

4.

The Nexus between Education and Economic Growth: The Moderator Effect of Governance – Evidence from African Countries

Kilani Hadda

Introduction

Despite the important role of education in achieving economic growth, there is a weak link between the two in many African countries. According to UNESCO (2021), although school enrolment rates increased from 53% in 2000 to 67% in 2020, these improvements have not consistently translated into economic growth. Several studies suggest that African economies are characterized by weak institutional quality, corruption, and political instability, which undermine the effectiveness of education systems and contribute to persistent unemployment, including among graduates (Acemoglu et al., 2001). More than 70 million young people in Africa were “not in employment, education, or training,”¹ representing roughly 23% of the youth population (International Labour Organization, 2024). This reflects structural labour-market constraints and the difficulty of converting educational expansion into productive employment opportunities. Further, the region also exhibits low levels of investment in research and development (R&D), with African countries investing less than 0.5% of GDP in R&D (African Development Bank, 2022).

African governments have long focused their investments on physical capital to support economic growth. The Africa Sustainable Development Report (AU, UNECA, AfDB & UNDP, 2022) pointed out a gap between investment in infrastructure and investment in education and health. The IMF recommends investing in both human capital and physical capital to achieve more inclusive growth, and presents Mauritius and Rwanda as examples (Baduel, Isakova & Ter-Martirosyan, 2021). Also, the African Union (AU) as well as national development plans, have prioritised human capital formation in their economic policies, promising to ensure equitable access to quality education (African Union Commission, 2015). However, brain drain reduces the potential of education to increase human capital. Highly educated Africans are seven times more likely to migrate than the general population (Docquier & Marfouk, 2006).

We propose that the quality of governance plays a moderator role in the relation between in education and economic growth. Indeed, technologies for supporting research, teaching, and administrative processes require an effective governance framework (Bianchi & Sousa, 2016). Good institutional

1 The internationally recognised indicator “Not in Employment, Education, or Training,” or NEET, refers to young people who are neither working nor enrolled in formal education or vocational training. This indicator is widely used by organizations such as the International Labour Organization to assess youth labour market vulnerability.

quality emerges as an essential tool to transform education into economic growth and to improve the education system, which implies the active participation of all stakeholders by creating jobs, entrepreneurship, innovation, and investment (Rodrick, 2004). In contrast, institutional economics suggests that weak institutional structures are a detriment to economic growth.

In this chapter we will examine the nexus between education and economic growth in the first step and estimate the moderating role of governance quality in fostering this relationship in the second step. We identify the key indicators of governance that facilitate human capital development in African countries. These could enhance African governments, which typically operate with limited resources, to provide their citizens opportunities for education. This chapter is structured as follows: in the next section, we survey the relevant literature and the previous theoretical and empirical results related to the topic. After that we present the methodology and discussion results.

Literature review

Economic growth and education

Human capital refers to a stock of physical and intellectual characteristics that enable an individual to participate in productive activity (Barro 1991; Hanushek & Woessmann 2012; Beitone et al., 2019). However, human capital also functions on an aggregate level, as one of the factors contributing to a country's competitiveness in the global economy (Satriadi et al., 2022). Both on the aggregate and the individual level, education is the main producer of human capital. The theoretical literature highlights at least three key mechanisms by which education can influence economic growth. Firstly, education enhances the human capital within the labour force, leading to increased labour productivity and facilitating a transition toward a higher equilibrium level of output, as suggested by neoclassical growth theories (Mankiw et al., 1992). Secondly, education enhances the economy's innovative capacity and the advancement of new technologies, products, and processes, which fosters growth, as suggested by endogenous growth theories (Lucas, 1988; Romer, 1990; Aghion & Howitt, 1998). Thirdly, education helps the transmission of knowledge for understanding and processing new information, as well as for successfully implementing technologies, which in turn drives economic growth (Benhabib & Spiegel, 1994).

Education at all levels is viewed as one of the most powerful tools for achieving human capital development, playing a crucial role in sustainable development, thus enhancing human well-being (Sebki, 2021). In this context, public investment in primary, secondary, and higher education is often discussed for its impact on economic growth. Indeed, it strengthens the workforce's collective capability to perform existing tasks more efficiently. Also, secondary and tertiary education support the transfer of knowledge of new information, products, and technologies developed elsewhere (Barro & Lee, 2010). Furthermore, by fostering creativity, education enhances a country's capacity to generate its own innovations, new knowledge, products, and technologies (Grant, 2017). The cost of education is an investment in human capital, where educated people tend to be more productive and can increase economic productivity more than those who are not educated (Widarni & Bawono, 2021).

