




## Sulemana Mumuni

 <https://orcid.org/0000-0002-9452-0909>

Institute of Governance  
Humanities and Social Sciences  
Pan African University  
Yaounde, Cameroon  
sulemanamumuni47@gmail.com

## Aloysius Mom Njong

 <https://orcid.org/0000-0002-3746-4314>

Department of Economics  
Faculty of Economics and Management  
Sciences  
University of Bamenda, Bamenda, Cameroon  
mom\_aloys@yahoo.fr

# Public sector spending, governance, and economic growth in Sub-Saharan Africa

Accepted by Editor Ewa Ziemba | Received: November 22, 2022 | Revised: March 30, 2023; May 2, 2023 | Accepted: May 15, 2023 | Published: June 16, 2023.

© 2023 Author(s). This article is licensed under the Creative Commons Attribution-NonCommercial 4.0 license (<https://creativecommons.org/licenses/by-nc/4.0/>)

## Abstract

**Aim/purpose** – This study examined the impact of public sector spending and governance on economic growth in Sub-Saharan Africa (SSA) and further assessed the role of governance in the causal relationship between public sector spending and economic growth in the sub-region.

**Design/methodology/approach** – The study employed the Panel Corrected Standard Errors (PCSE) estimator on data spanning the period 2002 to 2020 across a sample of 31 selected countries in SSA. To check for the robustness of the results, we adopted the Dumitrescu and Hurlin (2012) panel non-causality test to detect Granger causality in the relationships among the variables.

**Findings** – The findings show that spending in the public sectors alone, such as education and health, does not always yield the needed outcome of promoting economic growth. Government education expenditure stimulates economic growth in SSA, albeit the effect is statistically insignificant, whereas government health expenditure has a growth-limiting effect in SSA. The results reveal that government effectiveness, rule of law, political stability, and absence of violence/terrorism are among the governance indicators that can help to fast-track economic prosperity in SSA. However, the results further show that good governance can act as a stimulant to invigorate the effectiveness of public sector spending in achieving economic growth in SSA. The growth-enhancing complementary role of good governance to public sector spending is robust across all

Cite as: Mumuni, S., & Mom Njong, A. (2023). ChatGPT: Public sector spending, governance, and economic growth in Sub-Saharan Africa. *Journal of Economics & Management*, 45, 147-181. <https://doi.org/10.22367/jem.2023.45.08>

governance indicators except political stability for government education spending and regulatory quality for government health spending.

**Research implications/limitations** – The findings imply that strengthening good governance in SSA is non-negotiable in managing and using public funds allocated to the public sectors and in achieving sustainable economic growth, poverty alleviation, and income inequality reduction in the sub-region. However, the findings of this study are limited to the SSA region and may not apply to other regions of the globe.

**Originality/value/contribution** – The contribution of this paper is that it examines the moderation effect of governance in the causal relationship between public spending and economic growth in SSA while accounting for cross-sectional dependence. The paper also contributes to the existing literature by using disaggregated governance and public sector spending components to ascertain the robustness of the results and better inform policy.

**Keywords:** education expenditure, economic growth, governance, health expenditure, panel-corrected standard errors estimation, public sector spending.

**JEL Classification:** H, I, O.

## 1. Introduction

African countries after gaining independence from their former colonial administrators in the early 1960s began fighting another battle – economic emancipation. Notwithstanding, severe hunger and poverty were looming in the African continent at the time due to the harsh economic conditions, as many of these countries had just come out of colonial rule. As such, policies toward development were centered on growth-enhancing sectors of the economy in many developing countries, particularly in Africa. Thus, the establishment of import substitution industries, or better put, industrialization became a major priority area. However, much attention was not given to developing governance capabilities suitable for effectively implementing these strategies (Khan, 2008). The modernization school became the only governance discussion at the time that tried to justify the absence of democracy and the presence of corruption and rent-seeking in many of the developing countries that had become Cold War allies of the United States (Huntington, 1968). Hence, the results of this first phase of the development strategy witnessed poor growth and insufficient industrialization in most developing countries.

The poor growth performance and the increasing levels of poverty and hunger in developing countries, particularly in Africa at the time, led to the adoption of Structural Adjustment Programmes (SAPs) in the early 1980s. Regrettably, the structural adjustment policies failed to yield the needed outcomes in promoting

sustained growth and development or in reducing rent-seeking and corruption in Africa. In the words of Harriss-White and White (1996), despite significant liberalization and cutbacks in subsidies, together with privatization programs in some developing countries, there was little or no apparent reduction in corruption and rent-seeking anywhere. In almost every country where liberalization was carried out, there appeared to be an increase in corruption and rent-seeking.

Nevertheless, Africa as a continent is estimated to house the largest amount of the earth's natural resources, having a total of 60% of the world's arable land, 90% of the raw material reserve, 40% of the gold reserve, 33% of the diamond reserve, 95% of the platinum reserve and having the largest bauxite reserve in the world (Progress Initiative TV, 2021). In addition, Africa holds manganese, iron, wood, uranium, copper, and crude oil, among others. Yet, the continent is tagged as the poverty capital of the world, and most of its economies have experienced rising levels of income inequality, poverty, poor growth, and development, over the past decades relative to their counterparts in the other parts of the world. The World Bank (1981) report, identified poor governance, among other factors, as the major culprit responsible for Africa's poor state of economic health. In the same vein, Acemoglu and Robinson (2012) opined that some nations are rich and others poor not because of geography, art, or culture but a matter of politics and institutions. Against this backdrop, the current study tests the hypothesis of whether governance plays a critical role in cross-country growth differences.

Moreover, the poor growth performance in developing countries and the persistence of the vicious cycle of poverty in Africa brought to the fore the requirement of pro-poor service delivery as a necessary capability for developing countries (Khan, 2008). The idea was to alleviate poverty, reduce inequality, promote pro-poor growth, and achieve sustainable growth and development. Similarly, African governments in 2001, under the Abuja Declaration, pledged to commit themselves to allocate 15% of their budgets to the health sector (AU, 2001). The significance being placed on public sector spending is a result of the changing perceptions about the usefulness of human capital formation, which is seen not only as a means to an end but also as an end in itself. However, despite increasing expenditure in the public sectors by African governments, the growth and employment elasticities of such investment are little or nothing to write home about. Hence, there is a need for further investigation into the usefulness of public sector spending in enhancing economic growth and development in SSA countries.

Furthermore, several growth models, such as the Solow Swan growth model and the new growth theory, explain economic growth within a well-defined geographical area. However, an understanding of economic growth is still incomplete (Romer, 2012). These growth models fail to completely explain the cross-country growth differences (Romer, 2012). Additionally, the endogenous growth theories by Romer (1989) and Lucas (1988) identify factors such as human capital accumulation, physical capital accumulation, and technological progress as important determinants of economic growth and development in a country. However, Hall and Jones (1999) argued that social infrastructure and government policies play a much greater role in economic growth and development. Nevertheless, recent empirical literature used either one or two of the public sector spending and governance indicators to analyze their effects on economic growth (for example, Abille & Obiero, 2021; Mtiraoui, 2020; Odhiambo, 2021; Pham, 2020; Raghupathi & Raghupathi, 2020; Şaşmaz & Sağdıç, 2020; Suwandaru et al., 2021; Tiwari, 2021). Closely related to the current study are studies by Bah and Kpognon (2020), Dinh Thanh et al. (2020), Dzhumashev (2014), Kai Hong (2017), and Rajkumar and Swaroop (2008) in which the moderation effect of governance in the relationship between public investment or spending and growth was observed. However, analysis was limited in scope and dimensions of public sector spending and governance, particularly in SSA.

Therefore, this study contributes to the existing literature by examining the moderation effect of governance in the causal relationship between public sector spending and economic growth in SSA countries. Likewise, the study also filled the void in the literature by using disaggregated components of governance and public sector spending to assess their effects on growth in these countries. This study also accounts for cross-sectional (and temporal) dependence by employing the Panel Corrected Standard Errors (PCSEs) estimator, and as a means of robustness checking we conducted the Dumitrescu and Hurlin (2012) panel non-causality test among the variables.

The rest of this paper is organized as follows: the second section describes the literature review where associated theoretical and empirical literature is analyzed; the third section dwells on the research methods and procedures; the fourth section presents the results, the fifth section discusses findings, while the final section outlines the conclusion and policy directions.

---

## **2. Literature review**

This section discusses the theoretical foundations underpinning this study, and the empirical works in the realm of the nexus between public sector spending, governance, and economic growth.

### **2.1. Theoretical review**

In recent times, the World Bank and other International Financial Institutions, together with the African Union have emphasized the need for governments to improve pro-poor service delivery as a means of mitigating poverty and promoting inclusive growth and development. Economic models or theories that seem to support this view are associated with the endogenous growth theories of Lucas (1988), Romer (1989), and Barro (1988). These models provide an insightful explanation highlighting the significant role of social sector spending and/or investment in public sectors such as education and health in economic growth and social protection.

The models viewed the human capital stock as a factor that depreciates over time and can only be improved through investment in education and health (Grossman, 2000). According to Lucas (1988), human capital accumulation generates positive externalities. He distinguishes between the internal effects of human capital, where the benefits from training and learning accrue to the individual, and the external effects of human capital that spill over into production or output changes (Shaw, 1992). Such accumulations are considered endogenous because when there is growth, individuals' propensities for spending and investment also increase.

