Business and Economics, Debre Berhan University and is a record of original research carried out by Ehitnesh Demelash (*ID No**:** PGR/002/12*), under my supervision, and no part of the thesis/dissertation has been submitted for any other degree or diploma.

The assistance and help received during the course of this investigation have been duly acknowledged. Therefore, I recommend that it to be accepted as fulfilling the thesis requirements.

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We, the undersigned members of the boarded of the examiners of the final open defense have read and evaluated her thesis entitled INSTITUTIONAL QUALITY AND ECONOMIC GROWTH IN ETHIOPIA: EVIDENCES FROM ARDL MODEL, and examined the candidate. This is therefore to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree of Masters of Science in Economics with specialization in Development Economic policy analysis.

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AUTHOR'S DECLARATION

I undersigned hereby declare that this Msc. thesis entitled "**Institutional quality and Economic Growth in Ethiopia: Evidences from ARDL Model**" is prepared with my own effort and all source, of materials used for this thesis work have been acknowledged at the respective place in the text. This thesis has been submitted in partial fulfillment of the requirements for Master of Science (MSc) at Debre Berhan University and it is deposited at the University library to be made available for users under the rule of the library. I declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

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LIST OF ACRONYMS

ADF; Augmented Dicky Fuller

BTI; Bertelsmann Stiftung's Transformation Index

FH; Freedom House

FEVD; Forecast Error Variance Decomposition Analysis

GDP; Gross Domestic Product

GDPPC; Gross Domestic Product per Capital

GNI; Gross National Income

GMM; Generalized Method of Moment

GADP; Government Anti-Diversion Policies

ICRG; International Country Risk Guide

IMF; International Monetary Fund

IRF; Impulse Response Function

LSDV; Least Square Dummy Variable

OLS; Ordinary Least Square

PF; Political Freedom

SGMM; System Generalized Method of Moment

SSA; Sub-Saharan Africa

UNDP; United Nation Development Program

US; United States

VECM; Vector Error Correction Model

WB; World Bank

WID; World Development Indicator

WGI; Worldwide Governance Indicator

ABSTRACT

This study examined the relationship between institutional quality and economic growth in Ethiopia over the period from 1985 to 2020. For this purpose ARDL and NARDL models and Granger-causality test is employed on a data collected on the variables under study. The result of ARDL model indicated that governance quality has a statistically significant negative effect on the country's economic growth in both short-run and long-run. In addition, political freedom has a statistically significant negative effect on economic growth in the short run while, its effect is positive in the long-run. The NARDL result revealed that in both short-run and long-run the positive and negative shocks on institutional quality have no equal effect on economic growth. Furthermore, in the long-run positive component of governance quality has greater negative impact than the negative component while in short-run the positive shock has insignificant impact. Similarly, in both short-run and long-run the negative component of political freedom has insignificant impact but positive shock has significant positive and negative impact in the long-run and short-run respectively. The study also found that there is threshold of 4.90 and 5.27 point for governance quality in the long-run and short-run respectively, and for political freedom 3.21 point in the short-run. If the governance quality and political freedom exceeds the threshold, it causes the positive effect on the growth. The Granger-causality test result revealed that there is a bi-directional causality between political freedom and economic growth and unidirectional causality running from positive and negative components of political freedom and governance quality to economic growth. It is recommended that a threshold level of governance quality and political freedom should be met for it to stimulate economic growth of our country.

Keywords and phrases: Ethiopia, institutional quality, economic growth, non-linear autoregressive distribute lag model, autoregressive distribute lag model

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The cause of cross-country differences in economic development and economic growth is becoming the most important concern in the current globalized world (Acemoglu & Robinson, 2008). This is because, despite the claim that economic growth is determined by the amount of human capital, physical capital, and technology, evidences proved that differences in human capital, physical capital, and technology are only proximate causes of economic growth. That is, they pose the next question of why some countries have less human capital, physical capital, and technology than others. Recent literatures instead reveal institutional quality as a fundamental cause of economic growth (Acemoglu & Robinson, 2008). It has been argued that other factors such as innovation, human capital, and physical capital accumulation are not the causes of growth, but represent the growth itself, and that institutional quality is the fundamental cause of differences in economic growth (Vitola & Senfelde, 2015). As a result, institutional quality-growth relationship is becoming the area of interest of researchers.

Despite the increasing concern on institutional subjects, the advance in institutional quality tend to be stagnant. For instance, Freedom house (2021) report shows that the share of countries designated not free has reached greater level since the detoraration of democracy began in 2006 and countries with decline in political right and civil liberties outnumbered those with gains by the largest margin recorded during the 15 year period. According to Freedom House (2022) from 54 African countries only 15 percent of countries are politically free and the remaning 44 percent and 41 percent of countries are not free and partly free respectively. This implies that African countries have low institutional quality compared with other developing regions such as Asia-Pacific region with 39 countries and 44 percent, 33 percent and 23 percent of countries are politically free, partly free and not free respectively.

CPIA Africa documents that Sub-Saharan African countries are strugling to increase the quality of their institutions and policies to foster sustainable growth, poverty reduction, and the effective use of development assistance. The overall CPIA score for Sub-Saharan Africa countries was 3.1 in 2018, the same as 2017, reflecting the slow progress in improving institutional quality and policy frameworks in the region. In this region Governance policies and institutions displayed no strong upward trend. The rule of law, accountability and transparency, and the quality of public administration remained major areas of weakness that impede the efficient use of public resources across the region. Generally over the past 10 years (2008 to 2018) the overall score for the governance indicators of Sub-Saharan Africa region has averaged 3.0, reaching its highest point in 2013, at 3.1, in the index ranging from 1 to 6 which represent low and high governance quality respectively. Although the score for the efficiency of revenue mobilization component has been relatively high, it has remained unchanged since 2014 and the scores for property rights and rule-based governance, transparency, accountability, and corruption in the public sector have stayed consistently low and well below the governance indicators average score. In the years 2019 CPIA score of Sub-Saharan Africa countries, excluding high income coutries, was found to be 3.54 (World Bank, 2019). World Bank (2021) report show that in 2021 for SSA countries CPIA scores for most criteria groups remained the same as in 2020.

Ethiopia is not an exception in its institutional quality trend. Over the period 2010 to 2018 Ethiopia observed a slow progress with a CPIA score (change in CPIA score from 2010 to 2018) of only 0.1 (World Bank, 2019). According to BTI (2018, 2022) governance quality index of Ethiopia is among the lowest in sub-saharan africa. Moreover, over the period from 2015 to 2017 and from 2019 to 2021 governance quality index of Ethiopia was 3.65 and 4.26 respectively, in the index ranging from 1 to 10, 1 and 10 representing the low and high governance qality respectively. In addition, Freedom House data on political freedom (political right and civil liberties) indicate that on average over the period 1980 to 2020 Ethiopia's political freedom status is characterized by politically not free (average of political right and civil liberties is above 5.5) which indicate that institutional quality of Ethiopia is very poor.

Countries economic growth trend is argued to be shaped by its institutional quality. The low institutional quality experienced in Sub-Saharan Africa countries explains their poor economic performance (Wandeda et al. 2021). According to World Bank data, economic growth of Sub-Saharan Africa region was high in the first decade of the 2000s. Moreover, between the period 2000 and 2010 average growth rate of real GDP was 5.18 percent. However, economic growth in this region observed a growth rate below this average during the year 2011 to 2020 which is 3.07 (World Bank, 2022). IMF (2020) reported that the economic recovery in Sub-Saharan African countries surprised on the upside in the second half of 2021, prompting a significant upward revision in the previous year's estimated growth from 3.7 to 4.5 percent. Although Sub-Saharan Africa region achieved an economic recovery, World Bank data shows that on average GDP per capital growth rate of Sub-Sahara Africa region is lower than other developing regions. Moreover, average GDP per capital growth rate of Sub-Saharan Africa, South Asia, Europe and Central Asia, East Asia and Pacific, North America, Latin America and Caribbean, and Middle East and North Africa regions over the period 1980 to 2020 was approximately 0.23, 3.7, 1.4, 3.83, 1.57, 0.81 and 0.44 respectively. This indicates that over the period 1980 to 2020 economic growth of SSA countries was lower compared with other regions.

The economic growth story of Ethiopia looks different compared to the whole sub-Saharan region. The country began to see increased economic growth since 1992 and it shifted to an even high growth rate in 2004. Evidences revealed that Ethiopia has achieved an economic growth rate exceeding other low income and Sub-Sahara African countries with real gross domestic product growth averaging 10.9 percent in 2004-2014 (World Bank, 2015). Ethiopia's GDP growth rate is 10.9 percent in 2017 and it is 9.6 percent in 2018 with slight decline (World Bank, 2019). Over the past fifteen years, Ethiopia's economy has been among the fastest growing in the world at an average of 9.5 percent per year. Due to COVID-19 pandemic Ethiopia's real gross domestic product (GDP) growth slowdown in 2020 with growth of 6.1 percent and further in 2021 with growth of 6.3 percent (World Bank, 2022). In general, Ethiopia's economy grew at an average high annual growth rate (7 to 8 percent), double the average rate of Sub-Saharan countries over the period 2000 to 2018.

To accelerate the economic growth momentum discussed in the preceding paragraph improving institutional quality is believed to be a better approach. Previous studies on institutional quality-growth relationship establishes positive relationship between institutional quality and economic growth such as Hall & Jones, (1998); Acemoglu et al., (2000); Vijayaraghavan & Ward, (2001); Nawaz et al., (2014); Wandeda et al., (2021). In addition, these studies conclude that institutional quality is the fundamental cause of economic growth and development differences across countries and hence low quality of institutions is the root cause of economic growth problem of third world countries. Thus, the poor economic performance of the Sub-Saharan Africa countries (like Ethiopia) is linked to low institutional quality (Fikadu et al. 2019). As such, it is crucial to study the relationship between institutional quality and economic growth and the extent to which institutional quality determine economic growth of the country. The current study investigated the relationship between institutional quality and economic growth in Ethiopia.

1.2. Statement of the Problem

Ethiopia is quite sizable in terms of population and land area. It is characterized by large diversity and faces many complex problems making it a low-income country. The problem is aggravated by its weak institutional quality. That is, equality and supremacy of rule of law cannot be ensured without quality institutions (Admassie, 2006). Although Ethiopia has positive progress in economic growth over time, there is problem regarding continuing its positive economic growth on a sustainable basis and accelerating poverty reduction which both requires significant progress in job creation, as well as improved governance quality. Evidences prove that, the country has continued to be a low-income country and its overall socioeconomic development is still among the lower (World Bank, 2022).

The preceding paragraph revealed that Ethiopia has failed to ensure a sustainable economic growth path. The country is argued to perform an economic growth trend below that is needed to join the middle income group. Understanding the factors that constraint the economic growth path of the country is very crucial towards ensuring a rapid and sustainable future economic growth. Recent theoretical advances elucidate the significant role of institutional quality in shaping an economic

growth path. As such, having strong empirical evidence regarding the role of institutional quality on economic growth in Ethiopia is crucial in devising a robust policy decision. Despite the significance the evidence on the relationship between institutional quality and economic growth, empirical evidence reading the subject is very scanty (Wandeda et al., 2021). Ayen (2018) also argued that large share of studies on area of economic growth and institutional quality are theoretical.

There are some cross-country studies which examine the role of institutional quality difference on economic growth difference between countries. These studies include Acemoglu et al.(2000), Hall & Jones (1998), Knack & Keefer (1995), Rodrik et al.(2002), Vijayaraghavan & Ward (2001), Lee & Kim (2009), and Butkiewicz & Yanikkaya (2006). These studies tend to produce diverse evidence. For instance, Lee & Kim (2009), and Butkiewicz & Yanikkaya (2006) shows that different institutions required at different stage of economic development. Lee & Kim (2009) found that political institutions are particularly important at early economic development stage (for low income or developing countries). In addition, Butkiewicz & Yanikkaya (2006) found that the study result on the role of institutions on economic growth is sensitive to sample selection. Moreover, democratic institutions are important for economic growth especially for developing countries. Thus, evidences show that different institutions matter differently for economic growth on the basis of development stage of a country.

There are also studies conducted on the role of institutional quality on economic growth in Sub-Sahara Africa. These studies include Ayen (2018), Ceyhun (2016), Ebaidalla (2014), Bashir & Xu (2014), Kamil & Ishola (2015), Wandeda et al. (2021) and Oluwatoyin Matthew & Folasade (2014). Bashir & Xu (2014), Kamil & Ishola (2015), Wandeda et al. (2021) suggests that all Sub-Saharan African countries have not similar income levels, i.e. Seychelles, Mauritius, and South Africa are sometimes considered as upper middle income group but Burundi, Mali and Ethiopia considered as low income group. Any institutional change and its effect on economic growth are likely to operate slowly. As a result, incorporating large number of countries having heterogeneous characteristics into a single model will lead to a questionable result. It is also hardly possible to control the unexpected shocks that are specific to one country. As such, instead of

comparing a large number of countries having heterogeneous characteristics, engaging in a country specific analysis which considers a country specific issues and context is better for policy makers in order to design appropriate policy.

Previous paragraphs reveal that institutional quality-growth relationship should be narrowed down to country specific studies. In addition, all above institutional quality-growth studies assume linearity in the relationship between institutional quality and economic growth and not consider the possibilities that relationship may be non-linear. In Ethiopia although Garedow (2022) tried to examine how political institutions affect economic performance of Ethiopia. The study consider only political institutions which do not capture all dimensions of institutions, the study did not estimate threshold value of institutions, and not consider asymmetric impact of institutional quality on economic growth (asymmetric relationship between institutional quality and economic growth).

Generally, prior studies assume that there is linear relationship between institutional quality and economic growth. However, it may be non-linear, if the institutional quality is below a certain threshold point, a slight improvement in institutional quality may not increase growth rate or may not provide any significant effect on economic growth. In addition, negative and positive shocks in institutional quality may have different impact on economic growth. For this insight this study assumes that the relationship between institutional quality and economic growth may not be linear rather no-linear unlike what most studies assumes. However, to the best of the researcher knowledge and to date there is no study which examined the existence of institutional quality threshold value in the impact of institutional quality on growth and considers asymmetric relationship between institutional quality and economic growth in Ethiopia. Thus, this study is the first which examines the asymmetry relationship between institutional quality and economic growth; estimate the threshold value of institutional quality through investigating the non-linear impact of institutional quality on economic growth in Ethiopia by using ARDL and NARDL model. In addition, the study includes broad dimensions of institutions like governance quality indicators, and freedom house index of political freedom.

1.3. Objectives of the Study

1.3.1. General objective of the study

The main objective of this study is to examine the relationship between institutional quality and economic growth in Ethiopia.

1.3.2. Specific objective of the study

1. To examine the trends of economic growth and institutional quality.
2. To investigate long-run and short-run the impact of institutional quality on economic growth.
3. To examine the asymmetric impact of institutional quality on economic growth.
4. To estimate the threshold value of institutional quality which suitable for high economic growth.
5. To determine the direction of causality between institutional quality and economic growth.

1.4. Hypothesis of the study

In line with specific objectives of the study, the research hypotheses are stated in their null forms with their alternatives suitably implied as follows.

H_{01}: Institutional quality has no statistically significant effect on the growth of Ethiopian economy in both long-run and short-run.

H_{02}: The effect of institutional quality on economic growth is symmetry.

H_{03}: There is no threshold value institutional quality in the effect of institutional quality on economic growth.

H_{04}: There is no statistically significant causality between institutional quality and economic growth.

1.5. Significance of the Study

Analyzing the relationship between institutional quality and economic growth using a country specific time series analysis is very important since the relationship between institutional quality and economic growth depend on country's heterogeneous characteristics. In addition, while other factors like physical capital, human capital and other growth accounting factors have given emphasis as economic growth determinants, the role of institutional quality on economic growth is not well studied in Ethiopia. Thus, the current study tried to provide better understanding on the role of institutional quality on promoting economic growth in Ethiopia. In addition, the study has generated some policy implication based on the study result. With the evidence on the threshold level of institutional quality policymaker would also be able to render a comprehensive set of institutional quality improvement measures that may ultimately lead to highest level of economic growth possible. The purpose of this study is to call attention to the strong relationship between institutional quality and economic growth. This study finding will help policymakers to make reliable and appropriate economic decisions in Ethiopia. In addition, this study will solve the shortcoming of previous studies.

1.6. Scope of the Study

Including large number of countries having heterogeneous characteristics and different socio economic conditions in the study failed to address the unexpected shocks that are specific to one country. Thus, this study seeks to investigate the relationship between institutional quality and economic growth in Ethiopia over the period 1985 to 2020. The period was chosen based on the availability of data on institutional quality measures and in order to use more recent data. Moreover, the study period starting from 1985 as the ICRG governance quality indicators data of Ethiopia not available before 1985 and ended in year 2020 as the ICRG governance quality indicators data are only available up to 2020.

1.7. Limitation of the study

Based on the availability of data on institutional quality measures, this study forced to depend on only 36 years data over the period 1985 to 2020. In addition, due to lack of long time series data on economic freedom indicators, this study doesn't incorporate economic freedom indicators as a measure of institutional quality. The study period ended in year 2020 as the ICRG governance quality indicators data are only available up to 2020.

1.8. Organization of the paper

This thesis has been organized into six chapters. Up until here the introduction section, which include background, statement of problem, objective, research question, scope, limitation the study, and organization of the study is presented. Chapter two is an overview of the theoretical and empirical literature on the relationship between institutional quality and economic growth. Chapter three deals with methodology, it was set to describe source of data, method of analyzing, and description of variables. Chapter four presents descriptive analysis. Chapter five provides empirical analysis and discussion of the result. Finally, chapter six summarizes the entire study, makes conclusions and gives policy recommendations from the study results as well as areas for future research.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURES

2.1. Introduction

The study of institutional quality and economic growth relationship has gained prominence by researchers in recent times. Following the study objective, examine the relationship between institutional quality and economic growth this chapter presents different theoretical and empirical literatures written on institutions and economic growth and conceptual frame-work of the study.

2.2. Theoretical literature review

In this section, the study presents the theoretical literature review of the study includes definition of institutions, measure of institutional quality, growth theories and their view on the role of institutional quality and the core institutions for economic growth.

2.2.1. Definition of Institutions

It is not easy to define institutions precisely. The definition of institutions depends on the study objective and idea being followed. According to North (1990) institutions are the rule of the game in society or more formally they are humanly devised constraints that regulate or shape human interaction. As a result, they structure political, social, and economic incentives in human exchange. Institutional change shapes the way societies evolve through time and hence it is the key to understand historical change.

Institutions are rules which govern human actions. These rules may be informal which solely exist in human minds, for example codes of behavior. However, the rules may be formal that formally written down, for example rules and regulations. Both formal and informal institutions shape human interactions. This is possible since institutions help the individuals to have expectations

about other individual's behaviors. Hence, individuals which have of the same culture have the same codes of conduct and, therefore, all individuals have know-how about the action of other individuals. Similarly, individuals being subordinated to the same jurisdiction will behave accordingly; therefore, they can easily predict other individuals' behaviors. Since institutions shape or constraint human behavior, they have a major role in the determination of an agent's action (Constanze, 2011).

2.2.2. Formal and Informal Institutions

Formal institutions are different rules which written down in a rulebook. These institutions include the political, legal, economic, and social environment and are formally written down in a rulebook, such as a constitution. Formal institutions imply an official formal enforcement mechanism if different rules are violated (Constanze, 2011).

Informal institutions cannot be precisely defined as formal institutions. Informal institutions are socially shared rules, usually unwritten, that are created, communicated, and enforced outside of officially sanctioned channels. Moreover, they include conventions that evolve as solutions to coordination problems, norms of behavior that are recognized standards of conduct (such as codes of conduct that define interpersonal relationships in the family, business, school, etc.) and self-imposed codes of conduct (such as standards of honesty or integrity). Customs, traditions and culture are words we use to denote the persistence of informal institutions (North, 2005).

In addition, Constanze (2011) also suggest that informal institutions include values, beliefs, morals, convictions, norms, habits, and codes of conduct and the term is used as a substitute for culture. Thus, culture can be defined as institutions that correspond to the broadest categorization; further, values, beliefs, morals, norms, convictions, and so on can be categorized as culture or informal institutions. We can use culture as a substitute for informal institutions since at least in the current definition it shows the rules that regulate or shape human interactions. Culture constrained human interactions since individuals belonging to a certain culture share the same values and beliefs and, therefore, share norms, codes of conduct, habits, and traditions. Unlike formal institutions informal institutions are not officially written down and a violation of these

institutions might not lead to state-run, but rather societal punishment. The formal institutions can be changed with short time however, the informal institutions changed with a long time. Although both formal and informal institutions have a role in the social, political and economic interactions, formal institutions have strong role than informal institutions. Thus, this study focuses on the role of formal institutions.

2.2.3. Measure of Institutional quality

Many literatures show that institutions are very important for economic growth and development of a country but measuring institutional quality is difficult. Institutions have different dimensions and each dimension measured by an index or a number of indices. Therefore, use appropriate institutional quality measure is crucial in examining the impact of institutions on economic growth. Governance quality indicators, political freedom index and economic freedom index have been used as a measure of institutional quality in different research. Vijayaraghavan & Ward (2001), Ayen (2018), Kamil & Ishola (2015), and Nawaz et al. (2014) used governance quality as a measure of institutional quality. Ceyhun (2016) and Ayen (2018) measured institutional quality by economic freedom indicators. In addition, Oluwatoyin & Folasade (2014), Vijayaraghavan & Ward (2001) and Ayen (2018) used political freedom indicators. However, since Economic freedom indictors available for shorter time span this study used Governance quality indicators and political freedom index as a measure of institutional quality. Hence, the study discussed these measures below.

2.2.3.1. Measure of Governance Quality

The concept of governance quality is broadly discussed by different organizations and scholars and they define it differently. For example, definition of public sector governance proposed by the World Bank in 1992 is that: "Governance is the manner in which power is exercised in the management of a country's economic and social resources for development". In addition, World Bank's report 2002 defined governance as "rules, enforcement mechanisms, and organizations.

Since different organizations, researchers, and scholars define governance quality differently, there is no agreement among scholars, and researchers in the single definitions of governance quality. Recently the demand for the measure of governance quality increase and as a result, a number of aggregate governance indicators have been produced (Kaufmann, 2011). Kaufmann (2011) define governance as the traditions by which government authority in a country is exercised. This includes the process by which governments are selected, monitored, and replaced; the ability of governments to effectively formulate, and implement sound policies; and the respect of citizens and the state for the institutions that govern economic and social interactions.

There are different indicators used in different studies as a measure of governance quality such as Siyakiya (2017), Ayen (2018) and Nawaz et al. (2014) employed World Bank worldwide governance indicators while Vijayaraghavan & Ward (2001); Ebaidalla (2014) and Knack & Keefer (1995) used international country risk guide political risk components. Since World Bank worldwide governance indicators are available for shorter time span this study used international country risk guide governance quality indicators as a measure of governance quality (see section 3.4 for the full definitions of governance quality indicators).

2.2.3.2. Measure of Economic Freedom

Economic freedom is a fundamental right that individuals are free to choose for themselves and engage in voluntary transactions. Individuals are free to work, produce, consume, and invest in any way, as long as they do not affect the other person or property of others (Jan, 2016). Different studies used different indicators as a measure of economic freedom such as Ayen (2018) and Ceyhun (2016) used five indicators of economic freedom of the world provide by Fraser institute while Ahmad & Khalil (2020) used ten indicators of economic freedom provide by heritage foundation. Since economic freedom indicators have no long time series data this study not includes these indicators as a measure of institutional quality.

2.2.3.3. Measure of Political Freedom

Political freedom refers the procedures or processes that the government officials elect and decide political issues. We can say that there is Political right when all adult citizens are free to participate in the political process and elections are democratic, fair, and competitive (alternative political parties are free to participate in the election). Civil liberty includes the freedom of the press and the rights of individuals to assemble, hold alternative religious views, receive a fair trial, and express their views without fear of physical retaliation (Gwartney & Lawson,, 2002).

Freedom House political freedom index is simple average of political right and civil liberties index. Each country is assigned a numerical value ranging from 1 to 7 for both political rights and civil liberties, Country political freedom index ranging between 1 and 2.5 are given to countries that are considered to be "free"; indices between 3 and 5.5 indicate "partly free" countries, while indices between 5.5 and 7 describe countries that are "not free". However, in this study the reversed the index and the lower value of the index represent the weak institutional quality of a country and lower political freedom and the higher value of index represent the more political freedom a country enjoys, the more developed its institutional quality.

2.2.3. The theory of economic growth and the role of institutions

The most widely mentioned growth theories are the neo-classical growth theory and endogenous growth theories. Hence, this part aims to discuss these theories. In addition, in this part the study also discusses the view of neo-classical growth theory on the role of institutions on economic growth and the idea of new institutional economics.

2.2.3.4. Neo-classical growth theory and its view of the role of institutions on economic growth

The role of institutions on economic growth is explained since the work of Adam smith's Wealth of Nations. He suggested that prosperity of commerce and manufacture depends on the government justice system. Rule of law is the main institutions that determine trade and industry. Thus, the economic growth divergence is due to difference in the quality of rule of law and property

rights. However neo-classical economists ignored the importance of institutions on economic growth in their growth models. According to neoclassical growth theory the main source of economic growth comes through capital accumulation and in labor quantity and quality and the steady state income per capital achieved when rate of growth of physical capital equal to output growth (Barboza, 1997).

According to neoclassical economics, the explanations for economic growth divergence across countries depend on institutions-given economic growth models. Neoclassical theories explain economic growth through the accumulation of capital, labor, and technological knowledge. Neoclassical economics assume there is perfect rationality and perfect information. Moreover, according to neoclassical economists individuals have perfect information and unbounded rationality and that transactions are costless (zero transaction costs). Here, perfect rationality is defined as agents having enough foresight and mental skills to assess all the available information. Thus, the market is efficient and institutions have no role. The main explanation for the low levels of economic growth is the lack of a minimum level of endowments that makes sustained output growth possible. In this school of thought institutions have no role in explaining economic growth divergence across countries (Leite et al. 2014).