To understand the endogenous growth theory, Popović et al. (2019) estimated the relationship between education and economic development. By drawing a sample of two countries, Bosnia and Herzegovina, over the period 2005-2017 using multiple regressions, authors found a positive relationship between education years average, technological readiness and innovations, and economic development. For their part, Qutb and El Shennawy (2016) estimated the relationship between public education expenditures and economic growth in Egypt over the period from the 1980s to 2014 using the Johansen cointegration technique and VECM. The authors found that education was the vital channel through which human capital can contribute to economic growth in the long term. However, the relationship appears to be negative in the short term due to the growing rate of unemployment. Furthermore, Tsamadias and Prontzas (2012) analyse the impact of education on economic growth in Greece from 1960 to 2000, using the Mankiw, Romer, and Weil model. Their findings revealed that education positively and significantly impacted inclusive economic growth. The authors explained that the variation in the rate of economic growth depended around 66% on the rate of education. Also, Son et al. (2013) confirmed the crucial role of education in driving economic growth, particularly in the case of the European Union, through three double-log models. They highlighted a positive effect of GDP per capita growth on education, especially when it was measured by qualitative variables of human capital (primary, secondary, and tertiary education). Moreover, Guma (2014) examined the importance of education on economic growth in Albania from 1994 to 2011 using the Cointegration, Granger Causality Test, and VAR methodology. The results suggested a long-term relationship between education level and economic growth, while it seems unidirectional.

The moderator role of governance on the education-growth nexus

The relationship between economic growth and education has long been established in literature. For example, Madsen and Murtin (2017) confirmed that education has been the primary driver of British economic growth from 1970 to 2010. For Morocco, Hadir and Lahrech (2015) examined the relationship between total government expenditure and enrolment data in tertiary, secondary, and primary schools as indicators of human capital using the OLS method. Their findings suggested that the human capital development in Morocco is a significant driver for the country's socio-economic progress, and that investment in education contributes to economic development. However, Ojewumi and Oladimeji (2016) got more complex outcomes when they estimated the impact of government spending on Nigeria's education and health sectors using the ARDL model. They found that both capital and recurrent expenditures were negatively affecting the sector. They recommended establishing an optimum of education and health expenditures in the region.

A number of recent studies have pointed out the important role of governance, which depends on its nature and strengths, in enhancing the nexus between economic growth and education. For instance, effective institutions foster the allocation of educational resources efficiently and foster accountability and transparency (Acemoglu, 2012). The rule of law contributes to securing the legal system and increasing entrepreneurial activities, seen as a key channel to translate education into economic development (North, 1990). On the other hand, corruption inhibits the nexus between education and growth through fostering inequity, reducing investment in education, and decreasing motivation

among educators. Also, political instability can negatively impact growth in the long term through the declining school enrolment and brain drain (human capital flight) (Alesina et al., 1996).

Several studies empirically estimated the critical moderator of governance, whether it enhances or inhibits the education-growth link. For instance, Rankaduwa et al. (2017) analysed the relationship between government education expenditure and economic growth in Sri Lanka over the period 1960-2015. The study found a positive direct effect and a negative indirect effect of education expenditure of government on economic growth in the region. The authors observed that the impact of education expenditure can be inconclusive, meaning that an increase in education spending does not necessarily translate into economic growth, depending on various factors such as the fund of resources, efficiency, and the quality of education.

Furthermore, Duerrenberger and Warning (2018) explained the possible relationship between public versus private funding in higher education, using data from 88 developing countries. Their results show that increasing public funding in countries with high levels of corruption is negatively correlated with expected years of schooling and does not automatically transform into economic development, as high rates of corruption lead to more misallocation of resources. However, private funding has led to a potential benefit to invest in higher education by offering efficient and effective practices and services. The author underscores the importance of implementing an anti-corruption model in the education system and promoting efficient mechanisms to mitigate the negative effects of corruption, encourage the private sector, and promote sustainable development. Additionally, Dridi (2014) identified a possible transmission channel between corruption and economic growth. The main results suggested that corruption affects economic growth negatively by its impact on human capital, in particular through the internal efficiency of education systems.

Gnangoin et al. (2019) examined the nexus between government spending, income inequality, and economic growth by using GMM estimation in 19 Asian countries from 2002 to 2017. Their findings suggested that government expenditure and regulatory quality are key elements to increase economic growth in these countries. However, authors highlighted the insignificant effect of government expenditure on education and economic growth. The authors recommend countries governments invest more in gross domestic investment and reduce their current consumption. For their part, Carsamer and Ekyem (2015) examined the impact of government educational spending on school enrolment at primary and secondary levels. They selected a sample of 24 sub-Saharan African countries for the period 2000 to 2016, employing the system GMM approach. Their findings revealed that an increase in educational expenditure led to higher enrolment rates at both the primary and secondary school levels.