The discussions thus far point to the fact that the endogenous growth models acknowledge the role of human capital accumulation and public investment in the growth of an economy. This is possible when governments invest in human capital accumulation and the existing capital stock to generate new competencies and skills. New competencies and skills enhance productivity and generate positive externalities or spillover effects to the other sectors at virtually little or no marginal cost. According to Grossman (2000), investment in health increases human capital stock by improving the health status of workers, thereby increasing the per-worker productivity and hence the overall economic growth and development.

Similarly, the Solow Swan growth model also identified factors such as human capital accumulation, physical capital accumulation, and technological progress as important determinants of economic growth and development in a country (Romer, 2012). However, Hall and Jones (1999) contributing to the discussions on the Solow growth model, contended that only a small proportion of the output per worker is explained by physical capital accumulation and worker learning achievements. A larger contribution to the remaining part of the cross-country per-worker output differences arises because of the policy and institutional differences across countries. Likewise, Acemoglu and Robinson (2012, p. 3) opined that “some nations are rich and others poor not because of geography, disease, artor culture but rather a matter of institutions and politics.” Hence, this study argues that holding other factors constant, the cross-country growth differences come in, not necessarily because of the factors identified under the endogenous growth models and the neoclassical Solow Swan model, but also because of the differences in the level of governance structures and institutions across countries.

## **2.2. Empirical review**

Different empirical studies conducted over the past on the social sector spending, governance, and economic growth scholarship revealed mixed findings. While some researchers reported a positive and significant relationship between governance, public sector spending, and economic growth, others reported that there is no reason to conclude that governance affects economic growth in any significant way, rather economic development tends to positively affect good governance quality. Despite these controversies, it is undeniable that the effective implementation of good governance capabilities will result in better economic outcomes in the developing world.

A broader consensus in the literature suggests that the effectiveness of government can trigger economic growth and development. See, for example, studies by (Han et al., 2014; Şaşmaz et al., 2020; Tiwari, 2021; Zhuang et al., 2010). Similarly, corruption has been identified to be a canker to societal progress (Cieslik & Goczek, 2018; Marro et al., 2021). Also, Dzhumashev (2014), Gründler and Potrafke (2019), Mauro (1995), Mtiraoui (2020), Pham (2020), and Samarasinghe (2018) have shown that the control of corruption spurs economic growth and development. Pacific et al. (2017) found no statistically significant relationship between control of corruption and economic growth in

Botswana. In other studies, Han et al. (2014), Huynh and Jacho-Chávez (2009), and Samarasinghe (2018) examined the relationship between political stability and the absence of violence/terrorism and economic growth and revealed a positive and significant relationship between political stability and absence of violence/terrorism and economic growth. In contrast, Zhuang et al. (2010) found that there exists no statistically significant relationship between political stability and the absence of violence/terrorism and economic growth.

Moreover, better regulatory quality setup by governing institutions is necessary to foster economic growth and development (Han et al., 2014; Tiwari, 2021; Zhuang et al., 2010). In the same vein, voice and accountability are seen as important ingredients to propelling economic growth, especially in developing countries (Guisan, 2009). However, Han et al. (2014), and Tiwari (2021) found no statistically significant relationship between voice and accountability and economic growth. Besides, Haggard et al. (2008) found that the rule of law is essential for achieving economic prosperity in developing countries. Nevertheless, researchers (Han et al., 2014; Şaşmaz & Sağdıç, 2020; Tiwari, 2021) have indicated an insignificant statistical relationship between the rule of law and economic growth. While Haggard and Tiede (2010), and Matsuo (2002) found no clear-cut picture of the relationships between the two concepts but argued that the rule of law is still an important ingredient for sustainable economic growth and should not be taken for granted.

Furthermore, empirical studies abound in the literature reveal that public sector spending can be a conduit through which developing countries can achieve better economic outcomes. Studies such as Abille and Obiero (2021), Churchill et al. (2015), Babatunde (2018), Gupta and Verhoeven (2001), and Kaur (2019) have demonstrated that government education expenditure has growth-enhancing effects. However, Suwandaru et al. (2021) found no significant effect of government education expenditure on economic growth in the Punjab economy in both the short and long run. Furthermore, studies by Babatunde (2018), Gebregziabher and Niño-Zarazúa (2012), Gupta and Verhoeven (2001), Odhiambo (2021), Piabuo and Tieguhong (2017), and Raghupathi and Raghupathi (2020) have shown that health expenditure stimulates economic growth and aggregate social welfare by increasing the health status of the human capital stock and enhancing the productivity of the workforce. In contrast, studies such as Churchill et al. (2015), and Kaur (2019) indicated that government health expenditures including medical and public health, water supply, and sanitation, labor, and labor welfare, have negative and statistically significant impacts on economic growth.

Besides, the literature on the role of governance in the causal relationship between public sector spending and growth is scanty as only a few studies attempt to examine this nexus. The few kinds of literature in this domain focus on either the moderation effect of governance in the relationship between general government expenditure and growth, from the viewpoint of an aggregate measure of human capital, or the angle of health expenditure on health outcomes. However, in all of these studies, the two main components of public sector spending notably government education and health expenditures, are not fully incorporated into their studies, and the measures of public sector spending differ in some of the cases (for example, Bah & Kpognon, 2020; Dinh Thanh et al., 2020; Dzhumashev, 2014; Kai Hong, 2017; Omri & Ben Mabrouk, 2020; Rajkumar & Swaroop, 2008; Sarpong et al., 2020). In either case, the authors found that governance is crucial to enhancing the effectiveness of public investment and/or public health spending in economic growth.

### **3. Research methods and procedure**

Pesaran and Smith (1995) opined that in panel data analysis, aggregation can lead to spurious results especially when the slope coefficients vary across the cross-sectional units. Similarly, Hoechle (2007) contended that deliberately discarding cross-sectional (and temporal) dependence which is most likely present in panel data can lead to biased regression results. Consequently, to achieve the objectives of this study, and after checking for cross-sectional dependence, we adopted the Panel Corrected Standard Errors (PCSEs) estimator on data spanning the period 2002 to 2020 for a sample of 31 countries in SSA countries. The advantage of the PCSE estimator over the static panel models of Fixed and Random Effects (with robust standard errors), as well as the dynamic panel model and the system Generalized Method of Moments (GMM), lies in its ability to control for heteroscedasticity and serial autocorrelation as well as account for cross-sectional (and temporal) dependence (Hoechle, 2007).

Moreover, Hoechle (2007), posited that results from the PCSE estimation are robust and consistent, independently of the cross-sectional dimension  $N$  (i.e., also for  $N \rightarrow \infty$ ). Thus, panels with large cross-sectional units and a short period per cluster ( $N > T$ ), see, for example, White (1980, 1984), and Liang and Zeger (1986). Furthermore, Hansen (2007) and Hoechle (2007) have shown that PCSEs can be used for panels with many cross-sectional units ( $N_g \rightarrow \infty$ , i.e., long panels, in addition to panels with many clusters ( $G \rightarrow \infty$ ). An alternative



approach that could have been employed for this study is the Feasible Generalized Least Squares (FGLS) estimator. However, the FGLS estimator is only applicable in short panels, i.e., panels with few cross-sectional units and a longer period (for example, Beck, 2001; Beck & Katz, 1995; Hoechle, 2007).

The dependent variable in this study is the log of Gross Domestic Product (GDP) per capita, which represents the economic growth of the various countries. The primary independent variables in this study include public sector spending measured by government education expenditure and current health expenditure used as a proxy measure of government health expenditure; and governance, which is measured by the six major governance indicators developed by the World Bank (Kaufmann et al., 2004, 2010). The six major governance indicators include government effectiveness, regulatory quality, voice and accountability, rule of law, control of corruption, and political stability and absence of violence/terrorism.

Moreover, it is important to state that the six governance indicators are measured both by a percentile rank, which signifies a country's rank among all countries included in the aggregate indicator, with 0 representing the lowest rank and 100 denoting the highest rank; and by a governance score or estimate that ranges approximately between  $-2.5$  and  $2.5$ , that gives a country a score on the aggregate indicator with high values on the indicator corresponding to better governance and lower values corresponding to poor governance. It is worth noting that the percentile rank measure of the governance indicators is used in this study for estimation. Also, except for the GDP per capita, which is measured in current U.S. dollars, and inflation measured as an annual percentage, the remaining variables used for the estimations are measured as a percentage of GDP. The control variables used in this study are inflation, gross fixed capital formation, as well as trade openness. The selected control variables are included in the study to account for their confounding effects on growth as they are growth parameters. Table 1 summarizes all the variables and their data sources.

**Table 1.** Variables and their data sources

Variable	Symbol	Source
1	2	3
GDP per capita (current US dollar)	GDPP	https://data.worldbank.org/indicator (accessed on February 1, 2022)
Inflation, consumer price index (annual %)	INFL	
Trade openness (annual % of GDP)	Trade	
Gross fixed capital formation (annual % of GDP)	GFCF	
Government education expenditure (annual % of GDP)	GovEduexp	
Current health expenditure (annual % of GDP)	GovHealthexp	

table 1 cont.

1	2	3
Government effectiveness	GE	<a href="https://databank.worldbank.org/source/worldwide-governance-indicators">https://databank.worldbank.org/source/worldwide-governance-indicators</a>
Regulatory quality	RQ	(accessed on February 1, 2022)
Voice and accountability	VA	
Rule of law	RL	
Control of corruption	CC	
Political stability and absence of violence/terrorism	PV	

Source: Authors' own elaboration.

