NEXUS BETWEEN POLITICAL INSTABILITY AND ECONOMIC GRWOTH IN ETHIOPIA

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ADDIS ABABA, ETHIOPIA

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This is to certify that the thesis prepared by Mulugeta Melesse Tesema, entitled: "*NEXUS BETWEEN POLITICAL INSTABILITY AND ECONOMIC GROWTH IN ETHIOPIA"* and submitted in partial fulfillment of the requirements for the Degree Master Of Science In Development Economics complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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ACRONYMS

ADB African Development Bank

ADF Augmented Dickey-Fuller Test

AIC Akaike Information Criterion

ARDL Autoregressive Distributed Lag

CED Committee for Economic Development

CUMSUM: Cumulative Sum of Recursive Residuals

CUMSUMSQ: Cumulative Sum of Squares Recursive Residuals

DW Durbin Watson

ECM: Error Correction Model

GDP: Gross Domestic Product

HQ: Hannan-Quinn Criterion

ILO International Labor Organization

IMF: International Monetary Fund

OLS: Ordinary Least Square

PP Philips-Perron Unit root test

SBIC Shwartz Bayesian Information Criterion

SSA Sub-Saharan Africa

UNDESA Unite Nations; Department of Economic and Social Affiars

UNDP United Nations Development Program

UNRISD United Nations Research Institute for Social Development

WBI World Bank Indicators

WGI World Governance Indicators

ABSTRACT

This study investigates the nexus between political instability and economic growth in Ethiopia for the period of 1991- 2020due to the availability of data. The ARDL, co-integration approach and Error Correction Model are employed to examine the existence of long- run relationship between political instability and economic growth as well as short- run dynamics of economic growth respectively. For investigating the causal relationship among the variables of the model Granger causality test has been applied. The empirical results of the study confirm the existence of cointegration between political instability and economic growth in Ethiopia. Results show that political instability has significant and negative relation with economic growth both in long-run and short-run in general. This paper is relevant for two main reasons. First, it adds to the debate on the effects of political instability on economic growth. Second, it makes an important contribution by focusing on the case of Ethiopia, which has received little attention in the literature on political instability relation with economic growth so far, even though political instability is a constant threat to the country.

Keywords: *Political instability, Economic growth, ARDL, ECM, Ethiopia.*

1- INTRODUCTION

1.1 Background of the Study

Political stability is a pre-condition for nation building, such as political development and national integration. Political economists disagree on definition and measurement of political instability (Campos & Karanasos, 2008). For the purpose of defining political instability can be distinguish between its formal and informal dimensions. Formal political instability arises due to elections and constitutional changes. On the other hand, informal political instability originates through protests, assassinations, riots, strikes and violations (Javed and Mamoon 2017).

These formal and informal measures have been combined to define political instability. The first definition is labeled as social political instability. This is the simplest definition and it covers only informal measures of political instability. The second measures government changes covers a broader definition of political instability and is based on formal political instability, economic and institutional measures (Javed and Mamoon 2017).

According to Karim & Aziz (2015) political instability measure by number of violent political events like strikes, riots, assassination or coups, number of government changes and probability of government change. They are categories Political instability in to four dimensions. One is politically motivated violence, second one is mass political violence, third category is instability within the political regime and instability of the political regime, the last one number of assassinations and the number of revolutions (Karim & Aziz, 2015). Other study also categorizes it in two dimensions, i.e. regime instability and government instability (Aisen & Veiga, 2013).

Political instability and economic development are deeply interrelated to each other. Due to political instability, uncertainty comes in an economy and as a result investment decreases and economic development is also affected. Because of reduction in investment, the level of output correspondingly decreases. The powerless political society, instability of government and carelessness of political parties create the situation for a politically instable state. For economic development of any country political stability is required (Leydesdorff & Meyer, 2006; Varsakelis, 2006).

Political stability has direct effect on the process of economic development and the progress level of a state. Foreign direct investment affects economic growth and development process because it supplies capital for developing nations for investment purpose. Political instability is building block of the conceptual construct designed for this study. According to several past studies, political instability can be considered as a critical bottleneck for the innovation and overall economic development of many countries (Gayle et al., 2012; Hammed, 2018).

Political stability affects the level of economic growth. At the first glance can assume that Economic growth and political stability are deeply correlated and have a high causality one another. On the one hand, the uncertainty combined with an unstable political environment may have a negative effect by reducing investment and the tendency of economic development. On the other hand, low economic performance may facilitate the government collapse and political unrest. The politically unrest environment may affect sustainable development through irrational political and economic decision making which reduces private investment, public sector programs, pattern of public spending and economic growth (Jong, 2009;Gayleet al., 2012).

In the study of Aisen & Veiga (2011) political instability possibly shorten policymakers' horizons leading to suboptimal short term macroeconomic policies. It may also lead to a more

frequent switch of policies, creating volatility and thus, negatively affecting macroeconomic performance. And also there other study confirm that political instability create devastates environment for countries to have sustainable development by a variety of channels like restricting capital formation both physical and human capital flight, brain drain, devastating institutions, glass curtain on media freedom and restricting the mass information and awareness for the people. Then end up with its negative impact of taxation, debt and inflation (Aisen & Veiga, 2013).

Political instability is a broad and complex concept has led to the formulation of different indicators and proxies by international institutions and researchers**.** Kaufmann & Mastruzzi (2010) conceptualized political stability as absence of terrorism and violence, proficient government policy formulation and implementation, improved regulatory mechanisms, reduced corruption and ensuring the rule of law. these can be recognized as high governance qualities for political stability considered as proxies variables of political instability in this study (Kaufmann &Mastruzzi, 2010).

And also populations, physical and human capital, level of technology saving internal trade are considered source of economic growth in most countries. Such factors which can be determined by the competitive market economy may be relevant enough to explain the economic performance of the developed economy. But such conventional determinants cannot fully explain the growth process of developing economies. The growth function of developing countries differs from that of the developed countries (Barro, 1996).

Petrakos G. et al (2007) study Ethiopia situate as one of the least developed country, shared this feature. Considered growth performance in Ethiopia is largely determined by political economy factors; vagaries of nature; strength and efficiency of institutions; efficiency of public policies

and risk related to war and property ownership product and input market are found to be not only thin but also inflexible (Petrakos G. et al, 2007).

Ethiopia has a strategic geographic location in the East Africa, which is a region characterized by political instability throughout its history. Ethiopia is a nation with long history of existence; history of independence and history of war. It is with a population of more than 110 million, plenty of resources, large arable land and etc. Though is with these and other potentials to grow, It is one of the poorest countries , low level of living standard, low level of domestic saving, weak private investment, extremely low foreign investment inflow, unemployment and poor social and physical infrastructures(Alemeyew, 2005).

Even if the economy of Ethiopia is at the developing stage, at different times occurrence protests shaken the country to its core that of anti-government protests have been triggered over freedom of the press, land rights, under-represented seats in the coalition parties, and horizontal inequality in economic, political and social affairs among ethnic groups across the country. The war between Ethiopia and Eritrea also was brought political, economic and social security threats to Ethiopia and the Horn of Africa in general. These political instability, good governance and crime hamper economic growth in many ways. (IslamS.N. 2016).

The causes of political instability in Ethiopia lists as increasing of political crime, law and order situations, related with human rights and good governance. And also conflict between the political parties, inefficiency of local administration in conducting a legal and transparent election and corruption in the government levels etc. are main causes for political instability in Ethiopia.(IslamSN, 2016).

The goal of this study highlight about political instability, using voice and accountability, political stability and violence, regular quality, rule of law and corruption, relation with

Ethiopian economic growth as these factors exclusively reflect political instability in the economic system.

1.2 Statement of the Problem

The traditional growth model (Solow growth model, for example) states that economic growth is based on savings, capital accumulation and growth. Nevertheless, modern growth theories emphasize technology and the creation of human capital. Similarly, a country's political circumstances often decide the country's level of growth, as economic growth depends primarily on the stability of government policies and their implementation (Baro, 2013).

Political instability is considered by economists as a serious disease harmful to economic performance. Government criticism began to be posed by society that offers negative signals to investors who, as a result, avoid investing in such a risky climate. It is anticipated that political uncertainty would disrupt economic activity and macroeconomic variables. Hence, political instability is destructive for economic policies. Instability in political environment creates inflation and unemployment that is one of the fundamentals to cause political instability that eventually results in public riot in form of strikes against governments (Zureiqat, 2005; Farida, et al., 2008; Abdelkader, H. E., 2015).

Various researchers (Sweidan, 2016; Kaplan et al., 2017) have been interested in the wide-ranging phenomenon of political instability in several countries over time and its negative effects on their economic performance. It not only creates uncertainty in political and legal environment but also disrupts markets and disturbs macroeconomic variables. As such, the researchers have produced a wide range of literature, documenting the negative effects of political instability on a wide range of macroeconomic variables, private investment, unemployment and inflation. And also slow down economic activities and human capital development that is adversely affects

growth of output. It is seriously harmful for the economic policy makers and limits the scope of growth and prosperity.

Lots of other studies (such as Campos & Nugent, 2002; Pei & Adesnik, 2010; Gormu & Kabaskal, 2010) have documented political instability adversely affects economic growth. Political variability creates democratic unrest, frequent elections, intra-party conflicts, strikes, war, and inconsistence regime which lead economic growth to fall. This political instability has various adverse effects. It is measured by various factors and determinants such as elections, terrorist attacks, war, regime changes and strikes in the country over a period.

And also governance as source of political instability those take voice and accountability, political stability and absence of violence, regular quality, rule of law and control of corruption as proxy variables for political instability. Another quantification of economic growth is that national output should be composed of goods and services which satisfy the maximum want of the maximum number of people. Economic growth can be determined by human resources, National Resources, capital formation and technological development (Ogbonna and Ebimobowei, 2012).

The statistics available indicate that Ethiopia is suffering acutely from the issue of underdevelopment and political instability. The abundant wealth of a nation alone never ensures its economic growth, but good political stability has strong potential to justify the economic development of a nation as seen in different study that mention above. Ethiopia as a nation is facing problems regarding investments in extremely changing environment of investment, because of political instability in Ethiopia and global recession. Investors could feel hesitant to invest in Ethiopia due to political instability in the country. It seriously harmful for the economic policy makers and limits the scope of growth and prosperity. Though, there is limited research focusing in this area.

In Ethiopia almost a few researchers have focused and have even ever tried to explore the causes of low economic growth due to political factors rather they have been trying to find the causes of low economic growth, low productivity, low investment, high inflation and high unemployment because of economic factors. This study aims to point up how political instability has an effect on Ethiopian economic growth through the use of voice and accountability, political stability and absence of violence, regular quality, and rule of law and control of corruption, as these variables reflect political instability exclusively in the economic system.

The study is conducted to check the relation between political instability with economic growth of Ethiopia and which political instability variables affect economic growth of the country. Hence, the sole objective of this paper is to investigate the nexus between the economic growth and political instability in Ethiopia since 1991 taking into consideration the ignored problem. The research focused on the comparative between political instability indicators and their relation with economic growth of Ethiopia, though the time period it covers which is crucial, as it reflects the recent political circumstance have happened in Ethiopia. So that study will have area of contribution to the literature and possible benefit to key policymakers. Positively, the results of this study importance to policy analysts to suggest a way forward to Ethiopia's continuing development problems.

1.3 Objectives of the Study

1.3.1 General objective

The general objective of this study is analyzing the impact of political instability on economic growth in Ethiopia. In this regard, the study intends to particularly examine the following specific objectives.

1.3.2 Specific objectives

In order to realize the general objective, some specific objectives are also needed to be achieved. These are:

i. Investigate the trend of political instability and GDP per capital growth in Ethiopia.
ii. To quantify the impact of political instability on GDP per capital growth.
iii. To examine the direction of causality between political instability and economic growth in Ethiopia.

1.4 Research Hypotheses

In this study, the following hypotheses shall be tested:

HO: political instability variables are adversely impacting GDP per capital growth in Ethiopia.

HO: There is significant causal relationship between political instability and economic growth in Ethiopia.

1.5 Research Questions

The central research question of the study is; Does political instability adversely impacting GDP per capital growth in Ethiopia?

1.6 Significant of the Study

This study goes a long way to search political instability destructive to economic growth or not. It focuses on the case of Ethiopia, which has not received attention in the literature on political instability relation with economic growth so far, even though political instability is a steady threat for economic growth of the country. The main focus of this study tries to find notion for

Ethiopia economy that of increase the economic growth as much as possible and able to increase the living standard of the people. The research come across idea to suggest that of countries need to address political instability; dealing with its root causes and attempting to mitigate its effects on the quality and sustainability of economic policies engender economic growth. The findings initiate academia, researchers and any politicians by provoking deep thinking and stimulating discussions on the subject matter. In addition, the paper fill address the paucity of research on Ethiopian case.