Neoclassical growth model of Solow identifies two possible sources of variation in income, difference in capital per worker and difference in the effectiveness of labor. However, only labor effectiveness has permanent effect. According to Solow (1956) model the accumulation of physical capital cannot account for either the vast growth overtime in output per person or the vast geographical difference in output per person. This model implies that the differences in real incomes are far too large to be accounted for by differences in capital inputs. The model treats other potential source of income differences as either exogenous, thus not explained by the model (example technology) or absent together (Romer, 1996).

Many economists have asserted that the neo classical growth model of Solow (1956) cannot account for the international differences in income and this failure of the Solow model has stimulated work on endogenous growth theories. For example Romer (1987 & 1989a) suggests

that saving has too large effect on economic growth and takes this to be evidence for positive externalities from capital accumulation. In addition, Lucas (1988) asserts that population growth variation cannot account for any substantial cross country variation in real incomes along the lines predicted by the Solow model (Mankiw et al., 1992). Moreover, Mankiw et al. (1992) suggest that the Solow growth model did not account for important features of cross country growth differences observed today. They argue that cross countries economic growth difference is more consistent with the standard Solow growth model after the inclusions of human capital in the model. As a result, they developed human capital augmented neoclassical growth model.

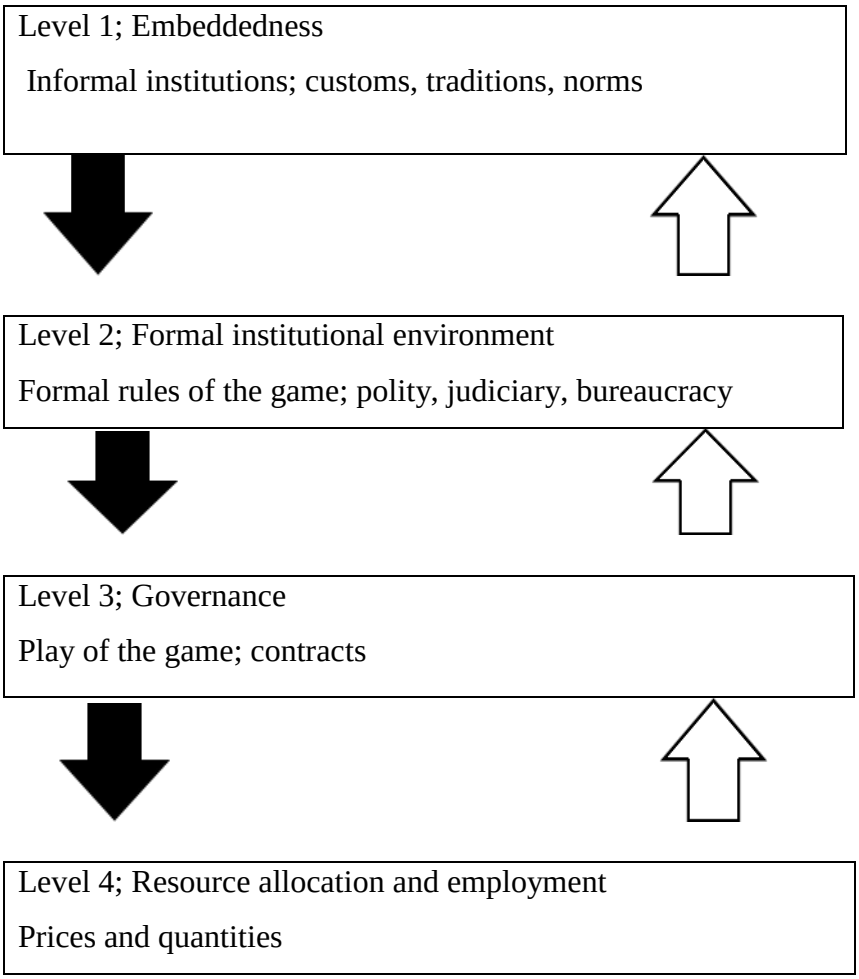
Unlike the neoclassical growth theories which are Ramsey (1928), Solow (1956), Cass (1965) and Koopmans (1965) the new (endogenous) growth model incorporates technological progress as a product of economic activities and also assumes knowledge and technology are characterized by increasing returns to scale (Romer, 1996).

2.2.3.5. New institutional economics and new (endogenous) growth theories

New institutional economics ignore the neoclassical economics assumptions that individuals have perfect information and unbounded rationality and zero transaction costs. NIE assumes instead that individuals have not perfect information (they have incomplete information) and limited mental capacity and because of this they face uncertainty about unforeseen events and outcomes and incur transaction costs to acquire information. To reduce risk and transaction costs individuals (humans) create institutions, writing and enforcing constitutions, laws, contracts and regulations so called formal institutions and structuring and inculcating informal institutions such as norms of conduct, beliefs and habits of thought and behavior. They develop modes of organization embedded in these settings that provide different incentives that vary in their capacity to motivate agents. According to new institutional economics the performance of economy depends upon the formal and informal institutions and modes of organization that facilitate private transactions and cooperative behavior. NIE focuses on how such institutions emerge, operate, and evolve, how they shape the different arrangements that support exchange and production in the economy (Shirley & Menard 2005). New institutional economics (NIE) argued that institutions play an important role

in economic growth and development. They focus on the development of general growth theory that include institutions as a key determinant of economic growth and development.

Figure 2.1; Williamson's hierarchy of social analysis



Source; adapted from Williamson (2000)

The hierarchy of social analysis indicates the evolutions of institutions overtime and how institutions promote economic growth.

As figure one depicts that, Williamson (2000) indicates that in social analysis institutions are divided into four levels. Level 1 is embeddedness, it includes informal institutions such as customs, traditions and norms. The rate of change of these institutions is slower and permanent characters

but is does not mean these institutions do not evolve rather it shows that it takes long time (100-1000 years) to change embeddedness. In level 2, formal institutional environment has been introduced and it includes formal rule of the game such as property right, laws and constitutions which are again first order choice to the economy that is gets the rule of the game right. Level 3 is institutions of governance, these institutions considered as play of the game such as contract. In addition, these institutions are guaranties for well-functioning of legal system, contract laws, and enforcing contracts. The last level (level 4) is institutions of resource allocation and employment. The effectiveness of each level institution is constrained by the above level institutions (black arrow); Contracts constrain resource allocation, laws constrain the shape and formulation of contracts, and norms and culture constrain laws. Similarly, lower-level institutions can influence higher level institutions through feedback (white arrows). This indicates how different institutions determine and shape economic activities. This study focuses on the role of formal institutions.

According to standard growth theories the main determinants of economic growth are accumulation of human capital, physical capital, and access to modern technologies. Accumulation and productivity of these factors is likely to be affected by institutional characteristics or quality of different institutions such as the organization and functioning of the productive sector, the distribution of political and civil rights, the quality of the legal system, government effectiveness (Docquier, 2014). Endogenous growth theories suggest that technological advancement is important for providing possible explanations for long-run economic growth variation across countries. Recent cross-country economic growth researchers have received more inspiration from neoclassical model as extended growth model to include government policies, human capital and the diffusion of technology (Barro, 1996). New economic growth theories focus on the role of different institutions for economic growth by providing incentives for people encourage people to invest in physical and human capital and also creating comfortable environment for invention and innovations (technological advancement). In addition, new growth model predict that economic integration will promote economic growth of integrated economy permanently but in neoclassical growth model it is temporary (Valdes, 1999). However, even if the assumptions of neoclassical

growth theories are questioned by the new growth theories and new institutional economics, there is still good ground to use them for growth analysis.

The basic reasons why growth researchers not included institutions in growth model was that measurement problem of institutions, and hence not easy to quantify them and use in the empirical analysis. However, recently there has been some progress in quantification of institutional quality across countries (emergence of quantitative data on institutional quality across countries). This leading many growth researchers to include institutions in growth model, for example Barro (1996) include institutional quality measures which are political assassinations and revolution in his growth regression. New growth theories have facilitated the inclusion of the role of institutions in economic growth discussion. Improvement in institutions is necessary to sustain economic growth even in developed countries. However, it is serious for developing countries, which are in the process of laying the basic institutional frame work for proper functioning market economies based on private enterprise. ''A'' of neo-classical production function not stand for only technology but also resource endowments, climate, and institutions. An improvement in institutions has positive impact on "A" (technology) and leads to higher steady state income level (Mankiw et al, 1992).

2.2.4. The core institutions in economic growth

Difference in institutional quality across countries has empirically proven by many researchers to be among the most important determinants of difference in economic growth rates across countries. However, the question is that which types of institutions matter more for long run economic growth. In addition, Rodrik (2000) suggest that markets should be supported by non-market institutions in order to perform adequately. The question of policy makers is not the importance of institutions to economic growth rather which institutions matter and how does one acquire them.

Rodrik (2000) points out five types of institutions that support the market to perform adequately which are;

A. The institutions of property rights

B. Regulatory institutions
C. Institutions for macroeconomic stabilization
D. Institutions for social insurance
E. Institutions for conflict management

A. The institutions of property rights

Property right institutions are norms and rules that allow entrepreneurs to have adequate control over the returns to the assets invested or values produced. The institutions in this category are; rule of law, law enforcement quality, and contract enforceability, risk of appropriation, political discretion, accountability and procedures for change of executives. These institutions affect economic growth through their effect on the economic agents' decisions to save and invest in assets. They also influence economic growth by establishing a certain level of trust, which reduces the risks associated with given levels of returns on investment and contracting (Ugur, 2010).

Secure property right has been playing a major role in the rise of the west and the onset of modern economic growth. Entrepreneurs would not have incentives to accumulate and innovates the assets unless they have adequate control (secure property right) over the return to assets that are thereby produced or improved (Rodrik, 2000).

B. Regulatory institutions

Regulatory institutions are norms, rules, and regulations which prevent or reduce market failure and agency problem. These institutions indicate the extent to which civil service independent from politics, the extent to which policy makers and regulators are open to capture by group interests, and the extent to which policy makers and corporate actors are accountable to the public in general and to stakeholders in particular. Regulatory institutions affect economic growth and economic development by increasing efficiency of public policy and by decreasing risk of anticompetitive behavior, free riding and rent-seeking by corporate actors (Ugur, 2010).

C. Institutions for macroeconomic stabilizations

Since the time of Keynesian economists' people have come to an understanding that capitalist economies are not self-stabilizing. In general Keynesian economists were focused on the shortfall

in aggregate demand which slows the economy and result high level of unemployment. The transmission of the instability of financial market to real economy has been stressed more recently. Recently most advanced economies have learned that it is necessary to acquire fiscal and monetary institutions that perform stabilizing function (Rodrik, 2000). These institutions can influence economic performance by reducing uncertainty and making economic growth sustainable.

D. Institutions for social insurance

In modern market economy, risk to income and employment is pervasive and movement up and down in the income level is frequent. Even though Modern economic growth entails a transition from a static economy to a dynamic one and frees individuals from their traditional entanglements, the kin group, the church, and the village hierarchy, it uproots them from their traditional support system and risk sharing institutions. Social insurance institutions legitimize a modern market economy by render social stability and social cohesion. Moreover, these institutions insure society against the social risks. However, the existing experience of Western Europe and United States engenders a number of social and economic costs. Because of these developing countries such as Latin America countries have not adopted social insurance institutions. In Latin America the aim of the reforms that took place after the debt crises was enhancing the scope of the market and reining in that of government. At least in the short-run privatization, deregulation, and trade liberalization all entailed restructuring of the economy and greater risk of job loss. The retrenchment of the public sector meant reduced opportunities for relatively safe public employment. Financial liberalization could be counted upon to generate volatility in the economic environment. Greater capital mobility showed the shifting of idiosyncratic country risk from mobile capital to immobile labor. So, the economic insecurity generated by the debt crises is only augmented by the market-oriented reforms that were adopted without instituting complementary programs of social insurance (Rodrik, 2000).

E. Institutions of conflict management

Institutions of conflict management are norms, rules and principles which resolve social, economic, political and ethnic conflicts. Economic or social conflict resolution institutions influence economic growth of a country by reducing the risk of prisoners' dilemma situations and

associated sub-optimal outcomes. While ethnic or political conflict resolution institutions influence economic performance through enhancing internal security (Ugur, 2010).

Most countries of world are diversity in language, region, and ethnicity. These divisions hamper social cooperation and prevent the undertaking of mutually beneficial projects. Social conflict diverts resources from economically productive activities to unproductive activities and discourage productive activities by generate uncertainty thereby it decreases economic growth. Example of institutions of conflict management are; free elections, independent trade unions, social partnerships, institutionalized representation of minority groups, social insurance, rule of law, a high-quality judiciary, and representative political institutions (Rodrik, 2000).

2.2.5. The relationship between institutions and economic growth

2.1.5.1. From institutions to economic growth

In line with institutions as a rule of the game approach Wolf Jr (1955) argued that institutions may stimulate or impede economic behavior leading to economic growth by their effect on (1) the direct calculation of economic agents cost and benefit; institutions may directly change cost and price relationship and also institutional innovations have impact on entrepreneurial decisions. (2) The relationship between production and distribution; land tenure institutions have impact on incentives to innovate it. While adverse institutions create discontinuities between responsible and benefiting economic agents. (3) Order, predictability and probability; institutions have impact on the predictability of the consequence of alternative economic action and the probability of risk of loss and gain. (4) Knowledge of economic action; institutions may affect economic growth by removing or reducing rigidity and imperfection of the markets which caused by imperfect knowledge in production, technical and marketing opportunities. (5) Motivations and values; institutions may affect economic growth through their effect on value (individuals' judgment or assumptions) and in rational human behavior value provide motivation. Furthermore, effective institutions can modify or activate values and motivations.

Institutions affect economic growth in different ways since institutions are habits that bring limitations to human actions. Institutions have impact on economic growth by reduce transaction cost, decrease uncertainty, transfer resources to productive areas, and by building trust and

promote cooperation. In the presence of trust consumption and investment levels increased. Confidence among the societies will decrease transaction costs by reduce necessity for formal arrangement there by economic growth will increase. Institutions may increase or decrease productivity. To achieve a sustainable economic growth and development, countries need high quality institutions (Yildirim & Gokalp, 2015).

Institutions promote the creation and growth of markets where economic agents can engage in mutually beneficially economic activities. When institutional quality increase, transaction costs decrease, transaction volumes increase and economic agents will expand their activities in to new areas and sectors. On the other hand, institutions increased efficiency of already existing markets. Greater public and private governance quality enable economic agents to secure higher overall returns on a given volume of contracting. Furthermore, greater quality of governance supporting institutions help the economy not suffers from welfare losses that arise from resource misallocation and distortions (Ugur, 2010).

Institutional quality can affect economic growth through allocation of resources. Providing public services, providing quasi-public goods and intervening to improve the market efficiency are all directly concerned with resource allocation. In addition, secure property rights promote economic growth. Secure property rights also promote efficient allocation of investments and promote efficient use of capital (Vijayaraghavan & Ward, 2001). In addition, high quality institutions create high quality government that reduces risk of coordination failure and agency problems; in turn quality of governance and coordination affects economic growth (Ugur, 2010).

According to Nawaz et al. (2014) weak institutions promote rent-seeking activities (activities through which public power is exercised for private gain). However strong institutions reduce chance of rent seeking activities and increase economic growth and productivity of factor of production. Generally, as institutional quality improves the rent seeking activities decrease and hence income increase and vice versa.

2.1.5.2. From economic growth to institutions

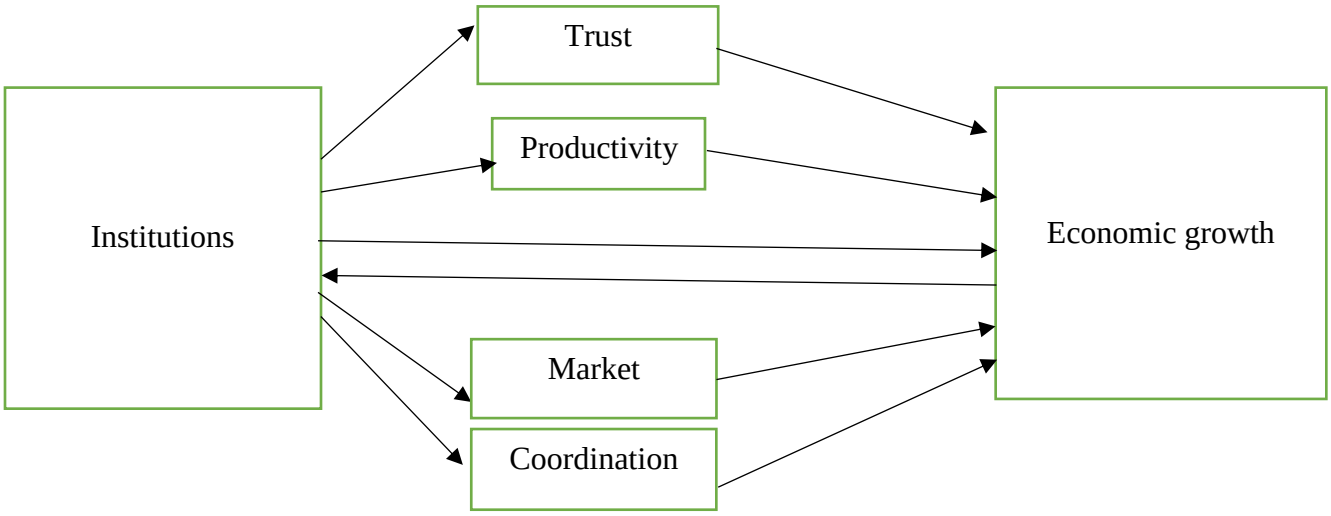
Even though the causality between institutions and economic growth may runs in both directions, from good institutions to economic growth and from economic growth to good institutions most studies were focused on institutions have impacts on economic growth and have not paid attention to the possibilities that economic growth may lead to better institutions.

Economic growth affects institutional quality through different ways. First, increased income due to economic growth may create higher demands for higher quality institutions, for example demands for political institutions with greater transparency and accountability. Second, greater income also makes better institutions more affordable. Establish and run institutions are costly and the high quality of institutions are expensive. Third, economic growth creates demand for new institutions (Chang, 2010).

According to Chang (2010) exclusively looking at one directions of causality that runs institutions to economic development and growth gives us only partial information about the relationship between institutions and economic growth. We should include the causality in the other direction, from economic growth to institutions to if we need to have a full understanding about the relationship between institutions and give the right policy implication.

We can summarize in diagram the relationship between institutions and economic growth. See figure 2.2 below.

Figure 2.2; institutions and economic growth; a diagrammatic model



Source; adapted from Ayen (2018)

In summary, theoretical literature on the relationship between economic growth and institutions shows that considering the role of institutions on economic growth of countries is a recent phenomenon. According to neo-classical growth theory economic growth is a function of only growth accounting factors (labor and capital accumulation) and institutions have no role on the economic growth. In contrast new institutional economics suggest that economic growth is a function of growth accounting factors and institutions. Moreover, neoclassical growth theory regard institutions as non-economic variable that are taken as exogenous but the New Institutional Economics (NIE) try to endogenize institutions. In addition, theoretical literatures show that institutions and economic growth may have bidirectional causality and institutions affect economic growth through various channels. Thus, this study adds to the literature by investigating the role of institutional quality on economic growth in Ethiopia.

2.3. Empirical literature review

In this section, the study reviewed the empirical literature on the institutional quality and economic growth. Following the work of North (1990) many investigations have been made to investigate the role of institutional quality on economic growth of a country. Nevertheless, large numbers of studies are cross country studies and country specific studies are few. Specifically, in Ethiopia

there is no study with the broad set of institutional quality measures. The next sections present the review of empirical studies on institutional quality and economic growth.

2.3.1. Cross-country studies

Most of the empirical literatures on the role of institutional quality on economic growth are cross country studies. Furthermore, many studies are panel data nature, used cross-countries data for intuitions quality indicators and measure of economic growth. Different cross-country studies used different methodologies in examining the role of institutional quality on economic growth. For example; ordinary list square (OLS), instrumental variable estimation technique (IV) and generalized method of moment (GMM). Thus, the current study presented cross-country studies depend on the method of estimation they used. Knack & Keefer (1995) and Vijayaraghavan & Ward (2001) used OLS method of estimation.

Knack & Keefer (1995) investigated the impact of institutions that protect property rights on economic growth, the study used international country risk guide (ICRG) and business environment risk intelligence indices of institutional quality and the study result revealed that institutions that protect property rights are crucial to economic growth and investment. In addition, Vijayaraghavan & Ward (2001) examined the relationship between economic growth and institutions in forty-three nations for the period 1975 to 1990. All countries except nine include in the sample are developing countries. The paper used four measures of institutions. Which are measure of governance, measure of security of property right, political freedom and government consumption as share of total consumption as a measure of government size and OLS method of estimation. The regression result revealed that all four institutional measures affect economic growth positively. However, only government consumption institutional variable is statistically significant, indicated that smaller governments are better. To determine the relative significance of four institutional variables the researchers employed a step – wise regression and found that security of property rights and size of government significantly explains the differential growth performance across countries. According to the regression result more secure property rights led to high level of economic growth.

However, OLS does not take into account for inter-temporal changes in the variables that could explain some of the variations in the growth rates; in this case endogeneity problem was not considered. Consequently, researchers tried to solve this problem by using instrumental variable estimation technique and two-stage least squares estimation procedure such as Acemoglu et al. (2000), Rodrik et al. (2002) and (Hall & Jones (1998)

Hall & Jones (1998) examined the quantitative importance of difference in social infrastructure (institutions) as a determinant of income difference across countries. They used data set includes 127 countries and they used an index of government anti-diversion policies (GADP) and openness measures. In addition, the study used distance from the equator, the Frankel-Romer predicted trade share and the fraction of the population speaking English and a European language as an instrument. The study result indicated that differences in social infrastructure (institutions) account for much of the difference in long-run economic performance.

Another study by Acemoglu et al.(2000) estimated the effect of institutions on economic performance. They used mortality rates faced by soldiers, bishops and sailors in the colonies in the 17^{th}, 18^{th}, and 19^{th} centuries as an instrument for current institutions. The study depends on argument that Europeans adopt different colonization strategies with different associated institutions. In the place where European faced high mortality rates they could not settle and they were more likely set up worse (extractive) institutions however in the place where Europeans faced low mortality rates, they tried to replicate European institutions with grate emphasis on private property and check and balance against government power and both kind of institutions persisted to the present. Instrumental variable estimation result indicated that difference in institutions explain approximately three quarters of the income per capital differences across the former colonies.

In addition, Rodrik et al. (2002) tried to estimate the respective contribution of institutions, trade, and geography in determining cross-country income levels. The study employed a two-stage least squares estimation procedure and also the study used rule of law index as a measure of institutional quality. The estimation result indicated that institutions are important in explaining the cross-country variation in economic growth. Institutions trump geography and openness. Controlling for

institutions, trade has a negative insignificant direct effect on income although trade has a positive effect on institutional quality. Similarly controlling for institutions, geography have weak direct effects on incomes although it has a strong indirect effect through institutions.

In this case (using instrumental variable estimation technique) the problem is to find out appropriate instrument for institutions. Thus, recently many studies used generalized method of moment (GMM) to take in to account the dynamic nature of the data (take in to account heterogeneity of country and control this heterogeneity). Such as Nawaz et al. (2014), Oluwatoyin & Folasade (2014), Efendic & Pugh (2015), Yildirim & Gokalp (2015), Kamil & Ishola (2015), Ayen (2018), Ceyhun, (2016), Malindini (2021) and Siyakiya (2017). However, these studies also come up with mixed results.

The study carried out by Oluwatoyin & Folasade (2014) investigated the impact of trade openness and institutions on economic growth in thirty selected Sub-Saharan African countries covering the period 1985 to 2012. The study employed least squares dummy variable (LSDV) and the generalized method of moments (GMM) techniques. The study used political right (proxy for political institutions), risk of expropriation (proxy for economic institutions) and ethnic tensions (proxy for cultural institutions). The study result revealed that these institutions have significant positive impact on economic growth in Sub-Saharan Africa countries. In addition, the study revealed that the political and cultural institutions have better influence on economic growth than economic institutions. The result also implied that ethnic tensions in a country have a negative influence on the level of economic growth of a country. This implies no country claim to grow when there are ethnic unrests in the country.

Another study by Nawaz et al. (2014) used worldwide governance indicator published by the World Bank as a measure of institutional quality and examined the impact of institutional quality on economic growth in thirty-five Asian countries over the period 1996-2012. The researchers divided the selected countries in to developed Asian countries and developing Asian countries based on income levels following the World Bank classifications. The study employed fixed effect model (FEM) and system generalized method of moment (SYS-GMM) method of estimation technique. Estimation has been carried out separately for the whole panel of countries as well as

for the developed and developing Asian countries. The estimation result indicated that institutions have a positive impact on economic growth in Asian countries. To examine the role of institutions on economic growth at various stage of economic development the researchers disaggregated their sample in to developed Asian countries and developing Asian countries. The result of disaggregated analysis indicated that institutions have positive impact for both developed and developing Asian countries. However, the contribution of institutions to economic growth is relatively high in developed Asian countries than developing Asian countries. They also found that different institutions perform differently for developed and developing Asian countries. For developing Asian countries even though all measure of institutions contributes significantly to economic growth the effect of government effectiveness and rule of law is greater. Similarly, the effect of government effectiveness, control over corruption and rule of law is more important than political stability, regulatory quality and voice and accountability in the full sample of Asian countries.

In addition, Yildirim & Gokalp (2015) used 23 institutional structure variables and per capital GDP as a measure of macroeconomic performance and analyzed the relationship between institutions and macroeconomic performance in 38 developing countries over the period 2000-2011. The result of this study revealed that institutional structure related indicators such as the integrity of the law system, foreign investment restriction, regulations on trade barriers, hiring-dismissal variables and private sector share in the banking system have a significant positive effect on macro-economic performance. However, Judiciary independence, government expenditures, transfers and subsidies, civil freedoms, black market exchange rate, collective agreement and political stability variables have a negative impact on macro-economic performance in developing countries. In addition, the quality of legal arrangements, property rights protection, marginal tax rate, political freedoms, tariffs, net negative interest, and hiring-minimum wage have insignificant impact on macroeconomic performance in developing countries.

