

THE THREE-DIMENSIONAL IMPACTS OF GOVERNANCE ON ECONOMIC GROWTH: PANEL DATA EVIDENCE FROM THE EMERGING MARKET

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Abstract

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In a modern economy, good governance is considered a prominent factor for economic growth (Liu, Tang, Zhou, & Liang, 2018). However, Sub-Saharan Africa has a poor track record of good governance and economic growth (Fayissa & Nsiah, 2013). Therefore, this study is aimed to investigate the impact of governance on economic growth in Sub-Saharan Africa. Panel data that covers a period from 2005 to 2019 for 34 countries and the principal component analysis (PCA) method are employed to achieve the stated objective of the study. The selected fixed- and random-effect estimations showed that among the six-governance quality indicators control of corruption, government effectiveness, regulatory quality, and rule of law positively affect real GDP per capita (economic growth) while political stability and absence of violence and voice and accountability are statistically insignificant to affect real GDP per capita. The estimations result of composite governance indicators confirmed that except for the political dimension of governance both the economic and institutional dimensions of governance, as well as overall composite governance indexes, positively affect the economic growth of the region. Besides, foreign direct investment, the government fixed capital formation and gross domestic product growth affect real GDP per capita positively in all models while government consumption expenditure and age dependency ratio negatively affect real GDP per capita. Therefore, in addition to the existing support in the improvement of the political activities in Sub-Saharan Africa, concerned bodies should also focus to enhance the economic and institutional dimensions of governance in the region.

Keywords: Governance, Panel Data, Fixed-Effects Model, Random-Effects Model, Sub-Saharan Africa, Real GDP Per Capita

Authors' individual contribution: Conceptualization — H.L.F., D.D.A., S.M.A., and F.T.T.; Methodology — H.L.F., D.D.A., S.M.A., and F.T.T.; Formal Analysis — H.L.F., D.D.A., S.M.A., and F.T.T.; Writing — Original Draft — H.L.F., D.D.A., S.M.A., and F.T.T.; Writing — Review & Editing — H.L.F., D.D.A., S.M.A., and F.T.T.; Supervision — H.L.F., D.D.A., S.M.A., and F.T.T.

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1. INTRODUCTION

Scholars describe governance in a variety of ways due to its complexity and breadth. Some use broad definitions, such as “rules, enforcement methods, and organizations”. Others concentrate on the structures in which a country’s power is exercised. By considering the broad and narrow definitions of governance, Kaufmann and Kraay (2002) define it as a structural arrangement in which power is sourced, implanted, and governed in a country. They stated that governance can be defined in three ways: first, the power of a country’s government to source, apply, and change policies; second, the power of the government to formulate sound policies and effectively implement them, and third, the acceptance of the institutions that shape the social and economic relations between society and the state (Kaufmann, Kraay, & Zoido-Lobaton, 1999; Kaufmann, Kraay, & Mastruzzi, 2011).

Over time, the fundamental basis of governance has evolved and it is a crucial element in leadership and implementation. Governance is increasingly being identified as one of the most critical issues to economic growth in most emerging countries. Because “institutions are the rules of the game in a society or humanly devised constraints that shape human interaction and structure incentives in human exchange, shape actions of individuals to maximize the utility of principals” (North, 1990, p. 3). Governance is the process of exercising authority, or control to manage a country’s affairs and resources (Schneider, 1999). Governance, on the other side, is a sophisticated process of interactions between structures, traditions, functions, and procedures defined by accountability, transparency, and participatory principles (USAID, 2002, as cited in Fayissa & Nsiha, 2013).

It is certainly known that improving a country’s business climate is a major factor in attracting both domestic and international investors, which would ultimately result in increased economic growth. Investments will flee politically volatile, bureaucratic, and heavily corrupted economies with inefficient and non-transparent public services. A state that is transparent and accountable in service delivery and responsive to its citizens’ needs will eventually create a democratic environment conducive to inclusive growth and human development (Emara & Chiu, 2016).

However, an economy with poor governance is unsuccessful regardless of sound economic policies. In many developing countries, institutions are largely run by autocratic and corrupt politicians, resulting in a slew of economic, political, and social issues. Developing country governance systems are unprepared to deal with a global market without losing control over rapid capital inflows that can destabilize them (Jreisat, 2002). Poor governance, according to the World Bank, is to blame for poor economic performance in most developing nations, particularly in Sub-Saharan Africa Countries (SSAC) (Kerandi, 2008).

Sub-Saharan African countries, in contrast to other parts of the world, have a poor track record of good governance. These countries have been plagued by political instability, weak leadership, a lack of rule of law, and serious corruption issues, all of which are symptoms of poor governance.

Concerning the importance of good governance to development, improving governance in this region has been given a central place in the New Partnership for Africa’s Development (NEPAD) (Fayissa & Nsiha, 2013).

Models for how governance affects economic growth have been developed in a variety of fields of study. The majority of these studies have found a strong link between good governance and economic growth. Kaufmann et al. (1999), for example, studied more than 150 countries and found empirical evidence that good governance matters a lot for economic outcomes. Furthermore, the findings of a study conducted by (Chong & Calderon, 2000; Chêne, 2008; Mehanna, Yazbeck, & Saredidine, 2010; Gisselquist, 2012; Han, Khan, & Zhuang, 2014; Yerrabati & Hawkes, 2015) confirmed that there is still a strong causal relationship between institutional quality and economic growth.

Although empirical research on the relationship between governance and economic growth is plentiful in general, they are limited in Sub-Saharan African countries and there is a lack of uniformity across the literature regarding the impact of good governance on economic growth. In addition, the existing causal impact studies consider the six governance quality indicators in a single estimation, which is therefore suspected to suffer from multicollinearity problems. Therefore, this study uses a separate estimation for each governance quality indicator to examine the impact of good governance on the economic growth of Sub-Saharan African countries case and considers political, institutional, economic overall dimensions of governance quality to understand the governance-growth relationship in Sub-Saharan Africa. Specifically, The study aims to answer the following questions:

RQ1: How does economic growth change when one of the six governance quality indicators changes?

RQ2: What happens to economic growth when the overall governance index shifts?

RQ3: In assessing economic growth variations, which aspect of governance is more important?

RQ4: In Sub-Saharan Africa, how are these findings interpreted?