1.7. Scope and limitation of the Study

This study focuses on the causal nexus between political instability and economic growth in case of Ethiopia. And the study covers time series data between 1991 and 2020. The scope of this study limited in terms of coverage and method. With regard to coverage, it was limited to the Ethiopian economy as well as political instability that have undertaken country wide. The major political instability variables incorporated in the model are voice and accountability, political stability and absence of violence, regular quality, rule of law and control of corruption with gross fixed capital formation and human capital as control variable. The study limited to the case of Ethiopia and hence the policies recommend at the end of the paper are also subject to the Ethiopian case. In order to answer the main questions, the researcher examined the theoretical and empirical investigation using time series data since 1991 on voice and accountability, political stability and absence of violence, regular quality, rule of law and control of corruption impacts on economic growth of Ethiopia.

The main challenges for this study are hereby to find some of appropriate indicators for political instability that related with economic growth of Ethiopia. The research have face limitations regarding it focus only on five variable on political instability and two control variables related

to economic growth. And also other political instability indicator those which is not considering in this research due to the problem of availability of time series data. But the study explores the possible ways through which political instability affect economic growth of Ethiopia. To achieve this objective, the period range from 1991 to 2020 chosen. This period is chosen based on availability of data and political regime of the Ethiopia. This study attempts to shed on the impact of political instability on economic growth in Ethiopia.

1.8. Organization of the Study

The rest of the paper is organized as follows: the second chapter devote to review relevant theoretical and empirical evidences, while the third chapter present a time series data and specifies the econometric model. Chapters four analyzes and discuss/interprets the econometric results. The last chapter conclude thesis and recommend policies.

2-LITERATURE REVIEW

2. REVIEW OF THEORETICAL LITERATURE AND EMPIRICAL EVIDENCES

The first chapter introduced the problem to be investigated in this study along with purpose and research hypothesis. In order to put the study within the context of the existing literature, the subsequent section of this chapter present the review of both theoretical and empirical studies related to political instability and economic growth. This literature review part of the research is elaborate about the basic issue of the research with giving special attention on economic growth and political instability in that order.

2.1. Theoretical Concept of Economic Growth

Economic growth is one of the most important notions in the global economy. It is an increasing in the amount of goods and services produced per head of the population over a period of time in the form of gross domestic product (GDP)(Khalid Y. and Kenji, 2016). According to Osipia (2009), the economic growth is a quantifiable transformation that increases the total output of the nation in a given period of time (Hatem *et al.,* 2016). The theory of economic growth proposed by Schumeter is based on the assumptions of private property, a competitive market and the efficiency of financial markets that could support the production of new inventions. His theory is addressed to the democratic and economically developed countries (Schumpeter, 1934).

Walt Rostow like Lewis, made economic development dependent on the accumulation of capital, and distinguished five stages of development (Rostow, 1960). According to Rostow, the biggest problem for poor countries is to achieve the third stage, called “take off”. Poor countries have a problem with the interruption of the “vicious circle” established through the years. Rostow

proposed to break it by accumulating capital (Rostow, 1971). This stated shortcoming led to the creation of the new endogenous growth theory. This model is founded on three main assumptions: first technological change results from the "animal spirit" optimism and pessimism of the market, which determines long-run economic growth, second technological change causes labor to be efficient, improving output per capita, and third the cost of production of new inventions is incurred once as a fixed-sunk cost. The underdeveloped economy experiences insufficiencies technology and investment.

The right institutions are more important than saving to accumulate technology and capital formation. Different quality of institutions causes different levels of economic growth. Institutions also improve the efficiency of distributions income and output and create knowledge of economic opportunity and motivations (Wolf, 1955). According to North (1990), institutions that shape incentive structures are the main factors of economic growth.

Robert Solow and Trevor Swan developed the exogenous neo-classical growth model (Dimand & Spencer, 2011). The Solow growth model states that long-run growth is achieved through capital accumulation, skilled labor, population growth, and technological progress (Solow, 1956). The model is based on four variables that are used to determine long-term growth, including output (Y), capital (K), labor (L), and investment (I) or savings (S). In Solow's growth theory, the output is a function of capital, labor, investment, and technology. Solow had four critical assumptions in his model: the first and second, he assumed that labor force growth and technology are exogenous factors, which means that labor force growth is constant; third, the Solow growth model assumes capital and labor to have a constant return to scale; fourth, the model assumes a diminishing return of its variable factor $GDPper\ capita$.

The Solow Growth Production-Function

$Y = (K,L)$**……** **(1)**

$y = (k)$ **……...** **(2)**

With the constant return-to-scale assumption, the Solow growth production-function becomes $equation$ (1) and $equation$ (2), where y is output per labor and k is capital per labor. Based on $equation$ (2), as capital per labor increases, output per labor will also increase. Hence, as the capital-labor ratio continues to increase, output reaches a peak and starts to diminish; thus, the law of diminishing marginal returns initiates. Therefore, balance can be achieved when savings and investment are at equilibrium with the capital-labor ratio, which will result in a steady-state of the economy:

$s\ (k*) = (\delta+n)\ k*$ **……** **(3)**

Where: s is savings rate, k is capital per labor, δ is depreciation, and n is the population growth rate.

2.1.1. Gross Fixed Capital Formation and Economic Growth

The rise in the real gross domestic capital formation in percentage form is used to measure the Economic growth (IMF, October 2012). Economic growth of the country is considered to be the derived by gross capital formation. It is measured as the rise in the amount of capital formation of services and goods of an economy over a period of time. Various studies (Edwards, 1996; Ahmad, Yusuf & Anoruo, 2000) (Yanikkaya, 2002) concluded that Gross Capital Formation has positive effects on the economic growth of the nation economy. To investigate the statistical relationship between Gross Capital Formation (GCF) and economic growth, Yanikkaya (2002)

studied the relationship between gross fixed investment and growth for poor and developing economies using two measures. The results were found sound as predicted, in the light of relevant literature of growth; it revealed that in the case of poor and small economies capital formation is positively related with economic growth.

Jhingan (2006) focused in his study that capital formation not only enhances the investment in capital equipment which leads to increase in production but also create job opportunities. He further explains that capital formation give kick to technical growth which leads to economics of large scale of production amplifies specialization and/or thus provides tools, machines and equipment which enhance growth of labor force. Capital formation also facilitate in market growth. Also he highlights that capital formation facilitate to remove market imperfections by the creation of social and economic overheads capital, as a result breaks the vicious circle of poverty from both demand and supply side. Even in case of increasing population capital formation makes the growth possible.

2.1.2 Human Capital Formation and Economic Growth

Greenaway et al. (1998) identified that the human capital has a positive relationship with growth rate looking into the situation and circumstances of the country. Bolaky and Freund (2004) also reported the same findings. Human capital accumulation has been considered as one of the key determinants of all kinds of growth such as political, social, cultural, production, innovation and economic (Dinkneh B and Jiang Y., 2015). The educational system and health care are the two most important integrated human capital parts which moved together to make an individual more effective and efficiency on the production and innovation sector (Gebrehiwot K., 2016; Dinkneh G. and Jiang Y., 2015). Thus, accumulation of the human capital includes investments on abilities of employees, technical skills, creative skills, knowledge, and enhancing innovation and improves the health of the society. Hence, financing additional resources to the human capital

will bring positive and significant out come on the production, which further progress on the economic growth by transforming resources to mankind's use and value (Adelakun, 2011).

In Ethiopia a few empirical studies have been conducted on the impact of human capital on the economic growth of the country (Gebrehiwot K., 2016). Some studies found the positive, significant and stable long term relationship of the human capital and economic growth (Gebrehiwot K., 2016; Dinkneh G. and Jiang Y., 2015; Girma, Z., Abdulwahab, S. & Gupta, K., 2013). Conversely, other studies reported the human capital doesn't have a major impact on the economic growth of Ethiopia (Seid, 2000; Woubet, 2006).

2.2. Political Instability

Political instability is a concept that can be explicated in various ways. Morrison and Stevenson (1971) understood political instability as a condition in political arrangements in which institutional structure of authority breakdown and the expected compliance to political authority is replaced by political violence. According to Hurwitz (1973), define political instability/stability in the context of the "existence of violence". Many authors include "violent" challenges to the political system, but this would leave out "peaceful" challenges such as strikes and demonstration, and other which can cause political disruption. Further, according to Hassan (1996), political instability is the disability of the system to mobilize adequate resources to accommodate the conflicts within the community and to prevent the occurrence of violence.

Those studies (Jong-A-Pin, 2009; Polachek and Sevastianova, 2012; Aisen and Veiga, 2013; Sweidan, 2016; Sweidan, 2017) also illustrate political instability as related to changes that originate inside the country that can be defined as internal political instability, whereas if it is related to changes that originate outside the country and have an effect on it, it can be defined as external. According to them indicators for internal political instability are cabinet changes,

chaos, social fractionalization, demonstrations, government crises, strikes, purges, ethnical heterogeneity, protests, riots and coups d'état. Indicators for external political instability are external intervention, military expenditure, instability within the region or on the borders of the country. Further indicators are wars in which the state participated internationally, death toll in external conflicts, and expulsion of diplomatic missions.

The study of Elbargathi and Al-assaf (2019) depicted that by referring Mbaku (1988) thought that there are at least three types of political instability, Elite, Communal, and Mass. Conceptualized elites as those persons who hold high positions in institutions which allocate resources. Elite instability, therefore, is the forceful removal of these persons by other members of the elite. The type of challenge common to Elite instability includes coups, attempted coups, and plots. According to them the second type of political instability is communal that groups consist of members who share common characteristics, such as ethnicity, religion, language, territory or combination of these traits. Behaviors usually associated with communal instability are civil wars, rebellions and ethnic violence. From these activities it is easily seen that most communal instability is violent. The final political instability category by them is mass instability that involves the attack on leaders of the present political system by members who are joined together by common goals and objectives (Elbargathi and Al-assaf, 2019).

2.2.1. Measurement of political instability

A basic challenge in analyzing political instability is its measurement. Because political stability cannot be observed directly and works through various channels, and is abstract, various proxies have been employed in the literature to empirically determine its relationship with economic growth. Quantify political instability, several types of proxies have been proposed: as discussed concept of political instability section of this literature review some scholars (like that of Fosu,

2002; and Jong-A-Pin, 2009) consider the following as an indicator of political instability such as cabinet changes, the number of terrorist incidents, elections, external wars, number of political strikes, demonstrations, riots, impeachment and change in head of key public economic institutions and occurrence of various coups. Others focus on cabinet change (Aisen and Veiga, 2011). Camposet al., (2012) and others consider assassinations, guerrilla warfare, coups, strikes, civil wars, riots, revolutions, and violence as indicators for political instability.

Abdelkader (2017) study show that of indicator for political instability such as propensity to change the government via constitutional and unconstitutional means as follow the number of years the chief executive has been in office, corruption in political elections, the duration of autocratic or democratic regimes, illegal or forced change in the top government elite, the size of the cabinet measured by the number of ministers, the level of freedom available for people in practicing political rights, and the number of years since the most recent regime change(Abdelkader, 2017).

In various studies (Campos and Karanasos, 2008; Gurgul and Lukasz, 2012; Ejaz and Khan, 2019) we get number of indicators to it such as constitutional changes, change in prime minister, number of government changes, polarization and fractionalization. Some of the proxies include the number of violent events, e.g., military coups, assassinations, violent revolutions, and strike (Shehzadi et al., 2019).

2.3. Political Instability and Economic Growth

The theoretical literature has extensively articulated how political instability affects economic growth through various channels. Drawing on the theoretical literature, Tabassam, A. H., Hashmi, S. H., & Rehman, F. U. (2016) contend that political stability influences economic growth through investment, savings, labor market disruption, and productivity/production levels

of private agents and monetary and fiscal policies of the government. Abdelkader, H.E.M. (2017) argues that political instability affects growth through the investment channel (reduction in physical and human capital accumulation and changes in its composition that favors short-run investments), socio-political unrest channel (reduces productivity caused by a disruption in normal economic activities), and sub-optimal economic policy channel (politically driven sub-optimal policies that are caused by the fear of not re-elected to office).

Meanwhile, Baklouti and Boujelbene (2020) explain that political instability leads to a break in production activity and increasing transaction costs that could prevent a country from realizing its true potential, which is essential for achieving economic growth. Their study also argues that political instability discourages investments (both foreign and local) that adversely affect economic growth and cause a government to disregard their commitment or engage in allegiances and corruption, which harms growth. Economic indicators or determinants as tackled by Abdelkader (2017) in his paper can also lead to political instability, such as low per capita GDP levels, lack of private investment and high unemployment and inflation rates. Mass unemployment and poverty in any country could easily lead to political instability. When most people in a country are impoverished and can't find jobs to do, they send their anger to the government and that leads to the country's instability. As a result, many countries suffered from instability.

Many previous studies also report negative and significance relationship between economic growth and political instability. These are two common arguments in literature about impact of political instability on economic growth. First, political instability increases policy uncertainty affecting incentives of economic agents and therefore growth will be decreases (Baklouti, N. and Boujelbene, Y. (2020). Some studies assumed that incumbent governments behave more myopically according to their own agenda in a political system that is both unstable due to a high

probability of government changes and polarized due to large differences in political and economic preferences of subsequent government. Second, the probability of government change is usually related to economic, political, social and institutional variables. With a high propensity to executive changes comes political uncertainty and possibly threats to property rights there by affect growth (Baklouti and Boujelbene, 2020).