Klomp and Haan (2013) estimated the impact of political regime on human capital based on a two-step structural equation model in 100 countries. In the first step the authors constructed two new indexes of human capital (16 indicators) based on advanced human capital. In the second step, they estimated the impact of the political dimension on the human capital index. The authors concluded that government instability has a negative relationship with advanced human capital. They also found a positive indirect effect of governance and democracy on both types of human capital through their effect on income.

Churchill and Yew (2017) suggested a positive impact of government spending on education in developed countries, while its effect is negligible for less developed countries. Indeed, North America and Europe are characterized by higher institutional quality and robust technological infrastructures, alongside advanced knowledge economies. Moreover, Gerged and Elheddad (2020) investigated the nexus between governance (voice and accountability) and the quality of education (Human Development Index) in Europe, using panel data from 2002 to 2017 and applying fixed and random effect models. Their results highlighted a positive and significant effect between education quality and national governance. This implies that voice and accountability are considered as factors to encourage education policies.

Data description and model

In line with the literature review, we examine the link between education, economic growth, and the moderating role of governance. We used the GMM technique in this current study. The Generalized Method of Moments (GMM) is a suitable approach for addressing endogeneity issues. Initially it was proposed by Holtz-Eakin, Newey and Rosen (1988) and by Arellano and Bond (1991). This technique provides two types of estimators: the Arellano and Bond estimator (GMM in differences) and the Blundell and Bond estimator (GMM in system). The GMM in differences aims to mitigate endogeneity bias by differentiating level equations into first differences. While this method yields more accurate estimates than ordinary least squares (OLS), using lagged level variables as instruments can be inappropriate and may not effectively capture the impact of time-invariant factors. Blundell and Bond (1998) demonstrate by Monte Carlo simulations that the system GMM estimator outperforms the first-difference estimator. The latter produces biased coefficients on small samples, particularly when the instruments are weak. The bias is amplified by the persistence of the variables, the importance of the specific effects, and the small-time dimension of the panel. Following Odhiambo (2023) and Tchamyu (2019) the model can be presented as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 X_{it} \cdot GOV + \beta_3 CV_{it} + \alpha_{it} + \varepsilon_{it}$$

(1)

$$GDP_{it} = \beta_0 + \beta_1^1 EDUC_{it} + \beta_1^2 GOV_{it} + \beta_1^3 GOV_{it} \cdot EDUC_{it} + \beta_2^1 EDUC_{it} + \beta_2^2 GOV_{it} + \beta_2^3 GOV_{it} \cdot EDUC_{it} + \beta_3^1 FI_{it} + \beta_3^2 INVEST_{it} + \alpha_{it} + \varepsilon_{it}$$

(2)

Variables GDP, EDUC, GOV, FI and INVEST are in logged levels. Where the terms *i* and *t* represent country and time respectively. GDP per capita represent the dependent variable. *X* represents the vector of independent variables. EDUC refers to education level, namely, primary education enrolment (prim) and secondary education enrolment (sec) of country (*i*) in period (*t*). Gov denotes six governance proxies as developed by Kaufmann, Kraay and Mastruzzi (2005): control of corruption, government effectiveness, regulatory control, rule of law, voice and accountability, and political stability of each country (*i*) and in each country period (*t*). Using these indicators simultaneously in the same model can generate problems of multicollinearity and simultaneity bias. This is why these six indicators are introduced into the regression models in an alternative way. EDUC x Gov represents

interactions between each of the six indicators of governance quality and the two proxies of education. CV is a vector of control variables, i.e., financial development (FD) and investment (INVEST). We use STATA version 17 software to analyse our data, particularly for dynamic panels. Table 4. 1 presents used variables:

Table 4.1. List of variables

Variables	Description	Expected Sign	Sources
Economic Growth (GDP)	Annual percentage growth rate of GDP	(+)	WDI ²
Education (EDUC)	School enrolment, primary (% gross)	(+)	WDI
	School enrolment, secondary (% gross)	(+)	WDI
Control of corruption (CC)	This indicator measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. (2.5 -2.5)	(+)	WGI ³
Government effectiveness (GE)	This indicator measures the credibility of the government's commitment to political leaders. Scored from -2.5 (less effective) to 2.5 (more effective)	(+)/(-)	WGI
Regulatory quality (RQ)	The ability of the government to formulate and implement sound policies and regulations ranging from approximately -2.5 to 2.5.	(+)	WGI
Rule of law (RL)	The capacity of a society to establish an environment in which fair and predictable rules. It range from 0 to 1.	(+)	WGI
Voice and Accountability (VA)	This indicator measures the possibility and opportunity for citizens of a country to participate in the choices of the government. It ranges from approximately -2.5 to 2.5.	(+)	WGI
Political stability (PS)	Perceptions of the likelihood of an incumbent government being disrupted or overthrown by serious threats to public order, including terrorism and violence. It ranges from -2.5 to 2.5.	(+)	WGI
Financial development (FD)	The financial Development index (FD) is a relative ranking of countries on the depth, access, and efficiency of their financial institutions and financial markets.	(+)	GFDD ⁴
Investment (INVEST)	Gross capital formation (% of GDP)	(+)	WDI