The remainder of the paper is organized as follows. Section 2 summarizes a review of relevant literature that provides theoretical and empirical background. The third section discusses the data and methodology. The study’s empirical results are presented in Section 4. Section 5 discusses the study’s findings. The study’s conclusion and policy recommendations are discussed in Section 6.

2. LITERATURE REVIEW

Even though the function of governance in economic development has been understood since the 18th century, economic theories have overlooked the significance of governance in production and economic development. However, in today’s world, whatever economic system has been formed, governance has become a major element (Fayissa & Nsiha, 2013). Thus, this section briefly discusses how theoretically and empirically governance affects economic growth.

Governance is a sub-component of an institution that covers all aspects of behavior and social network like political, economic, and legal aspects (North, 1990). Strong governance boosts individual and organizational productivity by utilization of their resources efficiently in production. Economic actors are more involved in resource reallocation when governance is poor, putting limits on free-market rather than productive activities (Yildirim & Gökalp, 2016; Hunjra, Mehmood, & Tayachi, 2020). Because strong governance lowers company expenses, it promotes the creation of markets in which agents can benefit from each other. It fosters an atmosphere in which people and physical capital are prioritized. To put it another way, strong governance minimizes macroeconomic instability, uncertainty, and negative externalities. This improves economic efficiency by allowing for more efficient resource allocation. Information for enterprises and consumers to respond rationally and foster free-market competition is governance quality. These factors contribute to economic growth (Ugur, 2010).

The rule of law and regulatory quality foster trust in society, which leads to increased investment, capital formation, and innovation. It takes less time to introduce a new technology or product when society is more trusting. This leads to higher economic growth in cultures with higher levels of trust. When there is a high level of trust, it is easier to apply property rights. As a result, the costs of acquiring, preserving, and transferring property rights are reduced (Knack & Keefer, 1997; Oppor, 2008). Similarly, excellent corporate governance is determined by the quality of institutions such as political and legal culture. Great corporate governance, in particular, is critical to economic success because it boosts competitiveness and creates prosperous societies (Arslan, Abidin, Alqatan, & Roudaki, 2019). Furthermore, strong governance helps to coordinate government policy and boost economic growth. In a well-conducive environment, good governance impacts public policy and corporate behavior. These outcomes like stability and dispute resolution are circumstances to form a market that influences productivity and per capita income. Excellent governance reduces conflict and promotes long-term stability. This, in turn, promotes foreign direct investment and technology transfer across countries (Ugur, 2010).

Given the theoretical importance role of governance in economic growth, there are plenty of investigations to understand the impact of governance on economic growth. However, studies used different measures of governance, methodologies, and sample for their investigations and the results are mixed. For example, Efendic and Pugh (2015) checked the impact of the aggregate institutional indicators on per capita GDP using panel data from 1991 to 2007 years for 29 transition countries and the estimates revealed that per capita GDP is positively affected by institutional reform and governance quality. Zidi and Dhifallah (2013) examined the effect of corruption and governance on financial performance using panel data over the period 1998–2011 from 30 nations and they found that improving governance quality decreases corruption and enhances economic development.

Bhattacharjee and Haldar (2015) analyzed the association of economic growth and institutions using data over the period 1996–2010 for four Asian countries. They found that voice and accountability and regulatory quality have a significant impact on growth. Yerrabati and Hawkes (2015) assessed the effect of governance on economic growth using meta-synthesized techniques for 29 studies with 554 estimators in the South and East Asia and Pacific region. They discovered that, aside from government effectiveness and regulation, most governance indicators have no significant impact on growth. Similarly, Emara and Chiu (2016) used principal component analysis (PCA) to investigate the impact of governance on economic growth in 21 Middle Eastern and North African (MENA) countries between 2009 and 2013, finding that the composite government indicator has a positive impact on per capita income.

Alomaisi, Schmaileh, and Schomacker (2016) investigated the impact of governance on economic growth for Yemen using multiple regression models. The results confirmed that rule of law and political instability directly influence economic growth while other variables are declared insignificant. However, Akinlo (2016) investigated the association of rule of law and real GDP using panel data over the period 1986–2013 from 32 Sub-Saharan African countries. Pooled OLS and GMM method of estimation found that rule of law negatively affects real GDP since in this region the rule of law is not deep-rooted and property rights are not well defined and protected. Habyarimana and Dushimayezu (2018) examined the association between good governance, economic growth, and development in Rwanda by adopting the principal component analysis method of investigation. The finding discovered that there is an existence of a pro-cyclical relationship between governance and economic development.

Afolabi (2019) used a panel to look at the impact of governance on sustainable development in West Africa from 2002 to 2016. He discovered that voice and accountability, political stability, government effectiveness, and the rule of law all have a positive impact on development, whereas regulatory quality and corruption control have a negative impact on short-term growth. Nonetheless, all governance indexes have a positive impact on development in West African countries over long periods. Moreover, studies like Osman, Alexiou, and Tsaliki (2012), Kilishi, Mobolaji, Yaru, and Yakubu (2013), Tarek and Ahmed (2013), Fayissa and Nsiah (2013), Ebaidalla (2014), and Mira and Hammadache (2017) found a substantial outcome of governance on economic growth in Sub-Saharan Africa.

Based on the empirical research discussed above, we found that poor governance leads to economic disparities between wealthy and poor nations. To put it another way, countries' governance indexes are inconclusive and dynamics.

3. RESEARCH METHODOLOGY

3.1. Data and description

The availability of appropriate data is crucial to the success of any econometric analysis (Gujarati, Porter, & Gunasekar, 2012). As a result, it's critical to talk about the data's origins and characteristics. This study used balanced panel data from the World

Development Indicators (WDI), the World Bank's premier compilation of cross-country comparable development data (The World Bank, 2014), and the Worldwide Governance Indicators (WGI), a research dataset summarizing the views on the quality of governance provided by a large number of enterprises, citizen and expert survey respondents in industrial and developing countries (Kaufmann, Kraay, & Mastruzzi, 2010) for 34 Sub-Saharan African countries. Panel data are cross-section data that have been pooled over time and follow the same individual agents over time (Blundell & Matyas, 1992). This study uses panel data because it is an invaluable tool for countering various types of biases that can be inherent in conclusions drawn from other data structures, or because it is more advantageous to construct and test more complex behavioral models than purely cross-sectional or time-series data (Hsiao, 2003). Aside from that, panel data is an efficient and cost-effective way to track changing behaviors and attitudes over time (Andreß, 2017).