2.3.1. Voice and Accountability with Economic Growth

According to Sharma (2008) voice and accountability involves a process of bargaining between those who hold power and those who seek to influence it. Thus, voice and accountability (VA) is an important dimension of governance: it is widely acknowledged that citizens as well as state institutions have a role to play in delivering governance that works for the poor and enhances democracy through interaction between formal and informal institutions. Voice refers to a variety of mechanisms – formal and informal – through which people express their preferences, opinions, and views. It can include complaint, organized protest, lobbying, and participation in decision making, product delivery, or policy implementation (Sharma, 2008 citing Goetz & Gaventa 2001). Accountability is for the process of holding individual actors or organizations to account for their actions. Accountability requires transparency, answerability, and enforceability between decision makers and citizens (Menocal & Sharma, 2008, cited in Combaz & Mcloughlin, 2014).

Voice and accountability describe the public participation in governance. This dimension of governance is directly related to democracy and transparency (Sirowy & Inkeles, 1990). The conflict perspective theories of democracy that higher economic growth can be achieved by an authoritarian political regime that successful policy implementation reforms is difficult under a democratic political system (Sirowy & Inkeles, 1990). This theory asserts there is a tradeoff

between democracy and economic growth if a country achieves a higher level of democracy before it reaches a threshold level of economic growth it may face difficulty in achieving a higher level of economic growth (Sirowy & Inkeles, 1990). As the literature reveals, although East Asian economies show higher economic growth, the level of democracy in some of these countries is still poor. Therefore, it is imperative for the developing countries to understand the degree of democracy and the political mechanism that best supports them to achieve economic growth.

Higher levels of democracy mean increased levels of voice and accountability, which in turn allow the rise of multiple political parties. Economic reform is more difficult under multiple political parties because the reforms create a heightened political risk for the next period of office for the existing ruling party. Decisions of the political elites are based on the self-interest and uncertainty (Adam, 2000). Ruling elites may not take the necessary action to undertake the required policy reforms under this uncertainty and therefore, it may hinder economic growth. Supporting this argument, Gani (2011) finds that voice and accountability have a significant and negative effect on economic growth (Gani, 2011).

2.3.2. Political Stability and absence of violence with Economic Growth

Political stability is the regularity of the flow of political exchanges (Ake, 1975). That is, the more regular the flow of political exchanges, the more stability. Alternatively, we might say that there is political stability to the extent that members of society restrict themselves to behavioral patterns that fall within the limits imposed by political role expectations. Any act that deviates from these limits is an instance of political instability. For Javed and Mamoon (2017) and Michael (1971), political stability is a pre-condition for nation building, such as political development and national integration. In most of developing countries a new government comes

into the power overnight; either through a coup or army takeover. The new government introduces a new system of rules for the operation of business by totally dismantling the previous, which results in significant sunk costs holding back the development of the country. For Langbein & Knack (2010), economic growth is the friend of regime longevity.

China's economic miracle can be linked to the one-party political system and high levels of political stability. On the other hand, it is reasonable to argue that low economic prosperity in India is to better levels of democracy and a multi-party political system (Younis et al., 2008). However, Pere (2005) found that political stability did not have a statistically significant effect on economic growth. Alesina et al. (1992) reveal that political instability has a negative and significant impact on economic growth. As a result, many negative impacts may arise in the economy in both the short-run and the long-run. However, major government changes may positively affect economic growth if the new government can create a better environment for local and foreign investors by reducing the country's risk and offering sound and consistent policies. The minor irregular change involves policy change. Policy changes need to be applied while maintaining political stability and without creating an investment risk (Feng, 1997). The stable political environment of the country increases the human capital and physical capital accumulation and thereby induces the growth process (Younis *et al*., 2008).

2.3.3. Regulatory Quality and Economic Growth

Regulation is a major way in which governments imposes its influence on society. According to the Merriam-Webster dictionary; regulation is any statement promulgated by an executive authority or regulatory agency of a government possessing the power of compliance as a rule or order. The Committee for Economic Development (CED) (2017, citing Dudley-and Brito 2012) defined regulations as administrative laws or rules by which the government implements laws

and agency objectives which dictate what individuals, businesses, and other organizations can or cannot do from dawn to dusk. Market economies need clear “rules of the game” to function efficiently, While better regulation can enhance economic growth when it creates a convenient working environment, poorly designed regulation can decrease economic performance by restraining productivity and increasing wastage (Beales et al., 2017).

2.3.4. Rule of law and Economic Growth

Langbein and Knack (2010) define rule of law as implying an open, “not under the table” transparent market, where contracts are enforced by a “rule” that is publicly known to parties outside the contract and applied equitably no matter who the enforcer or the contracting parties are. The Rule of Law is an important institution concerning economic growth because it directly links to ensuring personal security, property rights, unbiased contract enforcements and control of corruption (Haggard & Tiede, 2011).

The concern of the effect of institution on economic growth studies back to 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 part of institutions that affect economic growth. The economic performance gap is due to the quality of rule of law and property rights. This indicates the well-defined property rights and strong rule of law create confidence in the business makers and promote trade. With an environment in which property rights are protected, people hire whatever stock for future profits and prosperity. However, if economic agents lack confidence in their government, they hide their stock and activity being afraid of the violence of their superior. The levels of risk affect the private sector to do business (Smith, 1976).

A government needs to maintain law and order, judicial independence and control of corruption to maintain the rule of law and to avoid the consequences of government failure. Rogobon and Rodrik (2004), Butkiewicz and Yanikkaya (2004) and Hoggard and Tiede (2011) all emphasize a positive relationship between the rule of law and economic growth. The operation of the rule of law in developed countries is much more robust than in developing nations. When developing countries suffer from impaired rule of law there is an increased probability of corruption, expropriation and violence (Hoggard & Tiede, 2011). Rogobon and Rodrik (2004) and Butkiewicz and Yanikkaya (2004) argue that both rule of law and democracy together play a more critical role in increasing economic growth rather than just the rule of law alone.

2.3.5. Corruption and Economic Growth

Corruption is an effort to secure wealth or power through illegal means for private gain at public expense; or a misuse of public power for private benefit (Transparency International). According to Langbein & Knack (2010), controlling corruption implies a reduction in the use of public resources for private gain. Corruption is a costly, hidden (absence of Voice and Accountability), and usually illegal (absence of Rule of Law) transfer of revenues. Government officials often collect bribes as an ex-officio tax, fee, or "gift" in exchange for a license or service (for example, utility connection) or for exemptions to rules or taxes (implicating Regulatory Quality and Government Effectiveness).

Several studies have looked into the relationship between corruption and economic growth. However, this relationship varies from study to study and different studies show completely different results. Pere (2015) found an insignificant relationship between corruption and economic growth. Contrary to this, Mo (2001) concludes there is a reduction in growth Rate for increase in the level of corruption. According to his study negative impact of corruption on

economic growth is contributed by political instability. Ata and Arvas (2011) argue that corruption has a link to the social, economic, cultural and judicial systems of a country. Further to that, Mauro (1995) has revealed a significant negative relationship between corruption with both investment and economic growth. Corruption erodes good governance and the rule of law; it adversely affects service quality and efficiency, poses threats to the principles of democracy and justice, and undermines the economy (Graycar & Sidebottom, 2012).

Dion (2010) further describes corruption as being a basic threat to the stability of societies and to the maintenance of the rule of law. Furthermore, said he asserts that corruption actually impedes economic development in the long run. As Aidt (2009) argues, people have a different understanding of the impact of governance on economic growth. One group believes (Sanders) that the corruption has a negative effect on economic growth because it increases the transaction cost and the production cost. In contrast to Sanders, another group thinks that corruption brings an improvement in economic performance by removing bureaucratic bottlenecks such as delays in decision making regarding the issuing of licenses, permits, approvals and the enforcement of contracts (Aidt, 2009).

The study found existence of political instability and ineffective control of corruption in the region. The study also found that simultaneous implementation of policies of ensuring political stability and effective control of corruption are not complementary and has more negative impact on development in the region. The implication of this is that both policies are substitute, and hence should be pursued through sequential reforms. Findings from the study also reveals that continuous implementation of the current policies towards having both political stability and effective corruption control may not have positive impact on development within the continent (Adefeso, 2018).

2.4. Review of Empirical Evidence

Jong-A-Pin (2009) indicates that every dimension of political instability (e.g. civil war protest, aggression, instability within the regime, instability of the regime) has its own effect on economic growth. Several studies have investigated the effect of political instability on macroeconomic variables, such as government spending, investment, inflation, and capital accumulation. Telatar*et al*. (2010) indicates that greater political instability leads to both higher share of government spending to GDP and lower growth rates. His study reveal that there is a positive relationship between political instability and inflation in developed countries with low inflation rates as well as in developing countries with high inflation rates.

Many studies examine the economic effect of political instability focusing on a single country. Like that of Campos *et al.* (2012) indicate that political instability in Argentina has a direct and negative impact on economic growth, which is particularly high in the short term. A study by Afolabi and Abu Bakar (2016) in Nigeria provides evidence for a one-way relationship between political instability, economic growth, and foreign direct investment. Khemraj, T. (2016) considering evidence from the United Kingdom, conclude that political instability adversely affects economic growth directly and indirectly through investment.

Other studies also examine economic effect of political instability focusing on regional and more than one country at a time. Such as, Grochova and Kouba (2010) consider evidence from the Baltic States and demonstrate that political instability is a crucial condition for successful economic development. Gurgul and Lukasz (2012) investigate the nexus between political stability and growth using panel data for CCE countries (Bulgaria, Czech Republic, Estonia, Hungry, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) over the period 1990-2009.

The authors' defined political instability as the propensity for government change (or political instability). Two variables were used, the first is the change in prime minister (major change), and the other is a change in government. The study found political instability harmed economic growth. A study by Jaouadi *et al,* (2014) emphasizes that political stability is a determinant and primary factor to stimulate economic growth in developing countries. Sweidan (2017) studies the influence of political regime and political instability on real output for nine countries of the Middle East and North Africa. The results reveal a negative impact of political instability on real output, but provide mixed evidence concerning the relationship between the nature of the political regime and real output.

To summarize and after all the above, most of the findings from the primary and secondary research data indicate that the economic progress and future growth is dependent upon the stability of the political scenario of a nation. On the other hand, several results revealed that macroeconomic variables are not closely related to the political situation and slowly affected by any changes in the form of chaos or internal and external conflicts. In conclusion, unfortunately, the nature of the impact that the policy deficits have on the economic activities has not been cleared yet. Correspondingly the studies concerning this issue are rich in the case of some countries but are not for other developing countries. Therefore, the value added of this study is to bridge between what it has been found missing in the literature. That is why this research dedicated to examining the theoretical correlation between Political Instability and Economy.

2.4.1. Overview of the Ethiopian Economy

Ethiopia is located in the Horn of Africa and a peninsula in northeast Africa. The country has an area size of 1,126,829 square kilometer that making it the 10th largest country in the continent and 2nd in its population with an estimate of 108.6 million people. Ethiopia is a nation with long

history; history of independence and war, plenty of resources, large arable land (UN, 2018).These and other potentials could be a means to economic growth; it is one of the poorest countries in the world. And assessment of the Ethiopian economy still indicates low level of living standard and domestic saving, weak private investment, low foreign investment inflow, high unemployment and poor social and physical infrastructures (Alemeyew, 2005; Prunier and Ficquet, 2015).

Macroeconomic policies and external factors do play significant role in determining short-run economic growth performance National economic policies, which are influenced by political factors and institutional settings, do also have strong correlation with economic growth (Barro Robert, 1996). Ethiopia, as one of the least developed country, shared this feature. Growth performance in Ethiopia is largely determined by political economy factors; vagaries of nature; strength and efficiency of institutions; efficiency of public policies and risk related to war and property ownership product and input market are found to be not only thin but also inflexible (Petrakos G. et al, 2007).

The Ethiopian economic growth has shown different environment in different political regimes. The regime change created inconsistency to implementing one policy for long period due to the coming regime change the policy of the previous one. Internal and external war as well as the natural disaster cause unbearable drought and famine are makeup of Ethiopian economy. In modern Ethiopian political economic history, we can distinguish three regimes that followed unique macroeconomic policies with its impact on macroeconomic growth performance of the country. Ethiopia‘s economic policy history is characterized by several radical policy changes and blows. During the monarchy (pre 1974) economic policy was mainly characterize as a market-oriented economic system. However, period 1974–1991 considered by centralized and command economic system. EPRDF (1992-2018) officially denounced socialist system and

supported market-oriented economic system. Beginning in 2018, Ethiopian government began to implement new economic reform program (Prunier, and Ficquet, 2015).

For Ethiopia main challenges are sustaining economic growth which requires progress in job creation and improved governance. Ethiopia's economy is highly vulnerable to exogenous shocks due to its dependence on primary commodities and rain-fed agriculture. Various policy measures, some homebred, others imposed by the IMF and the World Bank, have been undertaking. Sustainable ways to finance infrastructure, support private investment through credit markets, and tap into the growth potential of structural reforms can help the country maintain high economic growth. Political disruption associated with political unrest could also negatively impact growth through lower foreign direct investment (Prunier, and Ficquet, 2015).

