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EDUCATION AND ECONOMIC GROWTH: IS THERE A ROLE FOR GOVERNANCE? A COMPARISON BETWEEN MENA AND OECD COUNTRIES

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Abstract

The outcomes of education and growth are mixed. This paper revisits the debate on the impact of education on economic growth by focusing on the effect of governance. Our sample covers 13 countries in the Middle East & North Africa and 37 OECD countries during the period 1990-2020. For a dynamic panel type model, we preferred the GMM estimation approach in order to appropriately verify the relevance of the supporting indicators. Our objective is to determine whether the effects of education and governance on growth depend on the level of development of the country. Our results show that good governance contributes to economic growth in OECD countries. Strong governance raises the level and quality of education of the population and stimulates growth. The governance system is still being built for the nations of the MENA region, and it has several flaws. These results have important policy implications. Governments in the MENA region must invest more domestic resources in education and raise the standard of their institutions by implementing good governance practices if they want to improve output. Economic performance is possible when the governing principles are applied strictly, severely, and effectively. The advancement of education and the achievement of economic prosperity require efficient governance.

Keywords: Education, Governance, Institutions Quality, Economic Growth

1. Introduction

Since the pioneering works by Becker (1964); Schultz (1961); Lucas (1988), Romer (1990); Barro (2001); Levine and Renelt (1992) and Mankiw *et al.* (1992), it has been widely acknowledged that investments in human capital have been identified as a key policy instrument to improve growth. The connection between education and economic growth has been analyzed by following two main approaches. First, a stream of literature focused on the causality between education and growth. The Second stream of literature focuses on the channels between education and growth.

The economic growth of a country may be hampered due to a number of different factors such as monetary policy, budgetary policy, investment, consumption, natural resources, etc. Another factor that boosts the effect of education on growth is governance. Both policy makers and academic researchers, as Nelson and Phelps, (1996); Xu, (2018); Andriyani and Wibowo, (2019), advocate that good public governance stimulates the effect of education on growth. According to Sommer and Fallon (2020) and Akinwale and Grobler (2019), effective governance has the potential to increase the effectiveness of education investments to improve education and development.

Adequate education and good governance promote a more productive labor force, which can stimulate national economic growth (Silander and Stigmar, 2019; Farooq *et al.* 2020; Sarpong and Bein, 2021). However, poor governance (high levels of corruption, macroeconomic instability, low rates of law enforcement, etc.) reduces incentives for families or individuals to invest in education (Abubakar, 2021; Dorasamy and Fagbadebo, 2021).

This paper contributes to the literature on the relationship between education and economic growth. We focus more specifically on the contribution of governance and its interaction with education on economic growth. Many previous studies in this literature pointed only to education as one of the mechanisms to promote economic growth. Thus, we revisit this relationship by testing whether this relationship depends on the governance of the country. We use multiple proxies for governance (law and order, corruption, democratic accountability, external conflicts, socio-economic conditions and investment profile) to test the link between education and growth.

The remainder of the paper is presented as follows. The next section reviews the theoretical connection between education, governance, and growth. In the third section, we present the sample, the data, and the empirical model. Section 4 explains the main findings. Finally, we present our conclusion and policy implications in Section 5.

2. Education, governance, and growth: a literature review

Our study is linked to the literature on the importance of education for economic growth. For Woessmann (2015); Hanushek (2016); Grant (2017); Li and Wang (2018); Oyinlola *et al.* (2020), both advanced and non-advanced countries have made large investments in education. This has substantially reduced the proportion of the population with no schooling. Theoretically, the positive effects of education could be transmitted to economic growth through two main channels, which are saving and investment (Muqtada and Kamal, 2020; Islam and McGillivray, 2020).

Education in the growth model started with Solow (1956), Schultz (1961), Becker (1964), Nelson and Phelps (1966), Smith (1776), Lucas (1988) and Romer (1990). These studies confirmed that investment in education contributes to growth via its role in productivity, innovation and via a reduction in income inequality. Education is a catalyst for economic growth by increasing technological advances and entrepreneurship, decreasing unskilled unemployment, favoring health and social integration and decreasing marginality. An increase in workers' educational level enhances their human capital, increasing the productivity of these workers and consequently, their income growth.