On the other hand, Efendic & Pugh (2015) used the EBRD index of structural and institutional reforms to investigate the relationship between institutions and economic performance in transition countries over the period 1992-2007. They found that per capital GDP is determined by the entire

history of institutional reform under transition. Moreover, the time-horizon over which they measure institutional quality performance matter. With five-year changes showing the clearest effects on current levels of per capital GDP.

Ceyhun, (2016) analyzed the causal relationship between institutions, corruption and economic growth in Sub-Saharan Africa countries with in a multi variant co-integration and error correction frame work over the period 1996 to 2014. The study used economic freedom of the world index as a measure of institutional quality. The co-integration test result revealed that the variables are co-integrated. This implies that there is long-run relationship between corruption, institutions and economic growth. The researcher investigated the direction of causality between variables by using Granger causality test and found that there is short-term unidirectional causality from economic freedom (measure of institutional quality) to economic growth. While the in the long-term causality runs from economic growth and economic freedom to corruption in Sub-Saharan Africa countries. More over the study employed the FEVD and IRF to examine the dynamic interaction among corruption, institutions and economic growth in Sub-Sahara Africa outside the sample period of 1996 to 2014. The FEVD confirmed that corruption, institutions and economic growth are endogenous. IRF indicated that a shock to economic growth has a negative effect on economic freedom and a shock to economic freedom has a positive effect on economic growth. Furthermore, IRF indicated that there is positive unidirectional causality from economic freedom and economic growth to corruption in long-run and positive unidirectional causality from economic freedom to economic growth in the short-run in Sub-Saharan Africa countries.

In addition, Siyakiya (2017) tried to examine to what extent institutions affect overall economic performance measured by gross value added per capital in 28 European Union member states and 8 prospective members over the period of 1996-2014. The study employed GMM model and also the study used composite index of the simple average of government effectiveness, rule of law, voice and accountability, control over corruption, political stability and absence violence and regulatory quality as a measure of institutional quality. The study result shown that institutions have highly significant positive impact on gross value added per capital of all countries and disintegrated economies. However, the impact of institutions on economic growth is not uniform

across countries that are at different development stages. Furthermore, the impact of institutions on economic growth is greater in high income countries than in low-income countries. In contrast, Malindini (2021) investigate the impact of institutional quality on economic performance in the Southern African Development Community (SADC) region over the period 2009-2019 by using Worldwide Governance Indicators (WGI) as ameasure of institutional quality and found that governance quality has negative impact on economic growth. Moreover, the study found that in the region weak governance quality and the nature of the political framework fail to create an attractive and enabling institutional environment for economic growth, thus leading to low economic performance in the region.

Another study by Ayen (2018) investigated the relationship between institutions and economic growth in sixteen Sub-Saharan Africa countries covering the time period from 2002 to 2016. The study used measure of governance quality, economic freedom and political freedom represented by six, five, and two indices respectively and the study adopted the system generalized method of moment (SGMM) estimation techniques. The researcher also analyzed the interactive effect of institutions on economic growth. The empirical result of the study showed that among institutional measures government effectiveness, control of corruption, political stability and absence of violence, voice and accountability, legal system and protecting property rights, political right and civil liberties have significant positive effect on economic growth but access to sound money has significant negative effect on economic growth. However, rule of law, regulatory quality, government size, freedom to trade internationally and regulation on credit, labor and business have no significant effect on economic growth. Generally, the study result indicated that each institution has no equal effect on economic growth in Sub-Sahara Africa. The analyzed of interactive effect of institutions on economic growth showed that institutions improve economic growth more than individually when they are improved together and also institutions become more important with policy variables like government expenditure.

2.3.2. Time series studies

In this subsection, the study presented a review of related empirical studies which are country-specific analysis. Although there are few country specific studies they found mixed result.

Alexiou et al. (2014) tried to examine the short-run and long-run relationship between institutional quality and economic growth over the period 1972-2008 in Sudan. The researchers employed ARDL estimation technique and freedom house political freedom index (political right and civil liberties) as a measure of institutional quality. The study found that institutional quality determines economic performance of a country. Moreover, political freedom (average of political right and civil liberties) has significant negative impact on economic growth both in short-run and long-run. Moreover, the study suggests that in Sudan the absence of political freedoms is detrimental to its society in general.

Similarly, Utile et al. (2021) examined the impact of institutional quality on economic growth in Nigeria over the period 2001-2019. The study employed ARDL estimation technique and World Bank governance indicators as a measure of institutional quality. The single institutional index calculated from six governance quality indicators. The study result revealed that institutional quality has significant negative impact on economic growth both in short-run and long-run. Weak institutional quality in Nigeria has significant negative impact on economic growth.

Murtaza & Faridi (2016) investigated the role of governance quality and democratic institutions in economic institutions-economic growth nexus from1984-2013 in Pakistan. The study employed rolling window 2SLS technique in order to gauge time varying relationship among variables. The study used economic freedom of world (EFW) index, political risk components of international country risk guide and polity IV as a measure of economic institutions, governance quality and democratic institutions respectively. The study result revealed that the performance of economic institutions in encouraging economic growth of Pakistan depend on governance quality, democratic institutions and time dimensions. Moreover, the study found that quality of governance a long with democratic institutions significantly explains the relationship between economic growth and economic institutions. Governance quality indicators such as law and order, investment profile, government stability, democratic accountability, military in politics promote economic growth by promote the quality of economic institutions. However, government of Pakistan is lacking in controlling corruption and internal conflict that is why economic institutions losing its positive impact on economic growth.

An other study by Garedow (2022) examined how political institutions affect economic performance in Ethiopia. He used level of democracy, democratic accountability, regime durability and political violence as a measure of institutional quality and auto regressive distributed lag (ARDL) model. The study result revealed that level of democracy, regime durability and democratic accountability has long-run adverse impact on economic performance but political violence has insignificant impact and in the short-run political violence has negative effect on economic performance but level of democracy has insignificant impact. Generally the study result implies that deteriorations of political institutions harmfully affect economic performance in Ethiopia.

In summary, different empirical studies used different indicators as a measure of institutional quality and different method of estimation. Many studies are cross country study and only few studies are country level study. Empirical evidences indicates that all institutions are not equally important for economic growth (all institutional quality indicators have no similar effect on economic growth), some institutional quality indicators have positive impact on economic growth and others have negative impact. In addition, the impact of institutional quality on economic growth varies with the countries heterogeneous characteristics such as level of development of a country. Moreover, the result of empirical evidences on the relationship between institutional quality and economic growth are mixed such as Wandeda et al. (2021) and Siyakiya (2017) found that institutional quality measured by governance indicators has a significant positive impact on growth of countries. In contrast Malindini (2021), Utile et al. (2021) (used World Bank governance indicators as a measure of institutional quality) and Alexiou et al. (2014) (used political freedom index as a measure of institutional quality) found that institutional quality has negative impact on economic growth. In addition, Ayen (2018) found that from governance indicators government effectiveness, control of corruption, political stability and absence of violence, voice and accountability have positive impact on economic growth but rule of law and regulatory quality have insignificant impact. This mixed result is may be due to difference in measure of institutional quality, difference in the study sample area and period, and difference in methodology.

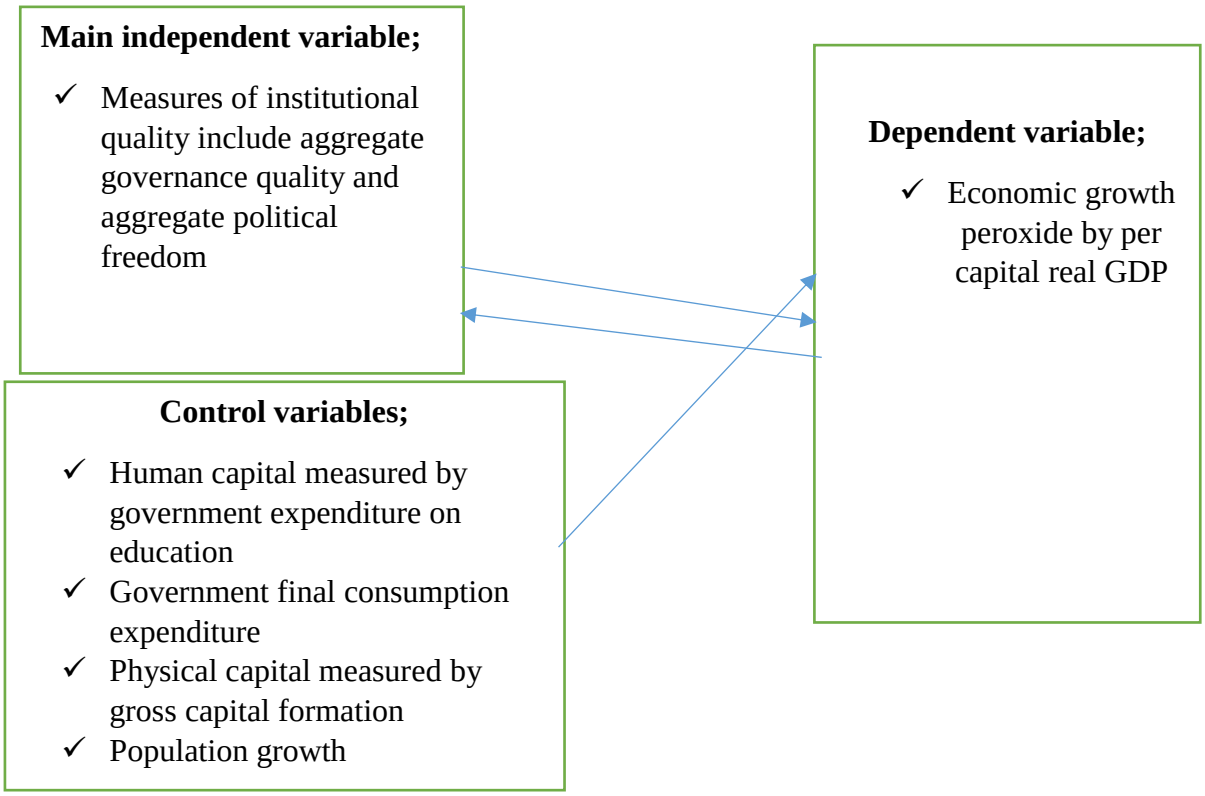
Gap in the literature

Both theoretical and empirical literatures indicate that studying the role of institutional quality on economic growth is current issue. The current study significantly differ from previous cross country studies by considering time series data in order to address heterogeneity of a country specific characteristics. Addressing context specificity through a time series outcomes may provide better understanding than cross countries studies that combines different countries together and above time series studies were not in the context of the Ethiopian economy. Based on the researcher knowledge, there is no prior study that examines the relation between institutional quality and economic growth in Ethiopia. Although Garedow (2022) examined the impact of political institutions on economic growth literatures indicated that institutions are a complex phenomenon and this study failed to capture all dimensions of institutions since. He only consider political institutions, the study also did not investigate threshold value of institutional quality, and not consider asymmetric impact of institutional quality on economic growth. Hence there is need of detailed analysis considering comprehensive measures of institutional quality. Thus, this study examines the relationship between institutional quality and economic growth in Ethiopia by using governance quality indicators and political freedom index as a measure of institutional quality. In addition, the study considers non-linearity in the relationship between institutional quality and economic growth.

The direction of causality between institutional quality and economic growth may get change with the addition or reduction in the number of countries since different countries have different socio economic characteristics. For that reason time series analysis is more preferable to examine the direction of causality between economic growth and institutional quality (Law and Bany- Ariffin, 2013). Thus, this study determine whether the causality between institutional quality and economic growth is bidirectional or unidirectional in Ethiopia by using Granger causality test. Moreover, this study tries to check whether poor institutional quality of Ethiopia associated with having low income.

2.4. Conceptual frame work

Figure 2.3 conceptual frame work of the study



Source; own computation

Institutional quality is theorized to have an impact on economic growth of a country. This study considers measure of institutional quality (governance quality and political freedom indicators) and control variables (government final consumption expenditure, human capital, physical capital and population growth). Further this study conceptualized that the relationship between institutional quality and economic growth may be feedback or bilateral (institutional quality affect economic growth and also economic growth has impact on institutional quality). In addition, this study also conceptualized that relationship between institutional quality and economic growth may be non-linear.

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

3.1. Introduction

The aim of this study is to examine the relationship between institutional quality and economic growth in Ethiopia. The section that follows presented the data source and type, theoretical frame work, model specification, and estimation method which employed to address the objective of this study. In addition, it also discusses the statistical tools and different diagnostic tests that are employed in this study.

3.2. Data type and Source

To address the objectives of the study, this study used secondary data which collected from different sources. The data for this study is drawn from sources like the National Bank of Ethiopia (NBE), World Bank, the International Monetary Fund (IMF), the International Country Risk Guide (ICRG), and the Freedom House (FH). More specifically, the data on institutional quality measures which are governance quality indicators and political freedom indicators drawn from the International Country Risk Guide (ICRG) and the Freedom House (FH) respectively and for control variables the data sourced from World Bank, national bank of Ethiopia and international monetary fund (IMF). The current study covers a period of 36 years, from the period (1985-2020). The period is chosen based on the availability of data on the measure of institutional quality (governance quality indicators) and to use more recent data.

3.3. Theoretical Framework

This part summarizes the visualization of growth theory which this study followed and how the role of institutional quality measures incorporated in economic growth model. To investigate the relationship between institutional quality and economic growth, this study relied on the human capital augmented neoclassical growth model which was developed by Mankiw et al. (1992),

which is the extension the Solow (1956) model by adding human capital accumulation in growth model. Thus, the aggregate production function in such model is given as;

$Y_t = K_t^{\alpha} H_t^{\beta} (A_t L_t)^{1-\alpha-\beta}$…… (1)

Where; Y_t is output, K_t is physical capital, L_t is labor input, H_t is human capital and A_t is level of technology. The model assumes that $\alpha+\beta<1$, which implies that diminishing return to overall capital. Where α and β are the share of physical and human capital in the total output respectively. In addition, the model assume that population and technology grow at n and g rate respectively. Therefore, the effective unit of labor A_tL_t should grow at (g+n) rate and both physical and human capital stock depreciates annually at δ rate.

Expressing the aggregate production function in terms of output per worker;

$Y_t/ A_tL_t = [K_t^{\alpha} H_t^{\beta} (A_tL_t)^{1-\alpha-\beta}] / A_tL_t$

$Y_t/ A_tL_t = K_t^{\alpha} H_t^{\beta} (A_tL_t)^{-\alpha-\beta}$

$Y_t/ A_tL_t = [\frac{Kt}{A_t L_t}]^{\alpha} [\frac{Ht}{A_t L_t}]^{\beta}$

$y_t = (k_t)^{\alpha}(h_t)^{\beta}$ ……... (2)

Where; $k_t = K_t/ A_tL_t$ and $h_t = H_t/ A_tL_t$;

Societies invest s_h and s_k amount of its total income in human capital and physical capital respectively and their evolution in the economy is given as; $\acute{K} = s_k Y_t - \delta k$ and $\dot{H} = s_h Y_t - \delta h$

$\acute{k}_t = \frac{dk}{dt} = \frac{dK/AL}{dt} = s_k y_t - (n+g+\delta) k_t$…… (3)

$\dot{h}_t = \frac{dh}{dt} = \frac{dH/AL}{dt} = s_h y_t - (n+g+\delta) h_t$…… (4)

We can substitute equation (2), (the value of y_t) in equation (3), and (4), setting $\acute{k}$ and $\dot{h}=0$, and transform it into natural logarithm to we obtain that;

$\ln s_k + \alpha \ln k^* + \beta \ln h^* = \ln(n+g+\delta) + \ln k^*$…… (5)

$\ln s_h + \alpha \ln k^* + \beta \ln h^* = \ln(n+g+\delta) + \ln h^*$ …… (6)

We can solve these two linear equations for the log of steady state value of k and h ($\ln k^*$ and $\ln h^*$). From equation (5), $\ln k^* (1- \alpha) = \ln s_k + \beta \ln h^* - \ln (n+g+\delta)$ …… (7)

And from equation (6)

$\ln h^* (1- \beta) = \ln s_h + \alpha \ln k^* - \ln(n+g+\delta)$ …… (8)

Multiply equation (8) by (1/1- β) then,

$\ln h^* = (1/1- \beta) \ln s_h + (\alpha/1- \beta) \ln k^* - (1/1- \beta) \ln (n+g+\delta)$ …… (9), and substitute it in equation (7).

We obtain that;

$\ln k^* [(1- \alpha) - (\alpha\beta/1- \beta) = (\frac{1- \beta- \alpha}{1- \beta})] = \ln s_k + (\beta/1- \beta) \ln h^* - (1/1- \beta) \ln (n+g+\delta)$ ……. (10)

Then multiply equation (10) by $\frac{1- \beta}{1- \beta- \alpha}$ we obtain the value of $\ln k^*$.

$\ln k^* = (1-\beta /1-\alpha-\beta) \ln s_k + (\beta/1-\alpha-\beta) \ln s_h - (1/1-\alpha-\beta) \ln(n+g+\delta)$ …… (11)

by substituting this equation on equation (9) we obtain the value of $\ln h^*$.

$\ln h^* = (\alpha /1-\alpha-\beta) \ln s_k + (1-\alpha /1-\alpha-\beta) \ln s_h - (1/1-\alpha-\beta) \ln(n+g+\delta)$ …… (12)

In order to solve steady state value of output per worker transform the production function (Y_t /L_t) in to natural logarithms give as; $\ln y_t^* = \ln A_t + \alpha \ln k^* + \beta \ln h^*$, then substitute the value of ln k* and ln h* in this equation and assume that the value of k^*, h^* and y^* denote the value of k, h and y respectively. Therefore, the value of $\ln y_t^*$;

$\ln y_t^* = \ln A_t + (\alpha /1-\alpha-\beta) \ln s_k + (\beta/ 1-\alpha-\beta) \ln s_h - (\alpha+ \beta/1-\alpha-\beta) \ln (n+g+\delta)$ …… (13)

Equation (13) shows that natural logarithm of output per worker depend on technology, the natural logarithm of investment in physical and human capital and natural logarithm of population growth rate plus growth rate of technology and depreciation of capital δ. However, in above equation as Mankiw et al. (1992) suggest that level of technology (A_t) is unobserved, therefore it can be captured by the error term $\ln A_t = \alpha + \varepsilon$ where; α is constant term and ε is a country specific shock. Then substitute it in equation (13).

$$\ln y_t^* = \ln y_t = \alpha + (\alpha / 1-\alpha-\beta) \ln s_k + (\beta / 1-\alpha-\beta) \ln s_h + (\alpha + \beta / 1-\alpha-\beta) \ln (n+g+\delta) + \varepsilon \ldots\ldots\ldots\ldots (14)$$

Where; $\alpha = \beta_0$, $(\alpha / 1-\alpha-\beta) = \beta_1$, $(\beta / 1-\alpha-\beta) = \beta_2$ and $(\alpha + \beta / 1-\alpha-\beta) = \beta_3$

Mankiw et al. (1992) suggest that 'A' term is not only just technology rather it refers resource endowment, climate and institutions etc., thus we take out technology from error term. In addition, Ayen (2018) argued that experience showed that the main factors responsible for large income differences across countries is not answered. For example, even though the effect of resource endowment and climate is not neglected, income differences across countries exist irrespective of resource endowment and climate. Thus, from the determinants of technology institutions take the higher share of 'A' in the model. Barro & Sala-i-Martin (1995, 1997), Rivera-Batiz & Romer (1991) also suggest that the main sources of difference in technological advancement across countries are government policies and institutional quality. Therefore, we can take out technology (A_t) from error term and substitute by institutional quality and government policy (government expenditure). Mankiw et al. (1992) assume that (g+δ) is 0.05. Thus, in investigating the relationship between institutional quality and economic growth the study considered human capital, physical capital, government final consumption expenditure and population growth as control variable which are used by many studies such as Ayen (2018), Ebaidalla (2014), Garedow (2022) and Akinlo & Olalekan (2021).

Then we can re write the above equation (14) as;

$$\ln y_t^* = \beta_0 + \beta_1 \ln (s_k)_t + \beta_2 \ln (s_h)_t + \beta_3 (INS)_t + \beta_4 \ln (GFCE)_t + \beta_5 LnN_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots (15)$$

3.4. Variable Description and Expected Sign

Before undertaking the empirical investigation, description of study variables is outlined below in order to present some preliminary explanation to the relationships between the study variables.

3.4.1. Dependent Variable

The dependent variable is gross domestic product per capital; it is the ratio of gross domestic product to the total population. The data is expressed in constant prices national currency (birr). In this study it transformed in to natural logarithm and used as a measure of economic growth of Ethiopia. The variable is transformed to logarithmic form to stabilize the variance of the series and avoid the problem of heteroscedasticity. The dependent variable of this study as a proxy for economic growth is real GDP per capita in logarithm form consistent with works of Derje (2018), Ebaidalla (2014) and Garedow (2022).

3.4.2. Independent Variables

In this study the main independent variable is institutional quality. Different studies used different measure of institutional quality. On the basis of the area focus, these measures can be categorized as measure of governance quality, political freedom and economic freedom. In this study the effect of aggregate governance quality and aggregate political freedom is investigated separately. However, the study does not include economic freedom due to lack of data over the study period. Thus, governance quality and political freedom indicators are discussed below.

Governance Quality

It measures the quality of governance of a country, which include the process by which government selected, the effectiveness of government in formulating and implementing sound policies and the respect of people and state for the institutions that govern social and economic interaction between them (Kaufmann et al, 2011). In order to measure the governance quality different studies have used different indicators. For example, studies like Wandeda, et al. (2021), Nawaz et al. (2014) and Siyakiya (2017) have used World Wide governance indicators (WGI) as a measure of

governance quality; Vijayaraghavan & Ward (2001) used ICRG political risk components and Murtaza & Faridi (2016) used seven indicators of international country risk guide (ICRG) political risk components as a measure of governance quality. Although many studies used worldwide governance indicators as a measure of governance quality, its short time span limit its use in time series analysis. Thus, following Murtaza & Faridi (2016) this study employ the seven indicators of ICRG political risk components as a measure of governance quality which are government stability index (GSTAB), internal conflict index (IC), investment profile index (IP), law and order index (LAO), democratic accountability index (DACC), index of military in politics (MIP) and corruption index (CORR) which is compiled by the international country risk guide (ICRG) as a measure of governance quality. ICRG indicators are widely used in empirical studies as reliable institutional quality indicators. Ebaidalla (2014), Oluwatoyin Matthew & Folasade (2014) and Knack & Keefer (1995) used these indicators as a measure of institutional quality. ICRG (2021) defines the above mentioned indicators as follows.

Government stability (GSTAB): it measures the government's capability to carry out its declared programs and remain in power without interference. It ranges from 0 to 12 which represent low and high governance quality respectively.

Internal conflict index (IC); measures the presence of political violence in the country and its actual or potential impact on governance. The index range from 0 to 12, 0 and 12 represent low and high governance quality respectively. The highest rating represent there is no armed or civil opposition to the government. The lowest rating represent there is an on-going civil war in a country.

Investment profile index (IP); it is an assessment of factors affecting the risk to investment. It refers government ability to formulate and implement sound policies and regulations which promote private sector development. It ranges from 0 to 12 which represent low and high governance quality respectively.

Law and order index (LAO); measure the extent to which the people are willing to be subjected under an authority that makes and implements laws and to adjudicate disputes. In particular it

measures quality of contract enforcement, policies, and courts, as well as the probability of the existence of crime and violence. It ranges from 0 to 6 which represent low and high governance quality respectively.

Democratic accountability index (DACC); it measure how government is responsive to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one. It ranges from 0 to 6 which represent low governance quality (Autarchies) and high governance quality (democracies) respectively.

Index of military in politics (MIP); it measure the existence of military in politics. The threat of military take-over can force an elected government to change policy or cause its replacement by another government more amenable to the military's wishes. In the existence of military in politics the government is unable to function effectively and therefore the country has environment which is not comfortable for foreign businesses. It ranges from 0 to 6 which represent low governance quality or a greater degree of military participation in politics and high governance quality or lower degree of military in politics respectively.

Corruption index (CORR); it assessment of existence of corruption in government. Government officials will ask for unlawful remuneration or take advantage of his/her position or power for their personal benefits. It reduces the efficiency of government and business by introducing an inherent instability into the political process. It ranges from 0 to 6 which represent low governance quality or a greater degree of existence of corruption in government and high governance quality or lower degree existence of corruption in government officials respectively.

In original data sets, different scales are used for governance quality indicators. Following Samad & Masih, (2018) for comparison purpose the index of all indicators are normalized (range between 0 and 1), which higher values implying higher governance quality and lower values implying lower governance quality. Then aggregate governance indicators computed by taking simple average of these seven indicators.

Higher quality of governance (institutions) in an economy means good policy formulation and implementation, absence of corruption and free from political interferences which promote economic growth (Duodu & Baidoo, 2020). Therefore, the study expects aggregate governance quality to have positive impact on economic growth.

Freedom House Political Freedom Index

Political freedom is a situation where citizens are free to participate in the political process, where the elections are fair and competitive (Freedom House, 2021). Freedom in the World survey by Freedom house provides an annual evaluation of the global freedom as experienced by individuals based on political rights and civil liberties.

Civil liberties; it include freedom of press, freedom of association, freedom of religion and freedom of speech (Gwartney & Lawson, 2002). Ethiopia is assigned a numerical rating on a scale of 1 to 7 for civil liberties. Rating of 1 indicates the highest degree of freedom and 7 the lowest level of freedom.