2.5. Conceptual Framework

The conceptual framework is based on the assumptions of the researchers by considering the existing theory, for the current paper the authors investigating the nexus between political instability and economic growth in Ethiopia over the period 1991- 2020. Political instability is expected to affect the economic growth which relationship is captured with the use of political instability variable indicating the effect of the growth. The conceptual frame works that of economic growth as a dependent on political instability which is measured by voice and accountability, political stability and absence of violence, regular quality, rule of law and control of corruption.

Different scholars incorporate human capital as one of the determinant factors of economic growth differently. Among those scholars Mankiw, Romer and Weil (1992)and Weil (2009) has accommodated human capital as an independent factor of production in their empiric analysis. World Bank has stated clear content of the Gross fixed capital formation, such as the land

development, and the purchasing of plants, machinery, and equipment, in addition to these structure and improvements of public and private buildings (World Bank, 2005).

Following literature (Ali, Hashmi & Hassan, 2013) investigated both economic as well as political factors to predict the reasons of volatile economic growth and low investment. The study described that non-economic factors like corruption, political instability, voice and accountability, regular quality and rule of law have been the major cause of poor economic performance and lower investment. These non-economic factors created uncertainty and made the country risky. Due to this risk and volatility the domestic investors have taken their capital away from developing Countries and they invested in outside for better return. This capital movement has become the reason of poor economic growth in developing Countries. Barro (2013) also stressed on corruption free government. He explored that if a country is peaceful and corruption free than investors will be encouraged to invest and it will promote the economic growth of an economy. Okafor (2015) documented the positive effect of political instability on economic growth by taking good governance, social unrest, corruption, political instability and unrest by using GMM approach.

Several studies confirmed that the physical capital formation (gross investment) is the main source of accumulated gross fixed capital formation and it is vigorous driver for economic development (Beddies, 1999). Economic theory allocated that the macroeconomic benefits to the physical capital formation through which it impacts on the nation economy (Ghura1997; Biswas and Saha, 2014). A country economic growth and the major functions depend on its physical capital formation and human capital accumulation (Adekola, 2014). Gross fixed capital formation and the human capital are included in the model as control variables.

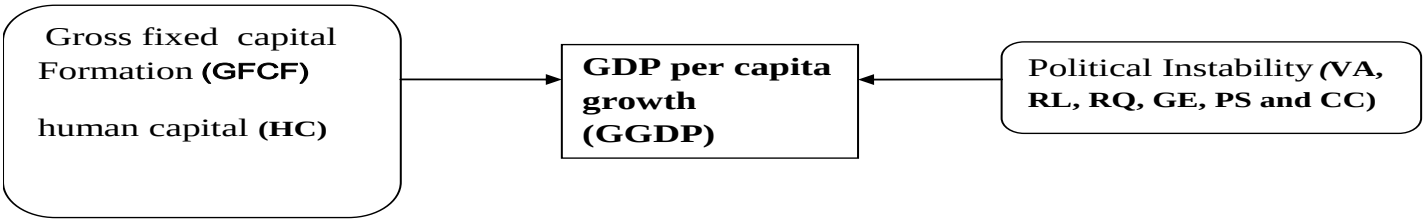
Independent Variable = Political instability + Control Variables

Dependent Variable = Economic Growth (GDP per capital growth)

Economic growth = f (Political Instability (voice and accountability, political stability and absence of violence, regular quality, rule of law and control of corruption)) +Control Variables (human capital and growth fixed capital accumulation)

In this single equation model, economic growth is a function of political instability. The theoretical framework of this study suggests that more political instability leads to lower economic growth.

Figure 2.1: Interrelationships between variables



Source: Self constructed conceptual Framework of the study

3- METHODOLOGYOF THE STUDY

3. Introduction

Methodologies that adopted to achieve the objective of this study are discussed in this chapter. Basically, the chapter focuses on how the entire study done. It discusses topics such as research approach and design, data sources and data analysis included model specification. Having a suitable data and managing the variables included in the model is necessary for not only empirical analysis but also for validity of the research hypothesis. The methodology and variables included in this study are selected taking into consideration their comparative importance on the empirical and theoretical basis.

3.1 Research Approach and Design

3.1.1. Research Approach

Creswell (2009) states quantitative research approach enables exploring and understanding the meaning individuals or groups ascribe to a social or human problem. It is particularly useful for data analysis that is inductive and build from specific themes. The study is an descriptive research that used quantitative research approach, as it is the best approach to test hypotheses and to identify factors that influence on outcome (Creswell, 2009).Consequently, the study in hand requires analyzing relationship between variables based on theories and hypothesis testing using statistical procedures due to nature of study the quantitative research approach is adopted (Creswell, 2009).

3.1.2. Research design

The main objective of this study is to examine the nexus between political instability and economic growth in Ethiopia for the period of year 1991 to year 2020. Since the objective of the study is to examine relationship between variables descriptive research design employed. The basic features of the data properly explain using descriptive statistics and Econometric models to analyze the data. The primary purpose of descriptive research design is to explain relationships occur and which ones may influence particular outcomes (Cooper & Schindler (2003). Descriptive studies are characterized by research hypotheses that specify the nature and direction of the relationships between or among variables being studied. Descriptive research devoted to finding causal relationships among dependent and independent variables. It does so from theory-based expectations on explain variables should be related (Cooper & Schindler (2003).

3.2. Type and Source of Data

The study based on secondary source of data and the data is time series. It investigates the nexus between political instability and economic growth by using secondary time series data from 1991-2020 on variables of political instability and real GDP in Ethiopia. The secondary data is obtained from published from concerned organizations and online materials from reliable websites. The source of data for real GDP is World Development Indicators (WDI) of the official website of World Bank database. Data on variable of political instability collected from International Country Risk Guide (ICRG). For growth fixed capital formation yearly data obtained from World Bank Development Research Group. Human capital annually data collected from Global Development Network Growth Database (GDN).

3.3. Model Specification of the Study

Pesaran and Shin (1997) and later on Pesaran *et al.* (2001) mention that under certain environment long-run correlation among macroeconomic variables can be found with the help of Autoregressive Distributive Lag Model (ARDL). After lag order selection for ARDL procedure, simply OLS can be used for identification and estimation. Valid estimates and inferences can be drawn through the presence of unique long-run alliance that is crucial for co integration. ARDL model is a dynamic model. Dynamic model is a model that describes the movement of the dependent variables which is influenced by the value from the past. The required time for independent variable X in influencing dependent variable Y is called time difference or lag or time-lag. When a dependent variable is influenced by the independent variable in the current time, and if it is also influenced by the independent value in the previous time, then it is called distributed lag model. If the dependent variable is affected by the independent variable in the current time, and also affected by dependent variable itself in the previous time, so it called autoregressive model (Gujarati, 2003).

ARDL bound testing approach presented by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001) has numerous advantages over traditional methods of co integration. Firstly, ARDL can be applied regardless of the order of integration. Secondly, ARDL bounds testing approach to co integration can be used for small sample size (Mah, 2000). Thirdly, this approach allows taking sufficient number of lags for capturing the data generating process in a general to specific modeling framework (Laurenceson *et al.*, 2003). Lastly, ARDL gives efficient and valid detailed information about the structural breaks in data. This technique is based on Unrestricted Vector Error Correction Model (UVECM) which have better properties for short and long-run equilibrium as compared to traditional techniques (Pattichis, 1999).

Economic Model

The empirical analysis is based on the neoclassical growth model developed by Solow (1956) and extended by Mankiw, Romer and Weil (1992). Relying on the standard production function $Q_t = f(A_t, L_t, K_t)$ which considers aggregate production (Q_t, gross domestic product in year t, GDP_t) as a function of total factor productivity (A_t), labor (L_t), and capital (K_t), this study estimates GDP per capital growth ($ggdp_t$) as a function of political instability (PI_t), growth fixed capital accumulation ($gfcf_t$) and human capital (hc_t). Thus, the general specification of the estimated regression is $ggdp_t = f(hc_t, gfcf_t, PI_t)$, whereas $ggdp_t$, hc_t, $gfcf_t$, represent the growth rate of their respective variables and political instability(PI_t), five different proxies are considered, namely voice and accountability(VA), political stability and absence of violence(PV), regular quality(RQ), rule of law(RL) and control of corruption(CC). Thus, economic model can be written as in following linear specification form:

$$lggdp_t = \beta_0 + \beta_1 lhc_t + \beta_2 lgfcf_t + \beta_3 VA_t + \beta_4 PV_t + \beta_5 RQ_t + \beta_6 RL_t + \beta_6 CC_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

ARDL approach applied to estimate the long and short run coefficients of variables relationship and if variables will be co-integrated state both short-run (ARDL) and long-run (VECM) models. The ARDL (p, n) form of equation will be as given below:

$$\begin{aligned}\Delta lggdp_t = {} & \alpha_0 + \sum_{i=0}^{p} \alpha_{1i} \Delta lggdp_{t-i} + \sum_{i=o}^{n} \alpha_{2i} \Delta lgfcf_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta lhc_{t-i} \\ & + \sum_{i=0}^{n} \alpha_{4i} \Delta VA_{t-i} \sum_{i=0}^{n} \alpha_{5i} \Delta PV_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta RQ_{t-i} + \sum_{i=0}^{n} \alpha_{7i} \Delta RL_{t-i} \\ & + \sum_{i=0}^{n} \alpha_{8i} \Delta CC_{t-i} + \beta_1 lggdp_{t-1} + \beta_2 lgfcf_{t-1} + \beta_3 lhc_{t-1} + \beta_4 VA_{t-1} \\ & + \beta_5 VP_{t-1} + \beta_6 RQ_{t-1} + \beta_7 RL_{t-1} + \beta_8 CC_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)\end{aligned}$$

Where:

- lggdp is natural logarithm of GDP per capita growth
- lgfcf is the natural logarithm of the gross fixed capital formation.
- lhc is natural logarithm of the human capital
- VA is voice and accountability
- PV is political stability and absence of violence/terrorism
- RQ is regulatory quality
- RL is rule of law
- CC is control of corruption
- B's are the long-run coefficients
- $\boldsymbol{\alpha}$'s are the short-run coefficients of the ARDL model
- p represents the number of lagged periods for the dependent variable,
- n denotes the number of lag periods for the selected explanatory variables and

Δ, α_o, ε_t and | represent the first difference operator, constant term, stochastic error term and natural logarithm respectively. $\boldsymbol{\varepsilon_t}$Is assumed to be serial uncorrelated with independent variables and i.i.d~N (0, σ)[1], where i.i.d stands for "independent and identical distributed".

3.4. Description and Measurements of the variables

The Dependent Variable

Economic growth is defined as the relative increase in gross domestic product (GDP), measured by fixed prices over a period of time. Additionally, it can be known as the real increase in GDP per capita during a specific time (Modigliani & Cohn, 1979). Correspondingly, according to the World Bank, it can be considered is a welfare indicator and one of the standard of living measurements (World Bank, 2005).

Explanatory Variables

The Worldwide Governance Indicators (WGI) specify six composite indicators of broad dimensions of governance, five of them are described below. The five dimensions of governance are measured both by a governance score that gives a country a score on the aggregate indicator that ranges approximately from -2.5 to 2.5 (where2.5 is the weakest and 2.5 the strongest form of governance) (Kaufmann, Kraay, &Mastruzzi, 2011).

Voice and Accountability (VA): expresses the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and free media (Kaufmann, Kraay, &Mastruzzi, 2011).

Political Stability and Absence of Violence/Terrorism (PV): captures "the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism."**(**Kaufmann, Kraay, &Mastruzzi, 2011).

Rule of Law (RL): expresses "the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence" (Kaufmann, Kraay, &Mastruzzi, 2011).

Control of Corruption (CC): "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests" (Kaufmann, Kraay, &Mastruzzi, 2011).

Regulatory Quality (RQ): captures "the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development"(Kaufmann, Kraay, &Mastruzzi, 2011).

Control Variables

In addition to the political instability, there are other variables that affect economic growth. In order to eliminate the effects of these variables on economic growth, they need to be included in the control variables set. Based on the previous research results (Olson et al. 2000; Seldadyo et al. 2007; Shao 2016), this paper selects the human capital (HC) and growth fixed capital formation that affect economic growth of the nation, so this study select them as control variables.

Gross Fixed Capital Formation (GFCF) is a proxy for physical capital stock in the economy, derived by dividing the gross fixed capital formation adjusted through GDP deflator for real GDP. Economic growth is defined as the relative increase in gross domestic product (GDP), measured by fixed prices over a period of time. Additionally, it can be known as the real increase in GDP per capita during a specific time (Modigliani & Cohn, 1979). Barro and Sala-I-Martin (1995; 2004) shows that the sign expected from the coefficient GCF is positive because the accumulation of the capital is supposed to favor the growth of the real GDP by fostering further production of new goods and services.

The human capital (HC) is defined as all the skills and abilities embodied in the working individual or the labor force acquired through training, education, health care or good food quality. And for the purposes of the economic analysis, this variable expressed by the total labor force that contributing to producing the goods and the services (World Bank, 2005).