The restrictive form of the econometric model is specified in Model 1 as follows:

$$y_{itg} = \beta_0 + x'_{itg}\beta + c_{itg} + \varepsilon_{itg} \tag{1}$$

$g = 1, \dots, G$

where:  $i$  = cross-sectional units;  $t$  = period;  $g$  = number of clusters or groups;  $y_{itg}$  = the dependent variable;  $x'$  = a vector of the explanatory variables of interest;  $\beta$  = a vector of the parameters of interest;  $c_{itg}$  is a  $k \times 1$  vector of the unobserved explanatory variables, which is assumed to be contemporaneously exogenous to the conditional error, and  $\varepsilon_{itg}$  = the idiosyncratic error term.

The operational form of the econometric specification of Model 1 is specified in Models 2, 3, and 4, respectively, denoting the stepwise regression equations of public sector spending and growth; governance and growth; and the influence of governance on the public sector expenditure and growth nexus.

$$\ln\text{GDPP}_{itg} = \beta_0 + PUS'_{itg}\phi + \beta_1\text{GFCF}_{itg} + \beta_2\text{Trade}_{itg} + \beta_3\text{INFL}_{itg} + c_{itg} + \varepsilon_{itg} \tag{2}$$

$$\ln\text{GDPP}_{itg} = \beta_0 + G'_{itg}\varphi + \beta_1\text{GFCF}_{itg} + \beta_2\text{Trade}_{itg} + \beta_3\text{INFL}_{itg} + c_{itg} + \varepsilon_{itg} \tag{3}$$

$$\ln\text{GDPP}_{itg} = \beta_0 + \text{int}G'_{itg}PUS'_{itg}\gamma + \beta_1\text{GFCF}_{itg} + \beta_2\text{Trade}_{itg} + \beta_3\text{INFL}_{itg} + c_{itg} + \varepsilon_{itg} \tag{4}$$

where  $\ln\text{GDPP}_{itg}$  is the log of GDP per capita,  $PUS'_{itg}$  is a vector of public sector variables of government education expenditure, and government health expenditure,  $G'_{itg}$  is a vector of governance indicators,  $\text{int}G'_{itg}PUS'_{itg}$  is a vector of the interplay between governance and public sector spending variables. In the same vein,  $\phi$  is a vector of the coefficients of public sector spending variables,  $\varphi$  is a vector of coefficients of the governance indicators, and  $\gamma$  is a vector of the coefficient of the interactions between governance and public sector spending.

Here, a positive sign of  $\gamma$  implies governance accentuates the impact of public sector spending on growth, while a negative sign of  $\gamma$  implies otherwise. The rest of the variables are defined in Table 1.

## 4. Research findings

Before we display the regression results of the models, it is good practice to present the correlation matrix that shows the relationship between the variables and the cross-sectional dependence test, which justifies our choice of the PCSE estimator, and the test for possible convergence of the countries in the levels of GDP per capita.

### 4.1. Correlation analysis

The results of the correlation matrix presented in Table 2 indicate that among the public sector spending variables, government education expenditure has a positive association with GDP per capita growth (0.311), while government health expenditure has a negative relationship with GDP per capita growth (-0.057). As concerns governance, we observe positive correlations between variables and economic growth in SSA over the period under study. Furthermore, the correlation matrix shows a positive relationship between two of our control variables (trade openness (0.557) and gross fixed capital formation (0.191)) and economic growth in SSA countries over the study period. The inflation rate has a negative association with economic growth (-0.118). It is important to note that the variables are weakly correlated with each other except for the governance variables, which are highly correlated among themselves with a correlation coefficient of above 80%. For instance, the correlation coefficients between VA and RL (0.813), RL and CC (0.900), RL and RQ (0.871), RL and GE (0.921), CC and GE (0.879), and RQ and PV (0.884). The high correlation coefficients among the governance variables suggest that including these variables in the same model could result in multicollinearity problems, which may undermine the efficiency and reliability of our estimates. Therefore, we adopted a stepwise regression approach to address this problem.

**Table 2.** Matrix of correlations among the variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) lnGDPP	1.000											
(2) GovEduexp	0.311	1.000										
(3) Govhealthexp	-0.057	0.337	1.000									
(4) VA	0.510	0.422	0.123	1.000								
(5) RL	0.573	0.470	0.127	0.813	1.000							
(6) CC	0.587	0.552	0.203	0.732	0.900	1.000						
(7) RQ	0.554	0.414	0.139	0.760	0.871	0.770	1.000					
(8) PV	0.613	0.372	0.095	0.730	0.795	0.779	0.661	1.000				
(9) GE	0.627	0.481	0.102	0.770	0.921	0.879	0.884	0.728	1.000			
(10) Trade	0.557	0.358	0.009	0.259	0.290	0.392	0.131	0.478	0.280	1.000		
(11) INFL	-0.118	-0.022	-0.008	-0.139	-0.123	-0.109	-0.148	-0.089	-0.078	0.040	1.000	
(12) GFCE	0.191	0.113	-0.227	0.095	0.142	0.154	-0.019	0.159	0.113	0.349	0.031	1.000

Source: Authors' own calculation using Stata 17.

## 4.2. Testing for cross-sectional dependence

We employed Pesaran's (2004), Friedman's<sup>1</sup>, and Frees' (De Hoyos & Sarafidis, 2006) tests for cross-sectional dependence (CD) to determine whether the residuals in our estimates are cross-sectionally dependent and the results are reported in Table 3. For the principle of parsimony, the study displays the CD tests for the first two models showing the relationship between public sector spending and growth. In this case, the null hypothesis is that there is spatial independence as opposed to the alternative hypothesis that there is spatial dependence in the residuals of the estimated equations. From Table 3, we observe that on average, the (absolute) correlation between the residuals of two cross-sectional units is 0.741 for the two selected models. Therefore, we reject the null hypothesis of spatial independence at any standard level of significance by Pesaran's, Friedman's, and Frees's CD tests. Notice that since  $T \leq 30$ , Frees' test provides the critical values for  $\alpha = 0.10$ ,  $\alpha = 0.05$ , and  $\alpha = 0.01$  from the Q distribution in Table 3. Frees' statistics for both models is beyond the critical value with at least  $\alpha = 0.01$ . Based on these results, it becomes clear that estimating the model(s) with fixed effects and/or random effects, as well as adopting the system Generalized Method of Moments, will produce cross-sectionally dependent regression residuals and bias the estimators. Consequently, the regression model(s) outlined for this study are estimated with Driscoll and Kraay's (1998) easy extension of standard errors (PCSEs) since they are robust and consistent with very general forms of cross-sectional (and temporal) dependence (Hoechle, 2007).

<sup>1</sup> <https://statistics.laerd.com/spss-tutorials/friedman-test-using-spss-statistics.php>

**Table 3.** Pesaran's, Friedman's, and Frees' tests for cross-sectional dependence

Test	Model of government education expenditure	Model for government health expenditure
<b>Pesaran's Test</b>		
Pesaran's test for cross-sectional independence	69.440	69.458
Prob.	0.000	0.000
Average absolute value of the off-diagonal elements	0.741	0.741
<b>Friedman's Test</b>		
Friedman's test of cross-sectional independence	358.971	358.822
Prob.	0.000	0.000
Average absolute value of the off-diagonal elements	0.741	0.741
<b>Frees' Test</b>		
Frees' test of cross-sectional independence	12.216	12.204
Critical values from Frees' Q distribution	alpha = 0.10: 0.1360 alpha = 0.05: 0.1782 alpha = 0.01: 0.2601	alpha = 0.10: 0.1360 alpha = 0.05: 0.1782 alpha = 0.01: 0.2601
Average absolute value of the off-diagonal elements	0.741	0.741

Source: Authors' own estimations using Stata 17.

### 4.3. Testing for convergence

It would be informative to verify if there is evidence of convergence in GDP per capita across the selected countries in this study, listed in the Appendix. In other words, we are interested in finding out if GDP per capita across the countries has a common steady-state path in the long run. To do this, we use the Phillips and Sul (2007) log-t regression test to test for convergence of GDP per capita of the countries. We find this approach appealing because it allows for different time paths and also accounts for individual country heterogeneity. Again, this methodology does not impose any particular assumption concerning trend stationarity and is therefore robust to heterogeneity and the stationarity properties of the data (Phillips & Sul, 2007, 2009).

**Table 4.** The Phillips and Sul log-t regression for convergence

Variable	Coeff.	SE	T-stat
Log (L)	-0.5540	0.0187	-29.5822

Source: Authors' own estimations using Stata 17.

From Table 4, we observe that the T-statistic is less than  $-1.65$ , and we feel obliged to reject the null hypothesis of convergence. This means that our results show a lack of support for full sample convergence in GDP per capita across the

sub-Saharan African countries over the period of study. This means that GDPs per capita across the countries do not share a common steady-state path in the long run. However, our finding does not tell the full story because convergence might still be found within groups of countries with similar initial characteristics. Our study, therefore, is limited in that it does not verify club convergence clustering in the sample.

#### 4.4. The Dumitrescu and Harlin panel non-causality tests

The null hypothesis underlying the Granger causality test is that there is no causality between the dependent and the independent variable, as opposed to the alternative hypothesis that there is causality between the variables. The results are reported in Tables 5 and 6.

