Institutions and Economic Growth in Sub Saharan Africa: Dynamic Panel Data Analysis

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A Thesis Submitted to
The Department of Economics

Presented in Partial Fulfilment of the Requirements for Degree of Master of Science in Economics (International Economics)

Addis Ababa University
Addis Ababa, Ethiopia
June 2018

Addis Ababa University
School of Graduate Studies

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This is to certify that the thesis prepared by Dereje Degu, entitled as: *Institutions and Economic Growth: Dynamic Panel Data Analysis*, and submitted in partial fulfilment of the requirements for the degree of Master of Science in Economics (International Economics) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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External Examiner **Signature**

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Acknowledgment

First, I would like to express my heartfelt thanks to my God for helping me successfully complete this thesis. Second, I would like to express my thanks to Dr Haile Kebret, who is my advisor, for his invaluable advice, encouragements, and friendly approach since the start to the completion of the study. Third, my thanks go to my family for being there for me every time. Finally, I would like to thank the Economics Department of Addis Ababa University and Haramaya University for their financial and training supports.

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List of acronyms

BERI	Business Environmental Risk Intelligence
DCS	Developed countries
DPDM	Dynamic panel data model
EF	Economic freedom
EFW	Economic freedom of the world
EXP	Government expenditure
FHI	Freedom House Indicator
GDP	Gross Domestic Product
GDPPPC	Gross Domestic Product per capita
GI	Governance qualities
GLS	Generalized least squares
GMM	Generalized Method of Moment
IMF	International Monetary Fund
IV	Instrumental variables
LDCS	Least developed countries
ODA	The official development assistance
OECD	Organizational for economic cooperation and development
OLS	Ordinary least squares
OPEN	Trade openness
PDA	Panel data analysis
PF	Political freedom
RGDPPC	Real Gross Domestic Product per capita
SGMM	System Generalized Method of Moment
SSA	Sub Saharan African
UN	United nations

USD	United states Dollar
WB	World bank
WDI	World Development Indicator
WGI	Worldwide Governance Indicator

Abstract

This study investigates the role of institutions in economic growth in Sub-Saharan Africa to identify the most important institutions for economic growth. The study takes into account the product of different institutional measures to analyze the interaction effect of institutions on economic growth. The study uses the panel data of 16 countries of Sub-Saharan Africa for the period from 2002 to 2016 and the system-generalized method of moment (SGMM) that captures the problem of endogneity, autocorrelation, and heteroskedasticity problems. The empirical results from system GMM indicated that per capita GDP is autoregressive. The previous period per capita GDP influences the current level. In addition, investment has positive effect on real per capita GDP. Among institutional measures, government effectiveness, control of corruption, political stability and absence of violence, voice and accountability, legal system and protecting property rights, political rights and civil liberties have positive and significant effect on real per capita GDP. However, access to sound money has negative and significant effect on real per capita GDP. The effects of the interaction term of institutional variables are positive on real per capita GDP and the effects of interaction term of institutions with policy variables are positive and significant. Therefore, the empirical evidence shows that undertakings of a series of actions that improve institutional qualities promote economic growth in Sub Saharan Africa. The study confirms that the combined improvement of institutional qualities is indispensable. The improvement of qualities of institution along with government expenditure growth makes the effect of institutions more effective on real per capita GDP.

Keywords: Sub-Sahara African, Institutions, Economic growth, System GMM

Chapter one

1. Introduction

1.1. Background of the study

Institutions become the area of recent interest of researchers following the prominent work of Matthews (1986) and North (1990) though the importance of institutions for economic growth dates back to 1960s with the emergence of the new institutional economics (Sobel and Coyne, 2011). Back then, researchers investigate the importance of institutions in economic growth. Hall and Jones (1999); North (1994); Acemoglu et al, (2001) and Rodrik et al, (2004) suggested that institutions promote investment, productivity, innovation and economic growth. However, since institutions are broad, they are measured in different ways and have different relationships with economic growth in many literatures.

Institutions can be defined as anything that forms human relations. They may be created by human or developed gradually. North defines institutions as "the framework within which human interaction takes place" (North, 1990, pp. 3-6). Institutional framework is the heart for decisions of economic agents by creating trust in human activities. Cost of production and transaction and incentive structure are the main channel in which institutions affect economic growth (North, 1990, 1994). The role of institutions starts from individual level since consumption and production decisions of individuals are given institutional framework to maximize their utility function and attain the pareto optimality (Lin & Nugent, 1995).

Williamson (2000) suggested that four hierarchy of institutions. These show clearly the way and time of change of institutions and the role of institutions in economic growth[1]. Williamson's hierarchy provides understanding of various levels that shows how they relate to one another. Formal institutions can be changed from 1 to 100 years and easily changed by lawmakers but informal institutions take 100 to 1000 years to change. The focuses of many studies are formal institutions.

Some literatures used broad measures of institutions together and others individually (Commander and Nikoloski, 2010). Using large set of measure of institutions is important to find out the effect of institutions on economic growth. [Aron, (2000); Acemoglu et al, (2001);

[1] See table 1

Rodrik et al, (2004)] used property rights as a measure of institutions suggested that protecting expropriation of private property is an important factor to enhance investment and per capita GDP. Barro, (1996) suggested that countries with low level of political rights can improve economic growth but not after adequate level of political rights occurs. Therefore, measurement of formal institutions is challenging. Literatures used some measure of formal institutions depends on their interest. Having single index of formal intuitions seems to be impossible.

In the world, some countries are developed and others are not while some economies grow faster and others do not. The gap of GDP per capita across different level of development, regions and countries is huge (WBI, 2017). Thus, find out the basic sources of economic growth across countries is an essential task for economists. Kong, (2005) suggested that capital accumulation and total factor productivity are sources of economic growth across countries. However, the sources of difference productivity and capital accumulation across countries are ambiguous.

Sub-Saharan Africa started to establish and reform their economic system since 1960s in order to bring economic growth and prosperity. The economic growth was not sustainable since economic activities were owned by the state and due to domestic and neighboring conflicts (Osman et al, 2011). Furthermore, the region receives huge money as development assistance from international originations and developed countries along with different economic reforms for a long period. However, more than 80 percent of low-income countries are in Sub-Saharan Africa today (WB, 2017). [Fellner, (2008); Dell'Anno (2010)] suggested that the institutional structure could enhance production by creating trust and prevent informal economies. [Edison, (2003); Yildrim, and Gökalp, (2016)] pointed out in weak institutions, the legal system does not function well and few part of population have unlimited power and access quality of public service and business opportunity. In addition, the role of institutions in economic growth are differs across regions and development levels (Nawaz et al, 2014).

Moreover, the economic reforms of Sub-Saharan Africa over time were not considering the institutional framework on the ground. Therefore, the important question is do institutions matter for economic growth and to what extent institutions matter for economic growth in Sub-Saharan Africa.

1.2. Statement of the problem

Despite the works on institutions as rule of the game for economic growth, most economies particularly in developing counties face low economic growth and deterioration of institutional qualities[2]. Low-income growth and higher income gap is the main challenge in the world. The quality of institutions in low-income countries (like in SSA) is very weak while a political aspect is given more priority in these countries.

Sub Saharan Africa receives aid from developed countries and international organizations like IMF and WB that are expected to address the challenge of low economic growth. The official development assistance (ODA) reached USD 142.6 billion in 2016 due to huge increase in the number of refugees owing to political instability and lack of economic opportunity. Net ODA to Africa was USD 27 billion from which 24 billion was for sub-Saharan Africa (OECD, 2017). However, the economic performance between higher income and low-income countries are far apart. In addition to low economic growth and development, the structure of institutions in developing countries does not encourage entrepreneurship, innovation, and investment[3]. They are manipulated by officials and higher income individuals for their own interest. Significant numbers of young people migrate to developed countries due to economic and political reasons for better life. More severely low-income growth and poor intuitional quality cause instability and failure of sovereign state[4].

Studies provide different results regarding to the role of institutions in economic growth. Political institutions and institutional reform are critical and determine per capita GDP [Eicher, (2010); Efendic, (2015)]. However, [Simon, (2010), Siddiqui, (2013)] suggested that no relation between political institutions and economic growth. Thus, it is important to have an accurate empirical assessment of institutional effects with the relevant measure of institutions. Moreover, few studies are done in Sub Saharan Africa so far (Tsaliki et al, 2011, Yakubu et al, 2013, Ebaidalla, 2014, and Akinlo, 2016) and come up with mixed results. They used limited measures of institutions. They did not include the economic freedom indices, political rights and civil liberties in their studies.

[2] Rule of the game means as many scholars pointed out the formal institutions that shape the behavior of people and interaction among them (North, 1990)

[3] Institutional structure encourages investment, entrepreneurial initiative, and innovation, which promote economic growth and development.

[4] Failed states are Syria, Libya, Yemen, and Somalia. Venezuela, Zimbabwe and Ethiopia are challenging instability problems due to poor institutional quality.

Given an assessment of prior works, this study attempts to fill this gap. Previous studies on institutions and economic growth in Sub Saharan Africa use only rule of law and governance quality index as a measures of institutions even though political rights, civil liberties, and economic freedom index are also the most prominent measure of institutions. Therefore, to capture the complete measure of institutions, this study includes more indices of institutions.

1.3. Objectives of the study

The main objective of this study is to investigate the relationship between institutions and economic growth. More specifically, it is to:

- Identify the most important institutions which affect economic growth
- Examine the interactive effect of intuitions on economic growth

1.4. Significance of the study

Most of the time, the candidate for low per capita GDP and low-income growth in SSA is low investment, weak economic policy, lack of innovation and entrepreneurship rather than focusing on institutions for economic activities. Examining the role of institutions for economic growth is important since institutions are the ultimate guaranty for trust and encouraging innovations and entrepreneurships, and smooth economic activities. Considering the effects of large measures of institutions and separate examination of them on economic growth must be conducted to deliver the real role of institutions on the economies. The system GMM technique could improve the knowledge on the effect of different institutional measures on economic growth. Hence, the significance of this paper is to solve the shortcomings of previous studies. In addition, it can be reference for upcoming studies on this area and can be clue for policy makers.

1.5. Scope of the study

The study examine the association between institutions and economic growth by accounting the period from 2002 to 2016 year span in Sub-Saharan Africa. Since the focus of the study is to find out the role of institutions for economic growth in Sub-Saharan Africa, this study considers 16 countries based on the availability of data.

1.6. Limitations of the study

The study is limited to only 16 countries from SSA since the available data of some countries are limited. Based on the various available institutional measures, the study is limited to a span of period covering 2002 to 2016.

1.7. Organization of the study

This study is organized into five sections. The second section is an overview the theoretical literature and empirical evidences on institutions and economic performances, focusing on how they related each other. The third section examines the methodology of econometric approach of generalized methods of moment (GMM) and section four presents the discussion of economic performance of SSA over time and the econometrics results. Finally, the last section concludes by highlighting the policy implications.

Chapter two

2. Literature review

2.1. Theoretical Literature

2.1.1. Definition of institutions:

The first important thing to examine the effect of institutions on the economies is defining the term institutions. It is difficult to define simply since the term is vague. Several studies used different definitions for institutions. Some define as social technology and others related the definition to originations. Nonetheless, institutions cover all aspects of behavior and social network like political, economic, and legal aspects. They extend hierarchically from the family, the community, the nation and beyond. Because of their complexity, institutions and institutional dimensions of development are often unobserved in designing development strategies (North, 1990). According to North:

> Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence, they structure incentives in human exchange. …Institutional change shapes the way societies evolve. …They are a guide to human interaction. …They are perfectly analogous to the rules of the game in a competitive team sport. That is, they consist of formal written rules as well as typically unwritten codes of conduct that underlie and supplement formal rules, such as not deliberately injuring a key player on the opposing team. And as this analogy would imply, the rules and informal codes are sometimes violated and punishment is enacted. Therefore, an essential part of the functioning of institutions is the costliness of ascertaining violations and the severity of punishment (North, 1990, pp. 3-4).

Lin and Nugent (1995) suggested that the main important role of institutions could be defined as the societies and economies motivation. Institutions are the collection of behavioral guidelines that administer connections between human and help to form anticipations. Institutions are departure from organization that is systematically organized collection of people with a common goal but institutions are the place of knowledge in which information and education delivered to the society (Surbhi, 2017).

2.1.1.1. Formal and informal institutions

Several literatures grouped institutions as formal and informal. They both organize social, political, and economic interactions. Informal institutions developed over long period of time that takes more than 100 years. Sanctions, taboos, customs, traditions, codes of conduct etc, are the most examples as the representative of informal institutions. On the other hand, formal institution developed within short time that takes from 1 to 100 years compered to informal institutions. They are constitutions, laws, property rights etc, (North, 1990).

Formal and informal institutions constraint the structure of human interactions but the way and the significant of their implantations are different. The will of the informal institutions in the society are implemented by strong exercising of the formal institutions. For example, in formal institutions there is enforceable punishment for unlikely actions but informal institutions there is pear pressure or morality that is unenforceable. Thus, both formal and informal institutions encourage desired thing in the society. However, formal institutions are strong to discourage those undesirable behaviors. For example, both formal institutions and informal discourage concealing business income from tax authority to evade tax. The formal institutions punish evader seriously unlike informal institutions. Thus, the main focus of this paper is formal institutions.

2.1.2. Measure of institutional quality

Like the definition of institutions, there is no single and common or straightforward measure of institutions. As a result, institutional quality measuring must be proxy by other variables. By doing so different organizations calculate the quality of institutions for different countries by using different methodologies. Hence, previous literatures have used different measure of institutions from different sources. However, governance index, political freedom index and economic freedom index have been used in different literatures to measure institutional qualities. Hence, this study uses measure of governance quality, political freedom, and economic freedom as proxy for institutional qualities. Hence, they are discussed in this section.

2.1.2.1 Measure of governance quality

It is difficult to get common definitions for the measure of governance since it is broad. Various authors define governance differently. Some agreed that they are anything like rules and enforcement mechanisms. others define it is the way in which power exercised (Kaufmann et al, 2011). Further, Kaufmann et al, (2011, p. 222) define governance as:

> The traditions and institutions by which authority in a country are exercised. This includes (a) the process by which governments are selected, monitored, and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them.

Based on the definitions six measures of governance quality are calculated from many individual variables and different sources. Kaufmann et al, (2011, p. 229) developed

> an equation to solve extraction problem. They assume that the observed score of country j on indicator k. y_{jk} can be written as a linear function of unobserved governance in country j, g_i and disturbance term ε_{jk} as:
>
> $$y_{jk} = \alpha_k + \beta_k(g_j + \varepsilon_{jk}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .1$$
>
> Where α_k and β_k are parameters which map unobserved governance in country j, into the observed data from source k andy_{jk}.

Thus, the aggregate governance indicators will be ranging approximately from –2.5 to 2.5.[5] The lowest value represents the minimum quality of governance and the highest value represents the maximum quality of governance. Based on the process by which governments are selected, monitored, and replaced, Kaufmann et al, (2011) construct two measure of governance corresponding to each area and resulting six dimensions of governance in total[6]. Thus, the six measure of the governance quality are constructed[7].

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[5] (See Kaufmann et al 2011. pp: 299)

[6] "The six aggregate governance indicators are based on hundreds of individual underlying variables from dozens of different data sources" (Kaufmann et al, 2011, p.223).

[7] See the appendix 6 for the full definitions of measure of quality of governance.

2.1.2.2. Measure of political freedom

This is the state of global freedom provided by the freedom in the world survey. It is based on the freedom that individuals experience in the field to act spontaneously outside the control of government. The potential dimensions in this regarded are political rights and civil liberties. These freedom enable people to participate freely in the political process and allow for the freedoms of expression and belief without interference from the state. The political freedom is based the status of political rights and civil liberties. They are derived from the large portion of Universal Declaration of Human Rights. This criteria is used for all countries to evaluate the political freedom due to universal declaration of human rights believed as the best for all (FH, 2016). Based on the methodology, the construction of the indices is as follows:

> The Ratings awarded to the political rights and civil liberties checklists determine the political rights and civil liberties ratings[8]. Each rating is from 1 through 7, with 1 representing the highest and 7 the lowest level of freedom … Status of Free, Partly Free, Not Free, Each pair of political rights and civil liberties ratings is averaged to determine an overall status of "Free," "Partly Free," or "Not Free." Those whose ratings average 1.0 to 2.5 are considered free, 3.0 to 5.0 partly free, and 5.5 to 7.0 Not Free (para.10-13).