3.5. The Unit Root Test

The analytical technique and the regression analysis adopted in this research study are tried to be most appropriate regarding to data, analysis of the model and variables used in this research study. Firstly, to search for the most suitable regression techniques to analyze truly the picture of

the data and model depend upon the stationary of the data that are checked through unit root tests. In the classical regression technique of ordinary list square (OLS), the variables are assumed to be non-stationary. But such non-stationary variables give spurious or non-sense regression, but to obtain non-spurious results variables have to be stationary (Gujarati and Porter, 2009).

According to Gujarati (2004), a variable is said to be stationary if its mean, variance and covariance are time invariant or time inconsistent, it depends on lag length. If a given series contains unit root, then the series is said tobe non-stationary otherwise, it is called stationary. Among the different methods of testing stationary of time series, the unit root test, it's recently developed and widely used test of stationary. There are different testing stationary series such as ADF, PP… etc. And also divided in to Dickey Fuller (DF) test and Augmented Dickey Fuller (ADF) test and that are used to test for the existence of unit roots. In this study therefore, the variables are tested for unit root using Augmented Dickey Fuller (ADF) and PP test is used (Gujarati, 2004)

3.5.1 The Augmented Dickey-Fuller (ADF) Test

This test use to test stationary and conduct by adding the lagged values on each variable. The ADF unit root test is used at level form and first difference of each series. Dickey and Fuller (1981) propose the Augmented Dickey-Fuller (ADF). The general forms of the ADF can be written as:

$$\boldsymbol{\Delta X_t} = \square\square\boldsymbol{\delta X_{t-1}} + \sum_{j=1}^{q} \emptyset_{\mathbf{j}} \Delta \mathbf{X_{t-j}} + \mathbf{e_{1t}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{3})$$

$$\Delta \mathbf{X_t} = \boldsymbol{\alpha_0} + \boldsymbol{\delta X_{t-1}} + \sum_{j=1}^{q} \emptyset_{\mathbf{j}} \Delta \mathbf{X_{t-j}} + \mathbf{e_{2t}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{4})$$

$$\Delta X_t = \alpha_0 + \square\delta X_{t-1} + \beta T + \sum_{j=1}^{q} \emptyset_j \Delta X_{t-j} + e_{3t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

X_t is a time series for testing unit roots, *t* is the time trend and $e_t$is error term having white noise properties. If *j* = 0, it represents the simple DF test. The lagged dependent variables in the ADF regression equation are included until the error term becomes white noise. For checking the serial correlation of error terms LM test is used. The null and alternative hypotheses of ADF unit roots are:

H0: $\delta = 0$ non-stationary time series; so it has unit root problem.

H*a*: $\delta < 0$ stationary time series.

Applying OLS and computing τ statistic of the estimated coefficient of X_{t-1} and comparing it with the Dickey Fuller (1979) critical τ values, if the calculated value of τ statistic is greater than the critical value then reject the H0; in this case the time series data is stationary. On the other hand, if we fail to reject H0, the series is non-stationary. In this way by applying this procedure on all variables, we can easily find their respective orders of integration.

3.5.2 The Phillips-Perron (PP) Unit Root Test

Null hypothesis of PP and ADF have same normalized bias statistics and asymptotic distributions. PP has two main advantages over ADF. First PP test has strong power to predict the heteroskedasticity and serial correlation in error term. Second, it is not needed to specify the lag length of test regression (Gujarati, 2009).

3.6. Lag Length Selection Criterion

In economics the dependence of a variably on another variable is rarely instantaneous, very often dependent variable responds to explanatory variable with a laps of time. Such laps of time is called lag. Too many lags lead to loss degrees of freedom and can cause multicollenearity serial

correlation in error terms and misspecification of errors. The lag length criteria are used in the time series data analysis in order to decide about the number of lags that will be used in the data variables. The data used in economic analysis mostly have the nature of time series and the time series model mostly used is the autoregressive (AR). AR model is used in order to determine the autoregressive lag length. (Pesaran and Shin, 1995; Pesaran et al., 1996).

There are so many lag selection criteria used in order to find out the lag length in the time series data variables. The lag length autoregressive process *p* states that a time series in which the present value of the variables is derived by its first lagged value AR (*p*). This AR(*p*) is always unknown and is carried out by the lag length criteria namely the Schwarz Information Criterion (SIC), Bayesian Information Criterion (BIC), Aikaike's Information criterion (AIC), Final Prediction Error (FPE), and Hannan Quinn Criterion (HQC) (Liew, 2000).

3.7. Co-Integration (Bound) Test

In literature, a number of co integration tests for econometric analysis are available. Most famous and traditional co integration tests are the residual based Engle-Granger (1987) test, Maximum Likelihood based on Johansen (1991/1992) and Johansen-Juselius (1990) tests. One thing common in these tests is that they require same order of integration for their analysis. These co integration tests become invalid and inefficient when the variables of the model have different level of integration. Moreover, the analysis based on these tests of co integration do not provide information about the structural breaks of time series data and also have low power of prediction. With the passage of time structural changes have occurred in time series such as economic crises, new institutional arrangements and changes in policy regime (Johansen, 1990;1991).

The problem with these traditional methods is that the testing of the null hypothesis of structural stability against the alternative of a one-time structural break only. If such structural changes are

present in the data generating process, but not allowed for in the specification of an econometric model, results may be biased. The decision criteria for bounds test is that can reject, the null hypothesis are the 10%, 5% or 1% significant level if F-statistics is greater than critical value for upper bound I(1), then we can conclude that there is co-integration. That is, there is a long run relationship. If the f-statics is lower than critical value for lower bound I(0), then there is no cointegration. The term auto correlation may define as correlation between members of series of observations ordered in time (as in time series data). The classical linear regression assumes that such auto correlation does not exist in the distributions ui, i.e., E (ui, uj) = 0, for all i≠ j. however, if there is such dependence we have auto correlation. Symbolically, E (ui,uj)≠0, for i≠j. there are (n-1) auto correlation if we have n observations. However, we cannot hope to estimate of all these from our data. Hence, we often assume that this (n-1) auto correlation can be represented in terms of one or two parameters (Pesaran, Shin and Smith, 2001).

ARDL approach can be applied irrespective of whether the repressors are I(1) and I(0) or Mutually co integrated, in which the dependent variable must be I(1). If the nature of the stationary of the data is not clear, then the use of the ARDL Bounds test is appropriate. A unit root test is not necessary if a conclusion can be made from the Bounds test for co integration (Pesaran et al., 2001).

3.7.1 The Long-Run Estimates of ARDL Model

When a dependent variable is influenced by the independent variable in the current time, and if it is also influenced by the independent value in the previous time, then it is called distributed lag model. If the dependent variable is affected by the independent variable in the current time, and also affected by dependent variable itself in the previous time, so it called autoregressive model (Gujarati, 2003).

In addition, the ARDL method avoids the problem of pre-testing for the order of integration of the individual variables, which is a matter of crucial importance in any empirical analysis. In the case where a long-run relationship between the variables involved is confirmed, an Error Correction (EC) model can be used to test for Granger-type causality. The advantage of using an EC specification to test for causality is that it allows testing for short-run causality through the lagged differenced explanatory variables on the one hand, and for long-run causality through the lagged EC term on the other hand. As Granger et al. (2000) suggest, a significant EC term implies long-run causality running from the explanatory variables towards the dependent variable.

$$\begin{aligned}\mathbf{\Delta lggdp_t} = \quad & \alpha_0 + \sum_{i=0}^{p} \alpha_{1i} \mathbf{\Delta lggdp_{t-i}} + \sum_{i=o}^{n} \alpha_{2i} \mathbf{\Delta lgfcf_{t-i}} + \sum_{i=1}^{n} \alpha_{3i} \Delta \mathbf{lhc_{t-i}} \\ & + \sum_{i=0}^{n} \alpha_{4i} \mathbf{\Delta VA_{t-i}} \sum_{i=0}^{n} \alpha_{5i} \Delta \mathbf{PV_{t-i}} + \sum_{i=0}^{n} \alpha_{6i} \Delta \mathbf{RQ_{t-i}} + \sum_{i=0}^{n} \alpha_{7i} \Delta \mathbf{RL_{t-i}} \\ & + \sum_{i=0}^{n} \alpha_{8i} \Delta \mathbf{CC_{t-i}} + \mathbf{\delta ecm_{t-i}} + \boldsymbol{\varepsilon_t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)\end{aligned}$$

Where δ is speed of adjustment parameter with negative sign which calibrates the convergence time, in other words, a positive coefficient shows a divergence while a negative coefficient tells a convergence. Moreover, the negative speed-of-adjustment coefficient (-δ) gauges the dependent variable reacts to a diversion from the equilibrium relationship in one period or how it rapidly adjusts the disequilibrium point and *ecm* stands for error correction term, the term ecm is nothing but it acts as the speed of adjustment parameter or it indicates how much of the disequilibrium being corrected (Nkoro and Uko, 2016).

The relationship and ECM was introduced by Engle and Granger (1987). ECM mainly provides causal factors that are may influence the variables. The negative sign of ECM and statistically

significant confirmed that long-run relationship can be achieved among the variables included in the model. This method is the easiest to confirm co-integration among the variables (Bannerjee et al. 1998). Error correction model (ECM) among the co-integrated variables explains change in dependent variables due to independent variable. The divergence in dependent variable shows short period of time to long run equilibrium relationship (Masih and Masih, 1997).

3.7.2The short-run estimation of ARDL model

After obtaining the long-run relations, our next task is to estimate short-run dynamics relation of ARDL model by applying the following equation. If the F-statistics less than the lower bound then there is short- run relationship. The coefficients in the output section explain for the short-run variations not due to deviations from the long-run equilibrium (Nripfganz and Schneider, 2018).

$$\begin{aligned}\Delta \mathbf{lggdp_t} = \quad & \alpha_0 + \sum_{i=0}^{p} \alpha_{1i} \Delta \mathbf{lggdp_{t-i}} + \sum_{i=o}^{n} \alpha_{2i} \Delta \mathbf{lgfcf_{t-i}} + \sum_{i=1}^{n} \alpha_{3i} \Delta \mathbf{lhc_{t-i}} \\ & + \sum_{i=0}^{n} \alpha_{4i} \Delta \mathbf{VA_{t-i}} \sum_{i=0}^{n} \alpha_{5i} \Delta \mathbf{PV_{t-i}} + \sum_{i=0}^{n} \alpha_{6i} \Delta \mathbf{RQ_{t-i}} + \sum_{i=0}^{n} \alpha_{7i} \Delta \mathbf{RL_{t-i}} \\ & + \sum_{i=0}^{n} \alpha_{8i} \Delta \mathbf{CC_{t-i}} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)\end{aligned}$$

3.8. Diagnostic Tests

After estimation has done it has to check whether the model has achieved the desired properties. Diagnostic that can be use as Ramsey's RESET, Normality (Jaurque-Bera test), Breusch-Godfrey Serial correlation LM TEST, ARCH TEST, Breusch-Godfrey Heterosedacity TEST performed under the sensitivity analysis to confirm the validity of the data used for the variables in the model. Some of various diagnostic tests for this study also serial correlation, functional form test, normality test and hetroscedasticity tests. Autocorrelation tested by using Durbin Watson and Breusch-Godfrey LM test, functional form is tested by Ramsey REST test which is

used to test based on the null hypothesis that is the model is specified correctly. Moreover, hetroscedasticity tested by using White's test and the stability of the model will be checked by CUSUM test.

3.9. Granger Casualty Analysis

This analysis is to test the causality of the time series data, and this model was established by Granger (1969).This section discusses the conceptual and econometric advantages as well as the limitations. of the Granger-causality framework. This framework has endured the test of time because of its elegance and strong intuitive appeal: the notion that an event in the future cannot cause one in the past. Consider two time series, X and Y. Series X is said to Granger-cause series Y if, in a regression of Yon t lagged Y's and lagged X's, the coefficients of the lagged X's are jointly significantly different from zero. The way of causality is tested in this model. This is actually different from the concept which is common nowadays. It shows the ability of one variable to forecast the other one. Assume two variables, $\square Y_t$ and $\square X_t$, which are affecting themselves with spreader lags (Granger, 1969). This model can notice the link which these variables have between them. So it can be stated that as:

- $\square X_t$ is caused by $\square Y_t$
- $\square Y_t$ is caused by $\square X_t$

Two ways this shows the causality between the variables. These two variables are dependent in nature. Now the cause and effect relationship which the variables have between each other must be tested and statistically detected by any relevant technique.