**Table 5.** Panel Granger causality test for the direct effects among the variables

Variables		Granger causality test for the direct effects		
Dep.Var	Indep.Var	Z-bar	p-value	Decision
lnGDPP	GovEduexp	1.5373	0.1242	Government education expenditure does not Granger-cause GDP per capita growth in SSA
lnGDPP	GovHealthexp	3.1374	0.0017	Government health expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	GE	2.8948	0.0038	Government effectiveness Granger-causes GDP per capita growth in SSA
lnGDPP	RQ	0.8076	0.4193	Regulatory quality does not Granger-causes GDP per capita growth in SSA
lnGDPP	RL	3.3922	0.0007	Rule of law Granger-causes GDP per capita growth in SSA
lnGDPP	VA	1.1134	0.2655	Voice and accountability do not Granger-causes GDP per capita growth in SSA
lnGDPP	CC	0.1160	0.9077	Control of corruption does not Granger-causes GDP per capita growth in SSA
lnGDPP	PV	2.3478	0.0189	Political stability Granger-causes GDP per capita growth in SSA
lnGDPP	Inflation	1.1412	0.2538	Inflation does not Granger-cause GDP per capita growth in SSA
lnGDPP	Trade Openness	5.1941	0.0000	Trade openness Granger-causes GDP per capita growth in SSA
lnGDPP	GFCF	0.9643	0.3349	Gross fixed capital formation does not Granger-cause GDP per capita growth in SSA

Source: Authors' own estimations using Stata 17.

**Table 6.** Panel Granger causality test for the modulation analysis among the variables

Variables		Granger causality test for the modulation analysis		
Dep.Var	Indep.Var	Z-bar	p-value	Decision
lnGDPP	intGEGovEdu	3.4797	0.0005	The interplay between government effectiveness and government education expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intRQGovEdu	2.1339	0.0329	The interplay between regulatory quality and government education expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intRLGovEdu	3.4061	0.0007	The interplay between the rule of law and government education expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intVAGovEdu	1.9066	0.0566	The interplay between voice and accountability and government education expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intCCGovEdu	2.4023	0.0163	The interplay between control of corruption and government education expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intPVGovEdu	0.8839	0.3767	The interplay between political stability and government education expenditure does not Granger-causes GDP per capita growth in SSA
lnGDPP	intGEGovHeth	6.3029	0.0000	The interplay between government effectiveness and government health expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intRQGovHeth	-0.1215	0.9033	The interplay between regulatory quality and government health expenditure does not Granger-causes GDP per capita growth in SSA
lnGDPP	intRLGovHeth	2.8217	0.0048	The interplay between the rule of law and government health expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intVAGovHeth	1.9766	0.0481	The interplay between voice and accountability and government health expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intCCGovHeth	2.7298	0.0063	The interplay between control of corruption and government health expenditure Granger-causes GDP per capita growth in SSA
lnGDPP	intPVGovHeth	3.8446	0.0001	The interplay between political stability and government health expenditure Granger-causes GDP per capita growth in SSA

Source: Authors' own estimations using Stata 17.

#### 4.5. Impact of public sector spending on growth in SSA countries

Table 7 presents the estimates from the PCSE estimator establishing the linkages between public sector spending and economic growth in SSA countries. The results show that government education expenditure has a positive impact on economic growth in SSA countries, albeit the effect is statistically insignificant, while government health expenditure has a negative and statistically significant impact on economic growth in SSA countries. These findings are supported by the Granger causality tests in Table 5. The causality test results show that government education expenditure does not Granger-cause economic growth in SSA while government health expenditure Granger-causes economic growth in the sub-region.

**Table 7.** PCSE estimates showing the impact of public sector spending on growth

Variables	(1) lnGDPP	(2) lnGDPP
Inflation	-0.00483** (0.00215)	-0.00530** (0.00217)
Trade openness	0.00307** (0.00139)	0.00373*** (0.00144)
Gross fixed capital formation	-0.00273 (0.00215)	-0.00280 (0.00213)
Government education expenditure	0.0197 (0.0130)	
Government health expenditure		-0.0170* (0.00940)
Constant	6.743*** (0.190)	6.883*** (0.186)
Observations	589	589
R-squared	83.5%	83.3%
Number of countries	31	31

Note: \*\*\*, \*\*, and \* denotes significant at the 1%, 5%, and 10% significance levels, respectively. Standard errors are in parenthesis.

Source: Authors' own estimations using Stata 17.

#### 4.6. Impact of governance on economic growth in SSA countries

Table 8 outlines the PCSE estimates of the effects of governance on economic growth in SSA countries over the period under consideration. From Table 8, the results show that governance positively and significantly impacts economic growth in SSA countries. Specifically, a unit improvement in government effectiveness, regulatory quality, voice and accountability, rule of law, control of



corruption, political stability, and absence of violence/terrorism will increase the economic growth of SSA countries by about 1.77%, 1.43%, 1.51%, 1.58%, 1.41%, and 0.89%, respectively, *ceteris paribus*. However, based on the Granger causality test results in Table 5, the results show that government effectiveness, rule of law, and political stability and absence of violence/terrorism are the only governance indicators that Granger-causes economic growth in SSA.

**Table 8.** PCSE estimates showing the impact of governance on growth

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	lnGDPP	lnGDPP	lnGDPP	lnGDPP	lnGDPP	lnGDPP
Inflation	-0.00516** (0.00236)	-0.00538** (0.00239)	-0.00503** (0.00219)	-0.00495** (0.00226)	-0.00504** (0.00227)	-0.00443* (0.00227)
Trade openness	0.00483*** (0.00134)	0.00548*** (0.00153)	0.00348** (0.00135)	0.00397*** (0.00133)	0.00371*** (0.00128)	0.00368*** (0.00133)
Gross fixed capital formation	-0.00380 (0.00241)	-0.00210 (0.00257)	-0.00360 (0.00234)	-0.00372 (0.00240)	-0.00298 (0.00235)	-0.00308 (0.00225)
Government effectiveness	0.0177*** (0.00216)					
Regulatory quality		0.0143*** (0.00296)				
Voice and accountability			0.0151*** (0.00229)			
Rule of law				0.0158*** (0.00240)		
Control of corruption					0.0141*** (0.00184)	
Political stability						0.00886*** (0.00190)
Constant	6.174*** (0.182)	6.186*** (0.211)	6.282*** (0.194)	6.256*** (0.191)	6.294*** (0.189)	6.488*** (0.186)
Observations	589	589	589	589	589	589
R-squared	84.2%	82.8%	84.5%	84.2%	84.3%	83.7%
Number of countries	31	31	31	31	31	31

Note: \*\*\*, \*\*, and \* denotes significant at the 1%, 5%, and 10% significance levels, respectively. Standard errors are in parenthesis.

Source: Authors' own estimations using Stata 17.

#### 4.7. The role of governance in the causal relationship between public sector spending and economic growth in SSA countries

In this section, the study distinctly assesses the role of governance in the causal relationship between two of the indicators of public sector spending (government education and health expenditures) and economic growth in SSA countries, as reported in Tables 9 and 10, respectively.

From Table 9, it can be observed that governance plays a role in enhancing the impact of government education expenditure on economic growth in SSA countries. A percentage increase in the interaction between the governance indicators and government education expenditure will increase economic growth in SSA countries by an average of 0.13 %, *ceteris paribus*. The findings of the moderation effects of governance in the relationship between government education expenditure and economic growth in SSA under the PCSE estimation technique are reinforced by the Granger causality test results as shown in Table 6. The causality test results show that all the governance indicators except for political stability play a complementary role in boosting the impact of government education spending on economic growth in SSA countries.

**Table 9.** PCSE estimates showing the modulation effect of governance in the relationship between government education expenditure and growth

Variables	(1) lnGDPP	(2) lnGDPP	(3) lnGDPP	(4) lnGDPP	(5) lnGDPP	(6) lnGDPP
Trade openness	0.00418*** (0.00137)	0.00491*** (0.00145)	0.00366*** (0.00138)	0.00379*** (0.00136)	0.00313** (0.00132)	0.00380*** (0.00136)
Inflation	-0.00493** (0.00231)	-0.00524** (0.00238)	-0.00485** (0.00224)	-0.00480** (0.00227)	-0.00469** (0.00221)	-0.00441* (0.00230)
Gross fixed capital formation	-0.00273 (0.00234)	-0.00212 (0.00245)	-0.00280 (0.00231)	-0.00268 (0.00233)	-0.00243 (0.00226)	-0.00258 (0.00231)
Government effectiveness & education exp.	0.00151*** (0.000289)					
Regulatory quality & education exp.		0.00146*** (0.000339)				
Voice and accountability & education exp.			0.00126*** (0.000290)			
Rule of law & education exp.				0.00140*** (0.000293)		
Control of corruption & education exp.					0.00123*** (0.000235)	
Political stability & education exp.						0.00120*** (0.000255)
Constant	6.523*** (0.169)	6.472*** (0.175)	6.581*** (0.173)	6.554*** (0.171)	6.601*** (0.176)	6.580*** (0.167)
Observations	589	589	589	589	589	589
R-squared	83.3%	82.5%	83.5%	83.5%	83.9%	83.3%
Number of countries	31	31	31	31	31	31

Note: \*\*\*, \*\*, and \* denotes significant at the 1%, 5%, and 10% significance levels, respectively. Standard errors are in parenthesis.

Source: Authors' own estimations using Stata 17.

Similarly, from Table 10, it is observed that governance plays a significant role in accentuating the positive impact of government health spending on economic growth in SSA countries. To be precise, a percentage increase in the interplay between the governance indicators and government health expenditure will increase economic growth in SSA countries by a minimum percentage score of 0.07%, all else being equal. In the same vein, these findings are vindicated by the Granger causality test results in Table 6 which shows that all the governance indicators except for regulatory quality ameliorate the effects of government health spending on economic growth in SSA countries.