The study's sample size and timeframe are determined by the availability of data. As a result, the study included 15 years of data for each Sub-Saharan African country where data is abundant for the given period. The collected data is analyzed using descriptive and regression methods of analysis. The descriptive statistics show the mean, standard deviation, minimum and maximum values, as well as correlation coefficients, for the variables of interest. While an econometric approach is used to assess the relationship between governance quality and economic growth.

3.2. Variables and hypotheses

3.2.1. Dependent variable

Economic growth is defined as an increase in the output of goods and services over a specific period. To be most precise, the measurement must account for the effects of inflation. It is the most effective tool for alleviating poverty and improving the quality of life in developing countries (Dfid, 2008). Existing economics literature employed various measures of economic growth, including gross domestic product (GDP), gross national product (GNP), gross national income (GNI), and real GDP per capita (RGDPPC), all of which are derived from GDP. Our study considers *RGDPPC* as a measure of economic growth among the alternative dependent variables because it is easy to compare when the population of a country is taken into account.

3.2.2. Explanatory variables

The way of life and establishments through which a country's power is used is known as governance. As policymakers and scholars pay more attention to the importance of governance in economic development, they need governance quality measurements to support their decision-making and analysis. The six governance quality indicators and four governance quality indicator composite indexes are used in this study as the main causal variables for variation in real GDP per capita across Sub-Saharan African countries.

Voice and accountability (VA), political stability and absence of violence/terrorism (PSAV), government effectiveness (GE), regulatory quality (RQ), rule of law (RL), and corruption control (CC) are the six broad dimensions of governance that the Worldwide Governance Indicators (WGI) project constructs.

Voice and accountability (VA) measure citizens' perceptions of their ability to participate in the election of their government, as well as freedom of expression, association, and the press. PSAV stands for political stability and absence of violence/terrorism, and it measures public perceptions of the likelihood that the government will be destabilized or overthrown through unconstitutional or violent means, including politically motivated violence and terror. Government effectiveness (GE) is a measure of public service quality, civil service quality and independence from political pressures, policy formulation, and implementation quality, and the credibility of the government's commitment to such policies. Regulatory quality (RQ) is a metric that measures public perceptions of the government's ability to develop and implement sound policies and regulations that allow and promote private sector growth. The term "rule of law" (RL) refers to how confident and obedient people are to society's rules, particularly 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) is a concept that describes how public power is used for private gain, including both petty and grand corruption, as well as "capture" of the state by elites and private interests (Kaufmann et al., 2011).

The six governance quality indicators are presented positively any improvement in one or more of the governance quality indicators will be followed by the overall improvement in governance. Any improvement in governance quality indicators has two effects on a country's economy. First, effective governance creates a set of critical institutions that increase human and physical capital productivity while also attracting investment in human and physical capital development. This procedure eventually boosts economic growth, according to the Solow model and new growth theory. Second, improved governance, according to the social infrastructure hypothesis, strengthens a country's main institutions and results in a favorable set of government policies for economic growth. Better institutions and government policies encourage increased investment in human and physical capital development, which leads to economic growth (Samarasinghe, 2018).

The six governance quality indicators on economic growth are expected to have a positive and statistically significant impact in this study. As a result, the following null hypotheses were proposed:

H1a₀: There is a statistically significant positive relationship between VA and economic growth.

H1b₀: There is a statistically significant positive relationship between PSAV and economic growth.

H1c₀: There is a statistically significant positive relationship between GE and economic growth.

H1d₀: There is a statistically significant positive relationship between RQ and economic growth.

H1e₀: There is a statistically significant positive relationship between RL and economic growth.

H1f₀: There is a statistically significant positive relationship between CC and economic growth as measured by per capita GDP, as opposed to the alternative hypothesis that all forms of governance indicators have no statistically significant relationship.

The six governance quality indicators are categorized into three dimensions based on the traditions and institutions by which authority in a country is exercised. The political dimension of governance — the process by which governments are selected, monitored, and replaced; the economic dimension of governance — the capacity of the government to effectively formulate and implement sound policies. Institutional dimensions of governance — the respect of citizens and the state for the institutions that govern economic and social interactions among them (Kaufmann et al., 2011).

This study also expects a positive and significant impact of the three dimensions and the overall governance composite index on economic growth as measured by per capita GDP. Thus, the following null hypotheses have been formulated:

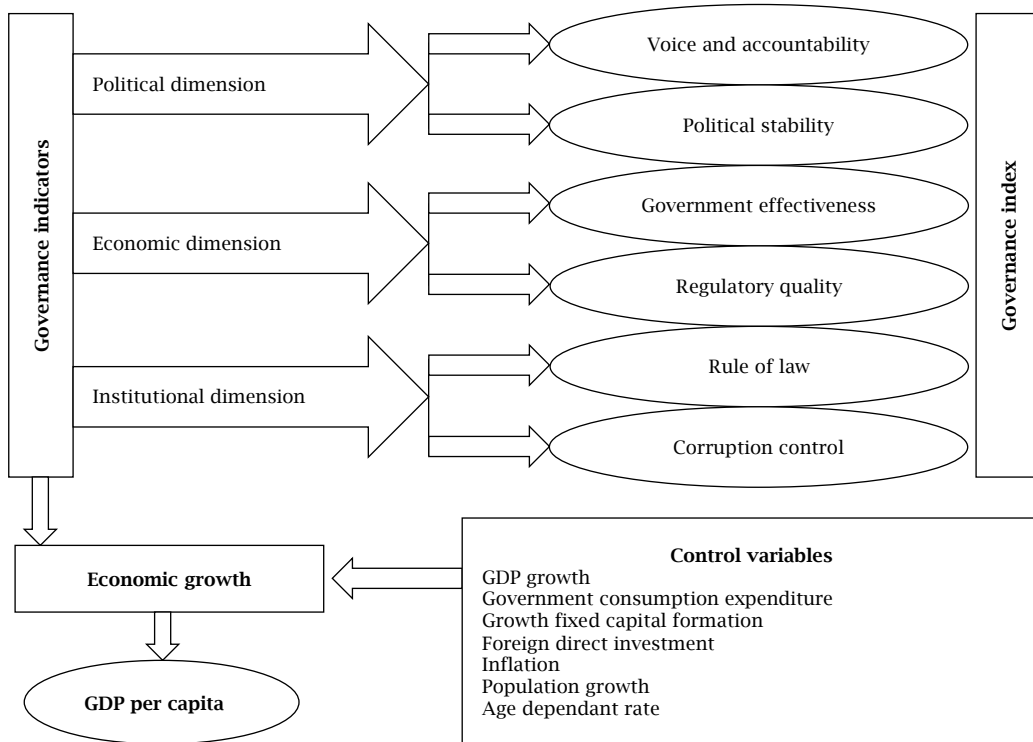
H2a₀: There is a statistically significant and positive relationship between the political dimensions of governance and economic growth.