Governance and institutional quality are gaining more and more ground in explaining the relationship between education and economic growth. Quality-based educational institutions are explained by theories which highlight different forms of institutions, among which there are legal institutions, economic, political institutions, and social institutions. Yeager (2018); Nirola and Sahu (2019); and Silander and Stigmar (2019) underline the fact that adopting efficient governance favors education and thus facilitates economic growth.

Education cannot have a positive impact on growth unless there is good governance. For Bekhet and Abdul Latif (2018), Ben Youssef *et al.* (2018) and Tomizawa *et al.* (2019), human capital, technological innovation and the quality of governance institutions are important for economic growth. They find that, interactions between technological innovation and the quality of institutions have a significant and positive impact on the economy. In addition, Saul Estrin *et al.* (2018), Boudreaux *et al.* (2019) and Urbano *et al.* (2019) confirm that a

positive relationship between entrepreneurship and sustainable development is determined except in the presence of innovation and good institutional quality.

Furthermore, Pritchett (2001) focuses on the role played by governance in explaining differences in economic development across countries. Then, it is assumed that the financial system's legal origin influences the level of education because types of legal institutions differ according to degree of protection of private ownership rights. The results of Seka (2013); Duerrenberger and Warning (2018); Jetter and Parmeter (2018) and Yahyaoui and Al Saggaf (2019) show that a high level of corruption reduces the positive effect of education on growth by decreasing human capital and productivity of the workers. Corruption reduces the rate of investment, especially investment in human capital.

3. Data and methodology

The present research explores 13 MENA countries[1] and 37 OECD countries[2] over the period 2000-2020. We used multiple proxies for governance (law and order, corruption, democratic accountability, external conflicts, socio-economic conditions, and investment profile). Azam (2022); Bello and Sagagi (2020); Islam and McGillivray (2020) and Barkhordari *et al.* (2019) use the factors that affect governance to highlight the significance of the latter for national development. Also, we find two measures of education: AYS (Average Years of Schooling) and GER (Enrollment Rate for Tertiary Education). Li and Wang (2018) and Owoye and Onafowora (2020) use the AYS variable to examine the effect of education on economic growth. Olasunkanmi and al. (2020) and Omodero and Nwangwa (2020) employ GER. The dependent variable is Economic Growth.

Referring to the article Rachdi *et al.* (2018), our model is expressed as follows:

$$Growth = f\ (Education,\ Governance,\ X)$$

$$GROWTH_{it} = \beta_0 + \beta_1\, GROWTH_{it-1} + \beta_2\, EDU_{it} + \beta_3\, GOV_{it} + \beta_4\, X_{it} + \varepsilon_{it} \quad (1)$$

We introduce the variable the interaction between governance and education ($GOV_{it} * EDU_{it}$) for robustness checks. Therefore, the model will take the following new expression:

$$Growth = f\ (EDU,\ Governance*EDU,\ X)$$

$$GROWTH_{it} = \beta_0 + \beta_1\, GROWTH_{it-1} + \beta_2\, (EDU_{it} * GOV_{it}) + \beta_3\, X_{it} + \varepsilon_{it} \quad (2)$$

where "*Growth"* denotes the real *GDP* per capita growth, "*EDU"* is education and "*GOV"* is governance. We use two education measures: AYS (Average Years of Schooling) and GER (Enrollment Rate for Tertiary Education). *X* is a vector of explanatory variables that includes trade *(Tade),* government size *(GSize),* and population *(Pop).* The variable governance includes some indicators such as law and order *(Lawor)*, corruption *(Corp), d*emocratic accountability *(Demacc),* external conflicts *(Exconf),* socio-economic conditions *(Soeco)* and investment profile *(Invespro).* ε is the error term. A definition of all the variables and their sources is provided in Table A1 in Appendix.