**Table 10.** PCSE estimates showing the modulation effect of governance in the relationship between government health expenditure and growth

Variables	(1) lnGDPP	(2) lnGDPP	(3) lnGDPP	(4) lnGDPP	(5) lnGDPP	(6) lnGDPP
Trade openness	0.00394*** (0.00138)	0.00396*** (0.00144)	0.00351** (0.00140)	0.00398*** (0.00138)	0.00351*** (0.00134)	0.00329** (0.00137)
Inflation	-0.00463** (0.00224)	-0.00482** (0.00223)	-0.00477** (0.00217)	-0.00471** (0.00223)	-0.00475** (0.00219)	-0.00446** (0.00218)
Gross fixed capital formation	-0.00335 (0.00233)	-0.00267 (0.00233)	-0.00337 (0.00224)	-0.00337 (0.00235)	-0.00297 (0.00227)	-0.00310 (0.00222)
Government effectiveness & health exp.	0.00168*** (0.000329)					
Regulatory quality & health exp.		0.00115*** (0.000349)				
Voice and accountability & health exp.			0.000907*** (0.000277)			
Rule of law & health exp.				0.00148*** (0.000320)		
Control of corruption & health exp.					0.00116*** (0.000246)	
Political stability & health exp.						0.000745*** (0.000238)
Constant	6.490*** (0.186)	6.557*** (0.196)	6.635*** (0.190)	6.508*** (0.187)	6.572*** (0.189)	6.677*** (0.186)
Observations	589	589	589	589	589	589
R-squared	83.9%	83.4%	83.6%	83.5%	83.8%	83.6%
Number of countries	31	31	31	31	31	31

Note: \*\*\*, \*\*, and \* denotes significant at the 1%, 5%, and 10% significance levels, respectively. Standard errors are in parenthesis.

Source: Authors' own estimations using Stata 17.

Additionally, the results from Tables 7, 8, 9, and 10, respectively, suggest that trade openness has a positive and statistically significant impact on economic growth in SSA. In contrast, inflation and gross fixed capital formation exert

growth-limiting effects on the economies of SSA countries, albeit only the effect of inflation is statistically significant. However, the Granger causality test results in Table 5 reveal that among the three control variables included in this study, only trade openness Granger-caused economic growth in SSA countries.

## **5. Discussion of findings**

This study is set up to empirically assess three objectives, the impact of 1) public sector spending on economic growth; 2) governance on economic growth, and 3) the interplay between public sector spending and governance on economic growth.

### **5.1. Impact of public sector spending on economic growth in SSA countries**

The results acquiescently show that social sector spending is necessary for growth. However, only government education expenditure has a positive impact on economic growth in SSA countries, although the effect is statistically insignificant. This finding is reaffirmed under the causality test in Table 5 which showed that government education expenditure does not Granger-cause economic growth in SSA. The positive but statistically insignificant effect of government education expenditure on economic growth in SSA countries could be a result of the increasing graduate unemployment in these countries over the past two decades. A mere increase in government budgetary allocation to the educational sector does not guarantee better economic outcomes. An increase in government budgetary allocation to the educational sector should be backed by creating an enabling environment for business growth to absorb the teeming masses of unemployed graduates.

Similarly, the educational system in Africa trains people for non-existing white-collar jobs. This system of education does not allow students to acquire the requisite competencies or technical know-how that would enable them to create more job avenues and contribute significantly to the economic growth and development of SSA countries. However, the positive impact of government education expenditure on economic growth thus confirms the propositions made by the endogenous growth theory of Lucas (1988) and Romer (1989), as well as the human capital model by Grossman (2000), that investment in education in-

creases the human capital stock of an economy and has positive externalities that spill-over to the rest of the economy, thereby benefiting everyone. It is not surprising, therefore, that these models consider expenditure on education as an important determinant of economic growth both within and across countries. The findings also corroborate with previous empirical studies such as Abille and Obiero (2021), Babatunde (2018), and Baldacci et al. (2008).

In contrast, the results show that government health expenditure has a negative and statistically significant impact on economic growth in SSA countries. This finding is counterintuitive and inconsistent with the a priori expectations of the study and the predictions made by the endogenous growth models of Lucas (1988) and Romer (1989) as well as the Grossman human capital model (Grossman, 2000). These models predicted that spending on health improves the health status of the workforce, thereby enhancing productivity per worker and consequently higher economic growth and development. One possible factor that could be responsible for this counterintuitive outcome may be the fact that governments in SSA countries may not be focusing enough on improving the quality and efficacy of public health-care services. An absolute increase in the amount of government health spending is no guarantee to propel economic growth and development in the region as predicted by these growth theories. For instance, Njog and Ngantcha (2013) showed that health centers, which are the frontline health-care providers, receive only 26.4% of their actual budget allocations due to leakages in the health-care delivery chain irrespective of the lion's share of the annual budget allocation to the health sector in Cameroon. Furthermore, the results of previous empirical studies by Churchill et al. (2015) and Kaur (2019) vindicate the findings of the current study, although these studies were, respectively, carried out in the United States and the Punjab economy. The finding of this study is further supported by the Granger causality test results in Table 5, which shows that government health expenditure Granger-causes economic growth in SSA countries.

## **5.2. Effect of governance on economic growth in SSA countries**

In this context, the results suggest that governance is critical for achieving sustained growth and development in SSA countries. The positive and statistically significant effect of government effectiveness on economic growth in SSA countries implies that 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 are prerequisites to trigger a condition for market efficiency and ultimately better economic outcomes in SSA countries. The results, thus, confirm the findings obtained from the matrix of correlations that indicate a positive relationship between government effectiveness and economic growth. The results of previous empirical studies such as (Han et al., 2014; Şaşmaz & Sağdıç, 2020; Tiwari, 2021; Zhuang et al., 2010) attest to the important role of government effectiveness in promoting economic growth and development, albeit differences in geographical and time dimensions. The finding of this study is in agreement with the results of the Granger causality test in Table 5 which indicated that GE Granger-caused economic growth in SSA over the study period.

Similarly, the positive and statistically significant effect of regulatory quality on economic growth in SSA countries suggests that governments' ability to formulate and implement sound policies for private sector growth and development is an important ingredient to achieving economic growth in SSA countries. It is therefore imperative that governments in SSA countries adhere to high regulatory standards such as better property rights and contracts; support innovation and invention; as well as enhance the ease of doing business to foster the most growth in SSA countries. The finding of this study reaffirms the findings from the correlation analysis indicating a positive relationship between regulatory quality and economic growth in SSA countries. This finding is also in agreement with the results of the following empirical studies (Han et al., 2014; Tiwari, 2021; Zhuang et al., 2010). However, the Granger causality test results in Table 5 show that regulatory quality does not Granger-cause economic growth in SSA over the period under study.

Also, the positive and statistically significant effect of voice and accountability on economic growth in SSA countries demonstrates that the government's ability to give citizens the chance to actively participate in the political process, enhancing freedom of expression, association, and the media are essential in driving economic growth and development in SSA countries. Embracing voice and accountability have the potency of ensuring that state resources are channeled into effective use and corruption will be reduced to the minimum as citizens are free to constructively criticize the government and elect a new government when necessary (Edokat & Njong, 2019; Njog & Ngantcha, 2013). Besides, the findings of this study concord with the empirical study of Guisan (2009) in which VA was found to have a positive and statistically significant effect on the economic

growth of the European Union countries. However, the Granger causality test results in Table 5 show that voice and accountability do not Granger-cause economic growth in SSA during the specified period of study.

Additionally, the positive and statistically significant effect of the rule of law on economic growth in SSA countries shows that maintaining more significance on improving the rule of law in SSA countries is necessary to reinforce better economic outcomes for sustainable and inclusive growth and development. This reasoning stems from the fact that enhancing and promoting the rule of law engenders citizens' confidence and compliance with the rules of the land and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as reduces the likelihood of crime and violence. Through these practices, a conducive and harmonious atmosphere is created, thereby boosting private investment and ultimately better economic outcomes. The finding of this study corroborates that of Haggard et al. (2008) in which similar submissions were made. However, a few empirical studies in the past such as Han et al. (2014), Şaşmaz and Sağdıç (2020), and Tiwari (2021) found no significant relationship between the rule of law and economic growth, even though they confirmed a positive relationship between the rule of law and economic growth. The finding of this study is further validated by the results of the Granger causality test in Table 5 which indicated that the rule of law Granger-causes economic growth in SSA over the study period.

Furthermore, the findings suggest that control of corruption has a positive and statistically significant effect on economic growth in SSA countries. This implies that the government's ability to roll out policies to counteract corruption can stimulate economic growth in SSA countries. Corruption causes distortions in the way state-limited resources are used, erodes government tax revenues, enhances shadow activities, promotes illicit financial flows, and hampers private investment by adding additional costs to businesses. It is therefore incumbent that governments of SSA countries take appropriate measures to curb corruption in all of its forms for better economic outcomes. The results of this study are in tandem with previous studies such as Alessandra and Marro (2021), and Cieřlik and Goczek (2018) wherein corruption was identified to be a disruptive factor to growth. The findings also corroborate the results of studies by Gröndler and Potrafke (2019), Mauro (1995), Mtiraoui (2020), Pham (2020), and Samarasinghe (2018) in which control of corruption was found to spur economic growth in different countries or regions across the globe. Notwithstanding, the Granger causality test results in Table 5 show that control of corruption does not Granger-cause economic growth in SSA over the specified period of study.