2.1.2.3. Measure of economic freedom

Over time trade barriers, monetary policy instability, higher marginal tax, and exchange rate has been reduced. More studies suggest that the more economic freedom leads to higher economic growth and have more per capita income. The measure economic freedom is a big question. The economic freedom of the world (EFW) index has been formulated "…to measure the consistency of a nation's institutions and policies with economic freedom" (p. 69). This measure is based on personal choice, free market structure, and protection of persons and their property from aggression by others. They provide an infrastructure for the free market and protection in persons and property as well. Country provides secure protection of privately owned property, even-handed enforcement of contracts, and a stable

[8] See appendix 6 for detail the definition of political rights and civil liberties

monetary environment, keep taxes low, refrain from creating barriers to both domestic and international trade, and trust on markets rather than on the political processes to allocate goods and resources to have the highest EFWI (Lawson, 2008). The construction of the indices of economic freedom of the world is based on:

> … five major areas: (1) size of government, (2) legal structure and security of property rights, (3) access to sound money, (4) freedom to trade internationally, and (5) regulation of credit, labor, and business. Within the five major areas, there are twenty-three components in the index. Many of those components are themselves made up of several subcomponents. In total, the index is comprised of forty-two distinct variables. Each component and subcomponent is placed on a scale from 0 to 10 that reflects the higher the value the more economic freedom. The subcomponent ratings are averaged to determine each component. The component ratings within each area are then averaged to derive ratings for each of the five areas. In turn, the five area ratings are averaged to derive the summary rating for each country (Lawson, 2008, p.70).

2.1.3. Sub-Saharan Africa economy and institutions

World classified as different groups based on culture, physical, climatic, administrative, socio economic and urbanization. Sub Saharan Africa (SSA) is one among those regions. SSA accounts 48 of 54 counties in Africa and 930 million population (WB, 2017). In addition, its area is larger than the area of European Union counties and the combined area of China, United States of America and India. However, SSA economy is opposite to its area and resources. Overtime many reasons given for the low economic performance of SSA. Primary good productions, lack of innovations and weak institutional qualities are referred mostly (Olamosu, 2015). Followed by the termination of colonization in Sub-Sahara African, they started building of their economic, social and institutions to bring prosperity. The efforts were unable to promote growth and prosperity (African Development Report, 2006).

Furthermore, Sub Saharan Africa economy is currently manifested by exporting primary goods, dependent on subsistence agriculture, and dependency of foreign economy. Over a long period of time, SSA exports primary goods that its price is low and declining compared to manufactured products. The economy entirely dominated by agricultural sector in which technology usage and development are weak and import mostly the strategic product like machines. This causes that SSA is highly dependent on foreign economy. Therefore, this

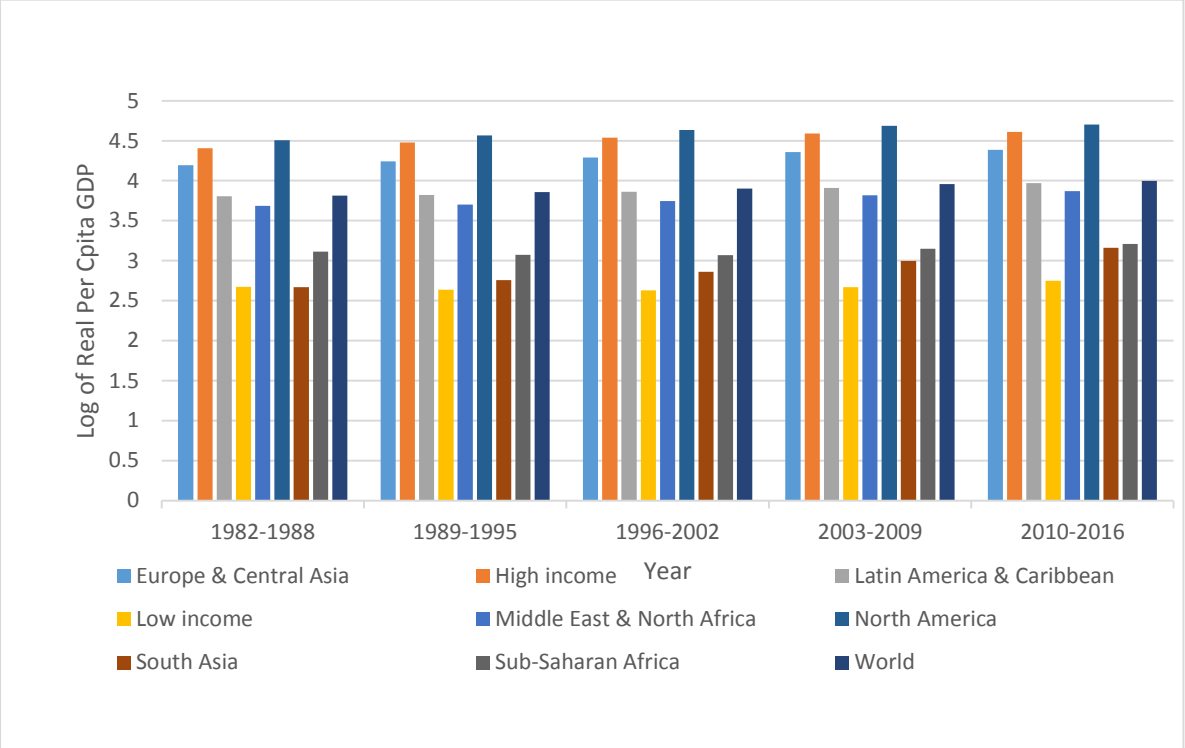
section highlights the Sub-Saharan Africa economy and institutional development over time relative to other regions. Specifically, the descriptions depicted the per capita GDP level of SSA with other regions and growth and institutional development.

2.1.3.1. Trends in Income Level and its Growth

Based on the per capita GDP countries classified as lower income ($1025 or less), low middle income ($1026-$4035), upper middle income ($4036-$12475), and higher income ($12476 or more) (WBDI, 2017). Figure 1 shows the average per capita of different categories of the world. The income difference between higher and low income is 41568.82 USD. In other word, the average income of higher income countries is more than 50 times of low-income countries. Furthermore, SSA is also the poorest region in the world with $1638.51 and followed by South Asia $1691.14 income. From figure 1 we can see that the income difference across different regions and different income levels. The income difference between higher income countries and SSA counties are almost related to the income difference between lower income countries and higher income counties. Figure 1 depicts the seven-year average real per capita of some regions and income level.

North America has the highest real per capita GDP (PCI) compared to other regions over the all sample year. Its average PCI is more than 45000 USD over all time. Europe and central Asia is second richest region in this sample with more than 40000 USD PCI. The average PCI of higher income countries is between these two regions of PCI. The PCI of both North America, and Europe and central Asia is more than the world PCI. Latin America and Caribbean, Middle East and North Africa, and world PCI is almost the same. Their income level is between 40 and 35 thousand USD. However, the Middle and North African PCI is less among them. The unfortunate regions are Sub Sahara African and south Asia in terms of PCI. They are the least among the regions in terms of PCI. Their average PCI is around 1000 USD overtime. The low-income counties group is the least among all the categories, but it is less than the SSA counties by small amount. The Average income of low-income countries less than 1000 USD but the SSA PCI is all most 1000 USD on average. Figure 1, represents seven-year average of per capita GDP for some regions and income level. Even though there are more income categories of countries according to World Bank development indicators classification, only low income and higher income countries average PCI are reported for simplicity in figure 1.

Figure 1: log of Seven-year average real GDP per capita (1982-2016)



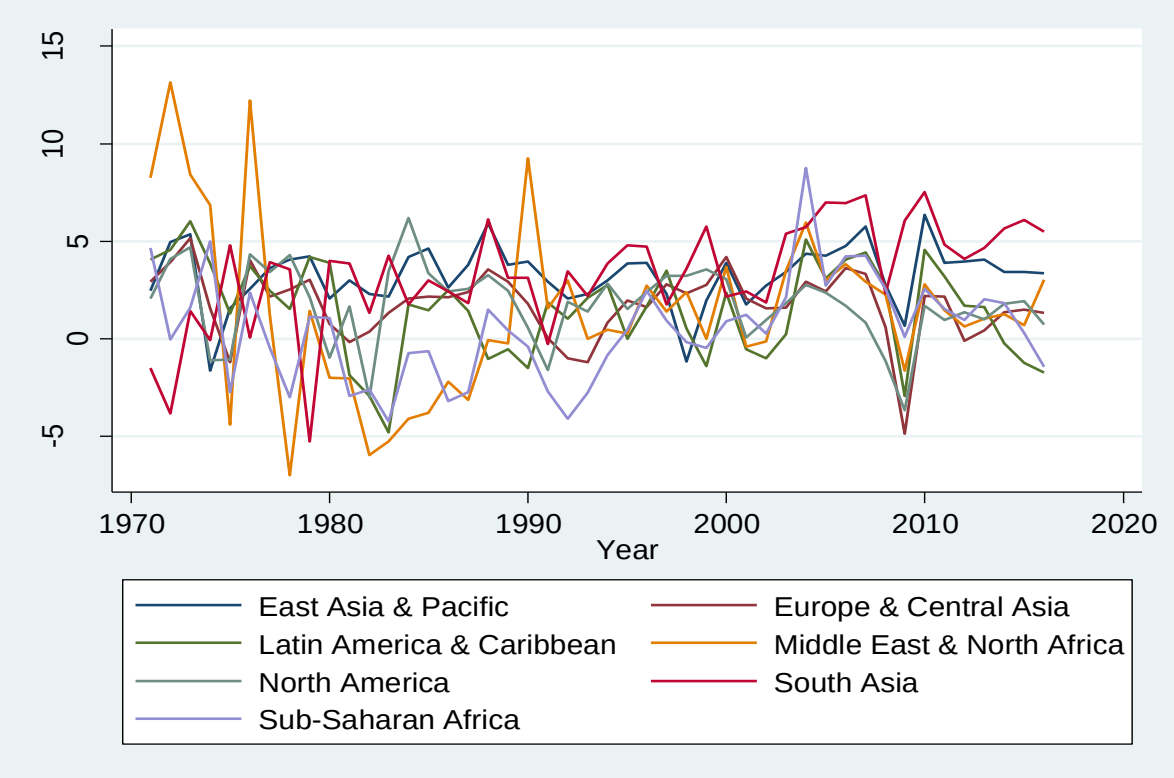
Source: WDI (2017)

There is two important points here; the first is we understand from Figure 1 that there is a giant income gap across countries and second among low-income counties, more than 80 % of them are in SSA Countries. Hence, low-income countries reflect SSA in terms of economic performance that is represented by PCI. Furthermore, although development programs have been implanted to eliminate this gap and to bring prosperity in low-income counties over time, more than half of people that live in extreme poverty are in Sub Sahara African (WDI, 2017). Moreover, even if some regions grow faster like South Asia, other growth reflects steady like East Asia and Pacific. However, Sub-Saharan Africa growth declined over time. It is the other problem of the region and the world as well.

Figure 2 shows the Per capita GDP growth (economic growth) of different regions since 1970 onward. In the end of 1970s and in 2009 the economic growth of almost all regions declined due to rising of oil price and financial crisis. However, except these period the world economy less volatile. South Asian grows faster and moderately relative to other regions. The growth rate of South Asia was more than zero after 1980. It growth rate has reach the highest level in 2007, 2008 and 2010 with more than 5 rate of growth. The Middle East and North Africa region economic performance is on the other hand, the most volatile over the

sample period. However, the growth rate of the Sub Saharan Africa is declining since 2010. The growth rate of this region is negative in many periods. The region faced declining growth rate since 1970s and reach the lowest level in early of 190s with growth rate of less than -4. The year of 2004 was the golden year of this region all time in the sample year. It is because the region had more than 5 growth rate. Nevertheless, this was for short period. As a result, this region seems to be unable to eliminate the giant income gap with other regions. As the trends shows the economic growth of this region is declining severely. In 2016, the region recorded the lowest economic growth next to North America. The point here is that low-income counties in other word SSA African should be grow faster than other region to reduce the gap between them. It is because for example, North America growth decline since 2010 and positive. However, the economy of SSA is low and it needs some GDP increment to bring large economic growth. As a result, comparing SSA economic growth with other region is another big problem of this region.

Figure 2: Per capita GDP growth By Region



Source: (WDI, 2017)

2.1.3.2. Quality of institutions across Sub Saharan Africa

The World Bank governance indicators, Economic freedom of the world index, and freedom House index are used as measure of institutions for this study. WGI provides six indexes of with corresponding percentile ranks of the world countries. They are regulatory quality, voice and accountability, government effectiveness, political stability and absence of violence, rule of law, and control of corruption. Their percentile ranks give the situation or rank of the country governance performance for 186 countries in the world. EFWI gives five indexes, summary of economic freedom of world index from the five indexes. In addition, based on the Summary of economic freedom of world index, it gives rank of EFW of 159 countries. The indicator includes size of government, legal structure and security of property right, access to sound money, freedom to trade internationally, and regulation of credit, labor, and business. The aggregate rank of theses indexes gives the economic freedom performance of a country. Freedom house also provides two indexes of rights for citizens of a country. Moreover, based on these two indexes FHI gives the political statues for 195 countries across the world. The index include political rights and civil liberties and three status of political situations as free, partial free and not free. Since political status, Economic freedom rank, and percentile rank of governance are available for many countries in the world, it is simple to compare the institutional quality performance across the world in general and SSA in particular. Thus, in this section institutional quality performance of SSA compared to other world and within SSA is discussed.

For comparison and identification of the institutional quality performance of countries, economic freedom rank (EFR), governance quality percentile rank (GQPR), and political status (PF Status) are used. Since these measures are entirely based on the corresponding indexes of the countries. The better rank reflects the better quality of institutional performance.

In section 2.1.2.1., the real per capita GDP and real per capita GDP growth of SSA compared to other regions has been discussed. Likewise, appendix 5 presents 15-year average of the six-percentile rank of WGI, economic freedom world rank, and political status of 45 SSA. These gives simple look of the quality of intuitions across the world and across SSA and these are simple to compare across countries.

In Appendix 5 column 2 political freedom of 43 SSA African is presented. Among them seven countries are only free. They are Benin, Cabo Verde, Ghana, South Africa, Senegal, Namibia and Mauritius. However, 19 and 17 countries from 43 are partial free and not free respectively. For example, Kenya, Cote d'Ivoire, and Lesotho are partial free and Ethiopia, Burundi, and Cameroon are not free. Generally, 35 countries of SSA are partial and not free countries from 108 countries of in the world in these status. This more than 32 % of countries in these category are in SSA. This indicates SSA is weak in political freedom in the world.

The third column of appendix 5 represents the governance quality rank of the 42 SSA from 186 countries in the world. Since the rank is between 0 and 100, 0 represents lowest and 100 better. Thus, only seven countries have more than 50 rank. The 35 countries have the low governance quality form 42 SSA. Even 21 countries including Ethiopia have rank of less than 30 that are may represent the worst institutional quality in general and governance quality in particular. Thus, in case of governance quality SSA is weak. It is because many SSA ranks indicates less than half. For example, Mauritius, Botswana and Namibia have better governance quality with greater than half percentile rank. Hover, Kenya, Ethiopia, Nigeria, and Somalia have low governance quality with less than 30 percentile rank.

The final column is about economic freedom rank of 37 SSA of 159 in the world. In general, Hong Kong, New Zealand, and Singapore are the first three counters free economy whereas Congo, republic, Central Africa Republic., and Venezuela are the three countries in weak economic freedom. In SSA countries, Only 8 countries have less than half of the rank. That means their rank is less than 80. However, 29 countries from 37 in SSA ranks are greater than 80. This indicates that SSA economic freedom is weak compared to the world. In addition, 8 countries ranks are not available. More severely, 25 countries of SSA countries ranks are less than 100. Therefor these represent SSA have weak institutional quality in economic freedom measurement compared to other world.