Source: Author

² World Development Indicators databank

³ Worldwide Governance Indicators

⁴ Global Financial Development Database

4. The Nexus between Education and Economic Growth

Table 4.2 illustrates the descriptive statistics of economic variables (LGDP, INVEST, FD), educational variables (LPRIM, LSEC), and institutional variables (PS, VA, GE, RQ, RL, CC) for 312 observations of the African region from 2005 to 2020. All the averages vary from one to the other. However, all governance indicators are negative and have not reached at least the average, which revealed a low performance of governance in the selected region. Moreover, the table provides a range of variation between the maximum and minimum values, indicating a significant heterogeneity in terms of education, economic development, and governance.

Table 4.2. *Statistical descriptive*

Variable	Obs	Mean	Std.	Min	Max
LGDP	312	7.238746	.9723516	5.573526	9.877228
LPRIM	312	4.504583	.4319874	1.697708	5.022078
LSEC	312	3.837786	.3843245	2.726303	4.699234
PS	312	-0.4620198	.7334136	-2.665278	.9992182
VA	312	-0.4305727	.67941	-1.84886	.9396508
GE	312	-.06206612	.6484609	-1.813808	1.150494
RQ	312	-0.4627738	.5354224	-1.66968	1.196947
RL	312	-0.4577759	.6275003	-1.513907	1.348969
CC	312	-0.50833	.59796	-1.599391	1.600455
INVEST	312	3.096133	.6827429	.0412977	4.723426
FD	312	1.153693	1.33131	-3.186948	23.18695

Source: Author

Table 4.3. *Matrix correlation*

	LGDP	LPRIM	LSEC	PS	VA	GE	RQ	
LGDP		1.0000						
LPRIM			1.0000					
	0.0008							
LSEC		0.5507	-0.1020	1.0000				
	0.0000	0.0721						
PS		0.5507	0.1343	0.1777	1.0000			
	0.0000	0.0177	0.0016					
VA		0.4473	0.1847	0.3043	0.7136	1.0000		
	0.0000	0.0011	0.0000	0.0000				
GE		0.7112	0.0792	0.4519	0.7053	0.6644	1.0000	
	0.0000	0.1631	0.0000	0.0000	0.0000			
RQ		0.6209	0.0601	0.4482	0.7300	0.6748	0.8028	1.0000
	0.0000	0.2901	0.0000	0.0000	0.0000	0.0000		

	LGDP	LPRIM	LSEC	PS	VA	GE	RQ	
RL		0.5639	0.0042	0.3952	0.3514	0.3964	0.6261	0.4656
	0.0000	0.9416	0.0000	0.0000	0.0000	0.0000	0.0000	
CC		0.6223	0.0932	0.3217	0.7444	0.6311	0.8669	0.7531
	0.0000	0.1004	0.0000	0.0000	0.0000	0.0000	0.0000	
INVEST		0.0011	-0.2351	-0.0529	0.1321	0.0814	0.1198	0.1090
	0.9846	0.0000	0.3518	0.0196	0.1513	0.0344	0.0545	
FD		0.0110	-0.0492	-0.0069	0.0163	0.0368	0.0326	0.0504
	0.8467	0.3865	0.9039	0.7745	0.5176	0.5664	0.3747	

Source: Author

The correlation matrix (Table 4.3) indicates the strength and direction of relationships between variables and the positive correlation between growth in per capita GDP, education (primary and secondary), the governance indicators, and the control variables over the period 2010–2021. The results show that the logarithm of GDP is correlated with governance indicators. Also, the table revealed a positive and significant correlation between secondary education and LGDP, meaning that secondary education is well correlated with economic development, which translates into very high skills and productivity. However, there is a negative correlation between the primary education and LGDP (-0.188).

Results and discussion

The GMM results are reported in Tables 4.4 and 4.5. The results of Table 4.4 show first that in all models the lagged variable of GDP (L. LGDP) is highly significant (0.974 and 1.017). That means that the level of current economic development depends on its previous level, which is called the “inertia of the growth process.”

The direct impact of education, when primary school is used as a proxy, is significant and positive only on two specifications of governance (3) and (4). However, it was insignificant in four specifications: (1), (2), (5), and (6). These results revealed that the direct impact of primary education is highly dependent on institutional quality. Additionally, governance’ variables in 4 specifications (GE), (RQ), (RL), and (PS) have a negative direct impact; however, their coefficients are corrected by positive interactions with LPRIM. Also, the coefficient of (VA) indicates a positive and significant impact on economic growth. However, in interaction with primary school, model 5 (VA*prim) has a significant but negative impact on economic growth. This result is consistent with Brown (2000) and Sen (2014). For instance, Brown (2000) finds that unlike other developing regions where democracy promotes primary school enrolment, it has no effect in sub-Saharan Africa. Moreover, recent research in Asia by Sen (2014) also shows that there is no significant effect of voice and civic responsibility on the number of years of schooling for children aged 15 or under.