In the same vein, political stability and the absence of violence/terrorism have a relatively low positive and statistically significant effect on economic growth in SSA countries. However, the positive and statistically significant impact of PV on economic growth demonstrates the need for a conducive, peaceful, and harmonious environment to foster economic growth and development in SSA countries. Arguably, frequent political unrest in SSA countries does not bode well for business growth as it creates some level of insecurity and stalled economic activities even during periods of relative stability. Therefore, efforts need to be made by governments and policymakers in SSA countries to improve the level of political stability and absence of violence/terrorism in the region to be able to reap the growth, investment, and employment, elasticities of this particular governance indicator. The finding is also in agreement with the results of previous studies, (for example, Han et al., 2014; Huynh & Jacho-Chávez, 2009; Samarasinghe, 2018). This finding is further attested by the results of the Granger causality test in Table 5 which depicted that political stability and absence of violence/terrorism Granger-causes economic growth in SSA over the study period.

### **5.3. Role of governance in the relationship between public sector spending and economic growth in SSA countries**

Governance plays a critical role in enhancing the impact of public sector spending on economic growth in SSA countries. It can be recalled that government education expenditure has a direct positive but statistically insignificant effect on economic growth in SSA countries, while government health expenditure has a direct negative and statistically significant impact on economic growth in SSA countries. However, when we interact both government education and health expenditure distinctly with each governance indicator, we found the effect to be positive and statistically significant even at the 1% level of significance. The growth-enhancing complimentary role of governance to public sector spending is robust across all governance indicators except political stability for government education expenditure, and regulatory quality for government health expenditure, under the Granger causality test results in Table 6.

In particular, the governance indicators such as government effectiveness (GE), regulatory quality (RQ), rule of law (RL), voice and accountability (VA), and control of corruption (CC) are governance indicators that are critical to accentuate the impact of government education expenditure on economic growth



in SSA countries. In contrast, political stability and absence of violence/terrorism (PV) do not Granger-cause economic growth in the sub-region, despite its impact is significant and positive under the PCSE estimation results. The findings of this study are in tandem with the results of a previous empirical study by Rajkumar and Swaroop (2008) in which it was observed that public spending has virtually no impact on health and education outcomes in poorly governed countries, while its impact on growth and education and health outcomes is high in countries with well-nurtured governance.

Good governance is a conduit through which government health expenditure can propel the greatest growth regarding the management and usage of public funds allocated to the health sector. The findings reveal that government health expenditure alone is detrimental to economic growth in SSA. This conclusion is backed by the negative and statistically significant coefficient of government health spending on growth, as well as the Granger causality test results in Table 5 which show that government health spending Granger-cause economic growth in SSA countries. An increase in budgetary allocation to the health sector is inadequate to foster growth and development in SSA countries. Specifically, the governance indicators such as government effectiveness (GE), rule of law (RL), voice and accountability (VA), control of corruption (CC), and political stability and absence of violence/terrorism (PV) are essential to enhance the efficacy of public funds allocated to the health sector to foster sustained growth and development in SSA countries. However, regulatory quality, though, when interacted with government health expenditure produces a positive and significant effect on economic growth, the Granger causality test results in Table 6 show that it does not Granger-cause economic growth in SSA over the period under study. These findings are in line with previous empirical studies such as Kai Hong (2017), and Sarpong et al. (2020) which also found that the aggregate institutional quality indicator significantly impacts economic growth only when it is combined with healthy human capital; and that good governance is necessary for the health system to achieve an optimal path and maintain a judicious balance between health service delivery and financing. In the same vein, Bah and Kpognon (2020) posited that political stability, and absence of violence/terrorism, and the rule of law are the only governance indicators that accentuate the impact of public investment on economic growth in ECOWAS countries.

#### **5.4. Impact of the control variables on economic growth in SSA countries**

To begin with, the positive and statistically significant impact of trade openness on economic growth in SSA means that openness to trade could act as a stimulant to trigger economic prosperity in SSA. These findings are consistent with the a priori expectations of the study and corroborate with economic theories such as the new growth theories, which demonstrate the dual growth effects of openness to trade. Therefore, the African Continental Free Trade Area (AfCFTA) could be a game changer in addressing the poor economic health persistent in SSA countries and increasing the competitiveness and efficiency of the African economies. However, the overall success of the AfCFTA depends on the commitments of member countries to the treaties they signed. This is because the potential benefits of trade openness or trade liberalization policies do not occur in a vacuum, and it could lead to trade creation or trade diversion. The results of this study are also in line with previous empirical studies (Dollar & Kraay, 2001; Masson, 2001; Pigato et al., 1997; World Bank, 2005). The finding of this study is further vindicated by the results of the Granger causality test in Table 5 which indicated that trade openness Granger-causes economic growth in SSA over the study period.

The results demonstrate that inflation (INFL) has a growth-limiting effect on economic growth in SSA countries across the estimations. The finding confirms the a priori expectations of this study and reaffirms the negative relationship between inflation and economic growth in SSA countries, as indicated under the correlation analysis. The general implication is that higher inflation distorts the price system, increases menu costs, and lowers the disposable income of the average consumer, thereby adversely affecting economic growth in SSA countries. These findings agree with the findings of Burdekin et al. (2004), Gylfason and Herbertsson (2001), López-Villavicencio and Mignon (2011), and Sarel (1996) which show that there is a threshold rate of inflation above which inflation adversely affects economic growth, especially in developing countries. In particular, inflation negatively affects economic growth when the annual rate is above a single-digit value in developing countries. Thus, annual inflation rates above 10% to 20% are detrimental to developing countries economic growth. Therefore, the current study concludes that policies both fiscal and monetary should be tailored toward taming higher inflation rates and/or keeping inflation within a reasonable range to enhance economic growth and development in SSA

countries. In contrast, the Granger causality test results in Table 5 show that the inflation rate does not Granger-cause economic growth in SSA over the period under consideration.

Lastly, our results show that gross fixed capital formation (GFCF) impacts negatively but statistically insignificantly on economic growth in SSA countries across the various models. The regression results contradict the findings obtained from the matrix of correlations in which GFCF had a positive relationship with economic growth in SSA over the period under study. Similarly, the results are inconsistent with expectations and contrary to the proposition made by the Neoclassical Solow Swan growth model and social infrastructure view that savings and investment are important determinants of growth both within and across countries (Romer, 2012). The findings of this study, notwithstanding, reaffirm the argument made by Acemoglu and Robinson (2012) that some nations are rich and others poor, not because of geography, disease, art, or culture but a matter of politics and institutions. In contrast, previous studies such as Li et al. (2022), Suwandaru et al. (2021), and Zaman et al. (2021) found that gross fixed capital formation has a positive and statistically significant effect on economic growth. The finding of this study is reaffirmed by the results of Granger causality in Table 5, which shows that GFCF does not Granger-cause economic growth in SSA during the study period.

## **6. Conclusions**

This study adopted the Panel Corrected Standard Errors (PCSEs) estimator and Dumitrescu and Harlin's (2012) panel non-causality test on data from 2002-2020 to examine the impact of public sector spending and governance on economic growth in SSA and ascertain whether governance plays a complementary role in accentuating the impact of public sector spending in economic growth in SSA countries. The results intuitively show that while government education is necessary for economic growth in SSA countries, its impact on growth is generally not statistically significant. Similarly, the findings suggest that government expenditure on the health sector has damaging effects on economic growth in SSA countries. These findings are further supported by the Granger causality test which shows that government education expenditure does not Granger-cause economic growth in SSA while government health expenditure Granger-cause economic growth in SSA countries. These findings imply that governance is imperative in the quest to achieve higher economic growth and development in

SSA countries. However, the Granger causality test indicates that only government effectiveness, rule of law, political stability, and absence of violence/terrorism among the governance indicators Granger-cause economic growth in SSA countries. Acquiescently, the results further suggest that governance can act as a stimulant to enhance the impacts of government education and health spending on economic growth in SSA countries.

In all, increasing public sector spending alone is not enough to foster economic growth and alleviate poverty and income inequality in SSA countries, it should be complemented with strong institutional capability and/or better governance practices to achieve the greatest growth potential. Results indicate that trade openness is necessary to achieve economic prosperity in SSA countries as it can enhance the regional value chains, increase the competitiveness and efficiency of the African markets, increase economies of scale and promote income-generating activities, and ultimately engender economic growth and development in SSA countries. Therefore, governments of SSA countries should strengthen their commitments to the African Continental Free Trade Area to fast-track economic growth and development in the sub-region. Lastly, the study opines that inflation should be maintained within a reasonable range as higher inflation rates are detrimental to growth. The central banks of the various countries should always ensure a good policy mixed between fiscal and monetary policy instruments to ensure better inflation targeting that will simultaneously invigorate sustained growth without bringing untold economic hardships to its people.

It is worth noting that the findings of this study are limited to the short run due to the limitedness of data on the key variables of the study. Also, the findings of this study are limited to the SSA sub-region, therefore, care should be taken when using the findings of this study for policy purposes in other regions of the world. Future researchers may consider expanding the data to allow for cointegration tests and possible long-run analysis of the subject matter. The issue of convergence should be further elaborated upon to account for club convergence and its influencing factors.

### **Declaration statement**

No potential conflict of interest was reported by the author(s).