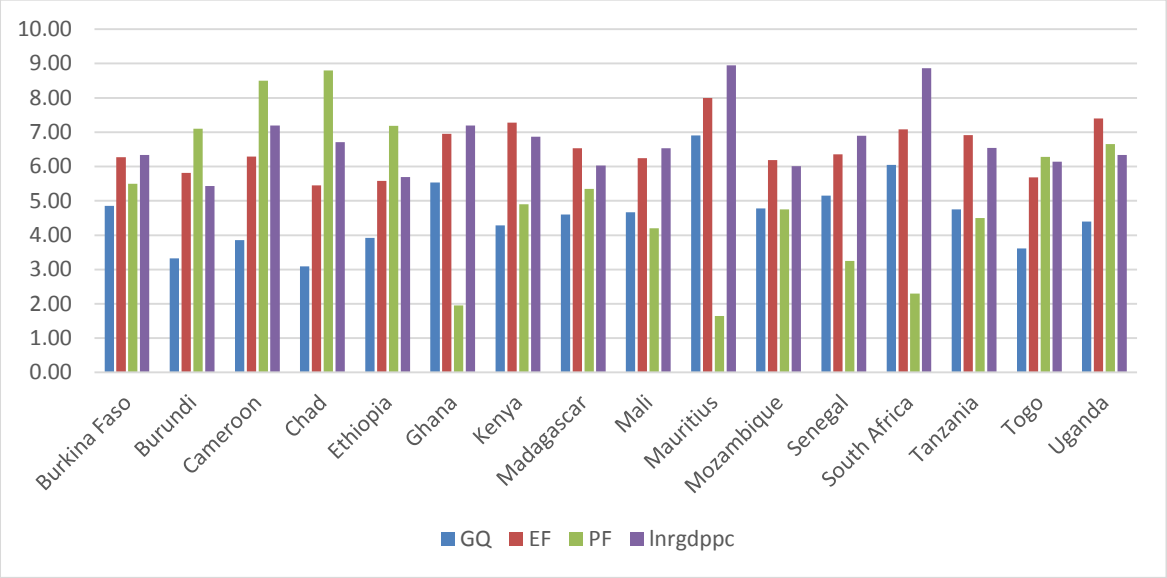
In general, the sub-Sahara African institutions quality is the most poor compared to other region. The economic performance is poor if one compares with other regions.[9] These fact lead to institutional quality and economic performance has links somehow. It is great opportunity for SSA because by improving the institutions the economy of the region can be boosted.

[9] See section 2.1.2.1

Figure 3 shows 15-year average of real GDP per capita and measure of governance quality, political freedom, and economic freedom. These institutional indexes of sixteen countries have been added to calculate average indexes in governance quality, political freedom and economic freedom for selected Sub-Sahara Africa. Botswana, Mauritius and South Africa have highest real GDP per capita whereas Burundi and Ethiopia have the lowest per capita GDP among sixteen countries respectively.

In terms of institutional qualities, Mauritius, Ghana, Senegal and South Africa have the highest political freedom and Chad, Burundi, Cameroon, Ethiopia and Uganda are referred to as lowest political freedom. Uganda, Ghana, Mauritius and Kenya have the highest economic freedom and Chand and Burundi have the lowest economic freedom and governance quality.

Figure 3: Relationships between institutional indexes and per capita GDP in SSA



Source: Authors' own calculation form (WDI, WGI, FHI, EFW, 2017)

The institutional quality and economic performance are related across both in SSA and sample countries. Section 2.1.1 and 2.1.2 shows the relation.

2.1.4. The theory of institutions and economic growth

This part presents the role of institutions in economies over the development of economic theories. Even though institutional role is explained since the work of Adam Smith, the idea of free market by mainstream economics ignored the institutional role in production. However, recently institutions become the prominent factors whatever economic system has been developed. Hence, this section explains the link between institutions and economic growth.

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 (Smith, 1976). The levels of risk affect the private sector to do business. Therefore, According to Smith (1976) the levels of security for business makers cause income difference across states.

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). This justification supports institutions are crucial as rules of the game. According to North (1990), institutions that shape incentive structures are the main factors of economic growth.

In spite of these, the neoclassical economics lack inclusion of institutions as key factor of production like labor and capital in the production function and utility functions. Resource allocation is efficient in free market system. However, the roles of institutions have not been ignored in the functioning of perfect competitive market. The non-market institutions have a correlation with market institutions to operate the market effectively. This situations do not get attention hence nations experience different level of economic growth. When the judicial

quality is low, the states become weak and face difficulty to enforce contracts. The mainstream economics criticized on this regarded as the free market increase problem rather than solutions in least development countries. The political distortions are the determinants of income gap across countries (Ugur, 2010).

Economists focus on the development of general theory of economics that include institutions. How institutions matter economic growth is doubtful due to complex measure of institutional quality. Williamson (2000) suggested the hierarchy of levels of social analysis that shows how institutions promote the economy. This hierarchy is depicted in Table 1: the hierarchy contains four level of social analysis. The first level is the slower the rate of change and permanent characters. Each level constraint each other. For example, the first level exerts constraints on second level and the second also constraints the third and the third impact the final level. This hierarchy visualizes how institutions encourage economic growth and the evolution of institutions over time.

Table 1: Williamson's Hierarchy of Social Analysis

Level	Description	Time to Change	Purpose
1	Embeddedness: Informal institutions, Customs, traditions, Norms, religion	100-1000 years	Often no calculative: spontaneous
2	Institutional environment: formal rules of institutional the game-esp. property (polity, 1st order Judiciary, bureaucracy)	10-100 years	Get the institutional environment right: first order economizing.
3	Governance: play of the game-esp. contract (aligning governance structures with transactions)	1-10 years	Get the governance structure right: second order economizing
4	Resource allocation and employment: (price and quantities: alignment)	Continuous	Get the marginal condition right: third order economizing

Source: Sobel and Coyne (2011, p.115)

Based on the diagram, one can see how each level of institutions factor one other and reach at the allocation of resources. The concept of Embeddedness (level 1) is almost permanent in terms of change. This does not mean that the informal institutions do not evolve. It indicates it takes time to change in Embeddedness. This is permanent that means no one change this in calculation manner but this influences the activities of society in different directions. In turn, from less lasting institutions to long-lasting institutions influence the informal or level one institutions. In the second level, the institutional environment has been introduced which are

like constitutions, laws and property rights. This becomes the situation for first-order economizing that is gets the rules of the game right. For the well function of the economy, the property rights must be protected well. The third level is governance that guaranty for functioning legal system, contract laws, and enforcing contracts. Governance qualities solve conflict and realize mutual gains. The last level (level 4) fits neoclassical analysis. The effectiveness of each level is constrained by the below levels vice versa. This indicates how institutions shape economic activities. In other hand, evolutionary psychology and cognitive nature of economic agents are vital in production. Therefore, any economic models that do not include institutional constraints in the model are invalid. In turn, Kumar et al, (2016) suggested that the source and implementation of power also affects institutions that are developed in a society. This developed institutional framework also impacts the economy of the society. This supports the existence of feedback in hierarchy of social analysis Table 1. In this paper, the role of formal institutions that includes level 1 and 2 considered for empirical analysis.

2.1.5. The core institutions in economic growth

Economic policies, models, and principles are highly dependent on different institutional setup that also helps the function of the market. The laws that are developed by societies have to be executed by authorized bodies to help the effectiveness of the written laws. The effectiveness of execution of law depends on the source of authority since the authority is subjective to its source. The government structure has to be in line with the market structure. Government structure serves the need of market economy by protecting uses of the public power for private gains (Rodrik, 2000). Unless the government structure and implantation of the rules that proxy institutions is supportive the market, the role of institution in economic growth will be neglected. Some institutions have reviewed how they support the economy in the next section.

Property rights

Property is the legal ownership of specific property to how to use and own. Institutions that provide the property rights includes "rule of law, law enforcement quality, and contract enforceability, risk of appropriation, political discretion, accountability, and procedures for change of executive" (p. 9). People with secure property right are encouraged for innovation and entrepreneurship since this gives control of profit from investment or production (Ugur,

2010). In addition, property rights simulate economic agents to save, invest, and influence the economic growth. If countries improve the strength of protect property rights, the society will develop a custom of protecting property rights and are encouraged in involving in innovation.

Regulatory institutions

[Rodrik, (2000); Ugur, (2010)] suggested that regulatory institutions are designed to control every activities according to the laws. If agents involve in wrong way the market will fail because of fake competitive behavior. Strong regulatory institutions can avoid the sources of market failures. Norms and rules are regulatory institutions that guaranty for independency of civil service and policy makers from politicians. These institutions help the economies by increase the efficiency of public policies and protect anti- competitive behavior, free riding, and rent seeking. Behind every successful market, economy there is a strong regulatory institutions. Any economy has to have the strong regulatory institutions with development policies. The economy could be free when regulatory institutions become stronger. However, free market with weak institutional quality lead to crisis.

Institutions for macroeconomic stabilization

Free market economy known as not self-stabilizing due to shortfalls in aggregate demand and the resulting unemployment. The instability of financial markets transmits to the real economy and harms the entire economy. Advanced economies have understand fiscal and monetary institutions stabilize the economy. In this regard, the central bank must be independent and transparent to stabilize the economy [Rodrik, (2000); Ugur, (2010)]. Therefore, institutions are necessary in the economies since they create confidence in firms.

Institutions of conflict management

Most countries are the home of diversities in religion, language and ethnic like Nigeria and South Africa. There may be disagreement involving in projects together if there is no trust among groups. Such situations are more vulnerable for social conflict that leads to use resource for unproductive activities. Economic models should consider institutions that are rule of law, quality of judiciary, free elections, independent trade unions, social partnerships and social insurance (Rodrik, 2000). Resource allocated efficiently and productivity increases because of a conducive environment for innovation and investment.

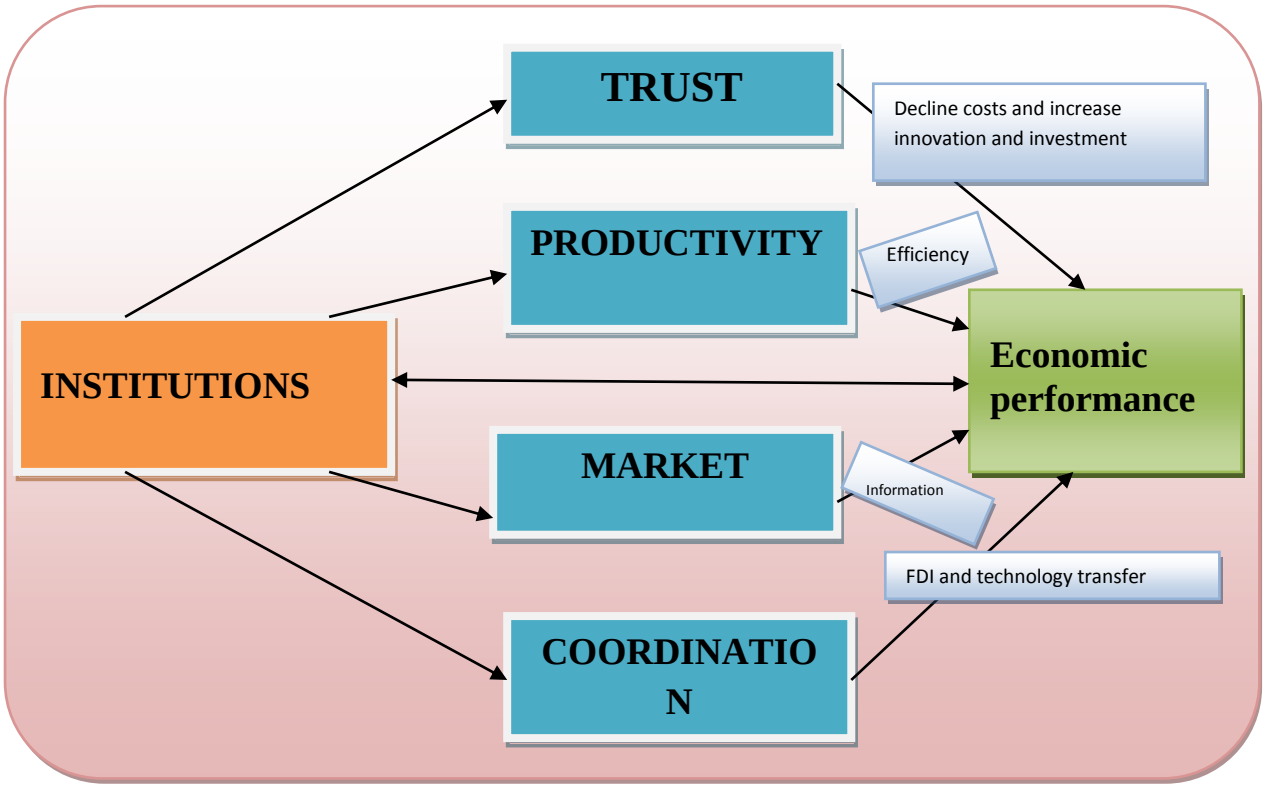
2.1.6. The relationship of institutions and economic growth

Institutions influence economic growth in different ways since economic agents habits are determined by institutions that are the cornerstone of economic decisions. Based on literatures, the possible associations between formal institutions and economic growth are proposed in figure 4. For simplicity, the association is from institutions to economic growth and the feedback is assumed to be insignificance. It is solved by instrumental variable techniques in empirical part. Figure 4 depicts that institutions affect the economy by facilitating as coordination and market efficiency, creating trust, and increasing the productivity of labor and capital in the production function.

In figure 4, the formal institutions contribute for acquiring of trust in the society. This leads to high investment, capital formation and innovations. These also immediately increase the economic growth of the country. (Knack & Keefer, 1997) suggested that trust among economic agents and with consumers is the significant element in economic activities. In case of higher trust in the society, less time consumed to introduce a new technology or a new product. This leads to higher economic growth in higher trust societies. Low trust disables economic decision and cause low productivities. The level of trust makes easy the control or implementation of property rights. This decreases the transaction costs for acquisition, reservation and transfer costs of property rights. Furthermore, if the property rights are not defined clearly, trade will be difficult. This results low returns for the producers and discourage farther production among individuals (Opper, 2008).

The second channel that institutions improve economic performance is productivity. Yildirim and Gökalp (2016) suggested that institutions cause an increase and a decrease in productivity. Strong institutions encourage the productivity of individuals and organizations. It is because both use their resources for production efficiently. In the case of low quality of institutions, economic agents involve more in reallocation resources, creating restrictions on free market rather than production activities. Good institutions enhance growth not only by increasing productivity but also by not discouraging efficient use of resources.

Figure 4: Institutions and economic growth: a diagrammatical model



Source: Ugur (2010, p.13)

The third channel of institutions to economic growth is through markets. Institutions support the emergence of markets in which agents can be jointly advantageous because strong institutions make business expenses lower. They create environment in which investment in human and physical capital gets focus. This causes larger returns on a given volume of contracting. These lead to increase economic growth. In other word, strong institutions reduce uncertainty, negative externality and reduce macroeconomic instability. This increases the efficient allocation of resources and increase efficiency of the economy. Furthermore, quality institutions are information for firms and consumers to respond in a rational way and create free market competition (Ugur, 2010).

The final channel is the coordination of public policy. Good institutions shape the public policy, and corporate in the line with good conducive environment. This results, stability and conflict resolution and these situations create market, which influences the production and income per capital. Moreover, good institutions solve conflict; create strong stability (Ugur, 2010). This also encourages the foreign direct investment and technology transfer among nations.

In western countries, the traditions and norms have changed to situations, which encourage production and prosper. More specifically, hard work and inventions are norms and traditions in western. This is because formal institutions shaped their norms and traditions by strong quality of institutions. In some Asian countries like china, South Korea, Thailand, and Malaysia, the formal institutions play a prominent role to shape the informal to which are the source of prosper. However, qualities of formal institutions are low in SSA countries. Maladministration and corruption are growing faster, these encourage the Sub Saharan Africa youth to leave their home rather than innovate and make entrepreneurship and formal institutions are dominated by informal institutions. Hence, whatever capital is invested it is difficult to bring growth and prosperity. Recent development of China, South Korea, Taiwan, Thailand and Japan is due to great actions to develop strong institutions with economic policies (Nawaz et al, 2014).