A variable $\square X_t$ is caused by $\square Y_t$, incase if it can forecast $\square X_t$ with greater number of accuracy with the usage of $\square Y_t$ past value. The first step of this test is the calculation by the VAR model and given as follows:

$$y_t = \square\square\alpha_1 + \sum_{i=1}^{n} \beta_i X_{t-i} + \sum_{j=1}^{m} \gamma_j y_{t-j} + e_{1t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

$$x_t = \square\square\alpha_2 + \sum_{i=1}^{n} \theta_i X_{t-i} + \sum_{j=1}^{m} \delta_j y_{t-j} + e_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Where e_{1t} and e_{2t} are known as the uncorrelated white noise error expressions. In our taken model following four different cases to be happened:

- *Case 1:* y_t is caused by x_t because there is a difference between lagged *X* terms in equation *(5)* and zero, and there is not a difference between lagged *Y* terms in equation *(6)* not and zero.
- *Case 2:* x_t is caused by y_t as there is a variance amongst the lagged *Y* expressions in mathematical equation *(6)* and zero, and there is not a difference between lagged *X* terms in equation *(5)* not and zero.
- *Case 3:* two-way causality is there. Because there is a difference between sets of *X* and *Y* terms and zero in equation *(5)* and *(6).*
- *Case 4:* y_t is dependent of x_t because there is a difference between both sets of *X* and *Y* and zero in equation *(5)* and *(6).*

4- RESULTS AND DISCUSSIONS

The previous chapter discussed the research design employed to achieve the objectives of the study and to test the research hypothesis. In this chapter, the study analyzes the collected data using statistical tool present the result and discussions accordingly. The findings are associated with the research objectives that support the study. Political instability and economic growth variables presented and discussed with tables along with the respective statistical descriptive and econometric measures.

4.1 Descriptive analysis and presentations

Table 4.1 is the summery statistics of all important variable used in this study. The time series data is made by taking between period 1991 and 2020 which is for 30years of observations.

Table 4.1: Descriptive statistics of variables included in model

Variables	Obs	Mean	Std.Dev	Min	Max
lggdp	30	1.531055	0.9665111	-2.960343	2.34253
lhc	30	4.403365	0.018605	4.369575	4.4273
lgfcf	30	3.316818	0.2907064	2.644045	3.705491
VA	30	-1.080081	0.1107334	-1.201769	-0.831739
PV	30	-1.068033	0.276374	-1.412843	-0.411482
RQ	30	-0.9976453	0.1927635	-1.43	-0.58
RL	30	-0.7126598	0.1431368	-0.9657885	-0.4523488
CC	30	-0.6378756	0.1273189	-0.930546	-0.4064651

Source: Own calculation based on secondary data sources (1991-2020)

Where **lggdp** is log of GDP per capita growth, **lgfcf** is log of gross fixed capital formation., **lhc** is log of human capital, **VA** is voice and accountability, **PV** is political stability and absence of violence/terrorism, **RQ** is regulatory quality, **RL** is rule of law, and **CC** is control of corruption. The outcome of this study along with the reason of observed outcomes are as follows. Table 4.1

exhibits the descriptive statics that shows the average of GDP per capita growth is 1.5311 with standard deviation of 0.97 and maximum value of GDP (per year) is 2.34 and that of minimum is -2.96. The mean value of voice and accountability (VA) is -1.08 which is the least one from proxy variables that deviation from sample mean is 0.1107. The highest mean value from proxy variables is -0.6379 for control of corruption (CC) with standard deviation of 0.1273 in this series.

4.2. Econometric Analysis

4.2.1 Unit Root Test

As this research study consist on the time series data, some suffers from non-stationary at level. Therefore, the unit root test ADF is applied to check the stationary of the data. The ADF unit root test is chosen for the stationary of data as it is good in case of large samples.

Table 4.2: Augmented-Dickey-Fuller Unit Root Test

Variable	LEVEL				First Difference				
	Intercept		Intercept & Trend		Intercept		Intercept & Trend		
	t-value	p-value	t-value	p-value	t-value	p-value	t-value	p-value	I(d)
lggdp	-4.967***	0.000	-5.139***	0.0001	-	-	-	-	I(0)
lhc	-2.718*	0.071	-2.261	0.4556	-	-	-	-	I(0)
lgfcf	-2.628**	0.0873	-3.100	0.1063	-	-	-	-	I(0)
VA	-2.326	0.1637	-2.331	0.4168	-2.785**	0.0605	-2.699	0.2366	I(1)
PV	-3.083**	0.0278	-2.910	0.1591	-	-	-	-	I(0)
Rq	-2.015	0.2802	-2.100	0.5461	-2.956**	0.0392	-2.829	0.1866	I(1)
RL	-2.880**	0.0477	-3.017	0.1273	-	-	-	-	I(0)
CC	-2.806**	0.0574	-3.096	0.1071	-	-	-	-	I(0)

Makinnon Critical Values					
		Intercept		Intercept & Trend	Significance
Makinnon Critical Values	1%	-3.730		-4.352	***
	5%	-2.992		-3.588	**
	10%	-2.626		-3.233	*

Source: Extract from results (1991-2020)

Note: ***, ** and * are significance levels at 1%, 5% and10% respectively.

The best estimator chosen to test the hypothesis of unit root is t-test and Prob. F statistics. The ADF tests applied on all the variables to check stationary. The variables didn't show the stationary at level form (with and with-out trends). Further, ADF test was applied on the variables for the first difference where the variables show the stationary.

There are different testing stationary series such as ADF, PP… etc. the study began with empirical testing by checking the presence of unit root with the Augmented dickey fuller test (ADF) and follow by pillip-Perron test(PP). The objective of this analysis is to ensure that order of integration for each variable is not stationary at I (2). The unit root test result can be view in table 4.2 and 4.3. Voice and accountability and regulatory quality are not stationary at level I (0) and becoming stationary at first difference. The other entire variable (lggdp…) have not unit roots at level or stationary at integrated order zero I (0).

Table 4.3: Results of Phillips—Peron Test

Variable	LEVEL				First Difference				
	Intercept		Intercept & Trend		Intercept		Intercept & Trend		
	t-value	p-value	t-value	p-value	t-value	p-value	t-value	p-value	I(d)
lggdp	-4.259***	0.0005	-4.433***	0.0019	-	-	-	-	I(0)
lhc	-2.718*	0.0720	-2.261	0.4556	-	-	-	-	I(0)
lgfcf	-2.203	0.2053	-2.960	0.1435	-6.397***	0.000	-6.618***	0.000	I(1)
VA	-2.252	0.1880	-2.131	0.5288	-3.980***	0.0015	-3.927**	0.0111	I(1)
PV	-3.644**	0.0050	-2.903	0.1611	-	-	-	-	I(0)
Rq	-1.951	0.3084	-2.183	0.4994	-2.939*	0.0410	-2.809	0.1935	I(1)
Rl	-3.745***	0.0035	-2.917	0.1567	-	-	-	-	I(0)
CC	-4.078***	0.0011	-3.098	0.1068	-	-	-	-	I(0)
Makinnon Critical Values									
		Intercept			Intercept & Trend		Significance		
Makinnon Critical Values	1%	-3.723			-4.343		***		
	5%	-2.989			-3.584		**		
	10%	-2.625			-3.23		*		

Source: Own computation based on data sources (1991-2020)

Where, ***, ** and * are significance levels at 1%, 5% and10% respectively.

The PP test for unit root result show that, almost the same as that of ADF result. The variable included in the model which is non-stationary at level becoming stationary at first difference. The ADF result showed that there are a mixed stationary for the variables for both intercept, and trend and intercept. Similar mixture result found in PP test as well. Since the variable are

integrated at level I (0) and the first difference I(1), and in both of the test there is no variable which is stationary integrated order two. So this study proceeded to ARDL technique to analysis the long run association between the selected factors, after checking the existence of co integration using F statistic and comparing to Narayan critical values.

4.2.2 Correlation matrix

Before testing long run relationship, checked correlation matrix to find out whether the studied variables do not have problem of multicollinearity. As table 4.4 shows, the pair wise correlations between the variables are logically normal. It is important to emphasize that we expect low correlation between explanatory variables. The correlation matrixes for variables of this study model are as shown below table 4.4.

Table 4.4: Correlation matrix of variables

	lhc	**lgfcf**	**VA**	**PV**	**RQ**	**RL**	**CC**
lhc	1						
lgfcf	0.7318	1					
VA	-0.4290	-0.6450	1				
PV	-0.7287	-0.5561	0.7335	1			
RQ	0.4679	0.3491	-0.3028	-0.5205	1		
RL	-0.0943	0.6385	-0.3465	-0.2830	0.4380	1	
CC	-0.1536	0.4895	-0.0555	0.1264	0.1668	0.6901	1

Source: Authors' computation based on data (1991-2020)

The results in table 4.4 show that there is an independence of variables with respect to each other and do not have any strong relationships. And the regressors are not linearly dependent on one another. Table 4.4 represents the results of correlation matrix among explanatory variables. Since, the correlation is the measure of association or relationship among variables. It also tells us about the strength and direction of the relationship. The results in the table 4.4 that there is an independence of variables with respect to each other and do not have any strong relationship, so that there is no problem of multicollinearity.

4.2.3. Optimal Lag Length Selection Criteria

Choosing optimal lag length is basically empirical issues. In order to test the lag length criteria for the model, table 4.5 has been used to identify the necessary lag intervals. The results of such a table show that the optimal lag of two. The criteria mostly preferred in economic studies are the Aikaike's Information Criterion (AIC). In the given time series data all the lag selection criteria are applied and their results are given below. Here LR test statistics, SIC, AIC, FPE, and HQ (at 5% level) all shows that there should be two lags selected of each variable and used in the analysis of the data (Woodridge, 2004) .

Table 4.5: Selection for Optimal Lag Length

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	134.386				1.7e-14	-9.02758	-8.91121	-8.64695
1	302.55	336.33	64	0.000	1.2e-17	-16.4679	-15.4206	-13.0422
2	440.537	**275.97***	64	0.000	**2.3e-19***	**-21.753***	**-19.775***	**-15.282***

endogenous:- all are variables
exogenous: constant
Source: Own calculation based on Stata 14 software.

The optimal lag interval for the equation;

LR: sequential modified LR test statistic (each test at 5% level).

FPE: Final prediction error.

AIC: Akaike information criterion.

SBIC: Schwarz information criterion.

HQIC: Hannan-Quinn information criterion

The lag length with asterisks is the one selected with respected criteria, the smaller criteria, the better for the model knowing that negative value are smaller and smaller. The table 4.5 has been

used to identify the necessary lag intervals. The lags have from 0 to lag 2 that mean there is provision to choose in this model, there are different criteria (LR, FPE, AIC, HQIC & SBIC). The optimal lag length criteria for this model is AIC which has least value as we see in table 4.5, AIC has -21.7526 against HQIC which has -19.7745 and SBIC has -15.2819 given this AIC criteria lest /last minimum value optimal lag of two. The result of such table shows that the optimal lag two.

4.2.4. Bounds test for co-integration

The decision criteria for bounds test is that can reject, the null hypothesis are the 10%, 5% or 1% significant level if F-statistics is greater than critical value for upper bound I(1), then we can conclude that there is co-integration. That is, there is a long run relationship. If the f-statics is lower than critical value for lower bound I(0), then we conclude there is no co-integration, hence, no long run r/ship. And also if F-statics falls b/n the lower bound I(0) and the upper bound I(1), the test is considered inconclusive (Pesaran et al, 2001).

Table4.6: Outcomes of ARDL Bound Tests for Co-integration

F-statistics	11.167	
Critical values	**Lower Bound I(0)**	**Upper Bound I(1)**
1%	2.96	4.26
5%	2.32	3.5
10%	2.03	3.13

Source: model result based on secondary data (1991-2020)

The result F-statics is 11.167 against Pesaran shin smith critical values, F-value greater than above I(1) bound or upper bound. For lggdp dependent variable there is co-integration among the variables, so exhibit a long run relationship. Implies there are related and can be combined in a linear fashion that is, even if there are shocks in short run , which may affect movement in the

individual series, they would converge with time (in the long run), there are estimating both long-run and short run models. Appropriate estimation technique are Autoregressive distributed lag(ARDL) and ECM (error correction model)(Pesaran et al, 2001).

4.2.5. Long Run Analysis of ARDL Model

Given the existence of cointegration or long run relationship, the estimation of the long run equilibrium model is performed. The study used STATA 14 software to estimate the results which is computed by ARDL model. In this study lag length of two is selected based on Akaike Information Criterion since it is best suited for small sample size. The long run estimates are presented in a table 4.7.

Table 4.7: Estimated Long Run coefficients using the ARDL approach

Regressors	Coefficients	Standard Error	T-Ratio	[Prob.]
lhc	-8.692624	8.515459	-1.02	0.337
lgfcf	3.153452	0.587569	5.37	0.001
VA	-23.80739	7.34289	-3.24	0.012
PV	1.421642	0.7173943	1.98	0.083
Rq	-2.914742	0.958416	-2.58	0.033
Rl	-3.14742	3.179783	-1.23	0.253
CC	20.83858	5.552352	3.75	0.006
Dependent Variable is lggdp				

Source: model result

Note: - ARDL (2, 1, 1, 1, 1, 2, 1) selected based on Akaike Information Criteria (AIC).

Table 4.7 shows that political stability and absence of violence/terrorism, control of corruption and gross fixed capital formation have a positive and significant effect on the growth rate of real GDP in the models at 10% and 1% level of significance respectively and The results of the regressions are consistent with economic theory.