## References

- Abille, A. B., & Obiero, W. L. (2021). The impact of human capital and defense expenditures on economic growth: Panel analysis for selected SSA countries. *Anadolu İktisat ve İşletme Dergis. Anatolian Journal of Economics and Business*, 5(1), 14-26. <https://dergipark.org.tr/en/download/article-file/1654103>
- Acemoglu, D., & Robinson, A. J. (2012). *Why nations fail: The origin of power, prosperity, and poverty* (1st ed.). Crown.
- AU. (2001). *Abuja declaration on HIV/AIDS, tuberculosis and other related infectious diseases*. OAU/SPS/ABUJA/3. Federal Republic of Nigeria. <https://au.int/sites/default/files/pages/32894-file-2001-abuja-declaration.pdf>
- Babatunde, S. A. (2018). Government spending on infrastructure and economic growth in Nigeria Government spending on infrastructure and economy. *Economic Research-Ekonomska Istraživanja*, 31(1), 997-1014. <https://doi.org/10.1080/1331677X.2018.1436453>
- Bah, M., & Kpogonon, K. (2020). Public investment and economic growth in ECOWAS countries: Does governance matter? *African Journal of Science, Technology, Innovation and Development*, 13(6), 713-726. <https://doi.org/10.1080/20421338.2020.1796051>
- Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2008). Social spending, human capital, and growth in developing countries. *World Development*, 36(8), 1317-1341. <https://doi.org/10.1016/J.WORLDDEV.2007.08.003>
- Barro, R. J. (1988). *Government spending in a simple model of endogenous growth* (Working Paper, No. 2588). National Bureau of Economic Research. <https://doi.org/10.3386/w2588>
- Beck, N. (2001). Time series – cross-sectional data: What have we learned in the past few years? *Annual Review of Political Science*, 4(1), 271-293. <https://www.annualreviews.org/doi/pdf/10.1146/annurev.polisci.4.1.271>
- Beck, N., & Katz, J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, 89(3), 634-647. <https://doi.org/10.2307/2082979>
- Burdekin, R. C. K., Denzau, A. T., Keil, M. W., Sitthiyot, T., & Willett, T. D. (2004). When does inflation hurt economic growth? Different nonlinearities for different economies. *Journal of Macroeconomics*, 26(3), 519-532. <https://doi.org/10.1016/j.jmacro.2003.03.005>
- Churchill, S. A., Yew, S. L., & Ugur, M. (2015). *Effects of government education and health expenditures on economic growth: A meta-analysis effects of government education and health expenditures on economic growth* (No. 14072; Greenwich Papers in Political Economy, Issue 68007). Greenwich Political Economy Research Centre, University of Greenwich. [https://gala.gre.ac.uk/id/eprint/14072/1/GPERC21\\_Churchill\\_Yew\\_UgurF.pdf](https://gala.gre.ac.uk/id/eprint/14072/1/GPERC21_Churchill_Yew_UgurF.pdf)

- Dinh Thanh, S., Hart, N., & Canh, N. P. (2020). Public spending, public governance and economic growth at the Vietnamese provincial level: A disaggregate analysis. *Economic Systems*, 44(4), 100780. <https://doi.org/10.1016/J.ECOSYS.2020.100780>
- Dollar, D., & Kraay, A. (2001). Trade, growth, and poverty. *Finance & Development*, 38(3). <https://www.imf.org/external/pubs/ft/fandd/2001/09/dollar.htm>
- Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics*, 80(4), 549-559. <https://doi.org/10.1162/003465398557825>
- Dumitrescu, E.-I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, 29(4), 1450-1460. <https://doi.org/10.1016/J.ECONMOD.2012.02.014>
- Dzhumashev, R. (2014). Corruption and growth: The role of governance, public spending, and economic development. *Economic Modelling*, 37, 202-215. <https://doi.org/10.1016/j.econmod.2013.11.007>
- Edokat, T., & Njong, A. (2019). Institutional and governance weaknesses and African transformation. In A. B. Elhiraika, G. Ibrahim, & W. Davis (Eds.), *Governance for structural transformation in Africa* (pp. 11-36). [https://doi.org/10.1007/978-3-030-03964-6\\_2](https://doi.org/10.1007/978-3-030-03964-6_2)
- Gebregziabher, F., & Niño-Zarazúa, M. (2014). *Social spending and aggregate welfare in developing and transition economies* (WIDER Working Paper, No. 82). United Nations University. <https://doi.org/10.35188/UNU-WIDER/2014/803-2>
- Cieślak, A., & Goczek, Ł. (2018). Control of corruption, international investment, and economic growth – evidence from panel data. *World Development*, 103, 323-335. <https://doi.org/10.1016/j.worlddev.2017.10.028>
- Grossman, M. (2000). Chapter 7 – The human capital model. In A. J. Culyer & J. P. Newhouse (Eds.), *Handbook of Health Economics* (Vol. 1, Part A; pp. 347-408). Elsevier Science. [https://doi.org/10.1016/S1574-0064\(00\)80166-3](https://doi.org/10.1016/S1574-0064(00)80166-3)
- Gründler, K., & Potrafke, N. (2019). Corruption and economic growth: New empirical evidence. *European Journal of Political Economy*, 60, 101810. <https://doi.org/10.1016/j.ejpoleco.2019.08.001>
- Guisan, M.-C. (2009). Government effectiveness, education, economic development and well-being: Analysis of European countries in comparison with the United States and Canada, 2000–2007. *Applied Econometrics and International Development*, *Euro-American Association of Economic Development*, 9(1), 39-55. <https://papers.ssrn.com/abstract=3121305>
- Gupta, S., & Verhoeven, M. (2001). The efficiency of government expenditure: Experiences from Africa. *Journal of Policy Modeling*, 23(4), 433-467. [https://doi.org/10.1016/S0161-8938\(00\)00036-3](https://doi.org/10.1016/S0161-8938(00)00036-3)
- Gylfason, T., & Herbertsson, T. T. (2001). Does inflation matter for growth? *Japan and the World Economy*, 13(4), 405-428. [https://doi.org/10.1016/S0922-1425\(01\)00073-1](https://doi.org/10.1016/S0922-1425(01)00073-1)

- 
- Haggard, S., Macintyre, A., & Tiede, L. (2008). The rule of law and economic development. *Annual Review of Political Science*, 11, 205-236. <https://doi.org/10.1146/annurev.polisci.10.081205.100244>
- Haggard, S., & Tiede, L. (2011). The rule of law and economic growth: Where are we? *World Development*, 39(5), 673-685. <https://doi.org/10.1016/J.WORLDDEV.2010.10.007>
- Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The Quarterly Journal of Economics*, 114(1), 83-116. <http://www.jstor.org/stable/2586948>
- Han, X., Khan, H., & Zhuang, J. (2014). *Do governance indicators explain development performance? A cross-country analysis* (Economics Working Papers, No. 2313-6537). Asian Development Bank. <http://hdl.handle.net/11540/4213>
- Hansen, B. E. (2007). Least squares model averaging. *Econometrica*, 75(4), 1175-1189. <https://doi.org/10.1111/J.1468-0262.2007.00785.X>
- Harriss-White, B., & White, G. (1996). Corruption, liberalization, and democracy: Editorial introduction. *IDS Bulletin*, 27(2), 1-5. [https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/9247/IDSB\\_27\\_2\\_10.1111-j.1759-5436.1996.mp27002001.x.pdf?sequence=1&isAllowed=y](https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/9247/IDSB_27_2_10.1111-j.1759-5436.1996.mp27002001.x.pdf?sequence=1&isAllowed=y)
- Hoehle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal*, 7(3), 281-312. <https://doi.org/10.1177/1536867x0700700301>
- De Hoyos, R. E., & Sarafidis, V. (2006). Testing for cross-sectional dependence in panel-data models. *The Strata Journal*, 6(4), 482-496. <https://journals.sagepub.com/doi/pdf/10.1177/1536867X0600600403>
- Huntington, S. P. (1968). *Political order in changing societies*. Yale University Press. <https://pdfs.semanticscholar.org/bf7d/7528a7d3614f3550ec9ef1b869f7f7d731a1.pdf>
- Huynh, K. P., & Jacho-Chávez, D. T. (2009). Growth and governance: A nonparametric analysis. *Journal of Comparative Economics*, 37(1), 121-143. <https://doi.org/10.1016/j.jce.2008.08.003>
- Kai Hong, P. (2017). Governance issues in health financing. In S. R. Quah (Ed.), *International Encyclopedia of Public Health* (2nd ed., pp. 330-341). Elsevier. <https://doi.org/10.1016/B978-0-12-803678-5.00177-6>
- Kaufmann, D., Kraay, A., & Massimo, M. (2004). Governance matters III governance indicators for 1996-2002. *The World Bank Economic Review*, 18(2), 253-287. <https://doi.org/10.1093/wber/lhh041>
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The worldwide governance indicators: Methodology and analytical issues* (Policy Research Working Papers). World Bank Group. <https://doi.org/10.1596/1813-9450-5430>
- Kaur, S. (2019). Expenditure on social services and economic growth: An analysis for Punjab economy. *International Journal of Multidisciplinary Research*, 9(4), 256-266. <https://www.indianjournals.com/ijor.aspx?target=ijor:zijmr&volume=9&issue=4&article=028>