2.2. Empirical evidences

Since institutions being important factor of economic growth following the work of North, (1990) and Mathew, (1987), many investigations have been made to identify the role of institution in economic growth. Even if large share of studies on this area are theoretical, some studies have been contributing on institutions as crucial part of economic growth. Nevertheless, studies in SSA countries are few with the broad set of institutional measures. The next sections reviewed the empirical studies on institutions and economic growth.

2.2.1. Cross country evidences

Almost all studies used cross-countries data for intuitional quality indices and GDP growth and GDP per capita as measurement of economic growth. The studies that are reviewed are panel data nature. Different methodologies have been used like list square (OLS), generalized method of moment (GMM), and instrumental variable estimator (IV). In the next part, these studies have been discussed depends on methods used by each. Studies used OLS methods to investigate the effect of institutions on economic growth were [Weede, (1983); Kormendi & Meguire, (1985); Knack and Keefer, (1995); & Abdiwelli, (2003)].

Weede (1983) used democracy and political liberties as proxy for institutions and covers large time span and large set of countries. The study has discriminated between developed,

developing countries, and showed different results across DCS and LDCS. The study revealed that the effect of democracy is negative on economic growth in overall. However, Weede found that no relationship for less developed countries and a negative relationship for countries with higher ratio between government revenue and the gross domestic product in case of sample discrimination regression. Hence, he concluded that there are no evidences to neglect the human rights for economic progress in case of authoritarianism government. Likewise, Kormendi and Meguire (1985) come up the effect of civil liberties is marginal on growth and an intense effect on investment. This indicated that countries with high civil liberty experienced more economic growth and the effect operates mainly through the investment. However, Knack and Keefer (1995) provided that political and civil liberties could not right proxy for protecting property rights. As a result, studies used these variables could not find the right impact of institutions on economic growth. Therefore, they used disaggregated dimensions of institutional measure of International Country Risk Guide (ICRG) and Business Environmental Risk Intelligence (BERI) rather than Gastil data unlike [Kormendi & Meguire, (1985) & Weede, (1983)]. Thus, they found that institutions that well define and protecting property rights are the prominent to economic growth and investment.

[Abdiwelli (2003) and Yildirim et al, (2016)] more recent studies used OLS method relatively and they found mixed results. Abdiwelli (2003) has also used data of time span over 1972-1995 from BERI, ICRG like Knack and Keefer and Freedom House. He found that negative and significant effect of civil liberty on economic growth. Yildirim et al, (2016) also support the evidence of Abdiwelli (2003) by finding out negative relationship between civil liberties and macroeconomic growth. However, Abdiwelli (2003) found positive and significant associations of economic growth and measure of institutions judiciary freedom, low corruption, effective bureaucracy, and protected private property since they used different specifications. In addition, they aggregated the indices of ICRG into a composite index and found out the positive and significant coefficient of institutional quality on economic growth. In the same logic, despite using developing countries as sample between the year 2000-2011 and 23 for 38 counties, Yildirim et al, (2016) found that the integrity of the law system, regulations on trade barriers, foreign investment restriction, and private sector share in the banking system and hiring-dismissal variables have positive impact on macro-economic performance. However, political stability variables have a negative impact on macro-economic performance. They also found insignificant effect of property rights protection, and political freedoms variables on macroeconomic performance. These may be due to because of

methodology that did not take into accounts the dynamic and endogeneity nature of economic performance and institutional measures.

However, since the above studies used the OLS method, Endogeneity problem was not considered. Literature suggested that using of models in which this problem is tackled since institutional qualities and per capita GDP have endogeneity problem. Many believed that the mixed and ambiguous results in this area are because they unable to consider this problem. Consequently, researchers tried to address this problem by using instrumental variables. With these methodology, the following are prominent empirical evidences. They are [Nsouli et al (2004); Rodrik et al (2004); Dollar and Kraay (2003); Acemoglu et al (2001); Rodrik (1999); Kaufmann et al, (1999); Hall and Jones (1999); Brunetti et al, (1997b); Brunetti et al (1997a), Knack and Keefer (1997a); Knack and Keefer (1997a); Barro and Lee (1993); De Haan and Siermann (1995); Levine and Renelt (1992)].

[Levine and Renelt (1992); De Haan and Siermann (1995)] used the political indicators and economic growth as proxy for institutions and economic performance respectively. They found no relation between institutions and economic growth. Levine and Renelt (1992) used data span of 1960-1989 whereas De Haan and Siermann (1995) have also used the Gastil index for time period of 1973-88. However, Barro and Lee (1993) used data between the year 1965 - 1985 and 96 countries. However, Knack and Keefer (1997a) also investigated the influence of social capital on economic performance. They used the data from 1980-1992 period for 29 countries. Trust and civic corporation used to measure the social capital to investigate the relationship between institutions and economic growth that was measured by GDP per capita growth rate. They found that both trust and civic cooperation are positively associated with per capita GDP growth rates. In the parallel study, Knack and Keefer (1997b) examined the impact of institutions on a developing country's ability to catch up with developed countries over the period from1960 to 1989. Average per capita growth and Bureaucratic Quality used for the measure of the economy and institutional quality respectively. They concluded that institutional indicators such as rule of law, pervasiveness of corruption have significant effect economic growth. In line with these, Brunetti et al, (1997a: 1997b), investigated whether institutions explain differences in economic performance. The result revealed that property rights security, political stability, judiciary reliability and lack of corruption affect foreign direct investment directly. Furthermore, property rights security and political stability influence economic growth significantly. However, predictability of rules,

judiciary reliability and lack of corruption are insignificant for influencing cross-country differences in growth. In addition, uncertainty about policies, laws, and regulations hampered development of the private.

Hall and Jones (1999) also tried to investigate the effect of institutions on output per worker. They used data of 79 countries over the period 1986-1995 governance quality used as institutional measures and the extent of Western European influence as instruments. These are distance from the equator and the extent to which the primary languages of Western. They found that social infrastructure cause large differences in capital accumulation, educational attainment and productivity across countries. Therefore, the governance quality causes the large differences of income across countries. Kaufmann et al, (1999) supported the result of Hall and Jones by investigating effect of governance in economic growth used 152 countries and used the governance indicators. The causation comes from improved governance to development. As a result, they concluded that governance matter economic performance significantly.

Rodrik (1999) also used domestic conflict and institutions of conflict management as proxy for institution qualities to find out the role of institutions in growth rates persistence and growth collapse using the sample varies from 49-103 counties and covers the period from 19975 to 1989. Rodrik found that social conflicts and the institutions of conflict management influence the persistence of economic growth. Development of institutions that mediate social conflict is also important. In addition, Rodrik indicated that enhancement of institutions that promote participation and democracy, rule of law, and social insurance eliminate the effect of external volatility in the domestic economy. Further, Rodrik concluded that internal social conflict and weak institutions for resolutions caused the short growth rate and growth collapse. Moreover, the result revealed that that institutional quality matter for both economic growth and its sustainability as well.

Acemoglu et al (2001) also investigated the role of institutions on economic performance by using settler molarity rates for instrumental variables to solve the endogeneity problem. It is because the existences of less settler mortality rate in European settlers were associated with quality of institutions and vice versa. Property rights and democracy used to explain institutions and they suggest that institutional quality is good predictors of the difference in economic performance. However, Rodrik (2004) suggested that income difference between non-

colonized and colonized countries is the same as the income difference of counties within colonized countries. As a result, he opposed instrument of settler mortality rates since using settler mortality rates as instruments is not adequate to investigate the effect of institutions on economic development. Rodrik suggested that openness and geography as instruments to investigated the effect of institutions on economic performance. However, Dollar and Kraay (2003) used rule of law and protection property rights as institutions proxy, they revealed that openness and geography were not good instruments to find out the real effect of institutions on economic growth. It is because the rapid growth, high levels of trade and good institutions go together and find out the partial causal effects of institutions, and trade separately is difficult using these instruments since both trade and better institutional quality traced to common geographical, historical factors. They used a composite indicator of institutional measures for the period 2000-2001 and 168 countries to examine the partial effects of openness to trade and institutional quality on per capita GDP.

Subsequently, Rodrik et al, (2004) investigated contributions of institutions, geography, and trade in determining performance of 137 counties and average over all 1950-95 available data used. Unlike Dollar and Kraay, they found that institutional quality come out with more significant than either geography or trade. Trade affects income negatively but statistically insignificant. However, the association between trade and institution is positive but small. Furthermore, Nsouli et al, (2004) investigated the link among institutions, implementation of programs, and macroeconomic performance in a sample of 197 counties from the period 1992-2002. They found that strong institutional qualities improve economic performance in long time horizon. In addition, institutions affect economic performance through better implementation of program that is indirect effect.

On the other hand, most recent studies also used dynamic panel model (DPD) and GMM estimation method to take into account the dynamic nature of the data and to generate efficient instruments from lag of endogenous variables in the model. However, these studies also come up with mixed results. In this regard, the following are the prominent studies [Efendic et al, (2015); Siddiqui et al, (2013); Simon et al, (2010); Kong, (2005)] are the prominent studies on this regard.

Efendic et al, (2015) used the time span from 1991- 2007 years and 29 institutional indices to investigate the impact of institutions on economic performance. The aggregate institutional

indictors also used for proxy quality of institutions. They indicated that the institutional reform over time affect per capita GDP positively and significantly. In addition, they revealed that countries with fragmented power have higher quality of governance and the optimal distribution political power influenced income level directly. Moreover, in the channel of governance quality, institutional structures influenced the long-run economic growth and governance quality also impact economic growth positively. However, Siddiqui et al, (2013) found mixed correlation of institutional indices and growth. That means political rents behave inversely with growth. It is due to democracy is already strengthened and low growth in developed countries unlike developing counties. To see the impact of different types of institutions on growth, they have used index of institutionalized social technologies and found positive effect on growth. In addition, they found institutional and policy rents to have positive and significant effect on growth and insignificant effect of political rents and risk reducing technologies. Generally, they found that institutions affect economic growth positively. Moreover, they found that institutions of institutional and policy rents affect long-run economic growth, but institutions that reduce risk and constrain political rent no relation.

Furthermore, Simon (2010) investigated the effect of political institutions and political on economic performance using annual data for the period 2003-2009 for 175 nations. In case of institutional measures, Simon used World Bank doing business survey and analysis in both firm and nations level. However, Simon found that no relation between income and institutions. Simon also found political institutions like political rights have no relation with economic growth at all. In the same logic, Kong (2005) also used political institutional structures on the fundamental of political power and used data for 177 countries over 26 years covers from 1975-2000. Checks were the variables of interest, which measures the number and preferences of veto players in countries' political systems. Kong found that the effect of political intuitions on economic performance is supplemented by the other institutions and non-institutions. This is because strong checks bring strong checks and balances and less power concentration.

2.2.2. Evidences from the Sub-Saharan Africa

Some studies investigated on SSA to examine the role of institutions for economic growth. Many cross-country growth studies treat SSA as a regional dummy variable. Brempong and Traynor (1999) explored the relationship between instability, investment and economic

growth in the SSA region by using a dynamic panel approach. The result confirmed that political instability affects economic growth negatively and the effect is directly and indirectly. As they pointed out indirect effect of political instability on economic growth is via accumulations of capital in the long run. Furthermore, they also found that the bidirectional relationship between political stability and economic growth. That means slow economic growth cause instability and vice versa. In addition, Brempong, (2002) used the data of 21 countries for the period from 1993-1999 period and dynamic panel estimator to investigate the impact of corruption on the growth rate of per capita GDP. He found that a negative impact of corruption on investment and growth rate of per capita GDP. The impact of corruption is via slowdown of the productivity of factors. In addition, Brempong confirmed that corruption also has positive effect the income inequality. However, Osman et al, (2011) used a group of 27 SSA Countries for the time span from 1984-2003 and panel data analysis (PDA). Real per capita GDP used proxy for economic performance and degree of public's satisfaction with government economic policies. Like estimate of corruption and language division have been used for institutional proxy. They found that corruption is not significant impact on economic performance. However, the result of social conditions and government stability has positive and significant impact on economic performance.

Yakubu et al, (2013) also used GMM method of estimation and six indicators of WGI for 15-year period that covers the data span of between the periods 1996 to 2010 and 36 countries in SSA. They confirmed that institutions matter economic performance in Sub Saharan Africa. In detail, they found that regulatory quality and rule of law are the more important variables that matter most in Africa growth performance. In addition, the combined improvement of institutional variables also more important in explain economic performance in SSA by taking into account the interaction terms of the six indicators of governance quality. Moreover, when the institutions interacted with openness more institutional variables affect per capita income positively. On the other hand, Ebaidalla, (2014) used data covering 1985-2007 for 20 Sub-Sahara Africa and the sample of 20 countries in total and 10 countries are from each British and French colonies. Real per capita GDP used proxy for economic performance and indices from International Country Risk Guide measure of institutional proxy for institutions. In addition, Ebaidalla used dynamic panel data model (DPDM) on the GMM method. He found that institutional quality affect the economic performance positively in Sub-Saharan Africa. That means corruption affects economic performance is negatively. In addition, law and order and bureaucracy quality affect economic performance positive. In

case of sample decimations as British and French colonies, he found no difference result in sample of British colonies from the full sample. However, in case of French colonies, he reveled that no significant effect of institutions on economic performance at all. However, Akinlo (2016) used the rule of law indicator of WGI as institutional proxy for the period 1986-2013 and for 32 SSA. In addition, real GDP used as proxy for economic performance and used both pooled OLS and GMM method of estimation. Akinlo found that rule of law affect real GDP negatively in SSA. And he conclude that in this region the rule of law is not deep rooted and the judiciary system in SSA is strong and protecting property rights is not well defined and protecting.

From the literature, institutions understood as complex and have no single indicator. However, they are important for economic growth as well. In SSA countries, literatures are rare on this area. Moreover, the existing literature in SSA counties used limited set of institutional indices. This leads to more work has to be done on this area by considering the large set of institutions like political freedom and economic freedom measures in addition to governance qualities. These reveled unclear understanding of the relationship between institutions and economic growth. Nonetheless, the evidences give two points for this study. One is to select the methodology and two large measures of institutions should be considered for the investigation.

Chapter three

3. Methodology of the study

In the next sections, data type and source, definition of variables, model specification, and method of estimation are discussed to address objectives of the study.

3.1. Data type and source

To find out the important relationship between institutions and economic performance, investigation has been carried out on a sample of 16 countries in Sub-Sahara African. This enables to observe the role of strong and weak institutions on economic performance. Each country listed has been picked based on data availability. For the exploration, the study used the time span covering from 2002-2016. All the data in this study are secondary in nature and are collected from different sources. The data for this study are taken from World Development Indicators (WDI), Worldwide Governance Indicators (WGI), Economic Freedom of World (EFW), and Freedom House index (FHI).

3.2. Variable definition

Consistent with the literatures, the study categorized the variables as variables of interest, and dependent and control variables. Each category is explained as follows:

3.2.1. The variables of interest

The variables of interest in this study are institutions that have many literatures used different measurements for institutional qualities. Based on the source of these measures and area of focus, these measures can be categorized as measure of governance quality, political freedom, and economic freedom. Measure of governance quality, economic freedom, and political freedom is represented by six, five and two indices respectively. They are measured in different scales. The governance quality, economic freedom and political freedom are discussed as follows:

Governance quality: This estimates the governance quality of a particular country. The measures present how the authorities of a country implement, that includes the selection of leaders and check and balance of them, the effectiveness of government policy, and the

respect of the people to create good economic and social interactions of the society (Kaufmann et al, 2011)[10]. The indices for measure of governance quality of a country are voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption[11]. Thus, this study used these six indicators of governance quality for investigation. Each index is initially ranked from -2.5 to 2.5, a better mark corresponding to a higher quality of the related institution.

Political freedom: Freedom in the World survey provides an annual evaluation of the state of global freedom as experienced by individuals. The political freedom based on political rights and civil liberties[12]. These measures political rights including participating freely in the political process, compete for public office, join political parties and organizations and elect representatives. Civil liberties also allow for the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state. Each country is assigned a numerical rating on a scale of 1 to 7 for political rights and civil liberties. Rating of 1 indicates the highest degree of freedom and 7 the lowest level of freedom (FH, 2016).