The gross fixed capital formation (**lgfcf)** variable show the statistical significance at 1%. The coefficients could be interpreted as the elasticity with respect to real GDP, a 1% increase in the

physical capital (gross investment) leads to approximately 3.15% increase in the GDP of Ethiopia, all the other variables remain constant. This result is in line with the growth theory of economic; which states that capital formation is the major factors of economic growth theory: Keynesian theory of growth and Solow theory of growth(Solow, 1956; Keynes, 1936). Additionally, this positive association between the political stability and absence of violence/terrorism and the economic growth in Ethiopia was consistence with the previous studies by (Weeks *et al.*,2004;Tadesse, 2011) in Ethiopia; (Biswas and Saha, 2014; Bal*et al*, 2016) in India; (Iqbal and Zahid,1998) in Pakistan;(Ndambiri *et al.,* 2012) in Africa and (Hatem*et al.*,2016) the kingdom of Saudi Arabia.

The result shows that positive and significant effect of political stability and absence of violence/terrorism (PV)on economic growth of Ethiopia. The percentage change in political stability and absence of violence/terrorism output is associated with 1.42% economy increase on average ceteris paribus at 10% level of significant. Specifically, the political stability and absence of violence/terrorism and the other proxy variable of political stability indicator that reflects the level are measured on a -2.5 to 2.5scale (whereas 2.5 denote the highest degree and -2.5 the lowest). Specifically, a 1-point increase in the political stability and absence of violence/terrorism (PV) leads to an increase of economy of Ethiopia at 1.42 point in the long run ceteris paribus.

This result corroborates the idea that, political stability and absence of violence/terrorism courage investment, affect Productivity as well as the allocation of resources and speed up thus economic development and growth and these results are consistent with the many studies. Estimation reveals that there is a significant and positive relationship between degree of control of corruption and output growth in long run. Specifically, a 1-point increase in the control of corruption rate leads to an increase the growth rate of real GDP by 20.84 point in Ethiopia as

ceteris paribus and the results coincide with Barro (1990) and Mauro (2002) works, and also d'Agostino, Dunne and Pieroni (2016) studies result.

The result show that Regulation quality (**Rq**) significant and negative impact of Regulation quality (**Rq**) on economic growth long-term and coefficients of it is statistically significant at 5% level. This is the same as results obtained by Gani (2011) and Marija (2020). This means when Regulation quality (**Rq**) rises for 1 point, Ethiopian economy falls for 2.91% ceteris paribus, 5% level of significant.

The regression confirms the significant negative impact of voice and accountability (Va) on economic growth long-term and coefficients of it is statistically significant at 5%. This shows negative long-term movements. When voice and accountability rises for 1 point, Ethiopian economy falls for 23.8% ceteris paribus, 5% level of significant. This outcome in line with the result obtains by Gani (2011) and Marija (2020).

In general, there is mixed evidence on the link between voice and accountability and economic growth, as some studies provide support for a positive association, while others for a negative and/ or for a non-robust relationship between voice and accountability and economic performance. Our result seems to support the first category, according to which voice and accountability may increase the uncertainty about the political life of a country and thus increase political instability which is end up with negative impact on economic growth. The result show that rule of law (RL) is not statistically significant at conventional levels in long run relation with Ethiopian economic growth.

4.2.6 Error Correction Model

Once the study identified the presence of long run cointegration through the F-statistics and estimation of the long run coefficients, we proceed to the estimation of the error correction representation of long run relationship. The ECM shows the short run dynamics of the model

which is consistent with the long run equilibrium of the model. After estimating the long-term coefficients, we obtain the error correction version of the ARDL model. Table 4.8 reports the short-run coefficient estimates obtained from the ECM version of the ARDL model. The error correction term indicates the speed of adjustment restoring the equilibrium in the dynamic model.

Table 4.8: Error Correction for the Selected ARDL Model

Regressor	Coefficient	Standard Error	T-Ratio	[Prob.]
dlhc	-150.19	60.8	-2.47	0.033
dlgfcf	-1.025	0.915	-1.12	0.289
dVA	-3.571	1.71	-2.09	0.063
dPV	3.125	0.839	3.72	0.004
dRq	-3.036	1.26	-2.41	0.037
dRl	2.967	1.52	1.96	0.079
dRl(-1)	1.0511	1.01	1.04	0.324
dCC	-2.889	1.49	-1.93	0.082
ECM(-1)	-0.8694	0.19655	-4.42	0.001
R-squared	0.9479			
Adjusted R-square	0.8918			
Log likelihood	-2.88			
Constant	154.1179	51.035	3.02	0.013
Dependent variable is dlggdp				

Source: model result

Note: - ARDL (2, 1, 1, 1, 1, 2, 1) selected based on Akaike Information Criteria (AIC).

The ECM coefficient shows how quickly/slowly the relationship returns to its equilibrium path, and it should have a statistically significant coefficient with a negative sign. In the short run, the error correction model is estimated to determine the coefficient of the short run dynamics and to grasp how fast the disturbance in the short run coefficients adjusted to their long run value. Bannerjee et al. (1998), states that a highly significant error correction term is further proof of the existence of a stable long term relationship. The results of the ECM are reported in table 4.8.

As per Table 4.8 shown, The R-squared value for the short run dynamics is about 0.9479. Meaning of R-squared 94.79% of the variation in the economic growth is due to explanatory variables involved in the model. As per table shown 4.8, coefficient of error correction term ecm (-1) is negative and highly significant indicating that in the short run changes in growth of real GDP is associated with political instability. The ECM permits that there is a long run co-integration among the given variables. The ARDL model result of coefficient of ECM is -0.8694, which is negative, more significant and falls between zero and one. This value also tells that the economic system corrects/adjusts its previous period shocks (disequilibrium) at a speed of 86.94percent (86.94%) for reaching in a long-term steady state.

The negative and significant coefficient (–0.8694) of ECM is theoretically correct. The negative and significant value of ECM shows the speed of adjustment from short-run to long-run equilibrium. Moreover, short-run deviations in the last period are corrected by 86.94 percent in future in case of Ethiopia. This means that the adjustment takes place very quickly. It is possibly due to the political stability.

The results of the ECM for the GDP per capita growth(lggdp) imply that most of the coefficients, except drl (-1), are statistically significant1%, 5% and 10% level of significance in explaining GDP per capita growth of Ethiopia in the short run.

Variability captured by coefficient of political stability and absence of violence/terrorism (PV) and coefficient of variation of rule of law (RL) has a positive and statistically significant effect on economic growth of Ethiopia in the short run. The short-run dynamics show that political stability and improvement of rule of law are more fruitful for increasing GDP in Ethiopia. This indicates that political stability expressed by absence of violence and rule of law improvement have positive impact on Ethiopian economy in the short run and results are consistent with various studies.

The outcomes indicts that in short-run there is negative and significant relationship between control of corruption and GDP of Ethiopia and this relationship is positive, and significant to long-run results seen in table 4.7, but which is consists with (Aidt, 2009) and (Adefeso, 2018) finding .

4.2.7Granger Causality Results

In the model for this study, there are existences of both unidirectional and bi-directional causalities between the given variables. Three ways of Granger causality test Causality in time series analysis, regression analysis deal with the dependence of one variable or other variables; it does not necessarily imply causation. In other words, the existence of a relationship between variables does not prove causality of direction of influence, but in regressions involve time series data, the situation may be somewhat different. A statistical relationship itself can't logically imply causation. But to ascribe causality, one must appeal to parietal theoretical considerations. There are three ways of checks causality such as regressors' t-statistics. Pair wise Granger causality test on direction of causality and Wald coefficient test as list the outcome in table 4.9 for the study(Granger, 1987).

Putting all the three check together seen in the Granger causality test results are presented in the Table 4.9, in conclusion, we get noted unidirectional causality as seen in the table for example from **lggdp** to **lhc**, and **LGFCF** to **lhc** ….etc. and also bi-directional causality from **lggdp** to **LGFCF** and vice-versa, **VA** to **lggdp** and vice-versa …. etc. it gives deeper in sight in to the interaction of model. Each of these causality tests /checks can serves as robustness of evidence of validation for one another.

Table 4.9 Three ways of Granger causality test

Dep variable	t-statistics	Granger/Wald test	Wald coeff test	Decision:
lggdp	lhc_1 LGFCF _1and_2 VA_1 PV_1 RQ _1and_2 RL_1 CC_ are significant	lhc LGFCF VA RQ RL CC are significant.	lhc LGFCF VA RQ RL& CC are significant.	All variables Granger cause lggdp except PV.
lhc	VP_2 RQ _1&_2 &CC _2 are significant	VP RQ and CC are significant	VP RQ and CC are significant	VP Granger-causes lhc RQ Granger-causes lhc CC Granger-causes lhc
LGFCF	ggdp_1 lhc_1 VA _1and_2 and RL _1 are significant	lggdp lhc VA are significant	lggdp, lhc, VA are significant	Lggdp Granger causes LGFCF lhc Granger-causes LGFCF VA Granger-causes LGFCF
VA	lggdp_2 LGFCF_1 & PV_2 are significant	lggdp LGFCF PV&are significant	lggdpLGFCF&PVare significant	lggdp Granger-causes VA LGFCF Granger-causes VA PV Granger-causes VA
PV	lhc _1and_2 and VA_2: significant	lhc & VA are significant	lhc & VA are significant	lhc Granger-causes PV VA Granger-causes PV
Rq	lggdp_2 lhc_1and_2 LGFCF_2 & RL_1 are significant	lggdplhcLGFCF &RL are significant	lggdp lhc LGFCF& RL are significant	All variables Granger cause Rq except VA, PV, CC
Rl	lggdp_1and_2: lhc _2 LGFCF_2&RQ_1&_2are significant	lggdp lhc LGFCF& RQ and significant	Lggdp lhc LGFCF &RQ aresignificant	Lggdp Granger-causes Rl lhc Granger-causes Rl LGFCF Granger-causes Rl RQ Granger-causes Rl
CC	lggdp1&_2LGFCF_2 RQ _1&_2&RL1&_2 are significant	lggdp LGFCF RQ & RL are significant	lggdp LGFCF RQ & RL are significant	lggdp Granger-causes CC LGFCFGranger-causes CC RQ Granger-causes CC RL Granger-causes CC

Source: model results

4.3. Diagnostic Tests

The robustness of the model is checking by using diagnostic test. The model estimation is in table 4.10. From result of table, Durbin-Watson (DW) statics is 2.05 near to 2so that the model has not serial correlation. This is confirmed by Breusch-Godfrey LM test for autocorrelation that hypotheses is accepted which the null hypothesis the reason that the p-values associated with test statistic are greater than the standard significant level (I.e. 0.2600> 0.05)there is no serial correlation, so this model has not serial correlation.

Table 4:10: Outcomes for different diagnostic tests

Tests	Test Statistics	P-value
A:Serial Correlation	CHSQ(2) =2.694	[0.2600]
B:Functional Form	F (3, 9) =2.64	[0.1129]
C:Hetroscedasticity	CHSQ(2) = 28	[0.4110]
Durbin-Watson	D(13, 28) =2.05192	
A: Breusch-Godfrey LM Test for serial correlation. B: Ramsey's RESET test using the square of the fitted values of **lggdp**. C: White's test for homoscedasticity		

Source: model results

We could not reject the null hypothesis test for Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. As the test result indicates that we can't reject Ramsey's test. The null hypothesis is of the model is no omitted variables. F values are 2.64 and P-value is 0.1129hich is greater than 0.05, so fail to reject the null hypothesis. And these conclude the study conclude there is no omitted variables that our model did not suffer from omitted variables bias. Therefore, the model is specified correctly.

The third diagnostic test is about the residual test. As the result indicates that we could not reject the null hypothesis which says that the residuals are normally distributed, for the reason, that the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (I.e. 0.4110> 0.05).For hetroscedasticity, result in the outcome accept null hypothesis of homoscedasticity, and the model is stable and hetrosedetics is not present and indicates the existences of constant variance.

The stability of the long run parameters were tested using the cumulative sum of recursive residuals (CUSUM) and CUSUM of recursive squares (CUSUMQ).The CUSUM and CUSUMSQ tests specify that the model is consistent and constant over time. Since, the plotted recursive residuals at 5% are within the prescribed reliable range or critical lines as seen in the

figure 4.1, we conclude that the parameters are stable. The second test: CUSUMSQ confirms that our coefficients are exhibit consistency/constancy over time.

Model Stability – The CUMSUM Test

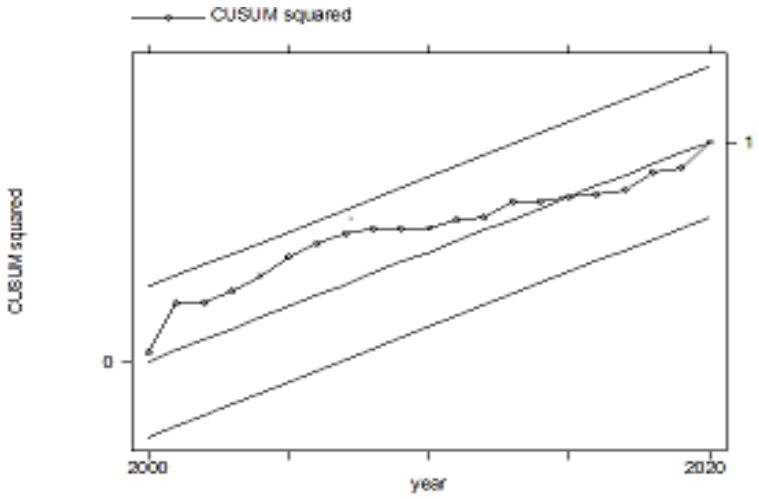


Figure 4.1: Plot of Cumulative Sum of Squares of Recursive Residuals Source: Model result

The plot discloses that the plot of CUMSUMSQ stay within the lines, and, therefore, this confirms the equation is correctly specified and the model is stable. Furthermore, the result reveals that there is no structural instability in the model during the sample period. The selected model adopted in study is good and robust in estimating the short run and long run relationship.