Political right; it represents the ability of citizens to participate in political process (vote, lobby and choosing among candidates) elections are democratic, fair, and competitive (alternative parties are allowed to participate in the election freely) (Gwartney & Lawson, 2002). Ethiopia is assigned a numerical rating on a scale of 1 to 7 for political right, which indicates the highest degree of freedom and the lowest level of freedom respectively. In current study, the researcher transform index so that higher value represent more freedom and lower values indicate least political freedom, thus 1 represent low freedom and 7 indicate high freedom. After transforming index the study used aggregate political freedom index which is calculated as simple average of political right and civil liberties and this index ranging from 1 to 7, rating of 1 indicates the lowest degree of political freedom and 7 the highest level of political freedom.

Strong political rights enable people to think freely and involves in investment and innovation activities. Countries with higher political freedom, then the functioning of government those create competition and efficient uses of resources increased and encourage innovations and inventions.

This leads to high economic growth (Ayen, 2018). Therefore, in this study it is expected that political freedom will have positive impact on economic growth.

According to Omteso and Mobolaji (2014) in order to deeply analyze the relationship between institutional quality and economic growth incorporating other control variables in the study model increases model accuracy and reliability of the estimates. As such based on the literature reviewed and the theoretical framework the current study include government final consumption expenditure, human capital, physical capital, and population growth. The measurement of the control variables and the expected relationship with economic growth is presented as follows. That is;

Physical capital (investment); Investment (capital formation) is the most fundamental determinant of economic growth of the country identified by both neoclassical and endogenous growth models. It is measured by gross capital formation. According to World Bank definition, gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Empirical evidences indicate that investment level of a country has positive impact on Economic growth of the country. Nawaz et al. (2014), Ayen (2018) and Siyakiya (2017) found that investment positively affect economic growth. Therefore, an increase in investment is expected to promote economic growth.

Human capital; it refers to the Knowledge and skills embodied in the people. In the current study it is measured by government expenditure on education. Literature shows that human capital promotes economic growth. Ebaidalla (2014) and Oluwatoyin & Folasade (2014) found that human capital has positive impact on economic growth. Therefore, in the current study it is expected that human capital will have positive impact on economic growth.

Population growth; it refer to the annual population growth rate for year t expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Malthus' population theory argues that population growth hamper economic growth of the country. Many existing empirical literature suggests that the impact of population on economic growth is negative. For example Fikadu et al. (2019), Ali (2003), Ebaidalla (2014) found that the population growth have significant negative impact on economic growth. Thus, in this study it is expected that population growth will have negative impact on economic growth.

Government final consumption expenditure; it refers government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). Government final consumption expenditure leads to deceleration of economic growth through disincentive effects of taxation and increased inefficiencies (Hajamini and Falahi, 2014). Therefore, in this study it is expected that government final consumption expenditure will have negative impact on economic growth.

Table 3.1: Summary of Variable measurement, data source and expected sign

Variables	Indicator	Data source	Expected sign
Economic growth	Real gross domestic product per capital (RGDPPC)	International monetary fund (IMF)	
Governance quality (GQ)	Aggregate governance quality	International country risk guide (ICRG)	**Positive**
Political freedom (PF)	Aggregate political freedom (PF)	Freedom house (FH)	**positive**
Government final consumption expenditure	Government final consumption expenditure	National bank of Ethiopia	**Negative**

Physical capital	Gross capital formation	National bank of Ethiopia	**Positive**
Human capital	Government expenditure on education	National bank of Ethiopia	**Positive**
Population growth	Population growth	World bank	**negative**

3.5. Method of Data Analysis and Model Specification

The theoretical framework presented discussion on the growth theory which the current study followed and how institutional quality measures and other control variables are incorporated in the economic growth model. Following the theoretical frame work, the study specified the economic growth function as follows; real GDP per capital as a function of governance quality, political freedom, government expenditure on education, gross capital formation, government final consumption expenditure and population growth. That is;

RGDPPC= F (GQ, PF, GCF, EDU, GFCE, N)……(16) .

The dependent variable (RGDPPC), government expenditure on education (EDU), gross capital formation (GCF), and government final consumption expenditure (GFCE) are in natural logarithm form.

3.5.1. Method of Data Analysis

To examine the relationship between institutional quality and economic growth the study used both descriptive and econometric method of data analysis.

3.5.2. Descriptive Analysis

In the descriptive analysis the study presented the overviews of the trends of real GDP per capital and institutional quality measures (aggregate governance quality and aggregate political freedom) in Ethiopia. For this purpose tools like, graphic analysis is employed. It is used to demonstrate the

trend of real GDP per capital and institutional quality measures (aggregate governance quality and aggregate political freedom) in Ethiopia. The aim of the trend analysis is to have a basic knowledge about how variables (real GDP per capital and institutional quality) are changing overtime in Ethiopia.

3.5.3. Econometric Analysis

The econometric analysis is used to empirically examine the relationship between institutional quality and economic growth. More specifically, to examine the short-run and long-run impact of institutional quality on economic growth, to determine threshold value of institutional quality, to investigate the asymmetric impact of institutional quality on economic growth and to determine the direction of causality between economic growth and institutional quality the study employed econometric analysis. The procedure for econometric analysis includes; determining whether variables used in the study are stationary or not, determining the optimal lag length, conducting co-integration test to examine whether there is long-run relationship between variables include in the study or not, estimating the long-run and short-run effect of institutional quality on economic growth, conducting Granger causality test to determine whether the causality between institutional quality and economic growth is unidirectional or bidirectional and finally conducting different diagnostic tests.

3.5.3.1. Estimation Method and model Specification

In time series analysis selecting appropriate estimation technique is crucial. This is because applying wrong estimation technique provides biased and unreliable estimates (Shrestha & Bhatta, 2018). Primarily, the selection of appropriate estimation method for time series analysis is based on unit root test result that determines the stationarity of the variables. Estimation methods which are commonly applied to analyze a stationary time series cannot be applied to analyze non-stationary time series.

There are alternative estimation methods in time series studies such as ordinary least square (OLS), vector autoregressive (VAR), vector error correction (VECM) model and autoregressive

distributed lag (ARDL) model. If all variables used in the study are stationary, ordinary least square (OLS) or vector auto regressive (VAR) model can provide unbiased estimate. Moreover, in OLS and VAR model all variables must be stationary at level (I (0)). In addition, VAR model can apply if all variables in the study are stationary at their first difference (I (1)) and there is no cointegration. VAR is a system of equation all the variables are explained by their lags and lags of other variables. But, if all variables are non-stationary OLS or VAR models may not be appropriate because the non-stationary variables is made stationary by taking first difference which in turn lead to loss of important information of the variables (Shrestha & Bhatta, 2018). So in this case we have to test if the variables are cointegrated or not. If variables are cointegrated, in order to capture both short-run and long-run relationship between variables Vector Error Correction Model (VECM) or auto regressive distribute lag (ARDL) model is better but if variables are not cointegrated we can apply VAR. VECM is a special case of the VAR for the variables in their first differences (Verbeek, 2008). Finally, if variables used in the study are mixed order of integration (some variables are stationary at level and others are stationary at first difference) autoregressive distributed lag (ARDL) model is better (Shrestha & Bhatta, 2018); (Nkoro & Uko, 2016)].

ARDL is a single approach having one dependent variable which is explained by lags of itself and the lags of independent variables (Enders, 2015). Autoregressive distributed lag (ARDL) model is an ordinary least square (OLS) based model which is applicable for time series with mixed order of integration (Shrestha & Bhatta, 2018).

ARDL model is preferred over other time series models because; first, it avoids problem of mixed order of co-integration (some variables are integration of order 0 and other variables are integration of order 1. That is, it can be applied whether the variables are purely order zero [I(0)], purely order one [I(1)], or mixed order of co-integration. This helps to avoid the pre-testing problems associated with cointegration analysis which requires the classification of the variables into I (0) and I(1). Second, it provides unbiased and efficient result even with small sample (Pesaran et al, 2001).

Considering the above advantages of ARDL model and following prior researchers such as Utile et al. (2021), Alexiou et al. (2014) and Garedow (2020) in order to examine the short-run and long-run impact of institutional quality on economic growth the current study used the ARDL model.

ARDL Model Specification

Thus, from equation (16) ARDL (p, q) model that examines the relationship between institutional quality measures and economic growth in Ethiopia specified as follow; the researcher transforms dependent variable and all control variables into natural logarithm. According to Curran (2018) logarithmic transformation, transform a highly skewed variables into a more normalized dataset and it also decrease the variability of the data and make the data more close to the normal distribution. Then equation (16) becomes;

$LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2 GQ_{t-i}+\sum_{i=0}^{q}\beta_3 PF_{t-i}+\sum_{i=0}^{q}\beta_4 LNGCF_{t-i}+\sum_{i=0}^{q}\beta_5 LNEDU_{t-i}+\sum_{i=0}^{q}\beta_6 LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_7 LNN_{t-i}+\epsilon_t$ (t= 1985, 1986, 1987……2020) ……. (17).

Where; LNRGDPPC is log of real GDP per capital, GQ_t is aggregate governance quality index at a time t, PF_t is aggregate political freedom index at time t, $LNGCF_t$ is log of gross capital formation at a time t, $LNEDU_t$ is log of government expenditure on education at a time t, $LNGFCE_t$ is log of government final consumption expenditure at a time t, and LNN is log of population growth at time t. The error term (ε_t) assumed to be normally and independently distributed with zero mean and constant variance, which captures all other independent variables which affect real GDP per capital in a country and not included in the study. In addition, β_0 is constant term, $\beta_1, \beta_2, \ldots\ldots, \beta_6$ represents the coefficient of institutional quality measures and other control variables and p and q are the lag length of dependent and independent variables respectively.

3.5.3.2. Estimation method and model specification for asymmetric impact of institutional quality

Linear ARDL model does not consider the possibilities that negative and positive variations in the independent variables may have different effect on the dependent variable. Moreover, linear ARDL model assumes positive and negative variations in the dependent variables have the same or equal effect on the dependent variable. Thus, to investigate the asymmetric or non-linear behavior of variables Shin et al. (2014) developed non-linear autoregressive distributive lag (NARDL) model, where independent variables are decomposed in to two partial sums namely

positive and negative. NARDL model indicate asymmetric impact of an independent variable on the dependent variable. Like ARDL model NARDL model is also applied regardless of whether the variables are I (0) or I (1) or combination of both. In addition, it is suitable for small sample. In addition, like ARDL model since NARDL model is not appropriate if there is any variable integration of order 2. For that reason before estimating the NARDL model the current study conducted a unit root test to check whether study variables are integrated of order 2. Then the study select appropriate lag length and study also under take co-integration test to check the existence long- run relationship among variables.

Thus, to check the asymmetric effect of institutional quality on economic growth the above equation (17) modified and the NARDL equation based on Shin et al. (2014) methodology is written as;

$$LNRGDPPC_t=\delta_0+\sum_{i=1}^{p}\delta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}(\delta_2^{+} GQ_{t-i}^{+}+\delta_3^{-}GQ_{t-i}^{-}+\delta_4^{+}PF_{t-i}^{+}+\delta_5^{-}PF_{t-i}^{-}+\delta_6 LNGCF_{t-i}+\delta_7 LNEDU_{t-i}+\delta_8 LNGFCE_{t-i}+\delta_9 LNN_{t-i})+\epsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (18).$$

In this equation institutional quality measures which are aggregate governance quality index (GQ) and aggregate political freedom index (PF) divide into the positive (represent improvement on institutional quality) and negative (represent decline in institutional quality) group. Moreover, the partial sum of positive and negative variations in GQ and PF are written below.

$$GQ_t^{+}=\sum_{j=1}^{t}\Delta GQ_j^{+}=\sum_{j=1}^{t}Max(\Delta GQ_j^{+},0)$$

$$GQ_t^{-}=\sum_{j=1}^{t}\Delta GQ_j^{-}=\sum_{j=1}^{t}Min(\Delta GQ_j^{-},0)$$

$$PF_t^{+}=\sum_{j=1}^{t}\Delta PF_j^{+}=\sum_{j=1}^{t}Max(\Delta PF_j^{+},0)$$

$$PF_t^{-}=\sum_{j=1}^{t}\Delta PF_j^{-}=\sum_{j=1}^{t}Min(\Delta PF_j^{-},0)$$

Where;

- ✓ $\delta_2^{+}$and δ_3^{-}, represents the impact of increase and decrease in GQ on real GDP per capital respectively.

- ✓ $\delta_4^+$and δ_5^-, represents the impact of increase and decrease in PF on real GDP per capital respectively.

3.5.3.3. Model specification for estimating threshold value of institutional quality

Law et al. (2013) suggested that whether there is an institutional quality threshold value for higher economic growth should be concerned by further studies. In addition, Zhuang et al. (2010) suggest that institutional quality is only effective when they are above the world average values. Strong institutional quality promotes economic growth than those with institutional quality below threshold level. On the other hand, Barro (1996) found a non-linear relationship between democracy level and economic growth which refers democracy can increase economic growth and negatively affect economic growth if it crosses a certain threshold level. Thus, the current study hypothesized that the relationship between institutional quality and economic growth may be U-shaped or inverted U-shaped. Therefore, in analyzing the relationship between institutional quality and economic growth this study adopts a standard quadratic relationship between institutional quality and economic growth by incorporating a square term of institutional quality in equation 17.

Then equation 17 can be written as: $LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2 GQ_{t-i}+\sum_{i=0}^{q}\beta_3(GQ_{t-i})^2+\sum_{i=0}^{q}\beta_4 PF_{t-i}+\sum_{i=0}^{q}\beta_5(PF_{t-i})2+\sum_{i=0}^{q}\beta_6 LNGCF_{t-i}+\sum_{i=0}^{q}\beta_7 LNEDU_{t-i}+\sum_{i=0}^{q}\beta_8 LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_9 LNN_{t-i}+\epsilon_t$…….(19).

This study hypothesized that the relationship between aggregate governance quality and economic growth can be U-shaped or inverted U-shaped. This hypothesis depends on the signs of β_2 and β_3, if both β_2 and β_3 are significant. If β_2 is negative and β_3 is positive, there is U-shaped non-linear relationship between governance quality and economic growth. On other hand if β_2 is positive and β_3 is negative, there is inverted U-shaped non-linear relationship between governance quality and economic growth. In these two cases the governance quality indicators threshold value can be obtained by first estimating the first order partial derivative of equation (19) with respect to GQ and setting equal to zero, and then solve it. That is, GQ^* (governance quality threshold) = $\frac{-\beta_2}{2\beta_3}$.

However, if β_2 and β_3 have the same sign the relationship between governance quality and economic growth is linear and there is no threshold value for governance quality index. Generally, to establish nonlinearity in the relationship between aggregate governance quality and economic growth, the two parameters must be significant and have opposite signs, otherwise, the relationship would be linear.

Similarly, the study also hypothesized that the relationship between aggregate political freedom index and economic growth can be U-shaped or inverted U-shaped. This hypothesis depends on the sign of β_4 and β_5. If β_4 is negative and β_5 is positive, there is U-shaped non-linear relationship between political freedom and economic growth. On other hand if β_4 is positive and β_5 is negative, there is inverted U-shaped non-linear relationship between political freedom and economic growth. In these two cases the political freedom threshold value can be obtained by first estimating the first order partial derivative of equation (19) with respect to PF and setting equal to zero, and then solve it. That is, PF^* (political freedom threshold) $=\frac{-\beta 4}{2\beta_5}$. However, if β_4 and β_5 have the same sign the relationship between political freedom and economic growth is linear and there is no threshold value for political freedom index. Generally, to analyze the nonlinear relationship between political freedom and economic growth, the two parameters must be significant and bear opposite signs, otherwise, the relationship would be linear.

3.5.4. Estimation procedure

In order to estimate above equations, the first step is carry out unit root test, second choose an appropriate lag length and third conduct co-integration test.

3.5.4.1. Unit root test

The procedure used to check whether the series is stationary or not is called unit root test. According to Gujarati (2004) the time series is stationary means that its mean, variance and covariance do not change systematically over time (mean, variance and covariance are time invariant). However, if the mean, variance and covariance of a time series are not the same at any point they measured, the time series is non-stationary.

There are different methods of testing unit roots such as Durbin-Watson (DW) test, Dickey-Fuller test (1979) (DF), Augmented Dickey- Fuller (1981) (ADF) test, Philip-Perron (1988) (PP) test, Kwiatkowski-Phillips-Schmidt Shin (1992) (KPSS), etc.

Because of its popularity and easy applicability the Augmented Dickey-Fuller (ADF) test is considered superior. The ADF test adjusts the DF test to take care of possible autocorrelation in error terms by adding the lagged difference term of the dependent variable (Nkoro & Uko, 2016). Thus, this study used Augmented Dickey-Fuller (ADF) unit root test developed by Dickey and Fuller (1981). The testing procedure for the ADF unit root test is specified as follows.

$\Delta y_t = \alpha + \delta t + \gamma y_{t-1} + \sum_{i=1}^{p} \lambda \Delta y_{t-1} + \epsilon_t$ ..... (20)

Where; $y_t$is a time series variables included in this study at time t, t is a time trend variables, Δ represent the first difference operator, ϵ_t is the error and p is the optimal lag length of each variable chosen.

The null hypothesis of this test is $\gamma=0$ (the variable has unit root – the variable is non-stationary) against alternative hypothesis of $\gamma<0$ (the variable doesn't have unit root or the variable is stationary). If the absolute value of ADF t-statistics is less than the absolute value of t-critical values, the null hypothesis of non-stationary is not-rejected, thus the series is non-stationary. However, if the absolute value of ADF t-statistics is greater than the absolute value of the critical values, the null hypothesis of non-stationary is rejected, thus the series is stationary. This decision can be verified using other related tests, such as Philips-Perron (PP) test. PP test has the same null hypothesis as ADF, and its asymptotic distribution is the same as the ADF test statistic.

3.5.4.2. Selecting optimal lag length

In conducting co-integration test and applying ARDL and NARDL model, selection of optimal lag length is very important. There are different information criterions to select optimal lag length such as Akakie information criterion (AIC), Bayes information criterion (BIC) or Schwartz information criterion (SIC), Hannan-Quinnan criterion (HQC). AIC is better for small sample size. Thus, this study used AIC to determine optimal lag length (Liew, 2004).

3.5.4.3. ARDL bound test to co-integration

Co-integration test help us to know whether the variables in the study model are co-integrated or not. Unlike Johansen and Juselius (1990) co-integration that requires all variables are I (1), ARDL bounds co-integration test give realistic and efficient estimates, irrespective of whether the variables are I (0) or I (1) or combination of both (Nkoro & Uko, 2016). Thus, this study used ARDL bound test to co-integration. The null hypothesis of this test is no long-run relationship between variables against alternative hypothesis of there is long-run relationship between variables. F-statistics is used to identify the existence of long-run relationship between variables.

The value of F-statistics can be compared with critical values provided by [Pesaran et al, 2001; Narayan 2004]. However, according to Narayan (2004) critical values provided by Pesaran et al, (2001) are based on large size and cannot apply for small size. Thus, this study used critical values provided by Narayan (2004). Narayan (2004) provides a set of critical values for small sample sizes ranging from 30 to 80 observations. If computed F-statistics falls outside this bounds conclusive decision are made. That is if F-statistics greater than upper bound critical value, the null hypothesis of no long-run relationship between variables is rejected. Conversely if F-statistics lower than the lower bound critical value, the null hypothesis of no long-run relationship among variables cannot be rejected. However, if computed F-statistics falls between lower and upper bound the decision is inconclusive.

Therefore, to check the existence of long-run relationship between variables, ARDL bound test to cointegration for equation (17) can be specified as follows.

$$\Delta LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1\,\Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2\,\Delta GQ_{t-i}+\sum_{i=0}^{q}\beta_3\,\Delta PF_{t-i}+\sum_{i=0}^{q}\beta_4\,\Delta LNGCF_{t-i}+\sum_{i=0}^{q}\beta_5\,\Delta LNEDU_{t-i}+\sum_{i=0}^{q}\beta_6\,\Delta LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_7\,LNN_{t-i}+\alpha_1 LNRGDPPC_{t-1}+\alpha_2 GQ_{t-1}+\alpha_3 PF_{t-1}+\alpha_4 LNGCF_{t-1}+\alpha_5 LNGEDU_{t-1}+\alpha_6 LNGFCE_{t-1}+\alpha_7\,LNN_{t-1}+\epsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (21)$$

Where; β_i are the short-run coefficients, α_i are long-run coefficients, Δ denote first difference operator, and ϵ_t is the error term. The null hypothesis of the bound test based on F-statistics used for joint null hypothesis is; H_0: $\alpha_1=\alpha_2=\alpha_3=\ldots\ldots\ldots=\alpha_7=0$ {there is no long-run relationship

between variables}, against alternative hypothesis H_1: $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \ldots\ldots\ldots \neq \alpha_7 \neq 0$ {there is long run relationship between variables}.

If there is an evidence of existence of long-run relationship between variables the following long-run ARDL (p, q_l, q_2, ……., q7) model and error correction model will be estimated. The long-run ARDL model is given as follow;

$$LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2 GQ_{t-i}+\sum_{i=0}^{q}\beta_3 PF_{t-i}+\sum_{i=0}^{q}\beta_4 LNGCF_{t-i}+\sum_{i=0}^{q}\beta_5 LNEDU_{t-i}+\sum_{i=0}^{q}\beta_6 LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_7 LNN_{t-i}+\epsilon_t \ldots\ldots\ldots\ldots (22)$$

Confirming the existence of long-run relationship between variables, the study used the error correction model (ECM) to find the short-run dynamics.

ECM version of ARDL model (short-run Error correction model)

One way of solving non-stationarity of the variable is to difference the data. However in this case the regression equation does not give information about the long-run behavior of the parameters in the model. To solve this problem the concept of co-integration and ECM is imperative. ECM estimates the speed of adjustment to long-run equilibrium. Thus, ARDL model of the co-integration is reparametrized into a dynamic error correction model by linear transformation. The ECM integrates the short-run dynamics with the long-run equilibrium without losing long-run information. The coefficient of ECM is expected to be negative and highly significant. Moreover, the negative coefficient of ECM shows the extent to which the previous year disequilibrium is being corrected or adjusted in the current year while the positive coefficient indicates a divergence (Nkoro & Uko, 2016).

ECM version of ARDL model (error correction model) for equation 17 specified as follows;

$$\Delta LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1 \Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2 \Delta GQ_{t-i}+\sum_{i=0}^{q}\beta_3 \Delta PF_{t-i}+\sum_{i=0}^{q}\beta_4 \Delta LNGCF_{t-i}+\sum_{i=0}^{q}\beta_5 \Delta LNEDU_{t-i}+\sum_{i=0}^{q}\beta_6 \Delta LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_7 \Delta LNN_{t-i}+\gamma ECM_{t-1}+u_t \ldots\ldots\ldots\ldots (23)$$

Where; ECM is error correction term, γ speed of adjustment parameter, and u_t is error component associated with ECM. To further confirm the existence of cointegration term γ expected to be negative and statistically significant.

In order to confirm the existence of long-run relationship in the asymmetric relationship model the study used non-linear autoregressive distribute lag (NARDL) model bound test and NARDL bound test to co-integration for equation (18) can be specified as follows.

$\Delta LNRGDPPC_t=\delta_0+\sum_{i=1}^{p}\delta_1\,\Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}(\ \delta_2^{+}\Delta GQ_{t-i}^{+}+\delta_3^{-}\Delta GQ_{t-i}^{-}+\delta_4^{+}\Delta PF_{t-i}^{+}+\delta_5^{-}\Delta PF_{t-i}^{-}+\delta_6\Delta LNGCF_{t-i}+\delta_7\Delta LNEDU_{t-i}+\delta_8\Delta LNGFCE_{t-i}+\delta_9 LNN_{t-i})+\theta_1 LNRGDPPC_{t-1}+\theta_2^{+}GQ_{t-1}^{+}+\theta_3^{-}GQ_{t-1}^{-}+\theta_4^{+}PF_{t-1}^{+}+\theta_5^{-}PFA_{t-1}^{-}+\theta_6 LNGCF_{t-1}+\theta_7 LNEDU_{t-1}+\theta_8 LNGFCE_{t-1}+\theta_9 LNN_{t-1}+\epsilon_t$…….(24)

Where; δ_i are the short-run coefficients, θ_i are long-run coefficients, Δ denote first difference operator, and ϵ_t is the error term. The null hypothesis of the bound test based on F-statistics used for joint null hypothesis is; H_0: $\theta 1=\theta_2^{+}=\theta_3^{-}=\theta_4^{+}=\theta_5^{-}=,\ldots..,\theta_6=0$ (there is no long-run relationship between variables) against H_1: $\theta 1\neq\theta_2^{+}\neq\theta_3^{-}\neq\theta_4^{+}\neq\theta_5^{-}\neq,\ldots..,\theta_6\neq 0$ (there is long-run relationship between variables). Decision; if F-statistics greater than upper bound critical value, the null hypothesis of no long-run relationship between variables is rejected. Conversely if F-statistics lower than lower bound critical value, the null hypothesis of no long-run relationship among variables is not rejected.

After finding the existence of long-run relationship between variables the following long-run NARDL ($p, q_l, q_2, \ldots\ldots, q_9$) model and NARDL error correction model is estimated. The long-run NARDL model is given as follow;

$LNRGDPPC_t=\delta_0+\sum_{i=1}^{p}\delta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}(\ \delta_2^{+}GQ_{t-i}^{+}+\delta_3^{-}GQ_{t-i}^{-}+\delta_4^{+}PF_{t-i}^{+}+\delta_5^{-}PF_{t-i}^{-}+\delta_6 LNGCF_{t-i}+\delta_7 LNEDU_{t-i}+\delta_8 LNGFCE_{t-i}+\delta_9 LNN_{t-i})+\epsilon_t$…….(25) and the NARDL error correction model specified as follow; $\Delta LNRGDPPC_t=\delta_0+\sum_{i=1}^{p}\delta_1\Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}(\ \delta_2^{+}\Delta GQ_{t-i}^{+}+\delta_3^{-}\Delta GQ_{t-i}^{-}+\delta_4^{+}\Delta PF_{t-i}^{+}+\delta_5^{-}\Delta PF_{t-i}^{-}+\delta_6\Delta LNGCF_{t-i}+\delta_7\Delta LNEDU_{t-i}+\delta_8\Delta LNGFCE_{t-i}+\delta_9\Delta LNN_{t-i})+\phi ECT_{t-1}+\epsilon_t$……..(26)

Where; δ_2^+, δ_3^-, δ_4^+, and δ_5^- represents asymmetric short-run dynamics and ϕ is an error correction term that indicates speed of adjustment. Dynamic stability requires the coefficient of ECT to be negative and less than one.