Furthermore, variables governances are positive and statistically significant (at the 1% threshold) but negative in two interactions (LPRIMVA and LPRIMCC). These findings highlighted the important combination of institutional quality with human capital (through education), which favours economic development. For instance, the interaction between QR and LPRIM has a positive and significant impact on economic growth. Improving the quality of regulation can promote export growth, which in turn leads to the creation of new employment opportunities and higher wages.

Table 4.4. GMM results

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
VARIABLES	LGDP	LGDP	LGDP	LGDP	LGDP	LGDP
L.LGDP	0.981***	0.977***	0.983***	1.004***	1.017***	0.974***
	(0.0167)	(0.0156)	(0.0127)	(0.0150)	(0.0144)	(0.0139)
LPRIM	-0.0542	0.0316	0.0718**	0.0602*	-0.0466	-0.0181
	(0.0425)	(0.0396)	(0.0349)	(0.0340)	(0.0337)	(0.0353)
CC	0.102					
	(0.252)					
LPRIMCC	-0.0148*					
	(0.0555)					
GE		-0.512				
		(0.182)				
LPRIMGE		0.122***				
		(0.0410)				
RQ			-1.036			
			(0.229)			
LPRIMRQ			0.245***			
			(0.0520)			
RL				-0.580		
				(0.200)		
LPRIMRL				0.130***		
				(0.0458)		
VA					0.321	
					(0.188)	
LPRIMVA					-0.0699	
					(0.0428)	
PS						-0.342
						(0.151)
LPRIMPS						0.0871***

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
						(0.0336)
INV	0.00430	0.00347	0.00454	0.00892*	0.00710	0.000801
	(0.00514)	(0.00507)	(0.00497)	(0.00484)	(0.00502)	(0.00518)
FD	0.00125	0.00158	0.00185	0.00198	0.00143	0.00139
	(0.00155)	(0.00154)	(0.00155)	(0.00152)	(0.00156)	(0.00154)
Constant	0.397	0.0479	-0.171	-0.311	0.0828	0.299
	(0.256)	(0.236)	(0.197)	(0.194)	(0.214)	(0.224)
Observations	286	286	286	286	286	286
Number	of	Country	26	26	26	26
AR(1)	-5.65 (0.000)	-5.45 (0.000)	-5.46 (0.000)	-5.18 (0.000)	-5.58 (0.000)	-5.32 (0.000)
AR(2)	-2.75 (0.000)	-2.78 (0.000)	-2.42 (0.005)	-2.82 (0.005)	-2.75 (0.005)	-2.93 (0.003)
Sargan OIR	195.48 (0.000)	135.64 (0.005)	132.49 (0.005)	127.92 (0.005)	135.53 (0.005)	129.29 (0.013)

Source: Author

However, the result also showed a positive but insignificant impact of control variables, investment (capital fixed formation), and financial development (FD). Financial development has a positive effect on economic growth in all the primary education specifications. But it is significant unconditionally at the level of 1% only when governance is measured by the rule of law.

The GMM results reported in Table 4.5 show that the coefficient of education, when secondary enrolment is used as a proxy, is significant only in four specifications of governance, i.e., regularity quality (RQ), control of corruption (CC), rule of law (RL), and voice and accountability (VA). This result has been confirmed in the coefficient of the secondary education variable in the economic growth function, which has been found to be positive and statistically significant in the four specifications. However, it has a significant and negative impact only in interaction with governance quality specifications such as (GE) and (PS). This result is inconsistent with economic theory and with the results of studies indicating the positive impact of human capital on economic growth (Hanif & Arshed, 2016; Ogundari & Awokuse, 2018; Ogunleye et al., 2017). Furthermore, the findings show that investment has a positive effect on economic growth in two of the secondary education specifications. However, it is significant unconditionally at the level of 1% only when governance is measured by the rule of law (RL) and voice and accountability (VA). Therefore, the quality of governance in interaction with secondary school has a negative and significant impact on economic growth.