[1] Algeria, Bahrain, Egypt, Iraq, Iran, Jordan, Kuwait, Lebanon, Morocco, Saudi Arabia, Syria, Tunisia, United Arab Emirates

[2] Austria, Australia, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States

4. Main results

4.1. First model estimation results

We will use the GMM system method because the Blundell and Bond (1998) estimator bypasses Arellano and Bond (1991) by making the additional assumption that the first differences of instrumenting variables are uncorrelated with the fixed effects. It builds a system of two equations, the original equation as well as the transformed one, and is known as "system *GMM".* Blundell and Bond (1998) built a system of two equations, the original equation as well as the transformed one, and are known as the GMM system*.* The test for AR (2) in first differences is more important, because it will detect autocorrelation in levels. The validity of the instruments is tested using a Sargan test of over-identifying restrictions and a test of the absence of serial correlation of the residuals. We prefer to display the method one-step GMM-in-System estimator because our data includes 13 MENA and 37 OECD nations.

First, we tested the effects of different governance and education variables, separately, on economic growth, using both channels. Then we will use the interaction between the governance and education variables. The results obtained by the first model for the MENA region and the OECD countries are summarized in Tables 1 and 2.

All models are globally and statistically significant because the Wald test probabilities are well below 5%. Sargan's and serial correlation tests do not reject the null hypothesis of correct specification (P-value of Sargan's test and Arellano and Bond's (1991) AR (2) test are greater than 5%), supporting our estimation results. Tables 1 and 2 give us the estimation results of the link between education and economic growth before including the interaction between the variables of governance and education for the MENA and OECD countries.

We start with Table 1, which summarizes the effects of the variables: respect for democracy, public order, corruption, external conflicts, investment profile and socio-economic conditions as measures of institutional quality (Kaufmann *et al.* 1999), and average number of years of schooling (AYS) as a measure of education, on economic growth in MENA countries and countries of the OECD, which is measured by real GDP per capita.

We use the different variables as separate explanatory variables. For the MENA region, most AYS coefficients are negative (-0.017 in column 2, -0.008 in column 3, -0.013 in column 4 and -0.012 in column 6), but not all coefficients are negative and not significant. Based on these results, we see no significant evidence that education promotes growth. This means that the level of education measured by the number of years of study has no significant effect on growth. Better access to education has no effect on the economic growth of MENA countries. The increase in years of study is not a development factor for the period 2000-2020. Malangeni and Phiri (2018) already endorse this finding for South Africa and confirmed an insignificant relationship between education and economic growth. For Phoong *et al.* (2018), the educational level of secondary education has a negative effect on the development of Malaysia.

However, the majority of the coefficients of the governance variables are negative (-0.095 for Demacc, -0.220 for Lawor, -0.038 for Exconf, -0.037 for Invespro and -0.002 for Soeco) and only Demacc, Lawor and Exconf are statistically significant at the level of 1%, 1% and 10% respectively. This result illustrates that high levels of disrespect for democracy, corruption and external conflict have a negative impact on economic growth (La porta *et al.* 1999; Oyinlola *et al.* 2020; Nirola and Sahu, 2019). In fact, democracy allows the building of good institutions (Rodrik, 2000). In the Middle East and North Africa (MENA), social and economic rights are not accompanied by civil and political rights. The Arab Spring was a reaction to this deficiency, and it increased hope for democratization in the MENA area (Ghosh, 2021).

Table 1. Education, governance and growth (Model 1) - Measure of education (AYS)