To test whether the positive and negative effect of governance quality and political freedom significantly differ from each other in short-run and long-run the study undertake long-run and short-run symmetry test by using Wald test. Long-run symmetric test of null and alternative hypothesis given as follows.

H_0: $\theta_2^+ = \theta_3^-$ (there is no long-run asymmetry), against H_1: $\theta_2 \neq \theta_3^-$(there is long-run asymmetry), for governance quality

H_0: $\theta_4^+ = \theta_5^-$ (there is no long-run asymmetry), against H_1: $\theta_4^+ \neq \theta_5^-$(there is long-run asymmetry), for political freedom

Short-run symmetric test of null and alternative hypothesis given as follows.

H_0: $\delta_2^+ = \delta_3^-$ (there is no short-run asymmetry), against H_1: $\delta_2 \neq \delta_3^-$ (there is short-run asymmetry), for governance quality

H_0: $\delta_4^+ = \delta_5^-$ (there is no short-run asymmetry), against H_1: $\delta_4^+ \neq \delta_5^-$ (there is short-run asymmetry), for political freedom

If p-value of the chi-square statistics is significant (less than 5 %); we can reject the null hypothesis of no asymmetry. Conversely if p-value of the chi-square statistics is insignificant (greater than 5 %), we cannot reject the null hypothesis of no asymmetry.

When the null hypothesis of no asymmetry is rejected, we can obtain the dynamic multiplier of the change of positive and negative variation of explanatory variables. Moreover, the asymmetric cumulative multiplier effect of 1% change in GQ_{t-i}^+ and GQ_{t-i}^- is formulated as;

$M_h^+ = \sum_{i=0}^{h} \frac{\Delta lnrgdppc_{t+j}}{\Delta GQ^+_{t-i}}$, $M_h^- = \sum_{i=0}^{h} \frac{\Delta lnrgdppc_{t+j}}{\Delta GQ^-_{t-i}}$

Similarly, the asymmetric cumulative multiplier effect of 1 % change in PF_{t-i}^{+} and PF_{t-i}^{-} is formulated as;

$M_h^{+}=\sum_{i=0}^{h}\frac{\Delta lnrgdppc_{t+j}}{\Delta PF^{+}_{t-i}}$, $M_h^{-}=\sum_{i=0}^{h}\frac{\Delta lnrgdppc_{t+j}}{\Delta PF^{-}_{t-i}}$

It should be observed that as 'h'→∞, then M_h^{+} and M_h^{-} will approach to $\beta^{+}$and β^{-}. Where $\beta^{+}= -\theta_2^{+}/ \theta_1$, $-\theta_4^{+}/ \theta_1$and $\beta^{-} = -\theta_3^{-}/ \theta_1$, $-\theta_5^{-}/ \theta_1$

Finally, to check the existence of long-run association between variables in the model for estimating the institutional quality threshold, the ARDL bound test to co-integration for equation (19) can be specified as follows.

$\Delta LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1\,\Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2\,\Delta GQ_{t-i}+\sum_{i=0}^{q}\beta_3\,(\Delta GQ_{t-i})^2+\sum_{i=0}^{q}\beta_4\,\Delta PF_{t-i}+\sum_{i=0}^{q}\beta_5\,(\Delta PF_{t-i})^2+\sum_{i=0}^{q}\beta_6\,\Delta LNGCF_{t-i}+\sum_{i=0}^{q}\beta_7\,\Delta LNEDU_{t-i}+\sum_{i=0}^{q}\beta_8\,\Delta LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_9 LNN_{t-i}+\alpha_1 LNRGDPPC_{t-1}+\alpha_2 GQ_{t-1}+\alpha_3(GQ_{t-1})^2+\alpha_4 PF_{t-1}+\alpha_5(PF_{t-1})^2+\alpha_6 LNGCF_{t-1}+\alpha_7 LNGEDU_{t-1}+\alpha_8 LNGFCE_{t-1}+\alpha_9\,NN_{t-1}+\epsilon_t$…….(27)

Where; β_i are the short-run coefficients, α_i are long-run coefficients, Δ denote first difference operator, and ϵ_t is the error term. The null hypothesis of the bound test based on F-statistics used for joint null hypothesis is; H_0: $\alpha_1= \alpha_2= \alpha_3=\ldots\ldots\ldots =\alpha_9=0$ {there is no long-run relationship between variables}, against alternative hypothesis H_1: $\alpha_1\neq\alpha_2\neq\alpha_3\neq\ldots\ldots\ldots \neq\alpha_9\neq0$ {there is long-run relationship between variables}.

If there is an evidence of existence of long-run relationship between variables the following long-run ARDL (p, q_l, q_2, ……., q_9) model and error correction ARDL model estimated. The long-run ARDL model is given as follow;

$LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1 LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2 GQ_{t-i}+\sum_{i=0}^{q}\beta_3\,(GQ_{t-i})^2+\sum_{i=0}^{q}\beta_4 PF_{t-i}+\sum_{i=0}^{q}\beta_5\,(PF_{t-i})^2+\sum_{i=0}^{q}\beta_6 LNGCF_{t-i}+\sum_{i=0}^{q}\beta_7 LNEDU_{t-i}+\sum_{i=0}^{q}\beta_8 LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_9 LNN_{t-i}\,\epsilon_t$……(28)

Short-run error correction model specified as follows;

$\Delta LNRGDPPC_t=\beta_0+\sum_{i=1}^{p}\beta_1\,\Delta LNRGDPPC_{t-i}+\sum_{i=0}^{q}\beta_2\,\Delta GQ_{t-i}+\sum_{i=0}^{q}\beta_3\,(\Delta GQ_{t-i})^2+\sum_{i=0}^{q}\beta_4\,\Delta PF_{t-i}+\sum_{i=0}^{q}\beta_5\,(\Delta PF_{t-i})^2+\sum_{i=0}^{q}\beta_6\,\Delta LNGCF_{t-i}+\sum_{i=0}^{q}\beta_7\,\Delta\ LNEDU_{t-i}\ +\sum_{i=0}^{q}\beta_8\,\Delta LNGFCE_{t-i}+\sum_{i=0}^{q}\beta_9\,\Delta LNN_{t-i}+\gamma ECM_{t-1}+u_t$……..(29)

Where; ECM is error correction term, γ speed of adjustment parameter, and u_t is error component associated with ECM. To further confirm the existence of cointegration term γ expected to be negative and statistically significant.

3.6. Granger causality test

Many researchers ignore the possibilities that the causality between institutional quality and economic growth may also runs from economic growth to institutional quality. However, this study considers that the causality may run from economic growth to institutional quality. Thus, this study undertake Granger causality test to determine the direction of causality between institutional quality indicators and economic growth.

Let us assume there are two variables x and y, we can say that the causality run from x to y or x cause y (x→y), if after controlling the past value of y, the past value of x should contain information that helps to predict y. If after controlling the past value of x, the past value of y contain information that helps to predict x, in this case we can say that the causality run from y to x or y cause x (y→x). If one of these relationships is true, this indicates that the existence of unilateral causality between them. But if both relationships are true, it shows that there is feedback or bilateral causality between them (y↔x) (Granger, 1969).

Following the Granger method the causal relationship between institutional quality measures (governance quality and political freedom) and economic growth can be specified as follows.

$GQ_t=\sum_{k=1}^{K}\emptyset_k\ GQ_{t-k}\ +\sum_{l=1}^{L}\varphi_l\ LNRGDPPC_{t-l}+\theta_t$…… (30)

$LNRGDPPC_t=\sum_{m=1}^{M}\gamma_m\ LNRGDPPC_{t-m}\ +\sum_{n=1}^{N}\mu_n GQ_{t-n}+v_t$…… (31)

Where t=1, 2…...T, $LNRGDPPC_t$ is log of per capital real GDP, GQ_t is governance quality in t period, θ_t , v_t are random error terms, k, l, m, and n, are appropriate lagged values to be chosen and ∅, φ, γ, and μ are estimated parameters.

$PF_t=\sum_{o=1}^{O} \phi_o \, PF_{t-o} + \sum_{p=1}^{P} \lambda_p \, LNRGDPPC_{t-p}+\theta_t$…… (32)

$LNRGDPPC_t = \sum_{q=1}^{Q} \omega_q \, LNRGDPPC_{t-q} + \sum_{r=1}^{R} \psi_r PF_{t-r} + v_t$…… (33)

Where; t=1, 2…...T and $LNRGDPPC_t$ is log of real GDP per capital, PF_t is political freedom in t period, θ_t and v_t are random error terms, o, p, q, and r, are appropriate lagged values to be chosen and, ϕ, λ , ω, and ψ are estimated parameters.

Equation (30) and (31), shows that economic growth as a cause for governance quality and governance quality Granger-cause economic growth respectively. Similarly, Equation (32) and (33) shows that economic growth cause political freedom and aggregate political freedom as a cause for economic growth respectively. To determine the direction of causality between governance quality and economic growth the null hypothesis of equation 30 (H0: $\varphi l=0$) where l=1, 2…. L. This hypothesis indicates that economic growth does not Granger-cause governance quality. Against alternative hypothesis (H1: $\varphi l\neq 0$). Similarly, for equation (31); null hypothesis (H0: $\mu_n=0$) where n=1, 2…..., N. this hypothesis indicate that governance quality does not cause economic growth against alternative hypothesis (H1: $\mu_n\neq 0$). If one of two null hypotheses are failed to rejected, it implies there is unidirectional causality between aggregate governance quality and economic growth. However, if both null hypotheses are rejected there is feedback or bilateral causality between them, thus two variables determined endogenously. In addition, if both null hypothesis in equation 30 and 31 are failed to rejected, it implies that there is no causal relationship between economic growth and aggregate governance quality.

To determine the direction of causality between aggregate political freedom and economic growth the null hypothesis of equation 32 (H0: $\lambda_p=0$) where p=1, 2…. P. this hypothesis indicates that economic growth does not Granger-cause political freedom. Against alternative hypothesis (H1: $\lambda_p\neq 0$). Similarly, for equation (33); null hypothesis (H0: $\psi_r=0$) where r=1, 2…..., R. This hypothesis indicates that political freedom does not cause economic growth against alternative hypothesis (H1: $\psi_r\neq 0$). If one of two null hypotheses are failed to rejected, it implies there is unidirectional causality between political freedom and economic growth. However, if both null hypotheses are rejected there is feedback or bilateral causality between them. But if both null

hypothesis in equation 32 and 35 are failed to rejected, it implies that there is no causal relationship between economic growth and political freedom.

In addition, this study assumes that the positive and negative shocks in institutional quality may have different Granger-causal impacts on the economic growth. The study tries to detect the possible nonlinear linkage between institutional quality (governance quality and political freedom) and economic growth by splitting governance quality and political freedom into positive and negative components. Thus, this test separates the causal impact of positive shocks from negative shocks. All other discussions are similar with above discussion.

3.7.Diagnostic tests

Diagnostic test tell us about the robustness of the estimated coefficients. Thus, to check the validity of the estimated short-run and long-run ARDL and NARDL model this study undertakes some diagnostic tests.

Autocorrelation test

Error terms are not serially correlated if the covariance between error terms over time is zero. When two or more consecutive error terms are correlated, we can say that error term is subject to autocorrelation or serial correlation. Omitted variables, incorrect functional forms, data manipulation, non-stationarity, and inadequate dynamic specification of the model may cause autocorrelation problem (Verbeek, 2004). There are different test for autocorrelation including Durbin-Watson and Breush Godfery (LM) test. Durbin Watson test is totally inapplicable when the lagged dependent variable appears as independent variables. However, Breush Godfery (LM) test avoid this limitation of DW test (Gujarati, 2004). Since lagged real GDP per capital is used as one of independent variables in the study model, this study used Breush Godfery (LM) test. The null hypothesis of this test is there is no serial correlation against the alternative hypothesis of error terms is serially correlated. If the probability of chi2 is statistically insignificant (greater than 5%), the null hypothesis of no serial correlation is not rejected. In contrast if the probability of chi2 is statistically significant (less than 5%), the null hypothesis of no serial correlation is rejected and concluded that the error terms are serially correlated.

Heteroskedasticity test

The Heteroskedasticity states that the variance of unobserved error term across observation is not constant. On the other hand, if the variance of unobserved error term across observation is constant it is said to be homoscedasticity (Gujarati, 2004). In the presence of Heteroskedasticity estimates are consistent but not efficient. This lack of efficiency violates the BLUE property of the estimates and hence makes the hypothesis testing inappropriate and also it will lead to invalid inference through biased standard error (Gujarati, 2004). There are different test for Heteroskedasticity including White test and Breush Pagan (LM) test. If the number of observations is small the power of the White test may be lower than Breush Pagan (LM) test (Verbeek, 2004). Thus, this study used Breusch-Pagan (LM) test. The null hypothesis of this test is error term variance is homoscedasticity (constant) against the alternative hypothesis of error term variance is heteroskedastic (not constant). If the probability of chi2 is insignificant, the null hypothesis is not rejected and concluded that the model has no heteroskedasticity problem, but if it is significant, the null hypothesis is rejected and concluded variance of error term is not constant (the model has heteroscedasticity problem).

Normality test

In order to determine whether the data is well-modeled by a normal distribution or not, this study undertake normality test by using Jarque-Bera normality test. It is a joint asymptotic test whose statistics is calculated from the skewness and Kurtosis of the residual. The null hypothesis of this test is that the residuals are normally distributed against alternative of the residuals are not normally distributed. If the probability value of Jarque-Bera statistics is less than 5 percent then reject null hypothesis of the residuals are normally distributed, means that the residual are not normally distributed but if the probability value of Jarque-Bera statistics is greater than 5 percent then the null hypothesis of the residuals are normally distributed is not rejected.

Model stability test

To evaluate the stability of the regression coefficients the study used the cumulative sum of squares (CUSUMSQ) of the recursive residual test and the cumulative sum (CUSUM). These tests are

based on the analysis of the scaled recursive residuals (Turner, 2010). If both CUSUM and CUSUMSQ lines are within the critical bounds at a significant level of 5%, thus, it can be concluded that there is no structural instability in the model during the period under investigation. From this, the model appears to be stable and efficient in estimating short-run and long-run relationship between the dependent variable and the explanatory variables.

CHAPTER FOUR

4. RESULT AND DISCUSSION

4.1.Descriptive analysis

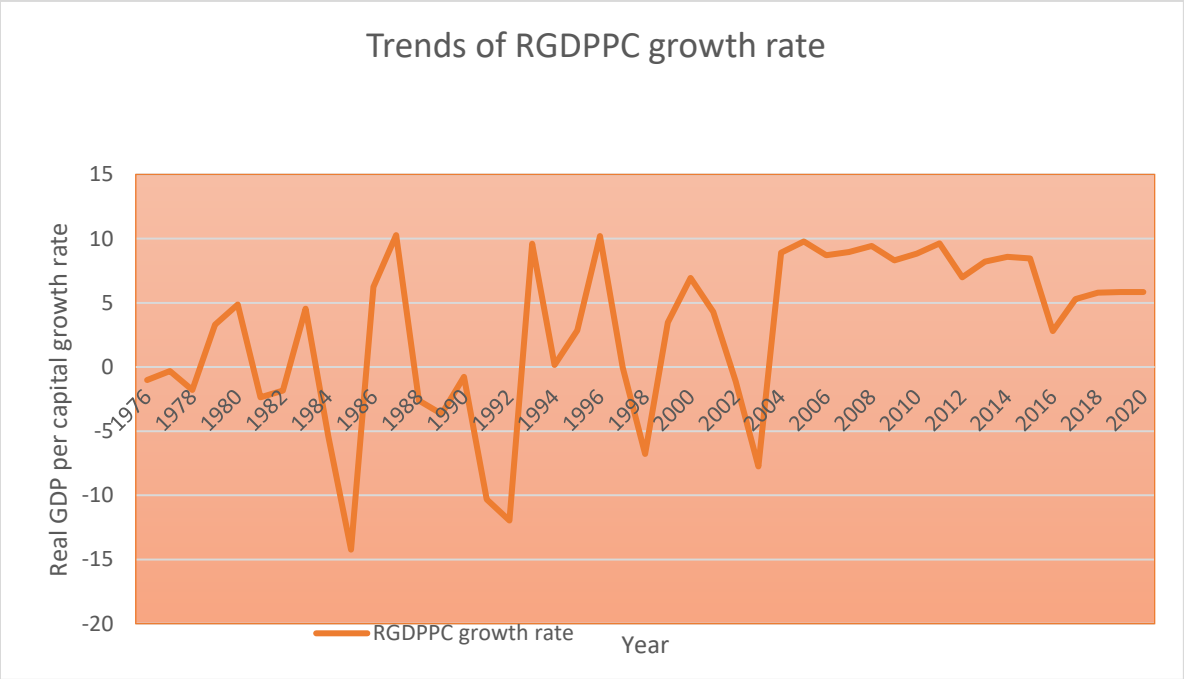
4.1.1. Introduction

Along with the study objective, examine the relationship between institutional quality and economic growth this section presents the results of the descriptive analysis. Moreover, in this chapter the trends of economic growth and institutional quality in Ethiopia are presented. The trend analysis provides us a picture of how institutional quality and economic growth behave overtime in Ethiopia.

4.1.2. Trends of Economic Growth rate (measured by real GDP per capital) in Ethiopia

In modern Ethiopian history, the country has experienced four political regimes: the imperial era (1930 to 1973/74), the socialist (Derg) regime (1974/75- 1990/91), the EPRDF regime (1991/92-2017/2018) and prosperity regime (2018/2019 to present). Economic performance in Ethiopia is highly associated with the political process. Moreover, economic growth in Ethiopia has shown different changes in various political regimes.

Figure 4.1: Trends of Economic Growth (real GDP per capital growth) rate from 1976-2020



Source: Author's own computation and IMF

As shown from the figure 4.1 above, over the period 1975/76 to 1990/91(Derg regime), Ethiopia has recorded the low real per capital GDP (economic growth) growth rate. Moreover, the average real GDP per capital growth rate over this period was negative, which was approximately -0.94 percent. The period 1976 to 1978 was characterized by internal conflict and external war with Somalia, over this period real GDP per capital growth rate of Ethiopia was continuously declined and it's was negative. In addition, in 1984 and 1985, the period of severe drought and famine, real GDP per capital growth rate was -5.4 and -14.2 percent respectively due to the consequence of drought. However, 1986 and 1987 was the period of recovery, in which real GDP per capital growth rate was increased to 6.2 and 10.7 percent, highest growth rate in the regime) respectively as a result of best rain seasons and good harvest. Generally, the period from 1975 to 1991 was characterized by low level of economic growth due to many reasons such as drought and external war with Somalia.

Economic growth of Ethiopia has increased rapidly after transition from command economy to market oriented economy. However, due to unfavorable economic basis from previous regime and crisis by civil war, during transition period (1991 to1993) average real GDPPC growth rate was very low, which is -4.22. In 1998 economic growth rate of Ethiopia was declined, real GDP per capital was deteriorated by 6.79 percent. This was due to war with Eritrea and also because of there was rain shortage in our country during this period. Ethiopia registered the highest economic growth rate in the EPRDF government in the post 2003 period, which is coincided with the period the government was widely propagating the developmental state program as the panacea for all the challenges the country was facing. Moreover, over the period 2004 to 2015 Ethiopia registered the highest economic growth. The average economic growth rate during the period was 8.73 percent. However, it was also evident that these growth rates were showing declining trend over time. In the year 2016 real GDP per capital observed a setback, recording a 2.8 growth rate. Economic growth rate after the year 2015 characterized by lower trend. Moreover, during the period 2016 to 2020 real GDP per capital was grown by 5.12 percent, which is far below the growth trend of the preceding periods., This is due to the impact of political instability in our country and COVID-19 pandemic.

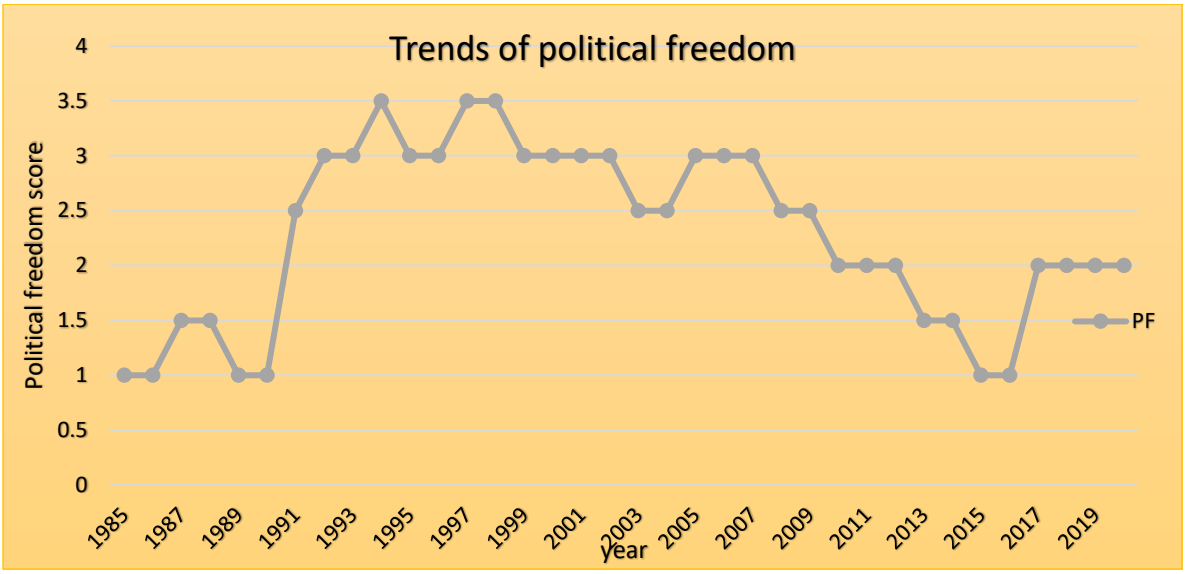
4.1.3. Trends of Institutional Quality in Ethiopia

Trends of institutional quality show that institutional quality observed a change over time. Looking at the trends of the institutional quality would enable the reader to understand the change of institutional quality during the study periods. Many literatures indicated that institutions in developing countries like Ethiopia lack the sufficient activities in supporting productive investments and solving the low efficiency problem. In these countries' property rights are not valid for the majority of the population, the elite have unlimited economic and political power.

Bedasso (2017) suggest that the imperial regime attempted to introduce a few liberal political and economic institutions toward the end of its tenure. In the Derg regime political and property right were very low levels. However, political right and civil right have improved substantially since

overthrew of socialist regime since 1991. Generally in Ethiopia political right and civil right established slowly as the country consolidated and modernized in the first half of the 20th century.

Figure 4.2: Trends of aggregate political freedom in Ethiopia (1985-2020)



Source: Author's own computation and FH (Freedom House)

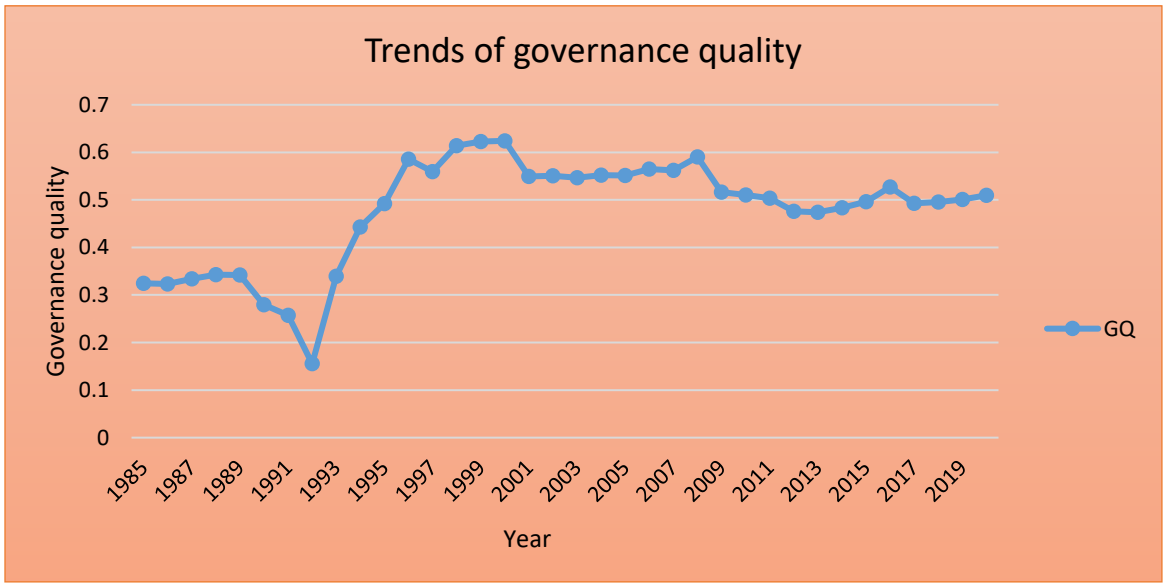
Freedom house (FH) suggests that each pair of political rights and civil liberties ratings of a country is averaged to determine an overall political status of a country (free, partly free, or not free). Moreover, country whose ratings average 1.0 to 2.5 is considered as politically 'Free', 3.0 to 5.0 'Partly Free', and 5.5 to 7.0 'Not Free'. However, in this study the researcher transforms the index, and lowest value represents low freedom and highest value indicates greater political freedom.