H2b₀: There is a statistically significant and positive relationship between the economic dimensions of governance and economic growth.

H2c₀: There is a statistically significant and positive relationship between the institutional dimensions of governance and economic growth.

H2d₀: There is a statistically significant and positive relationship between the overall governance index and economic growth as measured by per capita GDP against the alternative hypothesis that all the four dimensions of governance indicators have no statistically significant effect on economic growth.

Figure 1. Concept mapping of the study variables



Source: Authors' elaboration.

3.2.3. Control variables

Researchers also use control variables to rule out alternative explanations for their findings, as well as to reduce error terms and improve the model's statistical power (Schmitt & Klimoski, 1991). When planning a study, control factors should be given the same weight as independent and dependent variables. A researcher cannot make reliable statements about the impact of independent variables without control variables (Allen, 2017). As a result, we add seven control variables to the top of the governance quality indicator variables, which are commonly thought to be determinants of

economic performance as measured by GDP per capita in the literature: the log of foreign direct investment (*LFDI*), growth fixed capital formation (*GFCE*), growth consumption expenditure (*GCE*), inflation rate (*Inf*), population growth rate (*POPG*), GDP growth (*GDPG*), and age dependency ratio (*ADR*).

3.3. Principal component analysis (PCA)

Large datasets are becoming more frequent, yet they can be difficult to understand. PCA is a technique for lowering the dimensions of such datasets while minimizing information loss. It accomplishes this by

introducing new uncorrelated variables that gradually reduce variance (Jolliffe & Cadima, 2016). We were able to construct the four composite governance indexes namely political, economic, institutional, and overall governance index using the PCA. Principal components analysis is a dimensionality-reduction approach that reduces the dimensionality of large data sets by condensing a large collection of variables into a smaller set that retains the bulk of the information in the larger set. Furthermore, by condensing highly correlated variables into a smaller set of uncorrelated variables, this method preserves the multidimensionality of governance quality indicators while also addressing the issue of high collinearity among individual indicators.

3.4. Specification of the model

The model of the study is developed based on the works of Kaufmann et al. (1999), Emara and Chiu (2016), Fayissa and Nsiah (2013), Lahouij (2017), and Samarasinghe (2017). There are two sections in which we present our regression models. The first section is composed of six equations that depict the relationship between governance indicators and real GDP per capita. Whereas, the second section of the model composed four equations that depict the impact of political, economic, institutional dimensions of governance and overall governance composite indexes on real GDP per capita.

Model 1: The six governance quality indicators and economic growth

$$RGDPPC_{it} = \alpha + \beta_1 LFDI_{it} + \beta_2 CC_{it} + \beta_3 GFCF_{it} + \beta_4 GCE_{it} + \beta_5 Inf_{it} + \beta_6 POPG_{it} + \beta_7 GDPG_{it} + \beta_8 ADPR_{it} + \varepsilon_{it} \tag{1}$$

where, α is a constant term; $\beta_1 \dots \beta_8$ are the coefficients of the variables of the model; ε is the error term; t refers to the period. The control of corruption (CC) would be replaced by the government

effectiveness (GE), political stability and absence of violence (PSAV), regulatory quality (RQ), rule of law (RL), and voice and accountability (VA) in the alternative specifications of the model.

Model 2: Governance quality composite indexes and economic growth

$$RGDPPC_{it} = \alpha + \beta_1 LFDI_{it} + \beta_2 AGI_{it} + \beta_3 GFCF_{it} + \beta_4 GCE_{it} + \beta_5 Inf_{it} + \beta_6 PopG_{it} + \beta_7 GDPG_{it} + \beta_8 ADPR_{it} + \varepsilon_{it} \tag{2}$$

Similarly, the overall governance index (AGI) would be replaced by the political dimension (PD) of governance, economic dimension (ED) of governance,

and institutional dimension (ID) of governance in the alternative specifications of the model.

Table 1. Definitions of variables

Variables	Definition	Source	Expected sign
<i>Inf</i>	An increase in the general price level of goods and services.	World Bank (WDI)	-
<i>POPG</i>	A change in the size of a population.	World Bank (WDI)	-
<i>LFDI</i>	An investment from a party in one country into a business or corporation in another country.	World Bank (WDI)	+
<i>GCE</i>	The spending by households on goods and services.	World Bank (WDI)	+
<i>GDPG</i>	The total monetary value of all final goods and services produced within a country during a period.	World Bank (WDI)	+
<i>ADR</i>	An age-population ratio of those typically not in the labor force and those typically in the labor force.	World Bank (WDI)	-
<i>VA</i>	Expresses to which extent a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media.	World Bank (WGI)	+
<i>PSAV</i>	The likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism.	World Bank (WGI)	+
<i>RQ</i>	The ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank (WGI)	+
<i>RL</i>	The extent to which agents have confidence in and abide by the rules of society.	World Bank (WGI)	+
<i>CC</i>	Perceptions of the use of public power in the pursuit of private gain.	World Bank (WGI)	+
<i>GE</i>	The quality of public services, the quality of 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.	World Bank (WGI)	+
<i>PD</i>	Processes for selecting, monitoring, and replacing authority participants (composite index).	Own computation based on WGI data	+
<i>ED</i>	The process through which solid policies and public resources are efficiently administered (composite index).	Own computation based on WGI data	+
<i>ID</i>	Procedures via which citizens and the state itself respect the institutions of society/public (composite index).	Own computation based on WGI data	+
<i>AGI</i>	Composite governance index (CGI), which summarizes the current six global governance indicators measures (WGI).	Own computation based on WGI data	+

Source: Authors' elaboration.