Economic freedom of world index: The economic freedom of the world (EFW) index provides an infrastructure for voluntary exchange and protects individuals and their property from attackers. The higher EFW rating provides secure protection of privately owned property. In addition, it keeps enforcement of contracts, a stable monetary environment and keeping low taxes, refrains from creating barriers to both domestic and international trade, and relies more fully on markets rather than on the political process to allocate goods and resources (Lawson, 2008). The measure of the Economic Freedom of the World Index is based on five major areas.[13] The index scaled from 0 to 10. 0 represents the lowest freedom and 10 the highest.

[10] See section 2.1.2.1.
[11] See the detail definitions of six governance indices in Appendix 4
[12] See appendix 4 for the detail definitions of civil liberties and political rights
[13]See appendix 4 for detail definitions of five indices of measure of economic freedom

For simplicity, those different scales of measure of institutions are normalized between the range of 1 and 10 using equation 2 for each country based on Douglas (2002) equation[14].

$$y_{jit} = 1 + \frac{\left(X_{jit} - A\right) * (10 - 1)}{(B - A)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..2$$

Where Y is normalized index, X is the original index, B and A are the maximum and minimum range of X respectively. i represents index of country j at time t.

3.2.2. Other variables

This part discusses the dependent and control variables. Control variables are parts of independent variables that factor out the potential impact of other important variables to examine the real effect of variables of interest. In addition, dependent variable measures the economic performance of a country. Investment, trade openness, and government expenditure have been used as control variables based on the previous literature like [Nawaz et al, (2014); Ebaidalla, (2014); Osman et al, (2011)]. In addition, the real per capita GDP is used as measure of economic performance in the line with many literatures.

Gross fixed capital formation (INV): has been used for proxy for investment. This includes land improvements, machinery and equipment purchases, and the construction of roads, railways etc. This measures the investment level of a country to promote growth. This is measured as percentage of GDP.

Trade openness (OPEN): it is the sum of exports and imports of goods and services measured as a share of gross domestic product. In addition, it measures the technology exchange between courtiers. This is measured as percentage of GDP.

Government expenditure (EXP): government expenditure refers to the spending if the government. It is used as a proxy for policy variable in this study. It is because most policy of government implantation is financed through this expenditure. This is measured as percentage of GDP.

[14] When the scales normalized, it is change only the range of the scale. However, it does not affect the quality corresponding to the indices from the original indices. Example, political rights scaled from 1 to 7. 1 is the highest freedom and 7 the lowest freedom. After it is normalised, the scale become from 1 to 10 instead 1 to 7 1 represents the highest freedom and 10 the lowest freedom. It is applicable for all indices.

Expenditure on education (EDU): this refers to the spending on educations to increase the human capital of the country. It is used as a proxy for human capital in this study. This is measured as percentage of GDP.

Real gross domestic product per capita (RGDPPC): this is the ratio of gross domestic product by population. Gross domestic product (GDP) is the sum of value of goods and services produced by residents. The data are in constant 2010 USD. In case of this study, this variable is used as measure of economic growth of a country. The dependent variable of this study as a proxy for economic growth is real GDP per capita.

Generally, this study used many variables to explore the main objectives of the investigation. Table 3 summarize the short definition and expected sign of the variables.

Table 2: Definition of variables

Variable name	Source	Short definition
Real GDP per capita (RGDPPC)	WDI	The ratio of real GDP by population (constant 2010 USD)
Trade openness(OPEN)	WDI	The sum of exports and imports (% of GDP)
Government expenditure (EXP)	WDI	Government spending (% of GDP)
Investment(INV)	WDI	Gross fixed capital formation (% of GDP)
Voice and accountability (VA)	WGI	Participation in selection, freedom of expression, association, and media
Political stability and absence of violence (PV)	WGI	Avoiding the change of government by unconstitutional or violent means
Government effectiveness (GE)	WGI	Quality and independency of public and civil services
Regulatory quality (RQ)	WGI	Ability of the government to formulate and implement sound policies
Rule of law (RL)	WGI	Confidence in and abide by the rules of society
Control of corruption (CC)	WGI	Avoiding of using public power for private gain
Political rights (PR)*	FHI	Freedom of people to participate in the political process

The civil liberties (CL)*	FHI	freedoms of expression and belief
Size of Government (SG)	EFW	How political process limited to allocation of resources and business
Legal Structure and Security of Property Rights (LP)	EFW	How well the protective function of government is performed.
Access to Sound Money (SM)	EFW	The measure of price stability and the ease of using currencies by domestic and foreign bank accounts
Freedom to Trade Internationally (FTI)	EFW	The extent of international exchange
Regulation of Credit, Labor, and Business (R)	EFW	The extent in which credit, labor, and product are determined by markets

"*" the magnitude of political rights and civil liberties indices represents the opposite association with freedom and liberties. For example, the normalized indices of political rights and civil liberties are ranging from 1 to 10, 1 represents the highest freedom, liberties, and 10 the lowest freedom and liberties. Therefore, the negative hypothesized sign of political rights and civil liberties coefficient suggests the positive association of political rights and civil liberties with economic growth.

3.3. The econometric model

3.3.1. Theoretical framework

This part is the summary of the visualization of the link between institutions and production. It is in order that we develop the mathematical relationship between production and institutions. For the income difference across countries, a technology difference takes the higher share. In economic theory, technology has no definition like its role in production. Some economists consider technology as environment that promotes growth and production.

Institutions are the environment for productivities and market efficiencies. The efficiency of production is efficiency of firms through the decisions of firms. The decisions of firms are

given the environment. For example, when the firms decide to do business, their decision is based on the institutional framework. Political, social, legal and economic situation are given for firms to make decisions. Countries can shape the institutional framework or the rules of the game in which economic decisions are made. This institutional setup in the nations is the road for resource allocation efficiently. The GDP per capita is because of allocation of recourse and the way of combinations of factors of production (Scully, 1988). This is because according to (Scully, 1988):

> One or more of the economies described by the neoclassical production function…will have values of output per head that are greater than those of other economies with similar values of the input ratio. These economies are the most technically efficient in transforming inputs into output (p.655).

The sources of difference in productivity are because of social infrastructure. Social infrastructure comprises institutions that affect economic environment of firms. This environment is the source of invention and technology transfer. The hypothesized link between institutions and economic growth is that institutions cause productivity and in turn increase output in the economy (Hall and Jones, 1999)

Therefore, from Hall and Jones (1999) we can relate inputs and productivities with institutions in case of this paper. Hence:

$$A = F(I, O) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Where A is technolgy in tradational economic theory, I is institutions or social infrustructure and O is other factors of technogy like envirment, infrastracture etc. Equation 3 indicates that technology or productivity depeds on the institutions of the countries.

In the same logic the instituions also increase the efficiency of labor and capital inputs. Thus:

$$\boldsymbol{(K, L) = F(I) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4}$$

Here equation 3 and 4 show the effiecency of inputs and the level of productivities determined or influnced by the situations of institutional framework followed in the countries.

Then, based on the Solow 1956, Mankiw et al, 1992 we take a Cob-Douglas production function.

$$\boldsymbol{Y_t = AK_t^{\alpha} L_t^{1-\alpha}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots.\mathbf{5}$$

The notation: Y is output, K capital, L Labor and A the level of technology. A represents the effciency of the production. This the reason that firms produce different level of output given the same level of resources. In addition, institutions is part of this technology.

Therefore the imortant question is what does A stand for? The answer is complex. Our varaibles of interest take the higher share of A in the model. As mankiw et al, (1992) proposed A or the technology consists of reource endowment, climate and institutions etc as a result the study concluded that A is not only technology. Futhermore, experience showed that the main source of income across countries is not answered, for example even if resource endowment and climate contribution is not negleceted, the income differences exists irrespective of climate and resource endowment.

Thus, the candidate for this is institutions. Therefore based on [Hall and Jones, 1999; ALI, 2003] we can separate institutions from technolgy as in equation 5 as follows:

$$\boldsymbol{Y_t = IOK_t^{\alpha} L_t^{1-\alpha}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.\ldots\ldots\ldots\ldots\ldots\ldots..\ \mathbf{6}$$

3.3.2. Model specification

In the theoretical literature part and the theoretical framework, the link how institutions and economic growth associated has been discussed. In particular, equation (6) shows the mathematical formulation of GDP per capita with institutions. Based on equation (6) and Ebaidalla, (2014), the basic model of this paper is specified as:

$$\boldsymbol{lnY_{it} = \beta_0 + \beta_1 lnY_{it-1} + \beta_2 lnX_{it} + \mu_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ \mathbf{7}$$

$$\boldsymbol{\mu_{it} = \alpha_i + \theta_t + \mathcal{E}_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..\ \mathbf{8}$$

Where lnY_{it} is the log of per capita GDP of country i at time t, $\boldsymbol{\beta_0}$ is a constant and $\alpha_i$is individual country unobserved effect. θ_t stands for time effect while$\beta_1$is the coefficient of previous per capita GDP. X is the vector of investment, trade openness, government expenditure and expenditure on education β_2 The vector of coefficient of log of X, and $\mathcal{E}_{it}$ is the random error term.

In Equation 7, we can add the institutional variables, which, then, the model becomes:

$$\boldsymbol{lnY_{it} = \beta_0 + \beta_1 lnY_{it-1} + \beta_2 lnX_{it} + \beta_3 lnI_{it} + \mu_{it}} \ldots\ldots\ldots\ldots.\ldots.\ \mathbf{9}$$

I_{it} is the vector of institutions, $\boldsymbol{\beta_3}$ is the vector of coefficient of institutions that shows the effect of institutional variables on per capita GDP.

Furthermore, the interactive effect of the institutions is added in the model to see the combined effect of institutions on economic performance. Thus with this objective, the model is specified as:

$$\boldsymbol{lnY_{it} = \beta_0 + \beta_1 lnY_{it-1} + \beta_2 lnX_{it} + \beta_4 E_{it} + \mu_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \mathbf{10}$$

Where, E represents the interaction terms between different institutional variables. E is formulated as $(lnI_j * lnI_v)$ where, i and v are institutional variables but$j \neq v$. Moreover, β_4 shows the effect of interactive effect of institution on per capita GDP.

Furthermore, to see the role of policy in how institutions affect the GDP per capita, the policy variable be also interacted with institutional variables on specified model as:

$$\boldsymbol{lnY_{it} = \beta_0 + \beta_1 lnY_{it-1} + \beta_2 lnX_{it} + \beta_5 (lnEXPI_{it}) + \mu_{it}} \ldots\ldots\ldots\ldots\ldots \mathbf{11}$$

Where, EXPI represents the product of government expenditure and institutions. That is EXP is used as policy variable in this study. β_5 is the vector coefficient of interaction term between institutional variables and policy variable that reflects the effect on per capita GDP. Thus, based on the objective of this paper, different versions of equation (9), (10) and (11) are estimated.

3.3.3. Estimation method

To investigate the associations between of institutions and economic growth in Sub Sahara African, the study uses the dynamic panel models based on GMM. The GMM is developed by Arellano, bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The GMM model has many advantages over other alternative models of panel data. First, GMM model considers dynamic nature of the data; second, it also considers the autocorrelation, serial correlation of the panel data. Finally, this model generates instrumental variables from the lagged dependent variables and other endogenous independent variables; hence, it takes into account the problem of endogenity in the model.

Empirically there are two types of GMM models for estimating panel regressions. They are first-difference GMM estimator, and system GMM estimator. Since First- difference GMM uses lagged level of the dependent variable only, instruments might be weak (Bond et al.,

2001). System GMM estimator, on the other hand, solves the weak instrument problems by using the lagged difference and lagged level variables as instruments. As a result, this paper uses the system GMM estimator. These estimators are based on two simultaneous equations of levels with lagged first differences as instruments and in first differences with lagged levels as instruments.

Chapter Four

4. Estimation and discussions of results

4.1. Descriptive statistics

Under this section, the descriptive summary statistics has been discussed for all variables of the model. Thus, the summary statistics provides the mean, standard deviation, maximum and minimum values and the number of observations for all variables. In addition, the association among variables is discussed.

Table 3 shows the descriptive features of the data how its distribution over time looks like. It presents the variation of the distributions of the data between 2002 and 2016 over 16 SSA countries. In table 3 of the summary statistics, each row describes summary for the corresponding variables in each column.

The second row in table 3 shows the real per capita GDP (RGDPPC) that is proxy for economic performance of the country. The standard deviation shows the higher deviation in RGDPPC over in these countries. In average each countries per capital varies by 2266 from the mean of 1535. The maximum RGDPPC is 9822.01 USD for Mauritius in 2016 whereas the minimum RGGDPC is 193.87 USD for Ethiopia in 2003. This indicates high-income variation across SSA countries.

From third to fifth row, the control variables for this model are depicted. The Fifth row present government expenditure (EXP) that is used proxy for policy as well. The government expenditure (EXP) has the maximum value of 31.57% for Burundi in 2010 and minimum of 14.60 % for Chad in 2005, having small variation 5.08% from the mean of 14.60% for the overall observations.

The summary of openness to GDP ratio is showed in the fourth row. This is the sum of export and import to GDP ratio and used as a proxy for openness to international trade. It has maximum value of 127.06% % for Mauritius in 2006 and a minimum of 21.67% in Burundi in 2002, having a variation of 23.21 % from the mean of 66.88% for the overall observations.

The summary of investment to GDP ratio is showed in the third row. This is the sum of export and import to GDP ratio. It has maximum value of 59.72% for Chad in 2002 and a

minimum of 3.95% in Burundi in 2002, having a variation of 23.21% from the mean of 23.09% for the overall observations.

The summary of educational expenditure to GDP ratio is showed in the six row. This is the spending for education to GDP ratio. It has maximum value of 98.82% for Chad in 2002 and a minimum of 10.09% in Burundi in 2002, having a variation of 23.39% from the mean of 41.14% for the overall observations.

Table 3: Summary of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
RGDPPC	240	1535.25	2266.24	193.87	9822.01
INV	240	23.09	6.63	3.95	59.72
OPEN	240	66.88	23.21	21.67	127.06
EXP	240	14.60	5.08	4.16	31.57
EDU	240	41.14	23.39	10.09	98.82
NCL	240	5.09	2.04	1	8.50
NPR	240	5.39	2.74	1	10
NR	240	6.84	0.81	4.92	8.58
NFTI	240	6.71	0.78	4.36	9.03
NSM	240	7.60	0.98	3.96	9.70
NLP	240	4.69	1.04	2.77	7.05
NSG	240	6.89	0.96	4.63	9.27
NVA	240	4.88	1.19	2.78	7.19
NRL	240	4.58	1.02	2.59	7.44
NRQ	240	4.78	0.95	3.04	7.53
NPV	240	4.53	1.38	0.96	7.51
NGE	240	4.49	1.06	2.57	7.39
NCC	240	4.45	0.89	2.76	6.52

Source: Author's Estimation (2018)

From seven to nineteen rows present the statistics summary of institutional variables. These are proxy for political freedom, economic freedom and governance quality. All variables of institutions are normalized between 1 and 10.

The political freedom represents by civil liberty (NCL) and political right (NPR). The higher political freedom indices represent low freedom and vice versa. Civil liberty has the maximum value of 8.50 for Ethiopia in 2010-2016, for Burundi in 2015 and 2016, for Cameroon in 2002-2016. These indicate civil liberties are weak in these counties. However, Mauritius in 2004 and 2005 had the higher civil liberties with minimum value of 1 for civil liberties index. The variation of this variable is also 2.04 from the mean of 5.09 for the overall observation and indicates large civil liberty variation across countries. Furthermore, the lowest value of political freedom (NCL and NPR) represents the most free and the largest

value represents not free. Ethiopia since 2010, Burundi in 2015 and 2016, and Cameron in the all year of sample have the worst political freedom. However, Mauritius had the best political freedom in 2004 and 2005. In case of political right, the maximum value of 10 for Ethiopia in 2015 and 2016 and for Chad in 2007-2016 and the minimum value of 1 for Ghana in 2005-2016, for Mauritius in 2002-2016, and for South Africa in 2002-2016. The variation of this variable is 2.74 from the mean of 5.39 for the overall observations. In the same logic, Ethiopia and Chand, with large value of the NPR are referred to as the worst political right in the indicated year. However, Mauritius in all period and South Africa in 2002 and 2006 are referred as the best political rights.