As figure 4.2 above demonstrate that, in Ethiopia before the reform (1991) political freedom of Ethiopia was very low. In other word in each year in the sample period before 1991 the political status of Ethiopia was politically not free (i.e. the score of political freedom was in the range 1 to 2.5) but after 1991political freedom of Ethiopia was increased significantly. Moreover, in the years after 1991 political status of Ethiopia was improved. In most of the years between 1992 and 2007, the political freedom status of Ethiopia was partly free (political freedom score of Ethiopia was within the range 3 to 5.0) partly free means there is limited respect for political rights and civil

liberties. However, after 2008 political freedom of Ethiopia was declined. Over the period 2008 to 2020 political status of Ethiopia was not free and become sever in 2015 and 2016 (the political freedom index of Ethiopia in this period was 1 point, which is worst rating number). This is because during this period there was high political instability in our country. After 2017 although it shows some improvement the political status was still not free till 2020 implies that basic political rights are absent, and basic civil liberties are widely and systematically denied.

Thus, from this figure we can observe that the political freedom (average of political right and civil liberties) of the country is low over the study period. Furthermore, in terms of the Freedom House's labeling, Ethiopia has never been labeled 'Politically Free' in the study period. Rather, it has been categorized as 'Partly-Free' for 14 non-consecutive years and 'Not-Free 'for 22 non-consecutive years over the period 1985 to 2020. Finally, over the study sample the political freedom status of Ethiopia was not free (i.e. the average political freedom over the study period is 2.28).

Figure 4.3: Trends of aggregate governance quality in Ethiopia over the period 1985 to 2020



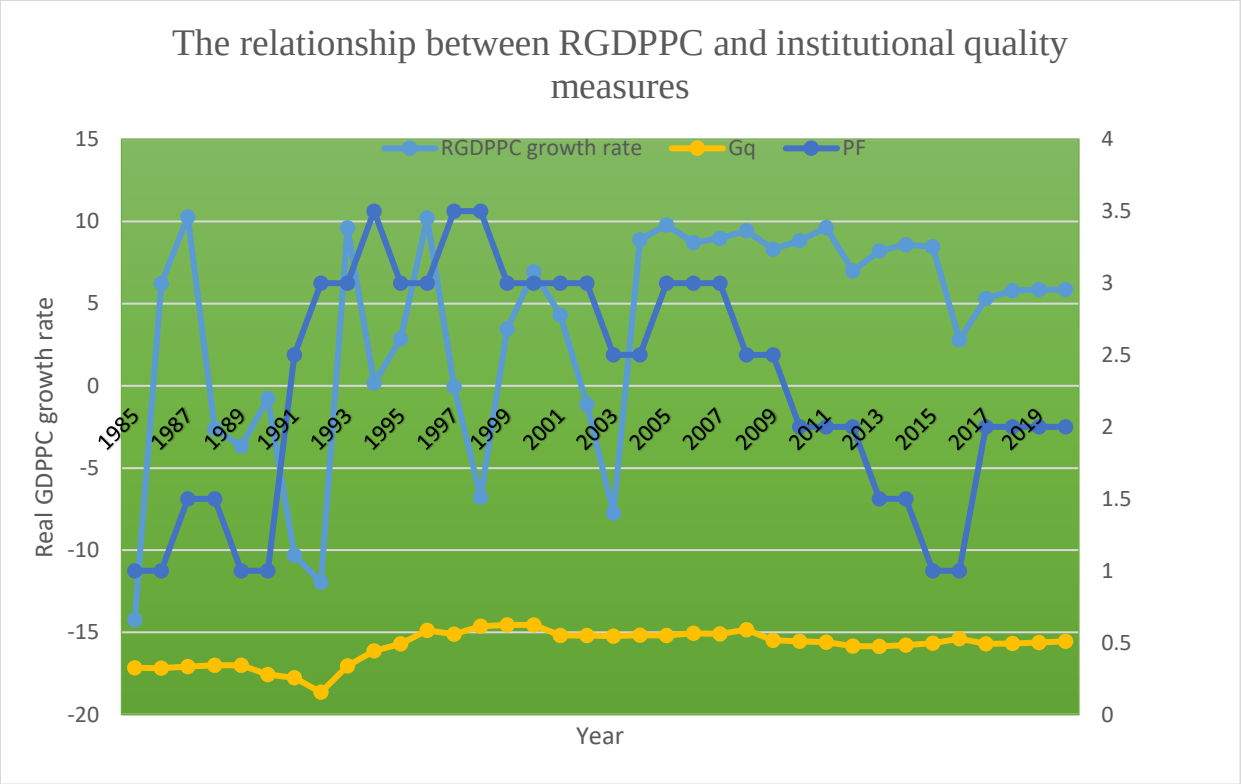
Source: Author's own computation and ICRG (international country risk guide)

Figure 4.3 above indicate that the other dimension of institutional quality which is aggregate governance quality in Ethiopia was very low in the period before the reform. However, it is

observed that as the country transition from a socialist to market oriented economy there was improvement in the score of governance quality of the country. Moreover, in the period after the reform the governance quality of the country was high compared with the previous years except in the transition period (1991-1992) with the lowest value of governance quality in 1992 which is 0.155 point (in the range 0 to 1). In the period between 1992 and 2020 the trend of governance quality in Ethiopia was improved and the highest governance quality over the study period was 0.624 in 2000 this improvement may be due to institutional reforms in our country. Since 1992 Ethiopia has embarked up on major policy and institutional reforms. In this reform governance has been a major concern (African Development Bank, 2009). Between 2001 to 2007 and 2017 to 2020 the trend of the governance quality was more or less constant (stable). In general, over the study period 1985 to 2020 the governance quality of Ethiopia is low, the average governance quality is 0.47 (in the range from 0, low governance quality to 1, high governance quality).

4.1.4. The relationship between Institutional Quality and economic growth in Ethiopia over the period 1985 to 2020

Figure 4.4: The relationship between real GDP per capital growth rate and institutional quality (political freedom and governance quality)



Source: Author's own computation & IMF, ICRG and FH

From figure 4.4 above, we can observe that during the period 1988 to 1997 the trends of governance quality and real GDP per capital growth rate shows that they were positively related. Moreover, from 1988 to 1992 the trends of governance quality and real GDP per capital growth rate were decreased but after 1992 to 1996 almost they have increased trend. Thus, over this period they tend to have a positive relationship. However, between 2008 and 2013, the trend of governance quality was decreased, while the trend of real GDP per capital growth rate was increased, implies that during this period they have inverse or negative relationship. In addition, from 2017 to 2020 the relationship between economic growth rate and governance quality was positive (both real GDP per capital growth rate and governance quality have increased trend). Similarly, the above figure demonstrate that economic growth rate (real GDP per capital growth rate) and political freedom were positively related in the period between 1985 and 1990. However, from 1990 to 1993 growth rate of real GDP per capital was declined and trend of political freedom shown improvement. Over the period 2004 to 2015 real GDP per capital growth rate was increased

but over this period the trends of political freedom observed a fluctuation. In addition, in 2016 both real GDP per capital growth rate and political freedom were very low but after 2016 their trend shown some improvement. The figure shows that in year before the reform (1991) both the political freedom and economic growth rate of Ethiopia were low compared to the year after 1991.

In general from trend analysis one can understand that in Ethiopia governance quality and political freedom are very low and the low level of economic growth is associated with low institutional quality. Thus, in order to ascertain the above descriptive analysis the study conducted an econometric analysis which is presented in the next chapter.

4.1.5. Descriptive Statistics

In this section, the descriptive summary statistics has been discussed for the dependent and independent variables of the study model. The summary statistics provides the mean, standard deviation, maximum and minimum values, skewness, kurtosis and the number of observations for all variables of the model. The mean value of the variables represents the average value of the variables, skewness measures the degree of asymmetry of the series, Kurtosis measures the peakdness or flatness of the distribution of the series and standard deviation indicates how variables are distributed around their mean values. Mean, maximum and minimum value, standard deviation, skewness and kurtosis value of dependent and independent variables were depicted in the table below.

Table 4.1: Descriptive statistics

	RGDPPC	N	GFCE	GCF	EDU	GQ	PF
Mean	4416.67	3.00	43697.27	135181.2	6090.42	0.47	2.28
Median	3080.44	2.83	32229.23	51430.56	699.42	0.50	2.50
Maximum	9879.43	3.97	220438.0	746427.5	39090.61	0.62	3.50
Minimum	2310.19	2.54	10593.16	19684.78	37.06	0.15	1.00
Std. Dev.	2279.98	0.38	48919.70	193628.3	9863.57	0.11	0.81
Skewness	1.11	1.05	2.63	2.22	1.79	-0.98	-0.26
Kurtosis	2.80	3.11	8.96	6.77	5.36	3.18	1.81
Jarque-Bera	7.42	6.69	94.73	50.94	27.62	5.78	2.51

Probability	0.02	0.03	0.00	0.00	0.00	0.05	0.28
Sum	158998.2	108.17	1573102.	4866524.	219255.1	17.09	82.00
Sum Sq. Dev.	1.82E+08	4.96	8.38E+10	1.31E+12	3.41E+09	0.46	23.22
Observations	36	36	36	36	36	36	36

Source; Author's computation and Eviews 9

Table 4.1 depicted the description of variables used in the study. EDU, GCF and GFCE expressed in millions of local currency (Ethiopian Birr). The mean value of real GDP pre capital collected over the period 1985- 2020 of Ethiopia is 4416.67 ETB and also the maximum and minimum value were 9879.44 ETB and 2310.19 ETB respectively. The standard deviation of the sample data of real GDP per capital is 2279.98 far from the mean of the data as shown on the above table. This result of high standard deviation shows the variety of real GDP per capita from time to time in Ethiopia over the study period. Similarly the maximum and minimum value shows high variation in real GDP per capital with the study sample period.

Over the period under the study the mean value of the governance quality in the Ethiopia is 0.47 that ranges from 0 (weak) to 1 (strong). This means that the governance quality in Ethiopia over the study period is weak. The minimum and the maximum value of this variable was 0.15 in 1992 and 0.62 in 2000 respectively. The variation from the mean for governance quality is 0.11. The average political freedom is 2.28 that range from 1 (weak) to 7 (strong). This indicates that the political freedom in Ethiopia over the study period is weak. The variable is ranging from minimum value 1 to maximum value 3.5. The standard deviation of the political freedom is 0.81. The standard deviation of GQ and PF indicates low level of variation in political freedom and governance quality over the study sample.

Education expenditure averages 6090.42 million ETB and goes from 37.06 to 39090.61 million ETB with a standard deviation of 9863.57 which indicates high variation of government expenditure on education over the study period. Similarly, government final consumption expenditure averages 43697.27 million ETB and ranges from 10593.16 to 220438.0 million ETB

with high variation indicated by high standard deviation of 48919.70. Gross capital formation varies from its minimum value 19684.78 million ETB to 746427.5 million ETB with high standard deviation of 193628.3 in the study sample period. The N averages 3.00 percent and varies from 2.54 percent to 3.97 percent.

Skewness of real GDP per capital it is positive skewed. The positive result of skewness is normally happen because the mean of the data is greater than the median as shown in the above table. Similarly N, EDU, GCF, and GFCE become also positively skewed and GQ, and PF become negatively skewed. The measure of normality is measured by kurtosis and skewness. The different level measures of Kurtosis are Mesokurtic, Leptokurtic and Pletykurtic. Mesokurtic (normal distribution) equal to the value 3, for leptokurtic (Positive kurtosis) greater than 3 and for platykurtic (Negative kurtosis) less than 3. The kurtosis results showed that RGDPPC, and PF are platykurtic (Negative kurtosis) while GQ, EDU, GCF, N and GFCE are leptokurtic (Positive kurtosis).

4.2.Econometric analysis

In this section, the study empirically investigates the relationship between institutional quality and economic growth using annual time series data from 1985-2020 in Ethiopia. Before going to the direct estimation of the study model, first it needs to undertake the unit root test to check whether the time-series is stationary or not and identify the optimal lag length. Then whether variables in the study model are co-integrated or not was tested using the ARDL and NARDL bound test approach. Finally, the long-run and short-run ARDL and NARDL models are estimated with respect to study objectives followed by different diagnostic tests. In addition, the Granger causality test is employed to determine the direction of causality between institutional quality and economic growth.

4.2.1. Unit Root Test

As clearly discussed in chapter three, undertaking stationarity test is necessary before estimate the study model. This helps us to avoid the possibility of running a spurious regression, which leads

to unreliable and inconsistent result. This test is done using the Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests. When the ADF test statistics and Phillips-Perron test statistic are greater than the critical value in absolute terms, the null hypothesis of non-stationary is rejected, and when the ADF test statistics and Phillips-Perron test statistics less than the critical value in absolute terms, the null hypothesis is not rejected. RGDPPC (real GDP per capital), GCF (gross capital formation), GFCE (government final consumption expenditure), population growth and EDU (government expenditure on education) are in logarithm form. The results of ADF and Phillips-Perron tests for unit root of variables are presented in Table 5.3.

Table 4.2: ADF and Phillips-Perron (PP) unit root tests results

ADF unit root test result				
Variable name		t-Statistic	Prob.*	Order of integration
LNRGDPPPC	Augmented Dickey-Fuller test statistic	-3.726546	0.0080	I(1)***
	Test critical values: 1% level	-3.639407		
	5% level	-2.951125		
	10% level	-2.614300		
LNN	Augmented Dickey-Fuller test statistic	-5.976336	0.0000	I(1)***
	Test critical values: 1% level	-3.639407		
	5% level	-2.951125		
	10% level	-2.614300		
LNEDU	Augmented Dickey-Fuller test statistic	-4.452309	0.0013	I(1)***
	Test critical values: 1% level	-3.653730		
	5% level	-2.957110		
	10% level	-2.617434		
LNGCF	Augmented Dickey-Fuller test statistic	-7.097242	0.0000	I(1)***
	Test critical values: 1% level	-3.639407		
	5% level	-2.951125		
	10% level	-2.614300		
LNGFCE	Augmented Dickey-Fuller test statistic	-4.967551	0.0003	I(1)***
	Test critical values: 1% level	-3.639407		
	5% level	-2.951125		
	10% level	-2.614300		

GQ	Augmented Dickey-Fuller test statistic		-5.228794	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
PF	Augmented Dickey-Fuller test statistic		-5.259374	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
GQSQU	Augmented Dickey-Fuller test statistic		-6.342939	0.0000	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
PFSQU	Augmented Dickey-Fuller test statistic		-5.491337	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	

Phillips-Perron unit root test result

Variable name			Adj. t-Stat	Prob.*	Order of integration
LNRGDPPPC	Phillips-Perron test statistic		-3.733886	0.0079	I(1)***
	Test critical values:	1% level	-3.639407		
		5% level	-2.951125		
		10% level	-2.614300		
LNN	Phillips-Perron test statistic		-5.977026	0.0000	I(1)***
	Test critical values:	1% level	-3.639407		
		5% level	-2.951125		
		10% level	-2.614300		
LNEDU	Phillips-Perron test statistic		-4.796093	0.0005	I(1)***
	Test critical values:	1% level	-3.639407		
		5% level	-2.951125		
		10% level	-2.614300		
LNGCF	Phillips-Perron test statistic		-7.426646	0.0000	I(1)***
	Test critical values:	1% level	-3.639407		
		5% level	-2.951125		
		10% level	-2.614300		

LNGFCE	Phillips-Perron test statistic		-4.967551	0.0003	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
GQ	Phillips-Perron test statistic		-5.228794	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
PF	Phillips-Perron test statistic		-5.232456	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
GQSQU	Phillips-Perron test statistic		-6.334389	0.0000	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
PFSQU	Phillips-Perron test statistic		-5.491337	0.0001	I(1)***
	Test critical values:	1% level	-3.639407	
		5% level	-2.951125	
		10% level	-2.614300	
N.B I(1)* represent a variable is stationary at first difference at 1 percent significance level**				

Source; author's computation and Eviews 9

The results in Table 4.2 show that at first difference for each variable absolute value of ADF and Phillips-Perron t-statistic greater than t-critical value at 1%, 5% and 10% level of significance. Therefore, the null hypothesis of non-stationary is strongly rejected and we accept the alternative hypothesis for each variable. Thus, all variables are non-stationary at level but stationary at their first difference, I(1). As clearly discussed in the methodology chapter both Autoregressive Distributive Lag (ARDL) and non-linear Autoregressive Distributive Lag (NARDL) models are applicable whether the variables are stationary at level (I(0)), at first difference (I(1)) or mixed (some variables are stationary at level and others are at first difference) but they are not applicable if there is any variable stationary at second difference and above. Thus, since all the variables are stationary at first difference both ARDL and NARDL models are applicable for the estimation of the relationship between institutional quality and economic growth in Ethiopia. The next step is selection of optimal lag length.

4.2.2. Selection of Optimal Lag Length

Determining the appropriate lag length for each of the underlying variables in the study model is very important because we want to have Gaussian error terms (i.e. standard normal error terms that do not suffer from non-normality, autocorrelation, heteroskedasticity etc.). There are different criteria which can be employed to determine the optimal lag length of the variables. The most popular information criteria are the Akakie information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan- Quinn information criterion (HQIC). Thus, before estimating the study model, we have to determine the maximum lag lengths of the variables. AIC is suitable for small sample, thus the study determined optimal lag length value by using AIC. Pesaran and Shin (1999) actually suggests a maximum of 2 lags in ARDL model.

Table 4.3: Optimal lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	187.4690	NA	2.23e-16	-10.49818	-10.09414	-10.36039
1	444.8234	363.3238	8.19e-21	-20.87196	-16.83160	-19.49408
2	601.0321	137.8312*	3.07e-22*	-25.29601*	-17.61931*	-22.67803*

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

Source; author's computation and Eviews 9

While, checking up AIC the 5% significance level suggest that the optimum lag length for the study model is 2 Lag. In addition, all ICs provides maximum lag of 2 and this has been confirmed by LR, FPE, AIC, SC and HQ in both cases. Thus, this study employs the optimal lag length of 2 for estimation techniques.

4.2.3. Long-run ARDL Bound Test for Cointegration

The current study also conducted a Co-integration test to understand whether there is long-run relationship among the variables under investigation. If the variables are found to be cointegrated, there is long-run relationship among variables. When series are integrated at order one (I(1)) then ARDL bounds tests for cointegration can be used. The results of the co-integration test are presented in Table 5.4 below. According to Narayan (2005), Pesaran et al. (2001) critical values are based on large sample size and cannot be applied for small sample sizes. Hence, Narayan (2004) provides a set of critical values for small sample sizes, ranging from 30 to 80 observations. The null hypothesis of the tests is non-existence of the long-run relationship among variables in the study against the alternative hypothesis of there is long run relationship among the variables. The ARDL bound test for cointegration result presented in Table 5.4 below and the critical values used in this study are extracted from Narayan (2004).

The results of bound test for long-run co-integration for ARDL model reported in Table 4.4 show that F- statistics value of the test (5.92) is greater than upper bounds critical values at 1%, 5% and 10% level of significance. While for NARDL model the F- statistics value is 7.41, which is also greater than upper bound critical values at 1%, 5%, and 10% level of significance. Similarly, F-statistics of ARDL model for estimating the threshold value of institutional quality (7.41) is higher than upper bound critical value at 1%, 5% and 10% level of significance. Generally, in both three models (ARDL and non-linear ARDL model) F-statistics is greater than the lower and upper bound critical values, so we can reject the null hypothesis of no co-integration and confirms that there is a long-run association among the modeled series. Thus, we can proceed with ARDL and NARDL model to investigate the symmetric and asymmetric relationship among variables and to estimate threshold value of institutional quality.

Table 4.4: ARDL and NARDL bound test result

ARDL bound test result for model 1

Test Statistic	Value	K	Significance level	Critical Value Bounds restricted intercept and no trend)	
				I(0), lower bound	I(1), upper bound
F-statistics	5.922309	6	1%	3.686	5.310
			5%	2.696	3.963
			10%	2.264	3.369

NARDL bound test result for model 2

Test Statistic	Value	K	Significance level	Critical Values	
				I(0), lower bound	I(1), upper bound
F-statistics	7.412694	8	1%	2.79	4.1
			5%	2.48	3.7
			5%	2.22	3.39
			10%	1.95	3.06

ARDL bound test result for model 3

Test Statistic	Value	k	Significance level	Critical Values	
				I(0), lower bound	I(1), upper bound
F-statistics	7.378096	8	1%	2.79	4.1
			2.5%	2.48	3.7
			5%	2.22	3.39
			10%	1.95	3.06

Source: Author's computation and Eviews 9

4.2.4. ARDL Model (short-run and long-run) Result and Discussion for Objective Two

After understanding that the variables employed in the study are co-integrated, the fourth step is estimation of short-run and long-run ARDL model. Moreover, if variables are integrated at order one I(1) then ARDL model can be used. Therefore, in the next section, short-run and long-run ARDL model shall be estimated.

4.2.5. Short-run ARDL (Error Correction) Model Estimation

Since ARDL bound test for co-integration result indicates the existence of long-run relationship between variables it is important to estimate the speed of adjustment using error correction model (ECM). The error correction model is estimated using equation (26) (in chapter three). As clearly discussed in the methodology chapter the error correction term (ECM), indicates the speed of adjustment to restore short-run disequilibrium to equilibrium in the long-run. It is the lag value of error terms obtained from the estimated long-run model. The error correction term (ECM(-1)) should have statistically significant negative coefficient, for the model to be dynamically stable. The result from ARDL short-run error correction model is presented in the Table 4.5 below.

Table 4.5: Short-run ARDL error correction model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.602537	0.101685	5.925511	0.0000***
DLNN	-0.083439	0.154018	-0.541745	0.5934
DLNGFCE(-1)	-0.089112	0.027194	-3.276957	0.0034***
DLNGCF(-1)	0.086965	0.025211	3.449513	0.0023***
DLNEDU	0.015889	0.021138	0.751660	0.4602
DGQ	-0.236512	0.074878	-3.158639	0.0046***
DPF(-1)	-0.037968	0.007226	-5.254380	0.0000***
ECM(-1)	-0.608273	0.084240	-7.220673	0.0000***
C	0.001022	0.003743	0.273104	0.7873
N.B ***, **, and * indicates significance at 1%, 5%, and 10% significance level respectively				
R-squared	0.845685	AIC	-5.562259	
Adjusted R-squared	0.768528	SCI	-5.023543	
Prob(F-statistic)	0.000001	HIQ		-5.378541
		Durbin-Watson stat		1.878576

Source: Author's own computation using Eviews 9

As it can be seen from Table 4.5, as expected, in this model the value of the ECM (-1) is negative (-0.608) and statistically significant at 1 % level of significant and this indicates convergence towards equilibrium. It further implies that, a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 60.8% per year. This means that after a shock, it takes less than 2 years for the variables to restore their long-run equilibrium relationship. Such highly significant ECM(-1) value is another proof for the existence of a stable long-run relationship between the variables. The coefficients of determination (R^2) show that in this model from the total variation in economic growth of Ethiopia approximately 84% of the variation is explained by the explanatory variables employed in the study and the remaining 16% of the variation not explained by the study model. Whereas the probability values F-statistic (0.000) implies that the overall predictive power of the study model is statistically significant. This indicates that the estimated model is well fitted. The estimated ECM(-1) equation is presented below.

ECM(-1)= LNRGDPPC - (-2.0409*LNN -0.3906*LNGFCE + 0.5592*LNGCF + 0.0436*LNEDU -1.1315*GQ + 0.0464*PF + 2.6403)

4.2.6. Long-run ARDL Model Estimation

The long-run model indicates the relationship between dependent variable and independent variables over time. It is estimated based on equation (22) (in chapter three). The estimated result is shown in Table 4.6 below.

Table 4.6: Long-run ARDL model result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-2.040929	0.561400	-3.635430	0.0020***
LNGFCE	-0.390592	0.092843	-4.207026	0.0006***
LNGCF	0.559241	0.077011	7.261858	0.0000***
LNEDU	0.043556	0.019898	2.188940	0.0428**
GQ	-1.131533	0.245698	-4.605383	0.0003***
PF	0.046360	0.025996	1.783355	0.0924*
C	2.640344	0.740003	3.568020	0.0024***

N.B asterisks ***, **, and * indicates explanatory variables are significance at 1%, 5%, and 10% significance level respectively.

Source: Author's computation and Eviews 9

The long-run estimated mode can be represented by the following equation.

LNRGDPPC=2.64 - 2.04*LNN - 0.39*LNGFCE + 0.56*LNGCF + 0.04*LNEDU -

(0.0024) (0.0020) (0.0006) (0.0000) (0.0428)

1.13*GQ + 0.046*PF

(0.0003) (0.0924)

As presented in the table above, the long-run coefficients of the explanatory variables are greater than the short-run coefficients which imply that in the long-run explanatory variables are relatively more responding in explaining economic growth than in the short-run.

A. Discussion of the results of short-run and long-run impact of control variables on economic growth.

Short-run ARDL estimated result reported in Table 4.5 shows that lag of real GDP per capita is highly significant. This implies that the previous year level of per capital real GDP is the main determinants of the current year per capita real GDP. Moreover, previous year real GDP per capital has positive impact on the current year real GDP per capital. This result is consistent with previous studies such as Wandeda et al. (2021), Nawaz et al. (2014) and Efendic & Pugh (2015). In addition, the results of short-run coefficients show that most variables have the same expected signs as in the long-run. However, unlike in the long-run, population growth (LNN) and government expenditure on education (LNEDU) are not statistically significant because the effects of population growth and government expenditure on education could not be felt in the short-run. Furthermore, the study result reveals that all control variables have an expected signs and consistent with many empirical and theoretical literatures.

Short-run and long-run ARDL estimated result reported in Table 5.4 and 5.5 suggests that in both long-run and short-run government final consumption expenditure has statistically significant adverse effect on economic growth. Moreover, ceteris paribus 1 percent increase in government

final consumption expenditure in the economy will lead to 0.089 and 0.39 percent decrease in real GDP per capita in short-run and long-run respectively. This result is in line with the priori expectation of the study and consistent with the results of the previous studies conducted by Siyakiya (2017) and Oluwatoyin & Folasade (2014). This is because since government consumption expenditure is high in developing countries like Ethiopia, it can affect economic growth significantly and the negative coefficient of government final consumption expenditure may be due to its disincentive effects of taxation. Government final consumption expenditure leads to deceleration of economic growth of the country through disincentive effects of taxation and increased inefficiencies. Furthermore, the necessary tax reduce the incentives to work and invest (Hajamini &Falahi, 2014). In addition population growth has negative significant effect on economic growth in the long-run, but in the short-run it has insignificant effect. Moreover in the long run, holding all other thing remain constant 1 percent increase in population growth rate will leads to reduction of real GDP per capital by 2.04 percent. The long run adverse effect of population growth may due to the fact that in developing countries like Ethiopia high population growth will leads to unemployment and underemployment which in turn harm economic growth of the country. This result consistent with Malthusian view of impact of population growth on economic growth and the result of many previous studies such as studies conducted by Fikadu et al. (2019), Ali (2003), Ebaidalla (2014) and Bashir & Xu (2014).