4. RESULTS

4.1. Descriptive statistics

Table 2 below summarizes the LGDP per capita, governance indicators, and control factors for 34 SSA countries over the period 2005-2019. Each governance indicator runs from -2.5 (poor governance) to +2.5 (good governance). The higher the rank, the greater the score. For governance indicators, the average score for *CC* is -0.66, with the lowest score of -1.83 is registered in Equatorial Guinea in 2017 and the highest score of 1.16 registered by Botswana in 2005. The highest *GE* is 1.06 which is scored by Mauritius in 2015 and the lowest one is -1.85 of Central Africa in 2014, with an overall mean of -0.7. *PSAV* has a mean of -0.57 in

the region, a minimum score of -2.70 registered by Central Africa in 2015, and a maximum value of 1.20 which is registered by Namibia in 2008. *RQ* has a mean score of -0.60, the lowest score of this indicator is -1.70 which is registered by The Democratic Republic of Congo in 2005, and the highest score of 1.13 is registered by Mauritius, 2014. The lowest score of *RL* is -1.82 which is registered by Central Africa in 2016, the highest one is 1.03 which is scored by Mauritius in 2005, and the mean score of this indicator for the region is -0.66. The average score of *VA* in the region is -0.54, with the lowest score of -2.0 is registered by Equatorial Guinea in 2015 and the highest score of 0.94 is registered by Mauritius in 2014. As illustrated in Table 2, similar statistical interpretations are utilized for the control variables.

Table 2. Summary statistics

Variable	Mean	Std. Dev.	Min	Max
LGDP/PC	7.163569	1.068798	5.337897	9.929787
CC	-0.6584126	0.590625	-1.82638	1.15993
GE	-0.7651698	0.6272714	-1.84833	1.05699
PSAV	-0.569945	0.8751663	-2.69919	1.20023
RQ	-0.5978292	0.5673181	-1.68372	1.12727
RL	-0.6604912	0.5910244	-1.8165	1.02916
VA	-0.5404445	0.7043093	-2.00025	0.940896
GFCF	21.92618	8.437647	6.349849	79.46179
GCE	13.83474	5.023638	2.736064	28.01463
DPR	83.28219	13.90929	41.29291	111.9387
Inf	8.468449	20.42961	-4.29487	379.848
PopG	2.591991	0.8271598	0.03224	4.654911
LFDI	0.9234608	1.328485	-6.280461	4.637999

Source: Own computation, 2021.

4.2. Model diagnosis

4.2.1. Heteroscedasticity test

According to Gauss-Markov conditions, the variance of the disturbance term in each observation must be constant. In other words, the likelihood of the error term reaching a given positive (or negative) value will be the same in all observations. This condition is known as homoscedasticity (Dougherty, 2016). If the homoscedasticity assumption is not satisfied,

then there is heteroscedasticity, or disturbances are heteroscedastic. There are different methods used to test the problem of heteroscedasticity, we used the Breusch-Pagan test to identify the problem of heteroscedasticity and the following table presented the test. The null hypothesis assumes residuals are homoscedastic for all the models, we have $\text{Prob.} > \text{Chi}^2$ with a value greater than 0.05, as a result, we accept the null that residuals are homoscedastic in all models employed in the study.

Table 3. Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

Regression No.	Breusch-Pagan test	Result	Regression No.	Breusch-Pagan test	Result
1	$\text{Chi}^2(1) = 0.54$ $\text{Prob.} > \text{Chi}^2 = 0.4607$	Homoscedastic	6	$\text{Chi}^2(1) = 0.28$ $\text{Prob.} > \text{Chi}^2 = 0.5944$	Homoscedastic
2	$\text{Chi}^2(1) = 1.97$ $\text{Prob.} > \text{Chi}^2 = 0.1602$	Homoscedastic	7	$\text{Chi}^2(1) = 0.28$ $\text{Prob.} > \text{Chi}^2 = 0.5944$	Homoscedastic
3	$\text{Chi}^2(1) = 0.44$ $\text{Prob.} > \text{Chi}^2 = 0.5077$	Homoscedastic	8	$\text{Chi}^2(1) = 1.65$ $\text{Prob.} > \text{Chi}^2 = 0.1994$	Homoscedastic
4	$\text{Chi}^2(1) = 1.65$ $\text{Prob.} > \text{Chi}^2 = 0.1994$	Homoscedastic	9	$\text{Chi}^2(1) = 0.54$ $\text{Prob.} > \text{Chi}^2 = 0.4607$	Homoscedastic
5	$\text{Chi}^2(1) = 1.70$ $\text{Prob.} > \text{Chi}^2 = 0.1924$	Homoscedastic	10	$\text{Chi}^2(1) = 0.85$ $\text{Prob.} > \text{Chi}^2 = 0.3575$	Homoscedastic

Source: Own computation, 2021.

4.2.2. Multicollinearity test

One of the essential assumptions of multiple regression models is that explanatory variables are not perfectly multicollinear. Multicollinearity is a situation where explanatory variables are highly related. The linear interdependence of two variables is explained by the correlation coefficient. As a result, it can be used in econometric models as a measure of multicollinearity among explanatory variables. Variables with high

correlation coefficients have a strong interdependence (Gujarati et al., 2012).

The correlations between the six governance indicators and the four governance composite indexes are much higher, as shown in Table 5. This is expected given the interdependence of all governance quality indicators. In our regression analysis, however, this is not a concern because the relationship between each governance quality indicator variable and per capita GDP is estimated separately in separate models.

The correlation coefficient of control variables, on the other hand, is less than 0.05, implying that multicollinearity will not be an issue in future econometric estimations.

4.2.3. Hausman specification test

Fixed-effects and random-effects models are the most commonly estimated models with panel (longitudinal) data. The unobserved variables in a fixed-effects model are allowed to have any relationship with the observed variables. In a random-effects model, however, the variation across entities is assumed to be random and unrelated to the model's independent variables (Williams, 2015). The statistical significance of the difference between the coefficient estimates obtained

by fixed effect and random effect is determined by the Hausman test (Sheytanova, 2015).

The study used a total of ten models divided into two subgroups, as stated in the methods section. The first subgroup uses real GDP per capita as a dependent variable and the six governance quality indicators as explanatory variables, while the second uses real GDP per capita as a dependent variable and the political, economic, institutional, and overall governance composite index as explanatory variables. As a result, we conduct separate Hausman tests on each model to determine whether the fixed-effects or random-effects model should be used. The fixed-effects model, except the second model, is found to be appropriate, as shown in Table 4 below.