5- CONCLUSIONS AND POLICY IMPLICATIONS

5.1. Summary and Conclusions

Growth of the economy is attributed to the change in the amount of production in the long-run which are caused by the infrastructure changes named as factor accumulation and growth of the technology. Traditionally, the increase in human and physical capital and changes in the technology which cause the increase in the productivity is documented as economicgrowth. It can also be described as the result of developing new goods and services, creating demand. The link between political instability and economic performance has raised much attention from the literature on growth and development (Alesinaetal, 1996).

Political instability creates uncertainty, which negatively affects economic growth by hampering the business environment and discouraging investment (Dixit and Pindyck, 1994).Political instability is generated by rapid social changes accompanied by slow institutional development and reflects the loss of legitimacy of the political system (Huntington, 1968).

The study investigates the nexus between political instability and economic growth in Ethiopia by using time series data from 1991 to 2020. The method used is a bound testing approach to cointegration developed with an ARDL framework to examine the existence of short run and long run equilibrium relationship between voice and accountability, political stability and absence of violence, regular quality, and rule of law and control of corruption. The study included human capital and growth fixed capital formation as control variables.

The results of the ARDL bound testing approach show that there is cointegration among the variables of the model. The long-run results show that control of corruption has positive and

significant relationship with GDP in Ethiopia. However, short run estimates show that there is negative and significant relationship with GDP in Ethiopia.

Results of the research indicate that there exist a relationship between the political stability of an Ethiopia and its economic growth. Political stability influences on the level of economic growth long term with growth of fixed capital, but human capital in short run. The total labor capital has negative and insignificant long run relation with GDP in Ethiopia, but it has negative and significant short run relationship with GDP in Ethiopia. The results of research show that in Ethiopia political stability is the biggest factor to stimulate economic growth specially the flow of the capital. Econometric results of this study proved long-run relationship between political stability and economic growth.

Proxy variables of political instability such as Political stability, absence of violence and control of corruption has long run positive and significant relation with economic growth of Ethiopia. In some aspects indicates that political stability in Ethiopia with less stable political systems such government regulatory quality as can stimulate a country's process of economic growth. However, Corruption control is the most important determinant of economic growth in the model. The control of corruption shows a significant positive relationship to economic growth in the long run, and it shows the highest contribution in the magnitude, among all other variables. A small progress in the control of corruption, a big improvement can get real per capita GDP of Ethiopia in the long run.

In the short-run some of political instability proxy variables have negative and significant impact on GDP of Ethiopia. The negative and significant value of ECM shows the speed of adjustment from short-run to long-run equilibrium. The estimates of ECM reveal those short-run needs years to converge in the long-run equilibrium. The diagnostic tests results reveal that there is no serial

correlation, heteroscedasticity and model has correct functional form with normally distributed data. The results of the Granger causality test show all the independent variables have causal relationship with GDP in Ethiopia. This confirms that for getting a targeted GDP, Ethiopia should make political environment stable for accumulation capital.

The study concludes that the government has to play its role to raising the pace of economic growth in Ethiopia. For this purpose, appropriate policies which make the country politic stable need to be formulated and implemented that can making the economic environment conducive to economic growth. These policies may also help in bringing macroeconomic stability. It helps in reaping the full fruit of economic development in the country. Based on the findings this study recommend following implications.

5.2. Policy Implications

Our results suggest that governments in highly politically instable countries need to address the root causes of political instability and try to make a stable political system and policies. Only then, countries can attain higher and sustained economic growth and lower poverty and inequality rates. Governments of countries have to have in mind these factors when planning their economies. Political instability and internal crisis can easily have quick and destructive effects economic growth. It would be interesting to see in the future researches the influence of political instability as defining factor of economic growth of Ethiopia. It is my suggestion for future research.

This study provides the following points that have policy implications to decision makers, regulatory authorities and political institutions when set their goals and chalk out their policies and plans, keeping in view the political instability factors while making their decisions. In future, this research recommends while examining control of corruption, absence of violence and

political stability in an important structure which will give more specific of this aspect of economy growth. Government has a fundamental function to further improve political stability for Ethiopia economic growth. Besides, ensuring that political stability is maintained and sustained is relevant for accumulation of capital for economic growth of Ethiopia. The following policy implications emerge from the analysis of the thesis:

- ✓ Government must invest in the physical and social infrastructure and other crucial sector which improves the economic performance of the country directly and indirectly through promoting rule of law,
- ✓ In order to avoid the adverse effects of economic growth of Ethiopia in short and long run, it demands creating of political stability of Ethiopia and avoidance of violence.
- ✓ Emphasis should be given to generate and accumulate fixed capital which important for further economic growth of Ethiopia.
- ✓ The government should increase domestic investment by promoting both public and private sectors through encouraging entrepreneurship and job creation so as to absorb the growing labor force in the long run in order to bring sustainable economic growth and the societal welfare
- ✓ Fight against corruption must be central issues in giving to confirm long run economic growth of Ethiopia
- ✓ Hence in Ethiopia the application of future development policies should take into consideration that political stability of country as very useful tool as a means and end goal of appropriate economic growth policies.

5.3. Limitations of this Paper and Areas for Future Research

Although this study have advantage that it measured the nexus between of political instability with economic growth of Ethiopia, the study pay no attention to economic progress effect on political stability of Ethiopia. Though, Economic growth condition has huge impact on political stability of Ethiopia.

This research uncovers some of the most critical areas relevant to the empirical relationship between the political instability and economic growth of Ethiopia. Most countries make policies to deal with foreign direct investments and trade openness with the objective of achieving a higher economic growth. However, this research suggests that the impact of political instability on economic growth may be greater than the effects of the other determinants. That means the influence on political instability factors increases the economic growth at a higher rate than its influence on other growth determinants, such as foreign direct investments and trade openness because they are not realized without political stability of Ethiopia.

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Appendices

Appendix 1.Augmented Dickey-Fuller Test of Unite Root (Stationarity test}

I. lggdp in level (intercept)

gmented Dickey-Fuller test for unit root Number of obs = 28

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
(t)	-4.967	-3.730	-2.992	-2.626

cKinnon approximate p-value for Z(t) = 0.0000

II. lggdp in level (intercept and trend form)

gmented Dickey-Fuller test for unit root Number of obs = 28

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
(t)	-5.139	-4.352	-3.588	-3.233

cKinnon approximate p-value for Z(t) = 0.0001

III. lhc in level (intercept and trend)&(intercept) form

```
. dfuller lhc, trend lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 28

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.261	-4.352	-3.588	-3.233

MacKinnon approximate p-value for Z(t) = 0.4556

```
. dfuller lhc, lags(1)
```

Augmented Dickey-Fuller test for unit root Number of obs = 28

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-2.718	-3.730	-2.992	-2.626

MacKinnon approximate p-value for Z(t) = 0.0710

IV. VA at level and at after first difference (intercept, intercept and trend)

```
. dfuller VA, lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        28

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.326           -3.730            -2.992           -2.626
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1637

. dfuller VA, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        28

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.331           -4.352            -3.588           -3.233
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4168

 dfuller d.VA, lags(1)

ugmented Dickey-Fuller test for unit root         Number of obs   =        27

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic         Value             Value            Value
------------------------------------------------------------------------------
Z(t)            -2.785           -3.736            -2.994           -2.628
------------------------------------------------------------------------------
acKinnon approximate p-value for Z(t) = 0.0605
```

Appendix 2.a PP Test of Unite Root (Stationarity test}

```
. pperron RQ, lags(1)

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         1

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -3.617           -17.472           -12.628           -10.280
 Z(t)            -1.951            -3.723            -2.989            -2.625
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3084

. pperron RQ, lags(1) trend

Phillips-Perron test for unit root                 Number of obs   =        29
                                                   Newey-West lags =         1

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -6.434           -23.012           -18.204           -15.792
 Z(t)            -2.183            -4.343            -3.584            -3.230
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4994

. pperron d.RQ, lags(1)

Phillips-Perron test for unit root                 Number of obs   =        28
                                                   Newey-West lags =         1

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)         -13.789           -17.404           -12.596           -10.260
 Z(t)            -2.939            -3.730            -2.992            -2.626
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0410

. pperron d.RQ, lags(1) trend

Phillips-Perron test for unit root                 Number of obs   =        28
                                                   Newey-West lags =         1

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)         -13.806           -22.884           -18.128           -15.744
 Z(t)            -2.809            -4.352            -3.588            -3.233
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1935
```

Appendix3. a Outcomes of ARDL Bounds test co-integration

```
Pesaran/Shin/Smith (2001) ARDL Bounds Test
H0: no levels relationship                 F =  11.167
                                           t = -4.424

Critical Values (0.1-0.01), F-statistic, Case 3

     | [I_0]  [I_1] | [I_0]  [I_1] | [I_0]  [I_1] | [I_0]  [I_1]
     |   L_1    L_1 |  L_05   L_05 | L_025  L_025 |  L_01   L_01
-----+--------------+--------------+--------------+--------------
 k_7 |  2.03   3.13 |  2.32   3.50 |  2.60   3.84 |  2.96   4.26
accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

     | [I_0]  [I_1] | [I_0]  [I_1] | [I_0]  [I_1] | [I_0]  [I_1]
     |   L_1    L_1 |  L_05   L_05 | L_025  L_025 |  L_01   L_01
-----+--------------+--------------+--------------+--------------
 k_7 | -2.57  -4.23 | -2.86  -4.57 | -3.13  -4.85 | -3.43  -5.19
accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)
```

Appendix 4. a Error correction estimation of ARDL model

Sample: 1993 - 2020 — Number of obs = 28
R-squared = 0.9479
Adj R-squared = 0.8918
Log likelihood = -2.8800349 — Root MSE = 0.3936

D.lGGDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ADJ						
lGGDP						
L1.	-.8694492	.1965518	-4.42	0.001	-1.294073	-.4448249
LR						
lhc	-8.692624	8.515459	-1.02	0.337	-28.32931	10.94406
lgfcf	3.153452	.5875696	5.37	0.001	1.798514	4.50839
va	-23.80739	7.342597	-3.24	0.012	-40.73945	-6.875327
vp	1.421642	.7173943	1.98	0.083	-.2326719	3.075957
rq	-2.469071	.958416	-2.58	0.033	-4.679183	-.2589601
rl	-3.914742	3.179783	-1.23	0.253	-11.24733	3.41785
cc	20.83858	5.552352	3.75	0.006	8.034829	33.64232
SR						
lggdp						
LD.	.5965214	.177726	3.36	0.007	.2005231	.9925197
lhc						
D1.	-150.1865	60.80063	-2.47	0.033	-285.6587	-14.71423
lgfcf						
D1.	-1.024504	.9145596	-1.12	0.289	-3.06227	1.013261
va						
D1.	-3.570612	1.706216	-2.09	0.063	-7.372297	.2310735
pv						
D1.	3.124965	.8389425	3.72	0.004	1.255684	4.994245
rq						
D1.	-3.035683	1.258357	-2.41	0.037	-5.839476	-.2318893
rl						
D1.	2.966562	1.515975	1.96	0.079	-.4112417	6.344365
LD.	1.051191	1.013951	1.04	0.324	-1.208033	3.310415
cc						
D1.	-2.888519	1.495107	-1.93	0.082	-6.219825	.4427875
_cons	154.1179	51.03509	3.02	0.013	40.40466	267.8312

Appendix5. a Post Estimation Diagnostic Tests

```
. estat dwatson

Durbin-Watson d-statistic( 19,     28) =    2.05192
```

```
. estat bgodfrey, lags(2)

Breusch-Godfrey LM test for autocorrelation
```

lags(p)	chi2	df
2	2.694	2

H0: no serial correlation

```
. estat imtest, white

White's test for Ho: homoskedasticity
          against Ha: unrestricted heteroskedasticity

          chi2(27)      =      28.00
          Prob > chi2   =     0.4110

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	28.00	27	0.4110
Skewness	17.64	18	0.4798
Kurtosis	0.40	1	0.5251
Total	46.04	46	0.4706

```
. estat hettest, fstat

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of lggdp

         F(1 , 26)     =      0.32
         Prob > F      =    0.5764

. estat ovtest

Ramsey RESET test using powers of the fitted values of lggdp
       Ho:  model has no omitted variables
                  F(3, 9) =      2.64
                Prob > F =      0.1129
```