The economic freedom of countries represented by size of government (NSG), legal structure and security of property right (NPL), access to sound money (NSM), freedom to trade internationally (NFTI), and regulation of credit, labor, and business (NR). The variations of these variables are between 0.81 and 1.04 for the variables NR and NPL respectively. Higher variation exists in legal structure and security of property right and less variation in regulation of credit, labor, and business. The mean of these variables are between 4.49 and 6.89 for NPL and NSG respectively. This indicates countries have low-level legal structure and security of property right compared to other and economic freedom measurement and higher values for compared size of government. The maximum value of NPL is 7.05 for Mauritius in 2016 and minimum value of 2.77 for Chad in 2005. Size of government has the maximum of 9.27 for and minimum value of 4.63 for Madagascar in Burundi in 2010 respectively. Overall, these countries are weak in legal structure and security of property right with low value for NPL and have large value of size of government, access to sound money and regulation, labor, credit and business. Hence, from the sample we can understand that the property right protections are low. The market also determines the labor, the credit and the product market. In addition, the share of government out and control of enterprise are low as well relatively.

The governance quality of countries are also represented by regulatory quality (NRQ), voice and accountability (NVA), government effectiveness (NGE), political stability and absence of violence (NPV), rule of law (NRL), and control of corruption (NCC). The variations of these variables are between 0.89, 1.19 and 1.38 for the variables NCC, NVA and NPV respectively. Thus, political stability and absence of violence and voice and accountability varies highly in these countries compared to other governance quality. However, they have all most less variation in control of corruption compared to other indexes. The mean of these variables are almost the same between 4.45 and 4.88 for the variable NNCC and NVA respectively. The

maximum value of NPV is 7.51 for Mauritius in 2002 and minimum value of 0.96 for Burundi in 2005. NVA has the maximum of 7.19 for Mauritius in 2014 and minimum value of 2.78 for Burundi in 2016. In the other hand, the maximum value of NCC is 6.52 for South Africa in 2005 and minimum value of 2.78 for Chad in 2008. Overall, these countries have less variation in terms of control of corruption and higher variation in political stability and absence of violence and voice and accountability. However, they score less value in control of corruption and higher political stability and absence of violence and voice and accountability on average.

The correlation result reported in appendix 1 also gives the correlation among the variables in the model. There is statistical association among variables in correlation coefficient of (appendix 1). This coefficient of correlation gives indication about the correlation of variables. In terms of magnitude, some variables have strong correlation and others have moderate associations, in terms of sign some variables have positive and others have negative correlation.

From appendix 1, only investment is negatively correlated with real per capita GDP in SSA. This means per capita GDP and investment move in the opposite direction. It is quite unlikely to the expectation. On other hand trade openness, government expenditure, and all institutional variables positively correlated with per capita GDP in SSA. This means that these variables move the same direction. The coefficient sign of the normalize civil liberty (NCL) and normalize political property (NPR) with real per capita GDP are negative but it does not oppose the positive association with real per capita GDP. It is because the lowest score of NCL and NPR measures the more political right and civil liberty. Thus, the positive association of these variables and per capita GDP means when the civil liberty and political rights increase the per capita GDP also increase. The increase of civil liberty and political rights reflects reduction of the score of these variables. In magnitude, the relation of per capita GDP and NCL and NPL has negative sign in correlation coefficient. However, Governance and economic freedom variables are consistence with the improvement of these variables and their score of magnitude.

Among the 13 indicator of institutional variables in this study, government effectiveness (0.79), regulatory quality (0.77), rule of law (0.71) and control corruption (0.66) have the strong relation with real per capita GDP in SSA. However, except size of government that

has weak correlation coefficients with real per capita GDP, other institutional indexes have almost approaches to 0.5 coefficient correlation with real per capita GDP.

Among institutional variables, there are strong correlations. Political right has positive coefficient of correlation with civil liberty and strong, however, rule of law, voice and accountability, and regulation quality have more than 0.8 coefficient of correlation with negative sign with civil liberty. This means in terms of institutional quality they are correlated with civil liberty positively. These variables are the same fashion with political rights. There are also strong correlation and positive between other institutional variables. For example, government effectiveness correlated with rule of law, legal system and protecting property rights, and regulations. Other also has positive and moderate correlations[15].

4.2. Model diagnostics

In order to examine the effects of the institutions on per capita GDP in Sub-Saharan Africa, the dynamic generalized moment method (GMM) estimation techniques was adopted. It can be difference GMM or System GMM. Since system generalized moment method, (SGMM) uses difference level and difference lags as instruments unlike the difference GMM, the specified model is estimated by SGMM. Based on the objectives many equations are estimated in different cases to fulfil the objective of this study. The estimated model is for the period 2002-2016 of 16 Sub-Sahara Africa and covers the set of 13 institutional variables from WGI, EFW and FHI. The full results of each model are reported in from appendix 2A to appendix 2E.

The model diagnostics determine the validity of the results in SGMM. This model does not assume normality and it allows for heteroskedasticity, autocorrelation, endogeneity and dynamic nature of the panel data[16]. Instruments are exogenous in SGMM. As a result testing for the presence of first- and, in particular, second-order autocorrelation in the error term is required.

According to the model, the GMM estimator requires that there is first-order serial correlation and no second order serial correlation. Thus, in all estimation for the first–order serial

[15] See appendix 1

[16] Roodman (2009a, p. 87) notice that the GMM estimators designed for situations with one left-hand-side variable that is dynamic, independent variables that are not strictly exogenous, heteroskedasticity and autocorrelation.

correlation of Arellano-Bond test for AR (1) in first differences ($p<0.05$), thus, the null hypothesis that is no presence of first-order serial correction is accepted. However, in all estimation of Arellano-Bond test for AR (2) in first differences ($p>0.05$) that leads to rejection of the null hypothesis that is no presence of second-order serial correlation. In appendix2A-2E, results of tests support the validity of the models in this case.

The Saragn tests also tests over identifying restrictions, in other word, validity of instruments. The null hypothesis of this test is that over identifying restrictions are valid, thus, in all models the Sargan test of overid restrictions is ($P>0.05$) that is null hypothesis is accepted in all models. In addition, as Roodman (2009b) suggested since dynamic panel models use many instruments that may be weak instrument and source-biased estimates, comparison between number of instruments and observations are necessary in the reported estimation. Thus, Roodman (2009b) suggested the number of instruments should be less than the number of observations. As a result, in all models (appendix2A-2E) the number of instruments less than the number of observations (50 instruments < 224 observations)[17].

All tests that have been conducted satisfy the main assumptions of SGMM estimation and this model is an appropriate.

Furthermore, in line with the system GMM estimator, the model is estimated using pooled OLS by Driscoll-Kraay standard errors estimator that allows heteroskedasticity and autocorrelation unlike the random effect[18]. However, the coefficients of the variables in pooled OLS are more significant and large in magnitude compared to system GMM results. It is due to Driscoll-Kraay standard errors estimator does not consider the endogeniety problem that inflate the coefficient. Since system GMM take into account the endogeneity problem and dynamic nature of the data, this paper relies on the results of system GMM for dissuasion and policy implications.

4.3. Discussion and interpretation of the findings

This section depicts the empirical results of econometric models of institutions and per capita GDP using a panel of 16 Sub-Sahara African countries from the period 2002-2016 and system GMM method of estimation. We have estimated equation (9), (10), and (11). Table 4

[17] The appendixes report shows the larger number of instruments in the all model is 50 given equal number of observations (224).

[18] For the full results of pooled OLS by Driscoll-Kraay standard errors estimator, see appendix 3.

shows the estimation results of the effect of institutions on per capita GDP. In this table, the effect of governance quality reported in the first place. In the second place, the effect of economic freedom is reported. Finally, the political freedom effect on per capita GDP is also reported in table 4. Table 5 also presents the interactive effects of institutions. In addition, table 6 presents the interactive effect of institutions and policy variable. Furthermore, many equations have been estimated based on the objective of the study.

The full estimations are reported in appendix 2A to appendix 2E. Appendix 2A and 2B shows the effect of 13 institutional variables on per capita GDP whereas appendix 2C and 2D depicts the results of interactive effect of institutions and appendix 2E reports the interactive effect of institutions and policy variable on per capita GDP.

The result for each institutions effect is reported in table 4. The lagged dependent variable and investment are the significant explanatory variables excluding the institutional variables in the model.

The estimated models suggest that lag of per capita GDP and investment is strongly significant. This means that the previous level of per capita GDP and investment are the main determinants of the current per capita GDP. The result is consistent with previous studies that is per capita GDP is strongly autoregressive [Efendic A and Pugh G (2015); Kilishi, Mobolaji, Yaru, and Yakubu (2014); Taiwo Akinlo (2016)]. The result of investment also impact real per capita GDP positively. The result is in line with [Ebaidalla Mahjoub Ebaidalla (2014)]. The effects of institutional variables on per capita GDP are also discussed on the next sub sections.

4.3.1. Analysis of the Effect of institutions on per capita GDP

Table 4 presents the value of estimated coefficient of institutions on per capita GDP. These results discussed as follow. The overall results showed that most institutions have positive impact on per capita GDP in Sub-Saharan Africa. The positive associations between institutions and economic growth is consistence with the previous studies [North (1990); Acemoglu, Johnson, and Robinson (2001); Hall and Jones (1999); Knack and Keefer (1995); Rodrik (1999)]. They argued that institutions are the sources of efficiency in production and productivity of factors of production that sources economic growth.

The effect of six indicator of governance quality is reported in the first place in table 4. The coefficients of these indexes are positive and consistence with the prior expectations. The result is consistence with previous studies [Kaufmann et al, (1999); Efendic et al, (2015). However, only control corruption, government effectiveness, political stability and absence of violence and voice and accountability are significant. The value of estimated coefficient of control corruption is 0.0757. This means a unit percentage increase in corruption control increases per capita GDP by 0.0757 percentage. This due to enhancing of institutions that increase control of corruption implies decline of misallocation resource and transaction costs and create business environment in which production is promoted. In addition, the value of the estimated coefficient of government effectiveness is 0.0839 that is greater and significant at one percent level of significant among other all governance quality indexes. Thus, a unit percentage increase of government effectiveness increases per capita GDP by 0.0839 percentage. It is due to when public and civil services more effective and independent from authorities and the quality policy implementation enhance investment and per capita GDP. The value the estimated coefficient of political stability and absence violence is 0.0502. Real per capita GDP responses by 0.0502 percentage for a unit change in political stability and absence violence in the same direction. It is due to when violence declines and stability exists, the investors become more confident and encouraged to invest more. The estimated value of voice and accountability is 0.0811. This indicates when quality of voice and accountability increases by a unit percentage, the real per capita GDP increases by 0.0811 percentage. It is because in the condition higher voice and accountability, resources are utilized efficiently. Among economic freedom indices, two of five variables are significant.

The result of legal system and protection of property rights on per capita GDP is consistence with previous studies [Knack and Keefer (1995, 1997); Abdiwelli (2003)]. The estimated value of legal system and protection of property rights and access to sound money are 0.0831 and 0.0518 respectively. This means that a unit percentage increase in protecting property rights increase per capita GDP by 0.0831 percentage. However, one percentage increment in aces sound money decreases per capita GDP by 0.0518 percentages. In case of the legal system and protection property rights, protecting property rights improve efficient operation of the market, create confident among contracts and promote labor to be more productive since they enjoy their fruits in the well protecting property rights environment.

Table 4: Table 4: SYS-GMM Results (The effects of institutions)

Variables	Coefficient
Measure of governance quality	
Control of corruption	0.0757** (-0.0359)
Government effectiveness	0.0839*** (0 .0312)
Political stability and absence of violence	0.05029* (0 .0292)
Regulatory quality	0.0525 (-0.0921)
Rule of law	0.0581 (-0.0308)
Voice and accountability	0.0811* (-0.0474)
Measure of economic freedom	
Size of Government	-0.0316 (-0.063)
Legal Structure and Security of Property Rights	0.0831*** (-0.029)
Access to Sound Money	-0.0518*** (-0.0136)
Freedom to Trade Internationally	0.0094 (-0.1089)
Regulation of Credit, Labor, and Business	-0.004 (-0.0664)
Measure of political freedom	
Political rights	-0.0189 * (-0.0099)
Civil liberties	-0.053* (0.0278)

*** is significant at 1%, ** is significant at 5%, and * is significant at 10%, standard error are in parenthesis.

However, in case of access to sound money that accounts for credibility of monetary policy to stability price and freedom to own foreign currency bank accounts may not be well functioning due to weak political structure in the region since it exerts negative economic growth. This may be because of two reasons; first, the monetary policy is not a cause for economic growth in SSA since the financial sector is weak and it may need strong political system. Second, since the institutional qualities are weak in Sub-Saharan Africa at all freedom to own foreign currency does not promote economic growth. Rather freedom to own foreign currency bank account may lead to money laundering and black market rather than

enhancing investment in this region. The effect of access to sound money leads to inefficiency use of foreign currency and causes low economic growth.

The political freedom effect also reported in table 4 in the last place. The results show both political right and civil liberties are negative and significant. These are consistence with the the previous study [Elisa Valeriani, Sara Peluso (2011); Kormendi and Meguire (1985)]. Since the indexes of these variables are assumed that the higher value of index represents less freedom, the negative estimated results of political rights and civil liberties show positive associations between political freedom and per capita GDP in Sub Saharan Africa. The value of estimated coefficient of political right is 0.0189. This means when political rights are improved by a unit percentage, the per capita GDP also is enhanced by 0.0189 percentage. This is because strong political rights enable people to think freely and involves in investment and innovations. In the same logic, the civil liberties have 0.053 value of the estimated coefficient. When civil liberties are improved by a unit percentage, the per capita GDP is changed by 0.053 percentage in the same direction. This is because countries with higher freedom in politics and political participation, the functioning of government those create competition and efficient uses of resources increased and encourage innovation and inventions. Strong political rights create trust between people and with government that encourage public participations in policy choices. This leads to the effectiveness of policy and promote economic growth.

Generally, the empirical results show that each institution has no equal importance in economic growth even if they are mediator one another. Legal system and protecting property rights, political rights, civil liberties, government effectiveness, political stability and absence of violence, voice and accountability and control of corruption are the most important variables in Sub-Saharan Africa to promote economic growth.

4.3.2. Analysis of the interactive effect of institutions

Table 5 shows results of the interactive effect of intuitions. This shows how different institutional variables interact each other to promote economic growth in Sub-Saharan Africa. The estimated results in table 5 depict most interactive terms are positive and significant. These indicate even some indexes have no effect on per capita GDP, they facilitate other institutional quality to improve the economic growth in Sub-Saharan Africa. These mean combined policies that improve quality of institutions promote economic growth.

In case of the interactive effect in five indexes of economic freedom, they are positive and significant more when they interactive with legal system and protecting property rights. These also indicate that the legal system and protecting property rights more effective when it improved combined with other economic freedom policies. The combined policy of improving both protecting property rights and free to trade internationally and own foreign bank account increase the contribution of free to trade internationally and own foreign bank accounts. When property is protected well, the foreign investors encouraged to invest in Sub-Sahara African as well encourage foreign direct investment in domestic economy and that can be source of technology and promote economic growth.

Table 5: SYS-GMM Results (Significant interactive effects of institutions)

Variables	Coefficients
Contcorr*Goveteffectiveness	0.0341*** (-0.0126)
Contcorr*rulelaw	0.0254* (0.0138)
Contcorr*Voiceacount	0.0321* (-0.0165)
Goveteffectiveness*politicalviolence	0.0267* (-0.0148)
Goveteffectiveness*regulatoryqaulity	0.0376** (-0.0165)
Goveteffectiveness*rulelaw	0.0269** (-0.0133)
Goveteffectiveness* Voiceacount	0.0395** (-0.0165)
Politicalviolence*voiceacount	0.0262* (-0.0155)
Politicalviolence*rulelaw	0.0223* (-0.0114)
Sizegoverment*propertyrights	0.0145 (-0.0188)
Propertyrights*acesssoundmoney	0.0243 (-0.0162)
Propertyrights*freedomtradeinternationaly	0.0260* (-0.0157)
Propertyrights*regulations	0.0246* (-0.0136)
Civilliberties*politicalrights	-0.0120* (-0.0066)
Propertyrights*Goveteffectiveness	0.0318*** (0.0114)

*** is significant at 1%, **is significant at 5%, *is significant at 10%, standard errors are in parenthesis. Source: computed by author

The interactive term of political rights and civil liberties is also negative. This indicates the combined improvement of political rights and civil liberties also enhance the contribution of each variable in economic growth in Sub-Saharan Africa rather than individual improvements. This is because political rights are source of civil liberties and vice versa.