Table 4. Hausman specification test

Regression No.	Hausman test	Preferred model	Regression No.	Hausman test	Preferred model
1	= 31.26 Prob. > Chi ² = 0.0001	Fixed effect	6	= 52.46 Prob. > Chi ² = 0.0000	Fixed effect
2	= 0.65 Prob. > Chi ² = 0.9987	Random effect	7	= 52.46 Prob. > Chi ² = 0.0000	Fixed effect
3	= 90.05 Prob. > Chi ² = 0.0000	Fixed effect	8	= 46.24 Prob. > Chi ² = 0.0000	Fixed effect
4	= 46.24 Prob. > Chi ² = 0.0000	Fixed effect	9	= 31.26 Prob. > Chi ² = 0.0001	Fixed effect
5	=152.28 Prob. > Chi ² = 0.0000	Fixed effect	10	= 46.24 Prob. > Chi ² = 0.0000	Fixed effect

Source: Own computation, 2021.

Table 5a. Correlation matrix

	(1) LFDI	(2) CC	(3) GE	(4) PSAV	(5) RQ	(6) RL	(7) VA	(8) PD	(9) ED
(1) LFDI	1.0000								
(2) CC	0.0360	1.0000							
(3) GE	0.0336	0.8572	1.0000						
(4) PSAV	0.1735	0.6810	0.6474	1.0000					
(5) RQ	0.0080	0.8436	0.9468	0.6305	1.0000				
(6) RL	0.0583	0.8921	0.9293	0.7436	0.9181	1.0000			
(7) VA	0.0340	0.7179	0.7179	0.5760	0.7468	0.7768	1.0000		
(8) PD	0.0340	0.7179	0.7179	0.5760	0.7468	0.7768	1.0000	1.0000	
(9) ED	0.0080	0.8436	0.9468	0.6305	1.0000	0.9181	0.7468	0.7468	1.0000
(10) ID	0.0360	1.0000	0.8572	0.6810	0.8436	0.8921	0.7179	0.7179	0.8436
(11) GI	0.3997	0.2204	0.1480	0.2334	0.1555	0.1981	0.1865	0.1865	0.1555
(12) GFCF	0.3585	0.0536	0.0872	0.2027	0.0393	0.0735	-0.0230	-0.0230	0.0393
(13) GCE	-0.0989	0.3665	0.3467	0.3364	0.3098	0.3086	0.2341	0.2341	0.3098
(14) Inf	0.0059	-0.0175	0.0102	-0.0097	0.0138	0.0098	0.0181	0.0181	0.0138
(15) POPG	0.1453	-0.5094	-0.4753	-0.2452	-0.4622	-0.4513	-0.3727	-0.3727	-0.4622
(16) GDPG	0.1426	0.1586	0.1410	0.0312	0.1474	0.1361	0.1656	0.1656	0.1474
(17) DPR	0.0154	-0.5063	-0.5537	-0.5515	-0.4875	-0.5393	-0.3737	-0.3737	-0.4875

Table 5b. Correlation matrix

	(10) ID	(11) GI	(12) GFCF	(13) GCE	(14) Inf	(15) POPG	(16) GDPG	(17) DPR
(10) ID	1.0000							
(11) GI	0.2204	1.0000						
(12) GFCF	0.0536	0.1527	1.0000					
(13) GCE	0.3665	-0.2980	0.1268	1.0000				
(14) Inf	-0.0175	0.0188	-0.0235	0.0102	1.0000			
(15) POPG	-0.5094	-0.1096	0.2076	-0.2050	-0.0187	1.0000		
(16) GDPG	0.1586	0.1175	0.0338	-0.1563	-0.0140	0.1079	1.0000	
(17) DPR	-0.5063	-0.0973	-0.0844	-0.2577	-0.0536	0.6100	0.1411	1.0000

Source: Own computation, 2021.

4.3. Regression result

Table 6 shows the empirical findings on the association between governance and real GDP per capita, which are based on the six governance indicators and four governance composite indexes mentioned earlier.

Four of the six governance indicators, CC, GE, RQ, and RL, are statistically significant and have a positive impact on real GDP per capita, according to the regression results. While both VA and PSAV are

statistically insignificant in influencing our dependent variable.

Several studies have been conducted to investigate the relationship between corruption and economic growth, and corruption control is widely regarded as critical to economic growth. The predicted relationship between corruption and economic growth, however, varies from study to study, making the link inconclusive. The positive relationship between corruption control and economic growth in Sub-Saharan

African countries is revealed by our regression results. Mustapha (2014), Mo (2001), Shabbir, Anwar, and Adil (2016), Gründler and Potrafke (2019), and Amin, Ahmed, and Zaman (2013) all found that corruption has a strong statistically significant negative impact on GDP per capita. The result, however, contradicts Habtamu's (2008) conclusion that corruption control has no relationship with growth.

The quality of government services, competent policy formulation, and the ability to implement desired policies all contribute to government effectiveness (Kaufmann et al., 2010). Our findings showed that government efficiency has a significant and positive impact on real GDP per capita. The findings are consistent with that of Lahouij (2017), who found a positive and statistically significant link between government effectiveness and economic development.

Our regression results on the impact of political stability, absence of violence, and voice and accountability on economic growth as measured by GDP per capita are similar to Pere (2015), who found a statistically insignificant relationship between the two variables (political stability and economic growth). The findings contradict those of Murad and Alshyab (2019), who claimed that internal political instability, as measured by the number of crimes and cabinet changes, has a significant and negative impact. Our regression result, on the other hand, shows that regulatory quality has a positive and significant impact on economic development. Our findings are consistent with Grochová's (2015) regression results, which show that more efficient institutional settings lead to an increase in environmental quality that is proportional to economic development.