	(1)		(2)		(3)		(4)		(5)		(6)	
	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD
Growth L1	0.166***	0.401***	0.151***	0.399***	0.181***	0.404***	0.187***	0.397***	0.182***	0.390***	0.181***	0.342***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade	0.0003	-0.08	0.002	-0.041	0.001	-0.079	0.001	-0.030	0.001	-0.139	0.001	0.023
	(0.26)	(0.415)	(1.17)	(0.523)	(0.62)	(0.212)	(0.71)	(0.695)	(0.74)	(0.206)	(0.65)	(0.801)
GSize	0.003	-0.631	-0.002	-0.537	0.006	-0.859	0.006	-0.681	0.002	0.271	0.006	-2.386
	(0.68)	(0.512)	(0.28)	(0.516)	(1.25)	(0.23)	(1.31)	(0.417)	(0.35)	(0.836)	(1.18)	(0.164)
Pop	0.009	-0.233	0.005	-0.317	0.011	-0.551*	0.018	-0.728***	0.012	-1.066***	0.012	-0.758
	(0.33)	(0.546)	(0.21)	(0.179)	(0.44)	(0.068)	(0.80)	(0.008)	(0.47)	(0.002)	(0.47)	(0.159)
AYS	0.008	-0.919***	-0.017	-1.049***	-0.008	-1.053***	-0.013	-0.579***	0.015	0.106	-0.012	-1.135***
	(0.14)	(0.000)	(0.22)	(0.000)	(0.11)	(0.000)	(0.18)	(0.009)	(0.21)	(0.510)	(0.16)	(0.000)
Demacc	-0.095***	-1.011***										
	(0.000)	(0.000)										
Lawor			-0.220***	-2.76***								
			(0.000)	(0.000)								
Corp					0.012	0.702***						
					(0.24)	(0.001)						
Exconf							-0.03*	1.257***				
							(0.09)	(0.000)				
Invespro									-0.037	0.652***		
									(1.16)	(0.000)		
Soeco											-0.002	1.254***
											(0.13)	(0.000)
Wald test	51.31	7688.11	192.26	8356.25	114.81	10075.46	177.29	4592.33	92.66	11347.46	103.86	5013.71
P-value Wald test	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000
AR(2) test	0.192	0.1107	0.285	0.1040	0.164	0.0855	0.139	0.0745	0.172	0.247	0.169	0.242
Sargan test	215.610	35.461	209.083	35.195	216.036	35.330	213.781	36.239	214.442	35.277	216.217	32.139
P-value Sargan test	0.074	1.000	0.128	1.000	0.071	1.000	0.087	1.000	0.082	1.000	0.070	1.000

Notes: 1. The estimation method is GMM-in-System estimator. AR (2): Null test of zero second-order serial correlation, with N (0, 1) distributed under null. The null hypothesis is that errors in the first difference regression exhibit no second-order serial correlation. Sargan: Sargan test for validity of over-identifying restrictions, distributed as indicated under null. This test of over-identifying restrictions is asymptotically distributed as χ^2 under the null of instrument validity. 2. The numbers in parentheses are t-statistics. The symbols *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% levels of significance, respectively.

Table 2. Education, governance and growth (Model 1) - Measure of education (GER)

	(1)		(2)		(3)		(4)		(5)		(6)	
	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD
Growth L1	0.159*** (0.000)	0.428*** (0.000)	0.142*** (0.001)	0.425*** (0.000)	0.177*** (0.000)	0.429*** (0.000)	0.181*** (0.000)	0.413*** (0.000)	0.171*** (0.000)	0.372*** (0.000)	0.175*** (0.000)	0.374*** (0.000)
Trade	0.001 (0.80)	0.034 (0.575)	0.003*** (0.000)	-0.053 (0.434)	0.002 (1.60)	0.054 (0.346)	0.002 (1.39)	0.042 (0.633)	0.002 (1.59)	-0.135 (0.299)	0.002 (1.50)	0.031 (0.718)
GSize	0.001 (0.24)	-0.172 (0.875)	-0.006 (0.82)	0.085 (0.928)	0.003 (0.64)	-0.137 (0.878)	0.002 (0.57)	0.188 (0.846)	-0.0002 (0.03)	0.002 (0.998)	0.002 (0.40)	-1.324 (0.315)
Pop	0.001 (0.07)	-0.754*** (0.003)	-0.009 (0.34)	-0.666*** (0.002)	0.001 (0.05)	-0.713*** (0.005)	0.006 (0.28)	-0.629** (0.032)	0.002 (0.09)	-0.936 (0.112)	0.003 (0.13)	-1.006 (0.101)
GER	-0.005 (1.08)	-0.011 (0.192)	-0.010 (1.64)	-0.01 (0.450)	-0.009** (0.021)	-0.009 (0.424)	-0.009* (0.011)	0.002 (0.851)	-0.007 (1.34)	0.093*** (0.000)	-0.009 (1.61)	-0.026** (0.043)
Demacc	-0.090*** (0.000)	-0.886** (0.038)										
Lawor			-0.232*** (0.002)	-1.075 (0.218)								
Corp					-0.027 (0.42)	0.009 (0.952)						
Exconf							-0.045* (0.09)	1.416*** (0.000)				
Invespro									-0.029 (0.94)	0.830*** (0.000)		
Soeco											-0.015 (0.65)	1.155*** (0.000)
Wald test	105.99	6355.78	285.14	11975.73	99.52	9485.73	148.37	10013.50	84.58	11806.92	80.17	12925.97
P-value Wald test	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000
AR(2) test	0.227	0.063	0.322	0.055	0.205	0.060	0.162	0.047	0.210	0.474	0.212	0.163
Sargan test	214.210	36.458	206.049	33.888	213.123	35.188	212.036	35.419	213.494	35.049	213.297	34.887
P-value Sargan test	0.084	1.000	0.161	1.000	0.092	1.000	0.101	1.000	0.089	1.000	0.090	1.000