In the other scenario what happen when governance and economic freedom interacts one another. The interactive effect of government effectiveness and protecting property rights in governance and economic freedom respectively for example is estimated and reported in table 5 at the last column. The effect becomes significant and positive. This indicates that the effectiveness of economic freedom to promote growth is good quality governance is necessary. That means when quality of governance and economic freedom improved together, the free economy of the country functioning well and enhance economic performance.

4.3.3. Analysis of the interactive effect of institutions and policy variable

Another hypotheses in this study was does economic policy and institutions facilitate one another for contribution of increase of economic performance. To do so, the government expenditure has taken as proxy for economic policy variable in Sub Sahara African. The interactive effect of institutions and government expenditure has been used as explanatory to view the combined effect on economic performance. The results of table 6 show that some indicators of institutions are significant after interacting with expenditure. This means if a government spends on like physical and public investments, improvement of institutions will have more impact on the economic performance and vice versa.

Table 6: SYS-GMM Results (Interactive effects of institutions and policy variable)

Variables	Coefficients
Contcorr*govtexpediture	0.0297** (-0.0141)
Goveteffectiveness*govtexpediture	0.0390*** (-0.0132)
Rulelaw*govtexpediture	0.0156* (-0.0089)
Voiceacount*govtexpediture	0.0203* (-0.0115)
Propertyrights*govtexpediture	0.0355*** (-0.0127)
Rulelaw*govtexpediture	0.0104 (-0.029)

*** is Significant at 1%, ** is significant at 5%, * is significant at 10%, standard error in parenthesis. Source: computed by author

In particular, when the control of corruption, government effectiveness, rule of law, voice and accountability, and legal system and protecting property rights interacting with government expenditure, they come up with positive and significant coefficient. This once again reveals that the effectiveness of institutions and economic policy are dependent one another. Specifically the improvement of rule of law, avoiding of corruption, and participation of people in public policy makes the government expenditure more effective since it used for the right objective. On the other hand, with good rule of law, property rights, and voice and accountability makes people ready to business activities and innovations, then the increment of government expenditure as economic policy facilitate people willingness to invest and invent.

In general, control of corruption, government effectiveness, voice and accountability, political stability and absence of violence, legal system and protecting property rights, access sound money, civil liberties and political rights are important institutions. Furthermore, control of corruption, government effectiveness, and legal system and protecting property rights are also significant when they interact with policy variable.

Chapter five

4. Conclusion and policy implication

5.1. Conclusions

Income gap across countries and at an individual level today is an acute problem facing both politician and economists in the world. Both problems are higher in Africa, particularly in Sub-Saharan Africa. Sub-Saharan African is not only unfortunate in terms of income but also quality of institutions. The region's income per capita did not show improvement since 1982 onward with around USD 1000 on average. The low and volatile per capita growth is also another problem of the region. The region is poor in terms of institutional quality compared to other regions as well. The region is the most restricted since 35 of 43 countries in SSA are partial free and totally not free. Most countries of this region have less than half governance quality percentile rank compared to world countries. Almost all counties in this region stand on more than 100 rank form 159 countries in the world.

Despite the efforts to prosper Sub-Saharan Africa, the region is the first in the case of weak economy attributes over time. Institutional framework is believed to the basis for efficient allocation of resource, innovation and productivity and source of economic growth. Hence, this study investigated the role of institutions on economic growth in Sub-Saharan Africa. The study used 16 countries of Sub Saharan African depend on the availability of data covers from 2002 to 2016. The measures of institutions are collected from world governance indicators (WGI), economic freedom of the world index (EFW) and freedom house index (FHI). The economic growth of Sub Saharan Africa is represented by per capita GDP. Based [Mankiw et al, (1992) and Hall and Jones (1999)], we link institutions and production via technology. Thus, the system GMM econometric techniques are employed for estimation since GMM model tackle the autocorrelation, heteroskedasticity and endogneity problem and to take into account the dynamic of the data.

The empirical results from system GMM estimations indicated that the per capita GDP is significantly affected by its past performance. This indicates economic performance is autoregressive nature in Sub-Saharan Africa. In addition, investment is other important source of per capita GDP in this region. Both lag of per capita GDP and investment are significant at 1 percent level of significance.

The estimation results show that control of corruption, government effectiveness, voice and accountability, political stability and absence of violence, legal system and protecting property rights, civil liberties and political rights affect the per capita GDP positively and significantly. Control of corruption, government effectiveness, voice and accountability, political stability, and absence of violence increase per capita GDP by 0.0757, 0.0839, 0.0811 and 0.0503 percentage for a unit percentage change respectively. Legal system and protecting property rights increases per capita GDP by 0.0831 percentage for a unit percentage change. In addition, both civil liberties and political rights affect per capita GDP positively. Per capita GDP increases by 0.053 and 0.0189 percentage when civil liberties and political rights improve by a unit percentage respectively.

The coefficient of access to sound money on the other hand, is negative and significant at 1% level of significant. This variable decreases per capita income by 0.0518% when it increases by a unit percentage. These show that all institutional measures have no equal effect on economic growth in SSA.

Institutions also improve economic growth more than individually when they are improved together since the interactive effect of institutions are significant and positive. The combined enhancement of government effectiveness and control of corruption for example increase the contributions of each for economic growth. In addition, when legal system and protecting property rights and government effectiveness interact each other, they promote economic growth more than they contribute individually. Moreover, the political freedom indexes of civil liberties and political rights interaction also improve the economy as well. Institutions and policy variable also mediate each other for the enhancement of economic growth. The interactive effect of government expenditure and institutional indices are positive and significant. This means institutions become even more important with policy variable like government expenditure.

5.2. Policy implications

The current and the previous economic performance of Sub Sahara African revealed no significant improvement since 1970s. Since the governments focus on only economic transformation overtime, many economic policy reforms and huge development assistance form developing countries adopted in the region. On the contrary, these actions did not prosper the economy of this region. Economic policy change and the development assistance are not supported by strong institutional framework like other countries. Moreover, the quality of institutions in this region is weak that may be cause of collapse of economic system compared to other region.

The study has come with empirical evidences on the relationship between economic growth and institutional qualities in Sub Saharan Africa. Based on the findings reported in the earlier section, the policy implications of the study would be the followings:

- Legal system including rule of law, security of property rights, independent of judiciary and impartial court system must be improved since they are the most important for protecting property rights in order to attain economic growth.

- As political rights and civil liberties have positive association with economic growth, countries must increase the status of to vote freely, the right to compute for public office, the right to join political parties and organizations, to elect representatives who have important influence on public policy and are accountable for electorate. To improve the civil liberties, freedom of expression and belief, rights of associational and organizational, rule of law, and personal autonomy must be improved.

- The countries must take action to improve the quality of governance since it affects the economy positively. In particular, actions like strong punishment by the law must be taken to prevent using of public power for private gain and manipulation of state by elites for privet interest. To increase the effectiveness of governments, countries must take the followings. Increase the quality of public and civil services by making them free from political pressures. Increase quality of policy by encouraging public participation in the process of policy formulation and implantation. Increase the

openness of government for people to create credibility of the government's commitment in policy formulation and implementation.

- The evidences show that the combined improving of institutional qualities enhance economic growth more than individually, countries need to make a policy that improve the combined institutions like rule of law and independency of public and civil services.

- The countries must give focus the freedom to own foreign currency bank account and policy to stable price since this action is discouraging the economic growth. In particular, the institutions that control black market and money laundering must be strong before freedom to own foreign currency.

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7. Appendix

Appendix 1: The Pearson correlation and statistical relationship

	RGDPPC	INV	OPEN	EXP	EDU	NCL	NPR	NR	NFTI	NSM	NLP	NSG	NVA	NRL	NRQ	NPV	NGE	NCC
RGDPPC	1.00																	
INV	-0.13	1.00																
OPEN	0.35	0.12	1.00															
EXP	0.13	-0.09	-0.15	1.00														
EDU	0.26	-0.16	0.14	0.34	1.00													
NCL	-0.51	0.14	-0.30	-0.36	-0.36	1.00												
NPR	-0.55	0.17	-0.33	-0.31	-0.31	0.88	1.00											
NR	0.48	-0.05	-0.14	0.30	0.30	-0.39	-0.34	1.00										
NFTI	0.59	-0.16	0.36	0.10	0.10	-0.67	-0.59	0.54	1.00									
NSM	0.49	-0.31	0.09	0.14	0.14	-0.47	-0.43	0.59	0.67	1.00								
NLP	0.59	0.09	0.00	0.21	0.21	-0.58	-0.58	0.65	0.53	0.35	1.00							
NSG	0.10	0.01	0.23	-0.46	-0.46	-0.08	-0.08	0.15	0.46	0.46	0.09	1.00						
NVA	0.65	-0.16	0.29	0.36	0.36	-0.92	-0.92	0.48	0.71	0.54	0.62	0.11	1.00					
NRL	0.71	-0.04	0.32	0.16	0.16	-0.81	-0.80	0.52	0.73	0.50	0.73	0.19	0.87	1.00				
NRQ	0.77	-0.14	0.27	0.24	0.24	-0.81	-0.74	0.62	0.84	0.67	0.68	0.26	0.87	0.87	1.00			
NPV	0.49	-0.12	0.46	0.12	0.12	-0.69	-0.69	0.16	0.60	0.34	0.37	0.16	0.73	0.73	0.65	1.00		
NGE	0.79	-0.02	0.20	0.20	0.12	-0.72	-0.75	0.58	0.68	0.52	0.80	0.16	0.83	0.90	0.90	0.59	1.00	
NCC	0.66	-0.08	0.27	0.24	0.24	-0.79	-0.77	0.36	0.56	0.32	0.66	0.02	0.82	0.88	0.81	0.69	0.85	1.00

Source: Author's Estimation

Appendix 2: The effect of institutions on real per capita GDP

The effect of governance on real per capita GDP

Variables	M1	M2	M3	M4	M5	M6	M7
lnRGDPPC(-1)	0.9990*** (0.0096)	0.9892*** (0.0132)	0.9800*** (0.011)	0.9940*** (0.0106)	0.9914*** (0.0193)	0.9896*** (0.0142)	0.9864*** (0.0151)
lnINV	0.0522*** (0.0124)	0.0576*** (0.0130)	0.0366*** (0.0079)	0.0631*** (0.0135)	0.0560*** (0.0156)	0.0517*** (0.0111)	0.0686*** (0.0171)
OPEN	0.0090 (0.0243)	0.0028 (0.0185)	0.0122 (0.0153)	0.0012 (0.0186)	0.0094 (0.0250)	0.0127 (0.0250)	-.0218 (.0270)
lnEXP	-0.0054 (0.0074)	-0.0180* (0.0099)	-0.0224* (0.0132)	-0.0098 (0.0088)	-0.0126 (0.0167)	-0.0122 (0.0117)	-.0136 (.0153)
lnEDU	0.0001 (0.0066)	0.0042 (0 .0052)	0.002 (.0057)	0.0019) (0.0077)	0.0009 (0.0072)	(0.0026) (0.0058)	0.0027 (0.0065)
lnNCC		0.0757** (.0359)					
lnNGE			0.0839*** (0 .0312)				
lnNPV				0.05029* (0 .0292)			
lnNRQ					0.0525 (0.0921)		
lnNRL						0.0581 (0.0308)	
lnNVA							0.0811* (0.0474)
_cons	-0.15 (0.1151)	-0.16103* (0.0901)	-0.0933 (0.0581)	-0.1563* (0.0897)	-0.1796 (0.1242)	-0.1664 (0.1028)	-0.1652 (0.0909)
No. Obs	224	224	224	224	224	224	224
No.inst	38	38	50	50	38	38	38
wald test	17012.59***	19102.97***	74889.11***	15253.80***	14604.53 ***	13444.68***	12892.40 ***
AB-AR(1)	-2.46**	-2.23**	-2.16**	-2.33**	-2.65***	-2.41**	-2.34**
AB-AR(2)	-1.15	-1.24	-1.11	-0.93	-1.06	-1.1	-1.06
Sargen test	30.61	47.81	39	45.42	29.89	28.24	26.41

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis, AB test is Arellano and Bond test for autocorrelation. Source: computed by authors

The effect of economic and political freedom on real per capita GDP

Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
lnRGDPPC(-1)	0.9990*** (0.0096)	0.9992*** (0.0096)	0.9843*** (0.0148)	0.9962*** (0.0103)	0.9997*** (0.0149)	0.9991*** (0.0121)	0.9909*** (0.0107)	0.9945*** (0.0113)
lnINV	0.0522*** (0.0124)	0.0519*** (0.0125)	0.0320*** (0.0103	0.0457*** (0.0144)	0.0515*** (0.0138)	0.0493*** (0.0142)	0.0577*** (0.0113)	0.0638*** (0.0149)
lnOPEN	0.0090 (0.0243)	0.0118 (0.0224)	0.0209 (0.0280)	00.0149 (0.0220)	0.0083 (0.0270)	0.0120 (0.0179)	0.0034 (0.0189)	-0.0153 (0.0168)
lnEXP	-0.0054 (0.0074)	-0.0092 (0.0130)	-0.0174 (0.0117)	-0.0011 (0.0076)	-0.0049 (0.0079)	-0.0054 (0.0087)	-0.0148* (0.0081)	-0.0309* (0.0152)
lnEDU	0.0001 (0.0066)	0.0022 (0.0090)	.0021 (0.0062	(0.0005 (0.0072)	0.0032 (0.0078)	0.0003 (0.007)	.0024 (0.0078)	0.0035 (0.0068)
lnNSG		-0.0316 (0.0634)						
lnNLP			0.0831*** (0.0295)					
lnNSM				-0.0518*** (0.0136)				
lnNFTI					0.0094 (0.1089)			
lnNR						-0.0040 (0.0664)		
lnNPR							-0.0189 * (0.0099)	
lnNCL								-0.0530* (0.0278)
_cons	-0.15 (0.1151)	-0.0956 (0.1840)	-0.1299 (0.10120	-0.0482 (0.1200)	-0.1328 (0.2455)	-0.1535 (0.1315)	-0.0392 (0.0974)	0.0879 (0.1067)
No. Obs	224	224	224	224	224	224	224	224
No.inst	38	38	38	50	50	50	50	50
wald test	17012.59***	25957.54***	19234.10 ***	25565.05***	26000.36 ***	26628.31***	16413.97***	16413.97***
AB-AR(1)	-2.46**	-2.48**	-2.59**	-2.48**	-2.74***	-2.47**	-2.43***	-2.43***

AB-AR(2)	-1.15	-1.1	-1.03	-1.2	-0.94	-1.19	-1.08	-1.08
Sargen test	30.61	29.92	26.04	51.87	58.41	36.55	32.03	32.03

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis, AB test is Arellano and Bond test for autocorrelation. Source: computed by authors.