Table 6. Governance quality indicators and economic growth

Model	Dependent variable: Log real GDP per capita					
	1	2	3	4	5	6
<i>Hausman test</i>	<i>FE</i>	<i>RE</i>	<i>FE</i>	<i>FE</i>	<i>FE</i>	<i>FE</i>
<i>LFDI</i>	0.0142*** (0.0053)	0.0132** (0.0055)	0.0138*** (0.0053)	0.0114** (0.0052)	0.0137** (0.0053)	0.0147*** (0.0054)
<i>CC</i>	0.0509* (0.0292)					
<i>GE</i>		0.6826* (0.0351)				
<i>PSAV</i>			-0.0227 (0.0142)			
<i>RQ</i>				0.1551*** (0.0297)		
<i>RL</i>					0.0838*** (0.0328)	
<i>VA</i>						0.0085 (0.0284)
<i>GFCF</i>	0.0058*** (0.0007)	0.0060*** (0.0007)	0.0062*** (0.0007)	0.0056*** (0.0007)	0.0056*** (0.0007)	0.0060*** (0.0007)
<i>GCE</i>	-0.0090*** (0.0020)	-0.0096*** (0.0020)	-0.0101*** (0.0020)	-0.0098*** (0.0019)	-0.0083*** (0.0020)	-0.0094*** (0.0020)
<i>Inf</i>	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
<i>POPG</i>	-0.0115 (0.1938)	-0.0145 (0.0197)	-0.0102 (0.0194)	-0.00127 (0.0189)	-0.0123 (0.0193)	-0.0112 (0.0194)
<i>GDPG</i>	0.0025** (0.0011)	0.0025** (0.0011)	0.0028** (0.0011)	0.0022** (0.0011)	0.0025** (0.0011)	0.00116** (0.0011)
<i>ADR</i>	-0.0230*** (0.0017)	-0.0230*** (0.0017)	-0.2185*** (0.0017)	-0.0218*** (0.0017)	-0.0203*** (0.0018)	-0.0215*** (0.0018)
Constant	9.01938*** (0.1589)	9.1522*** (0.1964)	8.9895*** (0.1578)	9.0867*** (0.1544)	8.9267*** (0.1587)	8.9801*** (0.1595)
Observation	443	443	443	443	443	443
R-squared	0.5907	0.6004	0.5923	0.5778	0.5973	0.5986

Note: *, **, ***: significance levels of 10%, 5%, and 1%, respectively. Besides, RE stands for random effect.

Rule of law (RL) has a significant and positive impact on GDP per capita, according to the estimation result, as shown in Table 6. Adzima and Baita's (2019) empirical findings support this conclusion. In terms of control variables, GDP per capita is positively influenced by the log of foreign direct investment (LFDI), the government fixed capital formation (GFCF), and GDP growth. Government consumption expenditure (GCE) and the age dependency ratio (ADR), on the other hand, have a significant and negative impact on real GDP per capita.

In addition, Table 7 shows the relationship between the four governance quality composite indexes

with the per capita GDP of Sub-Saharan African countries. The estimation results depict that except for the political dimension, both the economic and institutional dimensions of governance positively and significantly affect economic growth. Apart from that, the overall governance composite index has a statistically significant and positive effect on economic growth, and our findings are consistent with Kaufmann and Kraay's (2002) findings that governance quality and economic growth are linked. They discovered a strong correlation between per capita income and the quality of governance in their analysis of the worldwide governance indicators (WGI) from 1996 to 2002.

Table 7. Governance quality composite and economic growth

<i>Dependent variable: GDP per capita growth</i>				
<i>Model</i>	1	2	3	4
<i>Hausman test</i>	FE	FE	FE	FE
<i>LFDI</i>	0.1470*** (0.0054)	0.0114** (0.0052)	0.0141*** (0.0053)	0.01142*** (0.0052)
<i>PD</i>	0.0060 (0.0200)			
<i>ED</i>		0.0880*** (0.0168)		
<i>ID</i>			0.0300* (0.0172)	
<i>AGI</i>				0.0880*** (0.0168)
<i>GFCF</i>	0.0060*** (0.0007)	0.0056*** (0.0007)	0.0058*** (0.0007)	0.0056*** (0.0007)
<i>GCE</i>	-0.0094*** (0.0020)	-0.0098*** (0.0019)	-0.0090*** (0.0200)	-0.0098*** (0.0019)
<i>Inf</i>	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0001 (0.0002)
<i>POPG</i>	-0.0112 (0.0194)	-0.0012 (0.0189)	-0.0115 (0.0193)	-0.0012 (0.0189)
<i>GDPG</i>	0.0026** (0.0011)	0.0022** (0.0011)	0.0025** (0.0011)	0.0022** (0.0011)
<i>ADR</i>	-0.0215*** (0.0018)	-0.0218*** (0.0017)	-0.0216*** (0.0017)	-0.02189*** (0.0017)
Constant	8.9755 (0.1620)	8.9940*** (0.1532)	8.9858*** (0.1577)	8.9940*** (0.1532)
Observation	443	443	443	433
R-squared	0.5986	0.5778	0.5907	0.5778

Note: *, **, ***: significance levels of 10%, 5%, and 1%, respectively.

5. DISCUSSION

5.1. Individual governance indicators

Table 6 shows the study estimations of the six individual measures of governance regressed separately. Control of corruption, government effectiveness, regulatory quality, voice and accountability, and rule of law all positively affect economic growth in Sub-Saharan African countries, while political stability, the absence of violence, and voice and accountability have statistically insignificant effects.

Control of corruption (CC) impacts the economy positively in Sub-Saharan Africa. This contradicts the findings of Afolabi (2019) who found a negative effect of corruption on economic development. According to the estimation result as Sub-Saharan African countries registered improvement in control of corruption index by one, on average we expect an increase in real GDP per capita by 5.09%. It would be for two reasons, first, if corruption is controlled in the nation, resources are saved since the corrupted officials always conceal their resources by transferring capital to foreign countries especially in developed nations. However, with strong corruption control, this is not the case. Thus, the financial sector will avail a large number of loanable funds to the firm sector. The business sector in return enjoys more funds for their investment and increases their production. Second, there would be an efficient allocation of resources in a corruption-free economy. Corruption always exists to constraint the business opportunities of an efficient firm and reallocate resources to inefficient ones. An inefficient firm contributes less output than the efficient one in an economy.

The estimation result for government effectiveness (GE) revealed that there is a direct

relationship with economic growth in Sub-Saharan Africa. The result is in line with the findings of Yerrabati and Hawkes (2015) and Afolabi (2019). According to the estimation result, the one-unit improvement in the government effectiveness index results in a 68.28% improvement in real GDP per capita. Even though the result confirmed the preposition of Keynesian government intervention in the economy it should be done effectively and efficiently. Because government effectiveness implies quality public and civil services that improve the efficiency of resource allocation and production. If there are high government effectiveness policymakers formulate and implement quality and right economic policies without any political pressure.

The estimate of regulatory quality in this study shows a positive effect on economic growth in Sub-Saharan Africa as in the studies (Bhattacharjee & Haldar, 2015; Yerrabati & Hawkes, 2015). However, the finding disputes with the study of Afolabi (2019) which revealed the negative effect of regulatory quality on economic growth. According to our estimation, a unit regulatory quality enhancement results in a 15.51% increment in the economic growth of Sub-Saharan Africa.