4. The Nexus between Education and Economic Growth

Table 4.5. GMM results

	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
VARIABLES	LGDP	LGDP	LGDP	LGDP	LGDP	LGDP
	***	p<0.01,	**	p<0.05,	*	p<0.1
L.LGDP	1.026***	1.025***	1.017***	1.036***	1.036***	1.008***
	(0.0185)	(0.0157)	(0.0130)	(0.0131)	(0.0138)	(0.0149)
LSEC	-0.0798**	-0.0552	-0.0742***	-0.0886**	-0.0435*	-0.0332
	(0.0362)	(0.0373)	(0.0272)	(0.0366)	(0.0258)	(0.0260)
CC	0.377***					
	(0.145)					
LSECC	-0.0940**					
	(0.0384)					
GE		0.217				
		(0.161)				
LSECGE		-0.0521				
		(0.0429)				
RQ			0.405***			
			(0.148)			
LSECRQ			-0.0924**			
			(0.0383)			
RL				0.432**		
				(0.190)		
LSECRL				-0.115**		
				(0.0486)		
VA					0.401***	
					(0.154)	
LSECVA					-0.106***	
					(0.0412)	
PS						-0.0264
						(0.119)
LSECPS						0.0178
						(0.0318)
INVEST	0.00631	0.00759	0.00196	0.0109**	0.0128**	-0.00236
	(0.00554)	(0.00536)	(0.00511)	(0.00469)	(0.00556)	(0.00559)
FD	0.00132	0.00155	0.000577	0.00154	0.00187	0.00139
	(0.00157)	(0.00155)	(0.00158)	(0.00156)	(0.00158)	(0.00155)

Constant	0.124 (0.133)	0.0344 (0.129)	0.201 (0.126)	0.0659 (0.166)	-0.114 (0.112)	0.105 (0.118)
Observations	286	286	286	286	286	286
Number	of	Country	26	26	26	26
AR (1)	-5.58 (0.000)	-5.59 (0.000)	-5.71 (0.000)	-5.57 (0.000)	-5.51 (0.000)	-5.53 (0.000)
AR (2)	-2.66 (0.00)	-2.78 (0.05)	-2.47 (0.014)	-2.89 (0.004)	-2.67 (0.007)	-2.79 (0.005)
Sargan OIR	127.99 (0.016)	133.22 (0.07)	131.37 (0.000)	123.27 (0.032)	129.690 (0.013)	131.84 (0.009)

Source: Author

Corruption in interaction with primary and secondary education also negatively impacts the quality of education. Indeed, in a corrupt education system, students cannot acquire skills allowing them to participate significantly in improving the economic situation of their country. A negative effect of corruption on education is manifested at several levels, such as the gradual decline in the quality of education due to overcrowded classes, corruption in exams and competitions, the quality of training and recruitment methods for teachers, etc. Concerning the quality of legal procedures, it displays the highest coefficient with a positive and significant effect on the quality of education. The coefficient of interaction between rule of law and secondary school (RL*Sec) is negative and significant.

The rule of law has a negative and significant impact on secondary school enrolment, while its effects on primary school enrolment are statistically significant. These results suggest that improving the rule of law is a key factor facilitating access to secondary education. For instance, Nifo et al. (2017) report that in some regions of Italy, improved rule of law is associated with more graduates with technical and soft skills. However, Sen (2014) concludes that in Asia, the rule of law does not influence the school enrolment of children aged 15 or younger. Political stability and absence of violence have a positive and significant impact on primary education, while their effect on secondary education, although positive, is not statistically significant. This indicates that these factors do not guarantee enrolment at these levels. The results suggest that conflict affects primary education more. However, studies such as Shemyakina (2011) indicate that violent conflict may have a higher impact on secondary education.

Conclusion and policy recommendations

By using the GMM approach to data covering the period 2010-2021, this paper examined in the first step the nexus between education as a channel for human capital accumulation and economic growth in 26 African countries. In the second step, we explored how the quality of governance serves as a mediating channel in the education-economic nexus in Africa. The study found that governance quality enhances the positive effect of primary education on economic growth when governance is proxied by regulatory quality (RQ) and rule of law (RL). This result is confirmed by the positive interaction between these two variables and primary school. The outcomes are due to the challenges confronting the education sector in African countries. Furthermore, this result implies that good

quality of governance is a crucial determinant in access to education in the selected region. Moreover, human capital plays a crucial role in shaping the character of a nation. It can be influenced by various other factors, including educational policy factors, demographic factors, education market structure factors, health factors, geographic factors, and additional non-explicit explanatory factors that have been synthesized. As we see, it emerges that good governance as a whole, and in particular the improvement of the effectiveness of public authorities, promotes access to primary, secondary, and higher education.

Second, the lack of significant results between governance and secondary education quality indicates that governance mechanisms are a necessary but not sufficient condition to promote education quality when initial levels of education quality are low. In order to enhance access to primary and secondary education in African countries, policymakers should increase public spending, invest in school infrastructure, and recruit qualified teachers. Policymakers should enhance the economic environment to attract foreign investment and promote decent job creation, thereby encouraging individuals to acquire skills by valuing learning appropriately. Furthermore, policymakers should collaborate with private sector partners to improve education quality and relevance to labour market requirements, while ensuring access and affordability for all. Additionally, they must stimulate innovation and entrepreneurship in education by promoting new delivery models, encouraging educational technology development, and supporting social entrepreneurs addressing local educational challenges.