Appendix 3: The interactive effects of institutions

The interacting effect of governance on real per capita GDP

Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**
lnRGDPPC(-1)	0.9990*** (0.0096)	0.9814*** (0.0143)	0.9873*** (0.0139)	0.9845*** (0.0150)	0.9846*** (0.0132)	0.9807*** (0.0136)	0.9826*** (0.0146)	0.9754*** (0.0160)	0.9862*** (0.0146)	0.9878*** (0.0122)
lnINV	0.0522*** (0.0124)	0.0509*** (0.0113)	0.0541*** (0.0110)	0.0658*** (0.0139)	0.0573*** (0.0115)	0.0434*** (0.0116)	0.0480*** (0.0105)	0.0594*** (0.0137)	0.0608*** (0.0158)	0.0525*** (0.0137)
lnOPEN	0.0090 (0.0243)	0.0094 (0.0219)	0.0087 (0.0216)	0.0030 (0.0182)	-0.0006 (0.0181)	0.0125 (0.0198)	0.0146 (0.0250)	0.0101 (0.0225)	0.0060 (0.0151)	0.0110 (0.0175)
lnEXP	-0.0054 (0.0074)	-0.0197* (0.0106)	-0.0154 (0.0105)	-0.0251* (0.0138)	-0.0174 (0.0119)	-0.0228 (0.0140)	-0.0153 (0.0117)	-0.0287* (0.0165)	-0.0272* (0.0155)	-0.0190 (0.0117)
lnEDU	0.0001 (0.0066)	(0.0042 (0.0049)	0.0043 (0.0056)	0.0046 (0.0056)	0.0052 (0.0067)	0.0010 (0.0057)	0.0036 (0.0059)	0.0038 (0.0062)	0.0025 (0.0064)	0.0029 (0.0060)
lnNCClnNGE		0.0341*** (0.0126)								
lnNCClnNRL			0.0254* (0.0138)							
lnNCClnNVA				0.0321* (0.0165)						
lnNGElnNPV					0.0267* (0.0148)					
lnNGElnNRQ						0.0376** (0.0165)				
lnNGElnNRL							0.0269** (0.0133)			
lnNGElnNVA								0.0395** (0.0165)		

lnNPVlnNVA									0.0262* (0.0155)	
lnNVAlnNRL										0.0223* (0.0114)
_cons	-0.15 (0.1151)	-0.0707 (0.0878)	-0.1103 (0.0905)	-0.0969 (0.0843)	-0.0598 (0.0797)	-0.0595 (0.0631)	-0.0884 (0.0968)	-0.0532 (0.0846)	-0.0894 (0.0861)	-0.1045 (0.0775)
No. Obs	224	224	224	224	224	224	224	224	224	224
No.inst	38	38	38	38	50	50	38	38	50	50
wald test	17012.59***	5822.66***	15046.80***	15312.65***	21386.23***	78899.46***	12691.84 ***	14296.77 ***	14513.11 ***	22732.77***
AB-AR(1)	-2.46**	-2.37**	-2.44**	-2.42**	-2.31**	-2.33***	-2.37**	-2.34**	-2.41**	-2.45**
AB-AR(2)	-1.15	-1.14	-1.12	-1.07	-0.96	-1.22	-1.16	-1.11	-1.09	-1.15
Sargen test	30.61	23.84	26.71	25.29	39.61	54.38	26.29	23.75	41.6	49.92

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis, AB test is Arellano and Bond test for autocorrelation. Source: computed by authors.

The interacting effect of economic freedom and political freedom on real per capita GDP

Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**
lnRGDPPC(-1)	0.9990*** (0.0096)	0.9935*** (0.0143)	0.9899*** (0.0113)	0.9897*** (0.0099)	0.9894*** (0.0093)	0.9910*** (0.0111)
lnINV	0.0522*** (0.0124)	0.0447*** (0.0130)	0.0398** (0.0168)	0.0353*** (0.0159)	0.0344** (0.0149)	0.0646*** (0.0148)
lnOPEN	0.0090 (0.0243)	0.0114 (0.0258)	0.0170 (0.0165)	0.0146 (0.0192)	0.0222 (0.0157)	-0.0022 (0.0166)
lnEXP	-0.0054 (0.0074)	-0.0069 (0.0077)	-0.0156 (0.0129)	-0.0164 (0.0125)	-0.0156 (0.0118)	-0.0236* (0.0118)
lnEDU	0.0001 (0.0066)	0.0021 (0.0083)	0.0006 (0.0061)	0.0020 (0.0075)	0.0080 (0.0059)	0.0029 (0.0071)
lnNSGlnNLP		0.0145 (0.0188)				
lnNLPlnNSM			0.0243 (0.0162)			

lnNLPlnNFTI				0.0260* (0.0157)		
lnNLPlnNR					0.0246* (0.0136)	
lnNCLlnNPR						-0.0120* (0.0066)
_cons	-0.15 (0.1151)	-0.1416 (0.1093)	-0.1354 (0.1009)	-0.1086 (0.0862)	-0.1342 (0.0988)	-0.0132 (0.0837)
No. Obs	224	224	224	224	224	224
No.inst	38	38	50	50	50	38
wald test	17012.59***	20300.58***	65875.83***	62545.53***	37253.73***	15716.21***
AB-AR(1)	-2.46**	-2.48**	-2.59**	-2.54**	-2.53**	-2.34**
AB-AR(2)	-1.15	-1.1	-1.06	-1.09	-1.16	-1.05
Sargen test	30.61	29.67	42.58	39.92	35.73	25.3

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis, AB test is Arellano and Bond test for autocorrelation. Source: computed by authors.

Appendix 3: The interactive effects Institutions and policy variable

Variables	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**
lnRGDPPC(-1)	0.9990*** (0.0096)	0.9878*** (0.0134)	0.9763*** (0.0141)	0.9935*** (0.0086)	0.9916*** (0.0108)	0.9818*** (0.0103)	0.9968*** (0.0129)
lnINV	0.0522*** (0.0124)	0.0588*** (0.0134)	0.0442*** (0.0102)	0.0495*** (0.0126)	0.0531*** (0.0156)	0.0267** (0.0115)	0.0465*** (0.0167)
lnOPEN	0.0090 (0.0243)	0.0013 (0.0181)	0.0138 (0.0239)	0.0141 (0.0201)	0.0119 (0.0171)	0.0181 (0.0178)	0.0211 (0.0231)
lnEXP	-0.0054 (0.0074)	-0.0573* (0.0248)	-0.0719*** (0.0262)	-0.0324* (0.0179)	-0.0491* (0.0257)	-0.0698*** (0.0265)	-0.0262 (0.0601)
lnEDU	0.0001 (0.0066)	0.0048 (0.0054)	0.00179 (0 .0056)	0.0007 (0.0068)	0.0017 (0.0062)	0.0020 (0.0064	0.0014 (0.0076)
lnNClnEXP		0.0297**					

		(0.0141)					
lnNGElnEXP			0.0390*** (0.0132)				
lnNRLlnEXP				0.0156* (0.0089)			
					0.0203* (0.0115)		
lnNLPlnEXP						0.0355*** (0.0127)	
lnNRlnEXP							0.0104 (0.0290)
_cons	-0.15 (0.1151)	-0.0457 (0.0938)	0.0264 (0.0909)	-0.1202 (0.0732)	-0.0887 (0.0913)	0.0293 (0.0904)	-0.1692* (0.0964)
No. Obs	224	224	224	224	224	224	224
No.inst	38	38	38	50	50	50	50
wald test	17012.59***	17873.08***	13631.99***	42424.06***	27840.00***	52761.08***	34606.62***
AB-AR(1)	-2.46**	-2.46**	-2.3**	-2.45**	-2.47**	-2.59**	-2.48**
AB-AR(2)	-1.15	-1.08	-1.16	-1.16	-1.12	-1.01	-1.18
Sargen test	30.61	25.78	23.34	52.42	45.56	33.89	39.84

***significant at 1%, **significant at 5%, *significant at 10%, standard error in parenthesis, AB test is Arellano and Bond test for autocorrelation. Source: computed by author

Appendix 4: pooled OLS by Driscoll-Kraay standard errors estimates

Variables	**Coefficient**	**Standard error**	**t**
Constant	1.386672	1.291389	1.07
Investment	-0.0677839	0.2147687	-0.32
Trade openness	0.9354471	0.1218344	7.68***
Government expenditure	0.2527871	0.173785	1.45
Expenditure on educations	0.2853667	0.0269529	10.59***
Control of corruption	2.503487	0.1650783	15.17***
Government effectiveness	2.893728	0.1511445	19.15***
Political stability and absence of violence	1.068145	0.1792111	5.96 ***
Regulatory quality	3.658707	0.1322446	27.67***
Rule of law	2.60595	0.242586	10.74***
Voice and accountability	2.625179	0.2018507	13.01***
Size of Government	1.347235	0.2802143	4.81***
Legal Structure and Security of Property Rights	2.473682	0.2825157	8.76***
Access to Sound Money	3.281556	0.1861371	17.63***
Freedom to Trade Internationally	4.117842	.3267722	12.60***
Regulation of Credit, Labor, and Business	4.406421	.2452925	17.96***
Political rights	-.9357759	.0538928	-17.36***
Civil liberties	-1.465229	.1095803	-13.37***
Number of Observations = 240 Group Size = 16 F[prob]= 3309[0.0000] R-squared= 0.7057 ***The Coefficient is Significant at a 0.01 Significance Level **The Coefficient is Significant at a 0.05 Significance Level *The Coefficient is Significant at 0.10 Significance Level			

Source: Author computation

Appendix 5: Summary of institutional quality of SSA

Countries	PF Status	GQR	EFR	Countries	PF Status	GQR	EFR
Angola	NA	13.62	148	Liberia	PF	18.14	154
Benin	F	42.13	134	Madagascar	PF	34.57	110
Botswana	NA	72.87	49	Malawi	PF	37.83	132
Burkina Faso	PF	39.85	132	Mali	PF	35.63	130
Burundi	NF	12.91	125	Mauritius	F	74.89	7
Cabo Verde	F	65.92	93	Mozambique	PF	36.95	143
Cameroon	NF	19.08	127	Namibia	F	62.14	87
Central African Republic	NF	8.55	158	Niger	PF	29.93	139
Chad	NF	8.73	151	Nigeria	PF	15.12	115
Congo, Dem. Rep.	NF	4.64	147	Rwanda	NF	37.87	31
Congo, Rep.	NF	14.10	157	Senegal	F	45.86	124
Cote d'Ivoire	PF	16.84	131	Seychelles	PF	57.84	47
Djibouti	NF	26.58	NA	Sierra Leone	PF	23.23	134
Equatorial Guinea	NF	11.33	NA	Somalia	NF	0.88	NA
Eritrea	NF	13.40	NA	South Africa	F	61.20	95
Ethiopia	NF	21.32	146	South Sudan	NF	NA	NA
Gabon	NF	33.13	137	Sudan	NF	5.91	NA
Gambia, The	NF	33.69	61	Tanzania	PF	37.08	77
Ghana	F	52.75	104	Togo	PF	20.40	141
Guinea	PF	NA	NA	Uganda	NF	31.66	60
Guinea-Bissau	PF	NA	NA	Zambia	PF	39.30	89
Kenya	PF	29.00	70	Zimbabwe	PF	7.64	144
Lesotho	PF	46.19	101				

Note: NA is not available

The total number of SSA African in this table is 45. ***PF Status*** *represents the political freedom status of 195 countries in the world. (F=free, PF partial Free, and NF = Not Free). Among 45 countries the political freedom of 43 countries are available. Thus, (7 countries are free, 19 counties are partial free, and 17 countries are Not free).* ***GQPR*** *represents governance, quality, and percentile rank of 186 countries of the world. The percentile rank represents the country's rank among all countries, with 0 corresponding to lowest rank, and 100 to highest rank. Percentile ranks have been adjusted to correct for changes over time in the composition of the countries covered by the WGI. The only adjustment is the six-indicator ranks have been averaged and the 15 year rank as well to identify the rank of the countries. thus, (7 counties rank is greater than half, 35 countries rank less than half, and 3 countries rank is not available among 45 SSA African. More severely, 21 country ranks less than 30).* ***EFR*** *stands for Rank of Economic freedom of the world among 159 countries. Only 8 countries have less than half of the rank, 29 countries ranks are greater than half, and 8 countries ranks are not available. More severely, 25 countries of SSA countries ranks are less than 100.*

Source: (WGI, FHI, 2017, EFW, 2016

Appendix 6: Definition of institutional Variables

Voice and accountability (VA): *…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 a free media.* ***Political stability and absence of violence/terrorism (PV):*** *capturing perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means including politically motivated violence and terrorism.* ***Government effectiveness (GE):*** *…the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.* ***Regulatory quality (RQ):*** *…the ability of the government to formulate and implement sound policies and regulations those permit and promote private sector development.* ***Rule of law (RL):*** *the extents 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.* ***Control of corruption (CC):*** *"capturing 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 et al, (2011, pp.223).*

Political rights (PR): *it the situations that allow people to participate easily in the political practice. It consists vote freely, contest for public office, participate in political parties and organizations, and choose representatives. Based on these the central ideas of political rights, the index of political rights depend on different interviews about electoral process, political pluralism and participation, and functioning of government. The maximum point that can be given for each 10 question is 4 and the 40 maximum points of political rights checklist* ***The civil liberties (CL):*** *this is also about "freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state" (para. 21). The civil liberties also have questions about rights of expression and belief, associational and organizational Rights, Rule of Law, and Personal autonomy and individual rights. The maximum point of civil liberties that are given for each is 4 and maximum points of civil liberties checklist is 60 (FH, 2016).*

Size of Government (SG): *the government size is based on government spending relative to non-government sector, government enterprises, and marginal tax rate. When government spending is higher relative to other sector, government enterprises produce large share of output and the marginal tax is large, the allocation of resources determined by government. This situations cause lack of economic freedom since it substitutes personal choices. Therefore, the higher value of this index represents the low size of government.*

Legal Structure and Security of Property Rights (LP*): The prominent elements of in this part are rule of law, security of property rights, independent judiciary, and an impartial court system. These reflect the quality of government to protect its citizens and their properties. Since this security is the source of efficient market functions and free market system, it represents the higher value of this index.*

Access to Sound Money (SM): *Sound money is based on Money Growth, Standard deviation of inflation, Inflation and Freedom to own foreign currency bank accounts. Sound money controls the level of inflation in each country. As a result, this is an important to protect property rights and economic freedom, since inflation decreases the value of property. In addition, it is the basis for the individuals to plan future business. Access to sound money also takes into account the access of bank accounts in other currencies and open foreign bank accounts. Hence, the value this index is based the measure of on how monetary policy is consistency with price stability and the simplicity of using other currencies by domestic and foreign bank accounts. The higher rating in this regard, the country adapts stable rates of inflation and freedom of using other currencies.*

Freedom to Trade Internationally (FTI): *This index is based on the situation of country's tariffs,*

quotas, and control of exchange rate. Since these variables limit the exchange between countries, this index is the key point of economic freedom. Thus, this index measures the range of curbs that affect international exchange including the administrative limits, exchange rate and capital controls. Having large trade share, low tariffs, efficient admiration of customs, freely convertible currency and less controls of capital movement provide higher score for this index.

Regulation of Credit, Labor, and Business (R): *This index measures the freedom of exchange in credit, labor, and product markets. That means which dominates the banking industry; which credit is to private sector; and controls on interest rate are the important points in the first place. The nature that market determines the firing and hiring in labor market and determine wage and the nature that regulations and administrative procedures limit entry and reduce competition are also another important points regarding to this index. The higher score in this part is the market is free to determine credit, labor and business.*

Source: [Kaufmann et al, (2011, pp.223); Lawson, 2008, pp. 69-75); FH, (2016)]

Appendix 7: Panel Unit Roots Tests

Variables	LLC	ADF-Fisher	PP-Fisher
LNEXP	-2.27757**	53.1902*	70.1838**
LNINV	-5.84087***	59.6573**	66.9619***
LNNCC	-9.07474**	105.082***	198.158**
LNNCL	-9.21025**	96.7095***	121.444**
LNNFTI	4.28672***	46.1260*	44.7563*
LNNGE	-3.15734***	53.9876***	41.2481
LNNLP	3.50909***	50.3400**	45.7050**
LNNPR	-9.15181**	123.096**	123.096**
LNNPV	-1.87375**	49.2875**	44.9506**
LNNR	-4.21266***	56.3423**	69.3679**
LNNRL	-1.73174**	134.002**	176.162**
LNNRQ	-2.08209**	151.557**	156.079**
LNNSG	-4.85452***	63.2512***	60.1054**
LNNSM	-5.34832***	62.0266***	54.8057***
LNNVA	-4.41422***	61.9790***	57.3756***
LNOPEN	-16.6198**	49.5737**	58.4715**
LNRGDPPC	-2.58752**	103.537***	57.1786**

Notes: The null hypothesis is that the variable follows a unit root process * refers significance at 10% ** refers significant at 5%. ***refers significant at 1%.