The estimated model also suggests that investment has statistically significant positive impact on Ethiopian economic growth in both short run and long run. Moreover, all other thing being equal a 1 percent increase in gross capital formation will enhance real GDP per capita by 0.086 percent and 0.56 percent in short run and long run respectively. The implication of this finding is that investment plays a vital role in improving the level of economic growth of Ethiopia. The positive impact of investment measured by gross capital formation is in line with neoclassical growth theories which state that capital formation (investment) is the major determinants of economic growth of the country. Moreover, this study's result is similar with the study of Ayen (2018), Ebaidalla (2014), Nawaz et al. (2014), Fikadu (2019) and Yildirim & Gokalp (2015).

The study result also reveal that, in the long run human capital which is measured by government expenditure on education has statistically significant effect on the growth of the Ethiopian economy. That is, ceteris paribus, a one percent increase in government expenditure on education will result increament of per capital real GDP by 0.04 percent in the long-run.This result is consistent with the endogenous growth theories advocated or developed by Lucas (1988) and Romer (1986, 1990) which argue that improvement in human capital leads to higher productivity which inturn enhances economic growth of a country. This result is also consistent with the study results found by Ebaidalla (2014) and Oluwatoyin & Folasade (2014).

Along with the objectives of this thesis, enormous attention would be given to the effect of instituional quality on the economic growth. Thus, the next section is discussion of the impact of instituional quality on economic growth.

B. Discussion of the effect of institutional quality on economic growth in short-run and long-run.

As seen in the Table 4.5 and 4.6 above in both short-run and long-run institutional quality (political freedom and governance quality) has a statistically significant effect on economic growth. This result confirms the proposed link between the country's institutional quality and its level of economic growth as suggested by many researchers such as Acemoglu et al. (2001), Hall &Jones (1998) and Rodrik et al. (2002).

Political freedom (measure of institutional quality) and economic growth are related negatively in the short run; while positive relation in the long run. In both cases political freedom is statistically significant. Under the ceteris paribus condition one point increase in the score of political freedom leads to increase in real GDP per capital by 0.47 percent in the long run. This result consistent with study of Vijayaraghavan & Ward, (2001) who suggest that political freedom provides a check on governmental power and thereby limits the potential of public officials to amass personal wealth and to carry out unpopular policies thus, more political freedom tend to enhance economic growth. In addition, this result is similar with the finding of Dereje (2018) and Ahmad & Khalil (2020), which reveals that political right and civil liberties have positive impact on economic growth. In

the short run, holding all other variables in the study model remain constant, real GDP per capital decrease by 0.03 percent as political freedom score increases by 1 point.

Regarding governance quality, the result indicates that the variable has negative impact on economic growth of Ethiopia in both short run and long run and it is statistically significant at 5 and 1 % level significant respectively. That is, ceteris paribus, a 1 point rise in governance quality will cause economic growth to deteriorate by 0.24 and 1.13 percent in short-run and long-run respectively. This suggests that institutional quality in Ethiopia is sub optimal to elicit the desirable growth enhancing effect and this poses a great challenge to the growth of the country's economy. More specifically, in the case of Ethiopia there are some factors that affect the positive relationship between institutional quality and economic growth. In Ethiopia, the negative significant impact of institutional quality (governance quality in both short run and long run and political freedom in short run) on economic growth can be explained by the following two reasons.

First, according to the theory of underground economic sector, the activities of underground economic areas have great contribution to economic growth. Therefore, with the low institutional quality, the underground economic activities are more favorable, so if the governments improve their institutional quality quickly and drastically then the operation of this area decline, leading to a decrease in the economic growth of the country (Ngo & Nguyen, 2020). In developing countries specifically in African countries like Ethiopia informal economic activities also known as the underground economic activities have greater contribution to economic growth of countries, informal sector activities have a significant share in country's gross domestic product but in developed countries the contribution of underground economic activities to their economic growth is low. More specifically, different literatures show that in Ethiopia the share of underground economic activities from total country's GDP is greater than 30 percent. Therefore, in Ethiopia with low institutional quality, the underground economic activities are more favorable, so improvement of institutional quality may cause decline in the operation of underground economies which leads to a decrease in the Ethiopia's output.

Second, it might be because, institutional reform may only benefit certain groups of people in the country who are closely tied with policymakers. The institutional quality of the low income countries like Ethiopia is very poor, and in these countries there are slow institutional reforms, so the institutional quality and policy improvement may only benefit certain groups of people in society who are closely tied with policymakers. Moreover, the institutional reform is not beneficial to the people, distorts economic activities, and restricts growth rate of the country. Better institutional quality leads to rapid economic growth (Ngo & Nguyen, 2020). Thus, developing countries like Ethiopia need to increase the process of reform to improve institutional quality of their countries.

This result is similar with the study conducted by Utile et al. (2021) who found that institutional quality has negative impact on Nigeria economic growth. Alexiou et al. (2014) also found that low institutional quality (political freedom) of Sudan has negatively impacted the growth of Sudan's economy. Likewise, Malindini (2021) found that governance quality and the nature of the political framework in the Southern African Development Community (SADC) region fail to create an attractive and enabling institutional environment for economic growth, thus leading to poor economic performance in the region. Garedow (2020) also showed that democratic accountability (measure of political institutions) has a negative impact on economic growth of Ethiopia. In addition, Ayen (2018) also found that access to sound money (measure of institutional quality) negatively affect economic growth of SSA countries.

Finally, following the work of Law et al. (2013) and Zhuang et al. (2010), suggested that there is institutional quality threshold for optimum economic growth. This study suggests that Ethiopia's weak institutional quality has hampered the country's economic growth and development. Furthermore, a negative coefficient of governance quality and political freedom may suggests that economic growth require a long term stable institutional quality (governance quality and political freedom) improvement.

4.2.7. ARDL Diagnostic Test

To accept above ARDL model as a good model, it is necessary to meet the required criteria of the post estimation test like normality, serial correlation, heteroscedasticity and stability tests. The result of the tests is presented in Table 4.7 below.

The results of the different diagnostic tests presented in Table 4.7 below implie that the estimated model does not suffer from problem of non-normality, serial correlation, and heteroskedasticity. In addition, the estimated model is stable. This is because, the probability values of all the tests is insignificant (greater than 5% significance level) implying that the null hypotheses of no serial correlation, homoscedasticity, and normal distribution are not rejected. With regard to the stability of the estimated models, the plots of CUSUM and CUSUMSQ (see appendix B) indicate that the model is stable as the plots lie within the 5% level of significance interval. In other word the diagnostic test result shows that the error term is normally distributed with zero mean and constant variance, homoscedastic, and not serial correlated and the model is stable.

Thus, the estimated model passes all necessary tests and hence, it is a good model to explain the dependent variable of the model and the estimated results are reliable for further analysis and prediction.

Table 4.7: The result of ARDL diagnostic tests for above model

Diagnostic tests				
Breusch-Godfrey Serial Correlation LM Test	F-statistic Obs*R-squared	1.246106 4.844167	Prob. F(2,15) Prob. Chi-Square(2)	0.3158 0.0887
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic Obs*R-squared	1.320343 18.83954	Prob. F(16,17) Prob. Chi-Square(16)	0.2875 0.2771
Jarque-Bera Normality test	Jarque-Bera Probability	0.166476 0.920132		

Along with the study objective (objective 3), this study assume that the positive and negative shocks (decrease and increase in institutional quality may not have equal impact on economic growth of Ethiopia. Thus, in the next section the study estimate the relationship between institutional quality and economic growth by using NARDL model following above linear ARDL model.

4.2.8. Non-linear ARDL Model Estimation

As we have discussed clearly in the methodology part NARDL model possesses a unique feature to capture the asymmetric changes explained by the explanatory variables (positive and negative) to the dependent variable.

The results of NARDL bound test in Table 4.4 indicate that long-run co-integration exist among the variable. Thus, to explore the asymmetric relationship between institutional quality and economic growth this study applied non-linear ARDL (NARDL) model and short-run and long-run NARDL model estimates are reported in Table 4.8 below.

Table 4.8 presented both short-run and long-run NARDL model estimated result. The study result indicates that a positive and negative change in institutional quality brings a nonlinear effect on economic growth. This implies that institutional quality plays a vital role in determining economic growth of Ethiopia. The finding reveals that the speed of adjustment (ECMt-1) has the required negative sign and is statistically significant at 1 percent level of significance. This implies that, the previous period disequilibrium is corrected at an annual speed of adjustment of 43.9 percent. The coefficient of determination (R^2) shows that the variables included in the model accounted for 93 percent variation in the real per capital GDP and the remaining 7 percent have not been captured by the study model. This implied that the model is a good fit. In addition, higher R^2 and adjusted R^2 of the model than above ARDL model implies that non-linear ARDL (NARDL) model more explain the variation of dependent variable (economic growth) than the ARDL model and it further shows that the relationship between institutional quality and economic growth is asymmetric.

Table 4.8: Short-run and long-run NARDL estimated model result

Short-run NARDL model result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.328324	0.076142	4.311984	0.0004***
DLNN	-0.217088	0.121805	-1.782253	0.0907*
DLNGFCE(-1)	-0.077603	0.020608	-3.765588	0.0013***
DLNGCF(-1)	0.069413	0.019866	3.494063	0.0024***
DLNEDU	0.036058	0.016520	2.182630	0.0418**
DGQ_POS	-0.053909	0.061125	-0.881943	0.3888
DGQ_NEG	-0.243222	0.083685	-2.906393	0.0091***
DPF_POS(-1)	-0.054067	0.007628	-7.088201	0.0000***
DPF_NEG	-0.001592	0.009291	-0.171328	0.8658
ECM(-1)	-0.439822	0.043828	-10.03522	0.0000***
C	0.002152	0.004978	0.432220	0.6704

R-squared	0.930643	Akaike info criterion	-6.219788
Adjusted R-squared	0.883189	Schwarz criterion	-5.584906
Prob(F-statistic)	0.000000	Hannan-Quinn criter.	-6.006169
		Durbin-Watson stat	2.060645

Long-run NARDL model result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-1.936419	0.599268	-3.231307	0.0060***
LNGFCE	-0.353963	0.092078	-3.844155	0.0018***
LNGCF	0.387173	0.075219	5.147273	0.0001***
LNEDU	0.093923	0.050732	1.851363	0.0853*
GQ_POS	-1.280916	0.352667	-3.632083	0.0027***
GQ_NEG	-0.616001	0.230210	-2.675820	0.0181**
PF_POS	0.087033	0.047546	1.830488	0.0885*
PF_NEG	-0.011516	0.031229	-0.368769	0.7178
C	3.268788	0.946666	3.452947	0.0039**

N.B Variables which are significant at 1, 5, and 10 percent represents by asterisks *, ** and * respectively**

Asymmetric results for both short-run and long-run model are given in the above Table 4.8. In the long-run, coefficients of aggregate governance quality for both positive (GQ_POS), and negative (GQ_NEG) components are statistically significant at 1 and 5 percent level of significance respectively. Especially, the effect of the positive component of governance quality on economic growth is bigger in magnitude. Moreover, holding all other thing remain constant, a 1 point increase and decrease in the score of governance quality leading to an average of 1.28 and 0.62

percent decline in real per capital GDP in Ethiopia respectively. These findings revealed that the long-run positive component of governance quality impact is larger than the negative component by 0.67. In the short-run the negative component of governance quality (GQ_NEG) has a significant negative impact on economic growth, on average a 1 point decrease in the score of governance quality causes real GDP per capital deteriorated by 0.24 percent. But its positive component (GQ_POS) (positive change on the score of governance quality) has insignificant impact. Similarly, in the long-run, the positive component of political freedom (PF_POS) has a significant positive impact on economic growth. Furthermore, in the long-run with a point increase in the score of PF, real GDP per capital appreciated by 0.087 percent but its negative component (PF_NEG) has no significant impact on economic growth of Ethiopia. In addition, in the short-run positive component of political freedom (PF_POS) has a significant negative impact, ceteris paribus 1 point improvement in the score of political freedom will cause 0.054 percent decline in real GDP per capital but its negative component has no significant impact on economic growth. Generally, the study found that a positive and negative change in institutional quality brings a nonlinear effect on economic growth of the country.

4.2.9. Short run and long run Symmetric Tests

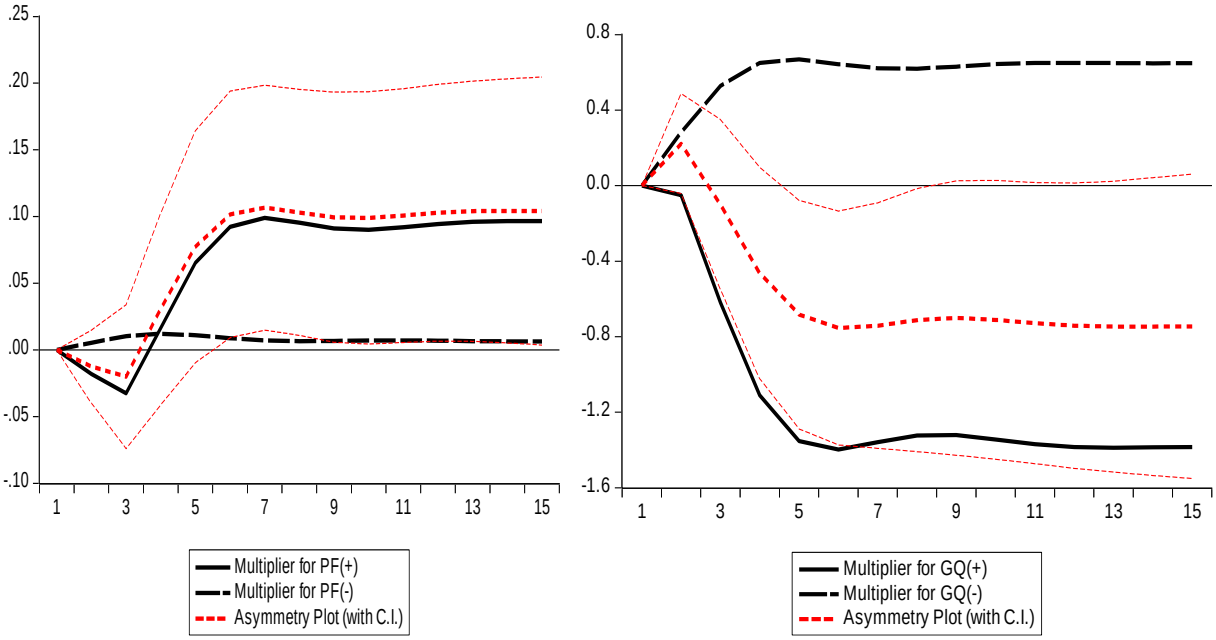
To identify the asymmetry effects of institutional quality on the economic growth of Ethiopia, coefficients are estimated in the long run and short run and the existence of the long-run and short-run symmetry is tested by using Wald test.

Results of the Wald test in Table 4.9 show that for governance quality in both short-run and long-run the probability value lower than 0.05 (5% percent level of significance), implies that the null hypothesis of long-run and short-run symmetry (GQ_POS=GQ_NEG,) is rejected. Similarly for political freedom in both short-run and long-run the probability value is less than 5%, thus the null hypothesis of long-run and short-run symmetry (PF_POS=PF_NEG) is rejected . These results provide evidence to conclude the effect of institutional quality (political freedom and governance quality) on economic growth is asymmetric.

Table 4.9: Short run and long run symmetric tests result

Long-run symmetry test			
Governance quality(GQ)		Political freedom(PF)	
F-statistics	17.73519	F-statistics	6.9029
Probability	0.0004	Probability	0.0157
Short-run symmetry test			
Governance quality(GQ)		Political freedom(PF)	
F-statistics	8.658538	F-statistics	10.05424
Probability	0.0084	Probability	0.0011

Figure 4.5: Dynamic multiplier graph for NARDL model created by author using Eviews.



To present the plotting of non-linearity, the dynamic multiplier graph is presented in above Figures 4.5. The dynamic multiplier graph in Figures 4.5 measures the asymmetric adjustment in economic growth in the long run because of negative and positive shocks in GQ (governance quality) and PF (political freedom). The asymmetric adjustment is evident from positive and negative change curves at a particular period. In Figures 4.5 GQ is governance quality and PF is political freedom. Years are plotted on the horizontal axis and the magnitude shocks (positive and negative) on the vertical axis. It indicates that both positive and negative shocks to GQ have stronger impact on real GDP per capital (economic growth). Similarly, the positive shock to PF has a stronger impact on real per capital GDP while its negative shock has a smaller impact on per capital real GDP.

Finally, After the discussion of long-run and short-run NARDL results, to determine whether the study model passed the classical OLS assumption and stability test or not it is necessary to undertake normality, auto correlation, and heteroscedasticity test as well as stability test. The result of NARDL diagnostic tests are reported in the Table 5.10 below.

Table 4.10: NARDL diagnostic test result

Diagnostic tests				
Breusch-Godfrey Serial Correlation LM Test	F-statistic	0.168473	Prob. F(1,13)	0.6882
	Obs*R-squared	0.422190	Prob. Chi-Square(1)	0.5158
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic	0.763099	Prob. F(18,14)	0.7093
	Obs*R-squared	16.34281	Prob. Chi-Square(18)	0.5686
Jarque-Bera Normality test	Jarque-Bera	0.572028		
	Probability	0.751252		

According to results in Table 4.10 Non-normality, heteroskedasticity and autocorrelation problem were not found in the model and the stability test result shows that both CUSUM and CUSUMSQ

lines (solid lines) of the model are within the critical bounds at a significant level of 5% (dashed lines) (see CUSUM and CUSUMQ plots in appendix F). Thus it can be concluded that NARDL model is stable.

Based on the results of ARDL and NARDL models, this study suggest that the negative impact of institutional quality on Ethiopia's economic growth may due to that governance quality of Ethiopia is very weak and there is low political freedom in the country and thus this result reveals that the impact of institutional quality on growth of Ethiopia economy may become positive after achieving certain level of institutional quality in the country. Moreover this study assumes that the relationship between institutional quality and economic growth may not be linear, but rather non-linear unlike what most studies have shown. Thus, in the next section this study examine the non-linear relationship between institutional quality and economic growth by including the square term of institutional quality (governance quality and political freedom) in the first ARDL model to investigate the existence of institutional quality threshold level.

4.2.10. Estimation of Threshold Value of Institutional Quality in Short-Run and Long-Run

As clearly discussed in the methodology section, an additional squared term for the measures of institutional quality factor is included in the model (1) to allow for the formation of the U shape movement. As we have seen earlier, the bound test result for this model (model 3) in Table 4.4 shows that in this model there is long run relationship between variables, thus we can estimate the short-run and long-run model as follows. Table 4.11 and Table 4.12 reports the estimated results of Equation (28) and (29) in chapter 3, which estimate the threshold value of institutional quality in the relationship between economic growth and institutional quality.

Table 4.11: Short-run ARDL results of estimating institutional quality threshold value

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.712439	0.075994	9.374896	0.0000***
DLNN(-1)	-0.766341	0.117668	-6.512728	0.0000***
DLNGFCE(-1)	-0.161897	0.020542	-7.881126	0.0000***
DLNGCF(-1)	0.218048	0.028244	7.720063	0.0000***
DLNEDU(-1)	0.036204	0.015350	2.358659	0.0306**
DGQ	-0.948901	0.110262	-8.605866	0.0000***
DPF	-0.076941	0.008294	-9.276725	0.0000***
DPFSQU	0.011965	0.001907	6.274733	0.0000***
DGQSQU	0.899357	0.103232	8.712023	0.0000***
ECM(-1)	-0.730763	0.065103	-11.22470	0.0000***
C	-8.57E-05	0.002538	-0.033770	0.9735
Note; asterisks *** and ** implies the variable is significant at 1 and 5 percent level of significance				
R-squared	0.950961	AIC	-6.414525	
Adjusted R-squared	0.904807	SCI	-5.651345	
Durbin-Watson stat	2.058664	HQI	-6.154259	

Table 4.12: Results of long run model for estimating threshold value of institutional quality

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-1.160560	0.497174	-2.334311	0.0444**
LNGFCE	-0.337490	0.101897	-3.312068	0.0091***
LNGCF	0.662958	0.109931	6.030645	0.0002***
LNEDU	-0.014859	0.036600	-0.405976	0.6942
GQ	-2.929179	0.959924	-3.051471	0.0138
PF	-0.048753	0.040879	-1.192625	0.2635
PFSQU	0.001252	0.008795	0.142329	0.8900
GQSQU	2.985401	1.125622	2.652224	0.0264**
C	1.385723	0.587276	2.359578	0.0426**
asterisks ** and *** represents significant at 1 and 5 % significance level respectively				

Estimation of the threshold value of institutional quality

The estimated result above shows that, in this model the higher value of adjusted R-squared value than model 1 (in section 4.2.6) (which includes only the linear term of governance quality and political freedom) implies that a non-linear model more explains economic growth than a linear model. In addition, the coefficients of linear and square terms of governance quality in both short run and long run and political freedom in the short run are statistically significant and have opposite sign. All these results show that the relationship between governance quality and economic growth is non-linear in both short run and long run. In the short-run the relationship between political freedom and economic growth is non-linear but in in the long-run it is linear. Moreover, the coefficients of the governance quality and its squared term are negative and positive, respectively in both short-run and long-run. Similarly in short-run political freedom and its squared term also have negative and positive coefficient respectively. This suggests a U-shaped institutional quality-economic growth relationship. This result confirm with the work of Zhuang et al. (2010); Ogbaro (2019) and Tran et al. (2021) and Law et al. (2013), they suggested that there is an institutional threshold for optimum economic growth of the country. Again, all diagnostic tests are found to be satisfactory.

Thus, from the coefficient of linear and square term we try to determine the threshold level of institutional quality in term of governance quality and political freedom for Ethiopia over the sample period by using the formula which discussed in the methodology chapter. The threshold values for governance quality in short-run and long-run are computed as 0.527 and 0.490 respectively. Similarly, in short-run the threshold value of political freedom is 3.21 but in long-run the relation between political freedom and economic growth is linear as shown by insignificant of square term of political freedom and has no threshold value. These threshold values are greater than the mean values of the country obtained from the descriptive statistics, which confirms the argument that, Ethiopia has weak governance quality and political freedom. In the other word on average, on average Ethiopia is operating below the threshold level over the study period.

In both short-run and long-run when the governance quality of the Ethiopia is lower than its threshold value, the coefficient is negative, suggesting that governance quality and economic growth are negatively related when the governance quality score falls below the threshold value.

On the other hand, economic growth of the country improves when the governance quality overshoots the threshold value, meaning that further governance quality improvement will enhance economic growth. Similarly in short-run given the political freedom score of Ethiopia is less than its threshold value, political freedom has negative impact on economic growth of Ethiopia but economic growth increases for the values beyond the threshold value. In general, the estimated threshold value implies that Ethiopia need to improve overall score of governance quality to 0.490 and 0.527 (on a scale of 0 to 1 index, 1 represent better governance quality and 0 represent poor governance quality) to enhance the level of economic growth in long run and short run respectively and score of political freedom to 3.21 (given that the re-scaling of political freedom ranges from 1 to 7, 1 represent low political freedom and 7 represent high level freedom) to increase economic growth in short run.

Diagnostic Tests

To accept above model as a good model, it is necessary to check whether it if free from problem of serial correlation, heteroscedasticity and non-normality of error term by undertaking post estimation tests like normality, serial correlation, and heteroscedasticity tests.. It addition it is necessary to check stability of the model. The result of these post estimation tests are reported in below table.

Table 4.13: Diagnostic test results for model 3

Diagnostic tests for model 2				
Breusch-Godfrey Serial Correlation LM Test	F-statistic Obs*R-squared	0.113934 1.071896	Prob. F(2,7) Prob. Chi-Square(2)	0.8939 0.5851
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic Obs*R-squared	0.536887 20.01801	Prob. F(24,9) Prob. Chi-Square(24)	0.8920 0.6958

Jarque-Bera Normality test	Jarque-Bera	2.549186
	Probability	0.279545

The diagnostic tests in the above table result shows that the probability values of all the tests is greater than 5% level of significance. Thus, that the null hypotheses of absence of serial correlation and heteroskedasticity, and non-normal distribution are not rejected. With regard to the stability of the model, the plots of CUSUM and CUSUMSQ (see in the appendix) indicate that the model is stable as the plots lie within the 5% level of significance interval. Thus, we can concluded that the model passed the key assumptions test, the findings and policy implications of the paper stand to be implemented by any relevant and concerned organizations.

4.2.11. Symmetry and Asymmetry Granger Causality Test

The Granger causality test between institutional quality (measured by governance quality and political freedom) and real GDP per capital result reported in Table 4.13 below. The result revealed the null hypothesis of political freedom does not Granger-cause real GDP per capital is rejected since probability value is statistically significant at 5 % level of significance and the null hypothesis of real GDP per capital doesn't Granger-cause political freedom is also rejected. Thus, it implies that there is bi-directional causality between political freedom and economic growth (i.e. from political freedom to economic growth and the reverse is true) at 5 % level of significance. This result confirm with Chang (2000) who suggest that there may be bi-directional causality between economic growth and institutional quality. Moreover, Economic growth can affect institutional quality. However, the null hypothesis of governance quality does not cause economic growth and economic growth does not cause governance quality is not rejected since in both case the p-value is greater than 0.05.