- Khan, M. H. (2008). Governance and development: The perspective of growth-enhancing governance. In K. Ohno, & I. Ohno (Eds.), *Eastern and Western ideas for African Growth: Diversity and complementarity in development aid* (pp. 107-152). Routledge-GRIPS Development Forum Studies. <https://doi.org/10.4324/9780203555644>
- Li, Y., Tariq, M., Khan, S., Rjoub, H., & Azhar, A. (2022). Natural resources rents, capital formation, and economic performance: Evaluating the role of globalization. *Resources Policy*, 78, 102817. <https://doi.org/10.1016/J.RESOURPOL.2022.102817>
- Liang, K.-Y., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika*, 73(1), 13-22. <https://doi.org/10.1093/BIOMET/73.1.13>
- López-Villavicencio, A., & Mignon, V. (2011). On the impact of inflation on output growth: Does the level of inflation matter? *Journal of Macroeconomics*, 33(3), 455-464. <https://doi.org/10.1016/J.JMACRO.2011.02.003>
- Lucas, R. E. Jr. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3-42. [https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7)
- Marro, S. A. B., Rivera Mallma, L., & Vicente-Ramos, W. (2021). The effects of corruption on Peru's economic growth during the period 1998-2018. *Accounting*, 7, 1645-1654. [https://repositorio.continental.edu.pe/bitstream/20.500.12394/10186/1/IV\\_FCE\\_313\\_TE\\_Benito\\_Marro\\_2021.pdf](https://repositorio.continental.edu.pe/bitstream/20.500.12394/10186/1/IV_FCE_313_TE_Benito_Marro_2021.pdf)
- Masson, P. (2001). *Globalization: Facts and figures* (Policy Discussion Paper, PDP/01/4). IMF. <https://www.imf.org/external/pubs/ft/pdp/2001/pdp04.pdf>
- Matsuo, H. (2002). The rule of law and economic development: A cause or a result? In *Cale Books* (No. 2; pp. 59-70). Center for Asian Legal Exchange, Nagoya University. [https://nagoya.repo.nii.ac.jp/record/18056/files/caleb\\_2\\_59.pdf](https://nagoya.repo.nii.ac.jp/record/18056/files/caleb_2_59.pdf)
- Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics*, 110(3), 681-712. <https://doi.org/10.2307/2946696>
- Mtiraoui, A. B. A. (2019). Action of public power between the control of corruption and economic growth in the MENA region. *Revue des Etudes Multidisciplinaire en Sciences Economiques et Sociales*, 4(3), 150-168. <https://hal.archives-ouvertes.fr/hal-02521414>
- Njog, A. M., & Ngantcha, J. T. (2013). Institutions and leakage of funds in Cameroonian healthcare delivery chain. *Journal of African Development*, 15(1), 19-43. <https://ideas.repec.org/a/afe/journal/v15y2013i1p19-43.html>
- Odhiambo, N. M. (2021). Health expenditure and economic growth in Sub-Saharan Africa: An empirical investigation. *Development Studies Research*, 8(1), 73-81. <https://doi.org/10.1080/21665095.2021.1892500>
- Omri, A., & Ben Mabrouk, N. (2020). Good governance for sustainable development goals: Getting ahead of the pack or falling behind? *Environmental Impact Assessment Review*, 83, 106388. <https://doi.org/10.1016/J.EIAR.2020.106388>



- Pacific, Y. K. T., Ramadhan A. A., & Magalie, N. M.-A. G. (2017). Does control of corruption accelerate economic growth? *Global Journal of Human-Social Science: E. Economics*, 17(E6), 40-50. <https://socialscienceresearch.org/index.php/GJHSS/article/view/2417>
- Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68, 79-113. [https://doi.org/10.1016/0304-4076\(94\)01644-F](https://doi.org/10.1016/0304-4076(94)01644-F)
- Pesaran, M. H. (2004). *General diagnostic tests for cross section dependence in panels* (Cambridge Working Papers in Economics, No. 0435). Faculty of Economics, University of Cambridge. <https://ideas.repec.org/p/cam/camdae/0435.html>
- Pham, V. T. H. (2020). Impacts of corruption control on economic growth in relationship with stock market and trade openness. *The Journal of Asian Finance, Economics and Business*, 7(12), 73-84. <https://doi.org/10.13106/jafeb.2020.vol7.no12.073>
- Phillips, P. C. B., & Sul, D. (2007). Transition modeling and econometric convergence tests. *Econometrica*, 75(6), 1771-1855. <https://doi.org/10.1111/J.1468-0262.2007.00811.X>
- Phillips, P. C. B., & Sul, D. (2009). Economic transition and growth. *Journal of Applied Econometrics*, 24(7), 1153-1185. <https://doi.org/10.1002/JAE.1080>
- Piabuo, S. M., & Tieguhong, J. C. (2017). Health expenditure and economic growth – a review of the literature and analysis between the economic community for central African states (CEMAC) and selected African countries. *Health Economics Review*, 7(23). <https://doi.org/10.1186/s13561-017-0159-1>
- Pigato, M., Farah, C., Itakura, K., Jun, K., Martin, W., Murrel, K., & Srinivasan, T. G. (1997). *South Asia's integration into the world economy*. World Bank. [https://books.google.com/books?hl=en&lr=&id=vfmmLGFFpwgC&oi=fnd&pg=PA1&dq=Pigato+et+al.,+1997+pdf&ots=f5kmEDwZMr&sig=G71ls5n03u9sf1\\_70-TFIWURUSI](https://books.google.com/books?hl=en&lr=&id=vfmmLGFFpwgC&oi=fnd&pg=PA1&dq=Pigato+et+al.,+1997+pdf&ots=f5kmEDwZMr&sig=G71ls5n03u9sf1_70-TFIWURUSI)
- Progress Initiative TV. (2021, January 4). *Know your Africa!!!* [Video]. YouTube. <https://www.youtube.com/watch?v=rNr2cCkIgU>
- Raghupathi, V., & Raghupathi, W. (2020). Healthcare expenditure and economic performance: Insights from the United States data. *Frontiers in Public Health*, 9, 1-15. <https://doi.org/10.3389/fpubh.2020.00156>
- Rajkumar, A. S., & Swaroop, V. (2008). Public spending and outcomes: Does governance matter? *Journal of Development Economics*, 86(1), 96-111. <https://doi.org/10.1016/J.JDEVECO.2007.08.003>
- Romer, D. (2012). *Advanced macroeconomics* (4<sup>th</sup> ed.). The McGraw-Hill Series in Economics. McGraw Hill-Irwin. <http://www.mim.ac.mw/books/David%20Romer%27s%20Advanced%20Macroeconomics,%204th%20edition.pdf>
- Romer, P. (1989). *Endogenous technological change* (NBER Working Paper Series, No. 3210). National Bureau of Economic Research. <https://doi.org/10.3386/w3210>
- Samarasinghe, T. (2018). *Impact of governance on economic growth* (Paper, No. 89834). MPRA. <https://ideas.repec.org/s/pramprapa.html>

- Sarel, M. (1996). Nonlinear effects of inflation on economic growth. *IMF Staff Papers*, 43(1), 199-215. <https://doi.org/10.2307/3867357>
- Sarpong, B., Nketiah-Amponsah, E., & Owoo, N. S. (2020). Health and economic growth nexus: Evidence from selected Sub-Saharan African (SSA) countries. *Global Business Review*, 21(2), 328-347. <https://doi.org/10.1177/0972150918778966>
- Şaşmaz, M. Ü., & Sağdıç, E. N. (2020). The effect of government effectiveness and rule of law on economic growth: The case of European Union transition economic growth. *Dokuz Eylül Üniversitesi İşletme Fakültesi Dergisi*, 21(1). <https://doi.org/10.24889/ifede.729490>
- Shaw, G. K. (1992). Policy implications of endogenous growth theory. *The Economic Journal*, 102(412), 611-621. <https://doi.org/10.2307/2234298>
- Suwandaru, A., Alghamdi, T., & Nurwanto, N. (2021). Empirical analysis on public expenditure for education and economic growth: Evidence from Indonesia. *Economics*, 9(4), 146-159. <https://doi.org/10.3390/ECONOMIES9040146>
- Tiwari, A. (2021). Assessing the impact of institutions on economic growth in the BRICS countries. *BRICS Journal of Economics*, 2(4), 30-46. <https://doi.org/10.38050/2712-7508-2021-4-2>
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817-838. <https://doi.org/10.2307/1912934>
- White, H. (1984). *Asymptotic theory for econometricians. A volume in economic theory, econometrics, and mathematical economics* (Revised ed.). Academic Press. <https://doi.org/10.1016/C2009-0-21869-1>
- World Bank. (1981). *Accelerated development in Sub-Saharan Africa: An agenda for action*. World Bank Group. <http://documents.worldbank.org/curated/en/702471468768312009/Accelerated-development-in-sub-Saharan-Africa-an-agenda-for-action>
- World Bank. (2005). *World Development Report 2005*. World Bank Group. <https://doi.org/10.1596/0-8213-5682-8>
- Zaman, M., Pinglu, C., Hussain, S. I., Ullah, A., & Qian, N. (2021). Does regional integration matter for sustainable economic growth? Fostering the role of FDI, trade openness, IT exports, and capital formation in BRI countries. *Heliyon*, 7(12), e08559. <https://doi.org/10.1016/J.HELIYON.2021.E08559>
- Zhuang, J., De Dios, E., & Lagman-Martin, A. (2010). *Governance and institutional quality and the links with economic growth and income inequality: With special reference to developing Asia Juzhong* (Economics Working Papers, Issue 193). Asian Development Bank. <http://hdl.handle.net/11540/1537>

## Data availability

<https://databank.worldbank.org/source/worldwide-governance-indicators> (accessed on: February 1, 2022).

<https://data.worldbank.org/indicator> (accessed on: February 1, 2022).

## **Appendix**

**Table 11.** List of SSA countries selected for the study

Angola, Benin, Botswana, Burundi, Cabo Verde, Cameroon, Central Africa Republic, Chad, Congo Republic, Cote d'Ivoire, Eswatini, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Mali, Mauritius, Mozambique, Namibia, Niger, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Tanzania, The Gambia, Togo, Uganda, and Zambia.
--

Source: Authors' own elaboration.