References

- Acemoglu, D., & Robinson, J. A. (2012). *Why nations fail*. Crown.
- Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review*, 91(5), 1369-1401. <https://doi.org/10.1257/aer.91.5.1369>
- African Development Bank. (2022). *African Economic Outlook*. https://www.afdb.org/sites/default/files/documents/publications/african_economic_outlook_2022_web.pdf
- African Union (AU). (2015). *Agenda 2063: The Africa we want*. African Union Commission. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/Agenda2063_Popular_Version_English.pdf
- African Union (AU), United Nations Economic Commission for Africa (UNECA), African Development Bank (AfDB) & United Nations Development Programme (UNDP). (2022). *Africa sustainable development report 2022: Building back better from the coronavirus disease while advancing the full implementation of the 2030 Agenda for Sustainable Development*. UNDP. <https://repository.uneca.org/handle/10855/49694>
- Aghion, P., & Howitt, P. (1998). *Endogenous Growth Theory*. MIT Press.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297. <https://doi.org/10.2307/2297968>
- Baduel, B., Isakova, A., & Ter-Martirosyan, A. (2021). Generational aspects of inclusive growth. IMF Working Paper No. 2021/072. International Monetary Fund. <https://doi.org/10.5089/9781513572642.001>
- Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, 106(2), 407-43. <https://doi.org/10.2307/2937943>

- Barro, R. J., & Lee, J.-W. (2010). A new dataset of educational attainment in the world, 1950-2010. NBER Working Paper No. 15902. National Bureau of Economic Research.
- Beitone, A., Cazorla, A., & Hemdane, E. (2019). *Dictionnaire de Science Économique*. Dunod.
- Belkhat-tab, Z. (2022). Gouvernance et Qualité de l'Éducation dans les Pays en Voie de Développement : Évidences Empiriques. *Revue Française d'Économie et de Gestion*, 3(5), 138-151.
- Benhabib, J., & Spiegel, M. M. (1994). The role of human capital in economic development: Evidence from aggregate cross-country data. *Journal of Monetary Economics*, 34(2), 143-174.
- Bianchi, I. S., & Sousa, R. D. (2016). IT governance mechanisms in higher education. *Procedia Computer Science*, 100, 941-46. <https://doi.org/10.1016/j.procs.2016.09.250>.
- Brown, D. (2000). Democracy, colonization, and human capital in sub-Saharan Africa. *Studies in Comparative International Development*, 35(1), 20-40.
- Carsamer, E., & Ekyem, E. (2015). An empirical analysis of government education expenditure on enrolments at primary and secondary school levels in Africa. *International Journal of Economics, Commerce and Management*, 3(7), 273-294.
- Churchill, S. A., & Yew, S. L. (2017). Are government transfers harmful to economic growth? A meta-analysis. *Economic Modelling*, 64(C), 270-287.
- Docquier, F., & Marfouk, A. (2006). International migration by education attainment, 1990-2000. In C. Özden & M. Schiff (Eds), *International Migration, Remittances and the Brain Drain* (pp. 151-199). World Bank.
- Dridi, M. (2014). Corruption and education: Empirical evidence. *International Journal of Economics and Financial Issues*, 4(3), 476-493.
- Duerrenberger, N., & Warning, S. (2018). Corruption and education in developing countries: The role of public vs. private funding of higher education. *International Journal of Educational Development*, 62, 217-225. <https://doi.org/10.1016/j.ijedudev.2018.04.005>
- Gerged, A., & Elheddad, M. (2020). How can national governance affect education quality in western Europe? *International Journal of Sustainability in Higher Education*, 21(3), 413-426.
- Gngain, Y. T. B., Du, L., Assamoi, G. R., Edjoukou, A. J. R., & Kassi, D. F. (2019). Public spending, income inequality and economic growth in Asian countries: A panel GMM approach. *Economies*, 7(4), 115. <https://doi.org/10.3390/economies7040115>
- Grant, C. (2017). The contribution of education to economic growth (K4D Helpdesk Report). Institute of Development Studies.
- Guma, M. (2014). The relationship between economic growth and education in Albania. *UBT International Conference*, 39. <https://knowledgecenter.ubt-uni.net/conference/2014/all-events/39>
- Hadir, A., & Lahrech, A. (2015). Human capital development and economic growth in Morocco. *International Journal of Education and Human Developments*, 1(1), 49-73.
- Hanif, N., & Arshed, N. (2016). relationship between school education and economic growth: SAARC countries. *International Journal of Economics and Financial Issues*, 6(1), 294-300.
- Hanushek, E. A., & Woessmann, L. (2012). Schooling, educational achievement, and the Latin American Growth Puzzle. *Journal of Development Economics*, 99(2), 497-512.
- Holtz-Eakin, D., Newey, W., & Rosen, H. S. 1988. Estimating vector autoregressions with panel data. *Econometrica*, 56(6), 1371-1395.
- International Labour Organization (ILO). (2024). Global employment trends for youth 2024. https://www.ilo.org/sites/default/files/2024-11/GET_2024_EN_web4.pdf
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2005). Governance matters IV: Governance indicators. World Bank Policy Research Working Paper No. 3630
- Klomp, J., & de Haan, J. (2013). *Political regime and human capital: A cross-country analysis*. Social Indicators Research, Springer.
- 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)
- Madsen, J. B., & Murtin, F. (2017). British economic growth since 1270: The role of education. *Journal of Economic Growth*, 22(3), 229-272. <https://doi.org/10.1007/s10887-017-9127-1>