In addition, to check asymmetric causality political freedom and governance quality split into positive and negative components. The result show that the null hypothesis GQ_NEG and GQ_POS doesn't Granger cause real GDP per capital is rejected but null hypothesis of economic

growth (real per capital GDP) doesn't cause economic growth is not rejected, meaning that negative and positive shock on aggregate governance quality cause economic growth but the reverse is not true. Thus, we can conclude that there is asymmetric causality running from governance quality to economic growth in Ethiopia. Similarly, for political freedom the null of hypothesis of negative and positive shock on political freedom does not cause economic growth is rejected at 1 % level of significance which implies that there is unidirectional causality running from positive and negative shock on political freedom to economic growth in Ethiopia over the sample period but the reverse is not true as shown by insignificant probability value. Thus, there is asymmetric causality from political freedom and governance quality to economic growth.

Table 4.14: Granger-causality test result

Null Hypothesis:	Obs	F-Statistic	Prob.
DPF does not Granger Cause DLNRGDPP	33	3.73171	0.0366
DLNRGDPPC does not Granger Cause DPF		5.29766	0.0112
DGQ does not Granger Cause DLNRGDPPC	33	0.58461	0.5640
DLNRGDPPC does not Granger Cause DGQ		2.11009	0.1401
PF_NEG does not Granger Cause DLNRGDPPC	33	5.00840	0.0138
DLNRGDPPC does not Granger Cause PF_NEG		2.82095	0.0765
PF_POS does not Granger Cause DLNRGDPPC	33	8.69419	0.0012
DLNRGDPPC does not Granger Cause PF_POS		1.22362	0.3094
GQ_NEG does not Granger Cause DLNRGDPPC	33	5.86375	0.0075
DLNRGDPPC does not Granger Cause GQ_NEG		0.24605	0.7836
GQ_POS does not Granger Cause DLNRGDPPC	33	5.38426	0.0105
DLNRGDPPC does not Granger Cause GQ_POS		1.88703	0.1703

CHAPTER FIVE

5. SUMMERY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1. Introduction

This chapter presents the summary of the study findings, conclusion, policy recommendation and implication for further research based on the study result. Moreover, the second sub topic of this chapter is about summery of the study findings and conclusions of the study. While the third sub presents policy implication of the study and the final sub topic of the chapter presents the limitations of the study and recommendation on the study areas for further research.

5.2. Summery and Conclusion of the Study

In a globalized world, the relationship between institutional quality and economic growth is becoming increasingly area of interest of researchers. Although there are some studies on institutional quality and economic growth, previous studies on relationship between institutional quality and economic growth provided mixed conclusions. Some studies conclude that institutional quality promotes economic growth of the countries and some other studies suggested that institutional quality is a detrimental to economic growth. In addition, some studies argued that there exists a nonlinear relationship between institutional quality and economic growth. The existence of limited country- specific analysis especially in Ethiopia, the existence of mixed results on the relationship between institutional quality and economic growth and ignorance of existence of feed-back or bi-directional causality between institutional quality and economic growth by most previous empirical studies motivated the researcher to investigate the relationship between institutional quality and economic growth in Ethiopia. In addition, the current study distinguishes itself from previous studies by using broad measure of institutional quality.

This study aimed to investigate the relationship between institutional quality and economic growth in Ethiopia, covering the period 1985 to 2020 using annual time series data. The model specification process was based on augmented neo-classical growth model. The study employed a set of time series methods, including symmetric and asymmetric ARDL framework, cointegration

test, different per-estimation and post estimation tests and symmetry and asymmetry Granger-causality test. Doing so, the study addressed the following specific objectives, which are, investigate the trends of economic growth and institutional quality, examine long-run and short-run the impact of institutional quality on economic growth, investigate the asymmetric impact of institutional quality on economic growth, estimate the threshold value of institutional quality and determine the direction of causality between institutional quality and economic growth.

The first specific objective of study was to analyze trends of institutional quality (aggregate governance quality and aggregate political freedom) and economic growth (measured by real GDP per capital). This was accomplished through descriptive analysis. The result of descriptive analysis shows that on average, in the year before reform (in the Derg regime) both institutional quality and economic growth were relatively lowest level but they were relatively better after 1991 (i.e., during the EPDRF). In addition the trends of political freedom and governance quality show that they are low over the study period. Ethiopia never be politically free throughout the study period. The variations on the economic growth rate link with the variation in institutional quality.

The result of pre-estimation tests (ADF and PP tests) revealed that all the variables (both dependent and independent variables) are stationary at first difference. Cointegration test results imply that the bound test (F-statistic) value is larger than the upper bound critical value which indicates there is a long run relationship between the study variables. Next to testing for time series property, the diagnostic tests results for both models (ARDL and NARD model) revealed that no evidence of serial correlation, the residual is normally distributed and no evidence of heteroskedasticity problem and also the models are stable.

The second specific objective was to examine the symmetric effect of institutional quality on economic growth in Ethiopia. This was accomplished through empirical analysis using linear ARDL model. The result of estimated ARDL model shows that in both short-run and long-run governance quality has a detrimental impact on economic growth. Political freedom has negative and positive impact on economic growth in short run and long run respectively. In addition, the other control variables such as gross capital formation and government final consumption

expenditure has positive and negative impact on economic growth of Ethiopia both in short-run and long-run respectively. Government expenditure on education and population growth have insignificant impact on economic growth in the short-run. In the long-run population growth and government expenditure on education have negative and positive impact respectively.

The third specific objective of the study was to analyze the asymmetric effect of institutional quality on economic growth in Ethiopia. This was done by using non-linear ARDL model. The NARDL result suggests that in the long-run the positive and negative components of the aggregate governance quality have detrimental impact on economic growth. It was also discovered that the positive component of the governance quality in the long-run has greater negative impact on economic growth than the negative component but in the short-run the positive component of governance quality has insignificant impact and its negative component has negative impact on growth of Ethiopian economy. Similarly, in long-run and short run, the positive component of the aggregate political freedom has a significant positive and negative effect on economic growth respectively but negative component of political freedom has insignificant effect.

The fourth specific objective of the current study was identifying the threshold level of institutional quality above which institutional quality would stimulate economic growth in Ethiopia. To address this objective, the study incorporates the square term of governance quality and political freedom in the first ARDL model. The result indicates that there is threshold level for governance quality in both short-run and long-run and for political freedom only in short-run. The threshold value for governance quality is 0.490 and 0.527 in long-run and short-run respectively and 3.21 for political freedom in the short-run. Finally, the fifth objective of this study was testing symmetry and asymmetry Granger-causality test between institutional quality and economic growth in Ethiopia and the result show that there is a causality run from political freedom to economic growth and the revers also true. In addition, there is a causality run from positive and negative component of political freedom and governance quality to economic growth.

It can be concluded that institutional quality (governance quality and political freedom) of Ethiopia has a significant role on the economic growth of the country. These institutions have generally low

score in our country. Accordingly, in Ethiopia the quality of governance is poor and throughout the study period on average the political freedom status of Ethiopia is not free. Thus, this low institutional quality has negative impact on the country's economic growth this may be because with low level of institutional quality since the share of informal sector to country's growth is greater improvement in institutional quality may causes deterioration of operations of informal sector which leads to decline in the economic growth of the country. In addition, the negative impact of institutional quality implies that the institutional quality threshold to impact economic growth positively. The result of NARDL model implies that there is asymmetric impact of institutional quality (governance quality and political freedom) on economic growth, the negative and positive changes of political freedom and governance quality have no equal impact on the economic growth.

The threshold result revealed that there exist institutional quality threshold for economic growth to reach its highest level. Moreover, the relationship between institutional quality and economic growth in Ethiopia is non-linear and supported that there is U-shape relationship. Furthermore, the threshold result revealed that when institutional quality index (score of political freedom and governance quality) less than their threshold level the coefficient is negative, political freedom and governance quality have negative impact on economic growth of the country. However, when the score of governance quality and political freedom is greater than their threshold value, the coefficient is positive, suggesting that economic growth improves when the score of political freedom and governance quality increases beyond the threshold value. The implication of this result is that, the minimum levels of governance quality that can impact positively on economic growth in both short-run and long-run are 0.527 and 0.490 respectively. Similarly, the minimum score of political freedom that can impact growth of the country positively in the short-run is 3.21. Furthermore, the result implies that better institutional quality promote economic growth. Finally, the Granger-causality test result revealed that there is bi-directional causality between political freedom and economic growth, implies that economic growth also causes political freedom this may be due to high income create demand for high quality institutions. In addition, there is

unidirectional asymmetric causality between positive and negative components of institutional quality (political freedom and governance quality) and economic growth.

5.3. Policy implications of the Study

Based on the study result the author propose some policy implications as follows: first, since low institutional quality (institutional quality below the threshold value) has adverse effect on economic growth, the study suggests that policies aimed at reinforcing governance quality and political freedom should be the priority for policymakers seeking to achieve high and sustain economic growth to Ethiopia. Second, since there is bi-directional causality between political freedom and economic growth, implies that improving one would affect the other and policies need to recognize this interrelationship in a complementary manner.

Moreover specifically, our country government must take serious action to improve the score of governance quality (average of government stability, corruption, internal conflict, law and order, democratic accountability, military in politics and investment profile) to maintain at the threshold level of governance quality so that high and sustainable economic growth can be reached. In particular;

- Actions like strong punishment by the law must be taken to prevent using of public power for private gain and manipulation of state by elites for privet interest. Moreover, the government should commit itself to control corruption.
- Sound economic and social policies should be adopted to reduce incidence of internal conflict (incidence of armed or civil opposition to the government) and military in politics.
- The government must be responsive to its people and promote its ability to carry out its declared program(s).

Similarly, as political freedom which is average of political right and civil liberties has a positive association with economic growth above its threshold level;

- Our country must increase the status of political rights, including free and fair elections. Candidates who are elected must be competitive, the opposition plays an important role

and enjoys real power, and the interests of minority groups should be well represented in politics and government.

- To improve civil liberty, including freedoms of expression, assembly, association, education, and religion, the government must established fair legal system that ensures the rule of law (including an independent judiciary).
- Generally, the paper suggests that improving governance quality and political freedom could be used as potential entry points of development strategies for Ethiopia. The thesis also highlights the need for more efforts to improve the governance quality and political freedom.

5.4. Areas for further research

In the light of the study results and limitations of the study aforementioned, this study forwarded the following implications for future investigation.

First, in analyzing the relationship between institutional quality and economic growth in Ethiopia, the study only consider formal institutions but informal institutions, which are basic for institutional foundation of the country, were not considered. Second, due to long time series data unavailability in economic freedom indicators, this study was not able to consider the impact of economic freedom. Thus, the study recommends that future studies will incorporate economic freedom indicators and informal institutions in examining the relationship between economic growth and institutional quality.

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Appendix

Appendix A: Short run and long run ARDL estimation results for model 1(ARDL model)

Short run ARDL model

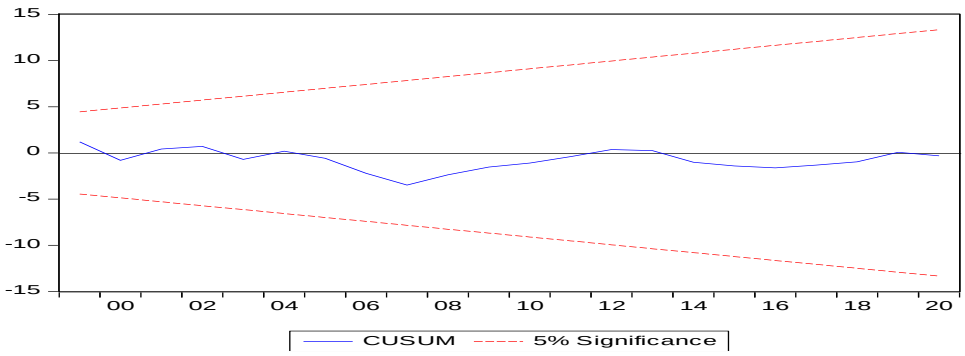
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.615486	0.088127	6.984086	0.0000
DLNN	-0.091205	0.148294	-0.615031	0.5446
DLNGFCE	-0.161228	0.037115	-4.344016	0.0002
DLNGFCE(-1)	-0.087297	0.025833	-3.379243	0.0026
DLNGCF	0.192052	0.032149	5.973837	0.0000
DLNGCF(-1)	0.087045	0.024697	3.524572	0.0018
DLNEDU	0.019070	0.017280	1.103580	0.2812
DGQ	-0.240004	0.072279	-3.320550	0.0030
DPF	-0.016426	0.005679	-2.892120	0.0082
DPF(-1)	-0.037889	0.007073	-5.356520	0.0000
ECM(-1)	-0.616333	0.077298	-7.973434	0.0000

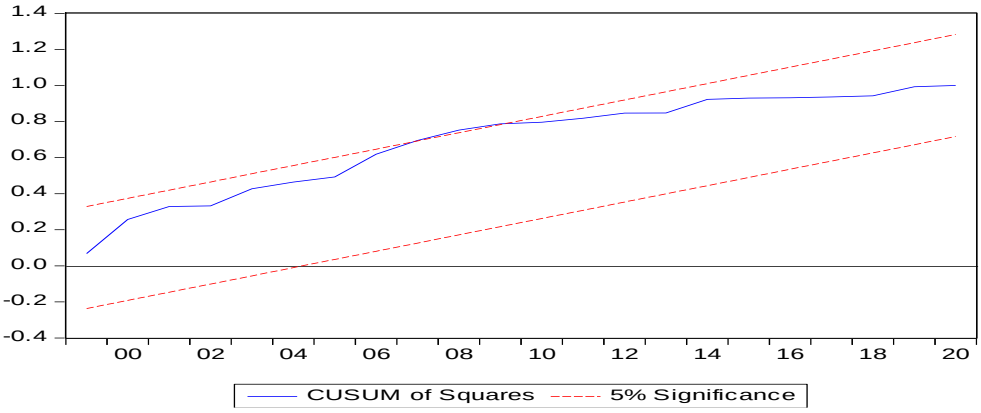
R-squared	0.845162	Mean dependent var	0.015881
Adjusted R-squared	0.777841	S.D. dependent var	0.027223
S.E. of regression	0.012831	Akaike info criterion	-5.617698
Sum squared resid	0.003787	Schwarz criterion	-5.123875
Log likelihood	106.5009	Hannan-Quinn criter.	-5.449290
Durbin-Watson stat	1.889754		

Long run ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-2.040929	0.561400	-3.635430	0.0020
LNGFCE	-0.390592	0.092843	-4.207026	0.0006
LNGCF	0.559241	0.077011	7.261858	0.0000
LNEDU	0.043556	0.019898	2.188940	0.0428
GQ	-1.131533	0.245698	-4.605383	0.0003
PF	0.046360	0.025996	1.783355	0.0924
C	2.640344	0.740003	3.568020	0.0024

Appendix B: Stability test (CUSU and CUSUMQ plots for model 1





Appendix C: Short run and long run ARDL results for model 2 (NARDL model)

Short run ARDL model

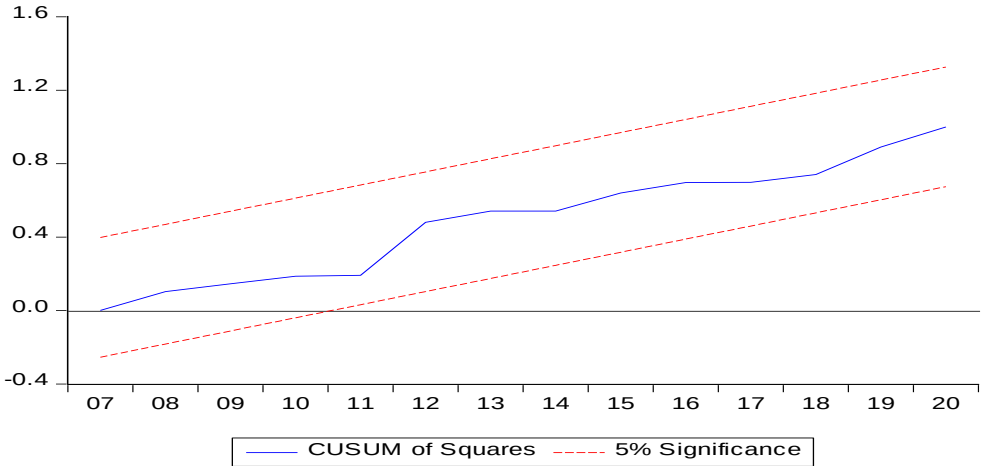
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.328324	0.076142	4.311984	0.0004
DLNN	-0.217088	0.121805	-1.782253	0.0907
DLNGFCE	-0.053673	0.025886	-2.073471	0.0520
DLNGFCE(-1)	-0.077603	0.020608	-3.765588	0.0013
DLNGCF	0.125780	0.020251	6.211098	0.0000
DLNGCF(-1)	0.069413	0.019866	3.494063	0.0024
DLNEDU	0.036058	0.016520	2.182630	0.0418
DGQ_POS	-0.053909	0.061125	-0.881943	0.3888
DGQ_NEG	-0.243222	0.083685	-2.906393	0.0091
DPF_POS	-0.018922	0.006144	-3.079691	0.0062
DPF_POS(-1)	-0.054067	0.007628	-7.088201	0.0000
DPF_NEG	-0.001592	0.009291	-0.171328	0.8658
COINTEQ(-1)	-0.439822	0.043828	-10.03522	0.0000
C	0.002152	0.004978	0.432220	0.6704
R-squared	0.930643	Mean dependent var		0.015075

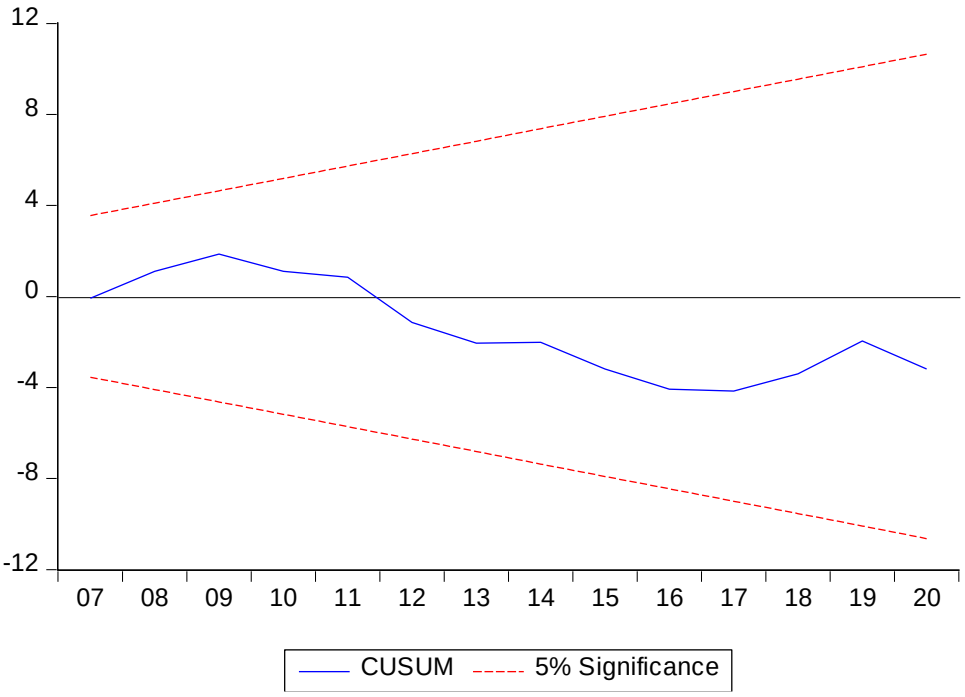
Adjusted R-squared	0.883189	S.D. dependent var	0.027230
S.E. of regression	0.009307	Akaike info criterion	-6.219788
Sum squared resid	0.001646	Schwarz criterion	-5.584906
Log likelihood	116.6265	Hannan-Quinn criter.	-6.006169
F-statistic	19.61127	Durbin-Watson stat	2.060645
Prob(F-statistic)	0.000000		

Long run ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-1.936419	0.599268	-3.231307	0.0060
LNGFCE	-0.353963	0.092078	-3.844155	0.0018
LNGCF	0.387173	0.075219	5.147273	0.0001
LNEDU	0.093923	0.050732	1.851363	0.0853
GQ_POS	-1.280916	0.352667	-3.632083	0.0027
GQ_NEG	-0.616001	0.230210	-2.675820	0.0181
PF_POS	0.087033	0.047546	1.830488	0.0885
PF_NEG	-0.011516	0.031229	-0.368769	0.7178
C	3.268788	0.946666	3.452947	0.0039

Appendix D: Stability test (CUSU and CUSUMQ plots for model 2 (NARDL model)





Appendix E: Estimated short run and long run ARDL results for model 3 (estimating threshold value)

Short run ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNRGDPPC(-1)	0.712439	0.075994	9.374896	0.0000
DLNN	0.247453	0.119227	2.075467	0.0534
DLNN(-1)	-0.766341	0.117668	-6.512728	0.0000
DLNGFCE	-0.379756	0.033958	-11.18315	0.0000
DLNGFCE(-1)	-0.161897	0.020542	-7.881126	0.0000
DLNGCF	0.363058	0.031216	11.63034	0.0000
DLNGCF(-1)	0.218048	0.028244	7.720063	0.0000
DLNEDU	0.038486	0.015042	2.558470	0.0204
DLNEDU(-1)	0.036204	0.015350	2.358659	0.0306
DGQ	-0.948901	0.110262	-8.605866	0.0000
DPF	-0.076941	0.008294	-9.276725	0.0000
DPFSQU	0.011965	0.001907	6.274733	0.0000
DGQSQU	0.899357	0.103232	8.712023	0.0000
COINTEQ(-1)	-0.730763	0.065103	-11.22470	0.0000
C	-8.57E-05	0.002538	-0.033770	0.9735

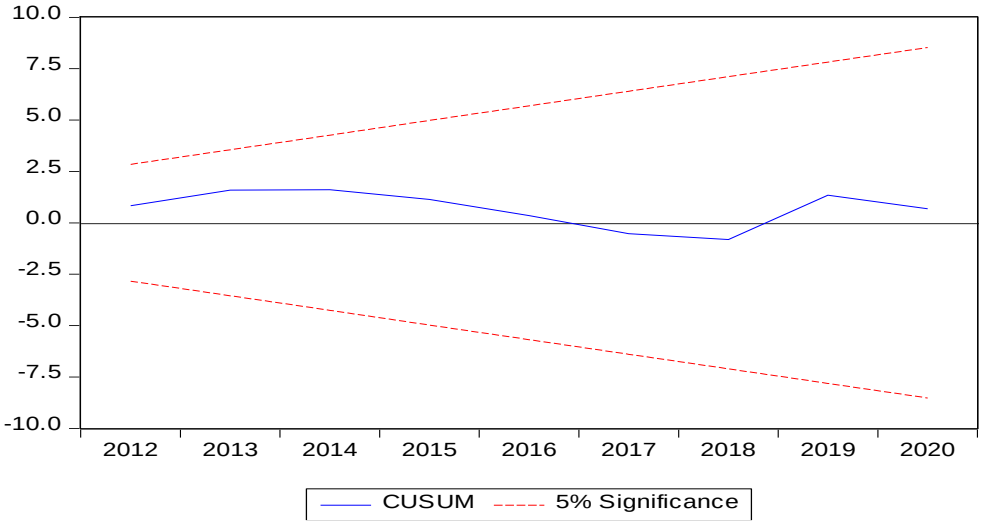
R-squared	0.950961	Mean dependent var	0.015881
Adjusted R-squared	0.904807	S.D. dependent var	0.027223

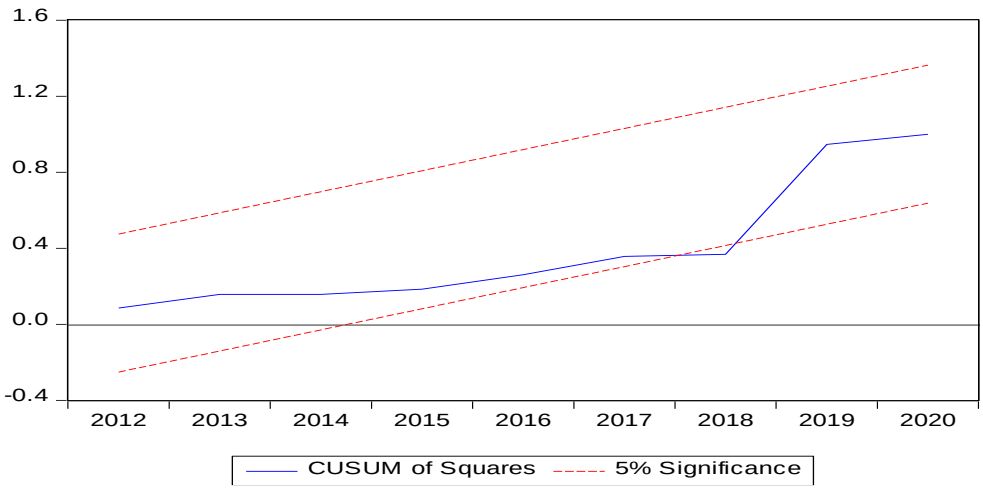
S.E. of regression	0.008399	Akaike info criterion	-6.414525
Sum squared resid	0.001199	Schwarz criterion	-5.651345
Log likelihood	126.0469	Hannan-Quinn criter.	-6.154259
F-statistic	20.60405	Durbin-Watson stat	2.058664
Prob(F-statistic)	0.000000		

Long run ARDL model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNN	-1.160560	0.497174	-2.334311	0.0444
LNGFCE	-0.337490	0.101897	-3.312068	0.0091
LNGCF	0.662958	0.109931	6.030645	0.0002
LNEDU	-0.014859	0.036600	-0.405976	0.6942
GQ	-2.929179	0.959924	-3.051471	0.0138
PF	-0.048753	0.040879	-1.192625	0.2635
PFSQU	0.001252	0.008795	0.142329	0.8900
GQSQU	2.985401	1.125622	2.652224	0.0264
C	1.385723	0.587276	2.359578	0.0426

Appendix F: Stability test (CUSU and CUSUMQ plots for model 2

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