This is because the quality of regularity increases the perception of firms that the government can formulate, implement and regulate comprehensive policies that improve the confidence of firms in business decisions and promote private sector development.

In Table 6 we can see that a rule of law positively affects economic growth. Sub-Saharan countries can enhance their economic growth by 8.386% as long as they improve their rule of law index with a unit. The reasons are straight forward that rule of law will create confidence in firms in the business sector since with a strong rule of law in

a particular country, there will be a quality of contract enforcement, strong and clear property rights, and conflict and crime controlled by the process of the judiciary system. With strong property rights, markets work effectively and efficiently. Thus, it has a positive impact on the overall economic growth in Sub-Saharan Africa. The positive impact of rule of law on economic growth contradicts the studies of Yerrabati and Hawkes (2015) and Akinlo (2016). However, it is in line with the findings of Alomaisi et al. (2016) and Afolabi (2019).

Voice and accountability (VA) and political stability and absence of violence (PSAV), on the other hand, have statistically insignificant effects on economic growth. Although the general perception of economic theory is that political stability, the complete absence of violence, and voice and accountability stimulate economic growth.

5.2. Composite governance indicators

The results of composite indicators on economic growth are reported in Table 7. The authors produce four composite indexes by employing the principal component analysis which is the political dimension of governance from voice and accountability and political stability and absence of violence, the economic dimension of governance from government effectiveness and regularity quality, institutional dimension of governance from rule of law, and control of corruption and finally the overall or governance composite index by combining the six indicators of governance measures. The aim of creating these composite indicators is two; one is to understand how each measure of governance affects economic growth together because some indicators may be preconditions for the other to impact the economy and second to increase the credibility of each indicator's influence on economic growth.

The estimation results of the four composite indicators have a positive outcome on economic growth. These results support two important points one how each indicator is important for economic growth since they have a positive effect together and separately except political stability and absence of violence and voice and accountability. Second, they are also more effective for influencing economic growth if all are improved at the same time than individually. The implication of this is the effectiveness of control of corruption, for example, is better along with a strong rule of law. Thus, if this is the case when nations improve the quality of institutions by improving control of corruption and rule of law together, the economy enjoys improvements in institutional dimensions of governance. According to our estimation, a unit improvement in the institutional dimension of governance will be followed by a 3% increase in real GDP per capita. The same is true for economic dimension measures of governance. The one-unit improvement of regularity quality along with government effectiveness produces an 8.8% increase in real GDP per capita of Sub-Saharan African countries. This supports that the improvement of measures of governance quality together is pivotal for an economy in Sub-Saharan Africa since the success of an institution puts positive pressure on the other one and vice versa. Furthermore, from

Table 7 we can learn that the overall indicator of governance has a positive effect on the economy of Sub-Saharan Africa. This supports the discussion so far and revealed how governance in Sub-Saharan Africa is crucial for their economic growth. This finding is similar to the studies (Efendic & Pugh, 2015; Zidi & Dhifallah, 2013; Emara & Chiu, 2016).

6. CONCLUSION

The overall objective of this study was to determine the impact of governance on economic growth in the Sub-Saharan Africa region, as well as to see if the impact varies among the six governance quality indicators and the four-dimensional composite index of governance. The study used panel data for a sample of 34 Sub-Saharan African countries over the period 2005–2019 and employed the principal component analysis with fixed- and random-effects models. The results of the alternative estimated models indicate that four of the six governance indicators, namely control of corruption (CC), government effectiveness (GE), regulatory quality (RQ), and rule of law (RL), are statistically significant and positively affect real GDP per capita. While voice and accountability (VA) and political stability and absence of violence (PSAV) are statistically insignificant to affect real GDP per capita in the region.

According to the study, the political dimension of governance, or the processes by which those in authority are selected, elected, monitored, and replaced, will not have a significant impact on the economic growth of Sub-Saharan African countries; rather, it is the economic dimension of governance or the process by which public resources are effectively managed and sound policy is effectively implemented, that will have a significant impact. Furthermore, the institutional dimension of governance or the process by which citizens and the state itself respect the society's/public institutions significantly and positively affect the economic growth of Sub-Saharan African countries. Therefore, besides the existing support towards the improvements of the political dimension of governance in Sub-Saharan African countries, governments, international organizations, and other concerned bodies should focus on the improvement of the economic and institutional dimensions of governance in Sub-Saharan Africa to improve the economic performance of the region.

Among the six governance quality indicators, the estimation of government effectiveness was found to have a larger impact on real GDP per capita. Other things remain constant, as government effectiveness of Sub-Saharan African countries increase by one, on average the real GDP per capita of the given Sub-Saharan Africa country will increase by 68.26%. Similarly, among the three dimensions of governance, the economic dimension of governance is found to have a larger and significant impact on economic growth as measured by real GDP per capita. As a result, government effectiveness and the economic dimension of governance need critical consideration due to their strong impact on the economic growth of Sub-Saharan African countries.

The study brought two new understandings to the attention of the researchers: firstly, it identifies the effects of the good governance quality indicators on economic growth. Secondly, it creates a three-

dimensional governance composite governance index that summarizes the existing six governance measurements into three dimensions using PCA and we estimate the dimensional impacts of governance on economic growth. However, because of the availability of data, this study considers only

34 countries out of 46 Sub-Saharan African countries and this can be considered as a limitation of the study. Besides, under the current complex and emerging world, the issues addressed in this study pave the way for further investigation on the study area, as it is a critical global affair.

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APPENDIX: THE LIST OF COUNTRIES

1. Benin
2. Botswana
3. Burkina Faso
4. Burundi
5. Cameroon
6. The Central African Republic
7. Chad
8. Comoros
9. Congo, Dem. Rep.
10. Congo, Rep.
11. Cote d'Ivoire
12. Equatorial Guinea
13. Eswatini
14. Gabon
15. The Gambia
16. Ghana
17. Kenya
18. Liberia
19. Madagascar
20. Malawi
21. Mali
22. Mauritania
23. Mauritius
24. Mozambique
25. Namibia
26. Niger
27. Nigeria
28. Rwanda
29. Senegal
30. Sierra Leone
31. South Africa
32. Sudan
33. Togo
34. Uganda