- Mankiw, N. G., Romer, D., & Weil, D. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, 107(2), 407-437.
- Nifo, A., Scalera, D., & Vecchione, G. (2017). The rule of law and educational choices: Evidence from Italian regions. *Regional Studies*, 51(7), 1048-1062.
- North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.
- Odhiambo, N. M. (2023). Revisiting the finance-growth nexus in sub-Saharan Africa: Does the level of income inequality matter? *Research in Globalization*, 6(1), 1-9. <https://doi.org/10.1016/j.resglo.2023.100126>
- Ogundari, K., & Awokuse, T. (2018). Human capital contribution to economic growth in sub-Saharan Africa: Does health status matter more than education? *Economic Analysis and Policy*, 58, 131-140. <https://doi.org/10.1016/j.eap.2018.02.001>
- Ogunleye, O., Owolabi, O. A., Sanyaolu, O., & Lawal, O. (2017). Human capital development and economic growth in Nigeria. *Journal of Business Management*, 3(8), 17-37
- Ojewumi, J. S., & Oladimeji, W. O. (2016). Effect of public spending on the growth of educational sector in Nigeria. *JORIND*, 14(2).
- Popović, G., Erić, O., Stanić, S., & Krajišnik, M. (2019). Education, technological changes, and economic development of Bosnia and Herzegovina. *International Journal of Cognitive Research in Science, Engineering, and Education*, 7(2), 77-86.
- Qutb, R., & El Shennawy, I. (2016). Exploring the impact of public education expenditure on economic growth in Egypt. *International Research Journal of Finance and Economics*, 146(1), 43-56.
- Rankaduwa, W., Haider, A., & Cooray, N. S. (2017). Education expenditure and economic growth under decentralization: An empirical study of Sri Lanka and Canada. In N. S. Coorac & S. Abeyratne (Eds.), *Decentralization and Development of Sri Lanka Within a Unitary State* (pp. 311-27). Springer.
- Rodrik, D. (2005). Growth strategies. In P. Aghion & S. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1A, pp. 967-1014). North-Holland.
- Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*, 99(5), S71-S102. <https://doi.org/10.1086/261720>
- Satriadi, S., Ausat, A. M. A., Heryadi, D. Y., Widjaja, W., & Sari, A. R. (2022). Determinants of entrepreneurial intention: A study on Indonesian Students. *Bisnis & Birokrasi: Jurnal Ilmu Administrasi dan Organisasi*, 29(3), 151-165. <https://doi.org/10.20476/jbb.v29i3.1323>
- Sebki, W. (2021). Education and economic growth in developing countries: Empirical evidence from GMM estimators for dynamic panel data. *Economics and Business*, 35(1), 14-29.
- Sen, K. (2014). Governance and Development Outcomes in Asia. Asian Development Bank.
- Shemyakina, O. (2011). The effect of armed conflict on accumulation of schooling: Results from Tajikistan. *Journal of Development Economics*, 95(2), 186-200. <https://doi.org/10.1016/j.jdeveco.2010.05.002>
- Son, L., Noja, G. G., Ritivoiu, M., & Tolteanu, R. (2013). Education and economic growth: An empirical analysis of interdependencies and impacts based on panel data. *Timisoara Journal of Economics and Business*, 6(19), 39-54.
- Tchamyou, V. S. (2019). The role of information sharing in modulating the effect of financial access on inequality. *Journal of African Business*, 20(3), 317-338.
- Tsamadias, C., & Prontzas, P. (2012). The Effect of Education on Economic Growth in Greece over the 1960-2000 Period. *Education Economics*, 20(5), 522-537.
- Widarni, E. L., & Bawono, S. (2021). Human capital, technology, and economic growth: A case study of Indonesia. *Journal of Asian Finance, Economics and Business*, 8(5), 29-35.