Notes: 1. The estimation method is GMM-in-System estimator. AR (2): Null test of zero second-order serial correlation, with N (0, 1) distributed under null. The null hypothesis is that errors in the first difference regression exhibit no second-order serial correlation. Sargan: Sargan test for validity of over-identifying restrictions, distributed as indicated under null. This test of over-identifying restrictions is asymptotically distributed as χ^2 under the null of instrument validity. 2. The numbers in parentheses are t-statistics. The symbols *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% levels of significance, respectively.

Then, in Table 2, we repeat the same regressions, with the same governance variables, but this time with another measure of education, “Enrolment rate in higher education” (GER). The education coefficients are all negative (-0.005 for column 1, -0.010 for column 2, -0.009 for column 3, -0.009 for column 4, -0.007 for column 5 and -0.009 for column 6). The coefficients in columns 3 and 4 are significant at the 5% and 10% level, respectively. All the coefficients of the governance variables are negative (-0.090 for Demacc, -0.232 for Lawor, -0.027 for Corp, -0.045 for Exconf, -0.029 for Invespro, and -0.015 for Soeco). Only the coefficients of Lawor and Invespro (columns 3 and 4) are significant at the 5% and 10% level, respectively. The results of Table 2 confirm those of Table 1.

The negative impact of institutional quality on growth for MENA countries can be explained by ineffective governance institutions. A study by Mtiraoui and Talbi (2021) proves that corruption, as both a social and economic scourge, can hinder economic development, particularly in the education and health sectors for the MENA region. Mtiraoui and Talbi (2021) showed the importance of state intervention in reducing this phenomenon (corruption) for these countries. Sarpong and Bein (2021), Bello and Sagagi (2020), Oyinlola *et al.* (2020) and Muqtada and Kamal (2020) discover the same result. Islam and McGillivray (2020) maintain that the impact of wealth inequalities on growth is mitigated by better governance.

For the OECD countries, the majority of the coefficients of the governance variables are positive (0.702 in column 3, 1.257 in column 4, 0.652 in column 5 and 1.254 in column 6, for Table 1, and 0.009 in column 3, 1.416 in column 4, 0.830 in column 5, and 1.155 in column 6, for Table 2) and are statistically significant at the 1% level. The results found in Table 1 are confirmed by those found in Table 2. Our results support our theoretical predictions and provide precise insight into the positive association of institutional quality with economic growth in OECD countries. This result is in full agreement with the work of Muhammad *et al.* (2021), Avdulaj *et al.* (2021), Asmara and Sumarwono (2021), Salehi *et al.* (2020) and Thanh and Canh (2020). His analysis unequivocally proves this connection and comes to the conclusion that industrialized countries' prosperity has only been boosted by high institutional quality.

4.2. Results of the second model estimation

For this part, in Tables 3 and 4, we use the interaction between education and governance variables in order to know the impact of governance on the education-growth relationship for the MENA region and OECD countries. These two tables summarize the results achieved by the second model.

All models are globally and statistically significant because the Wald test probabilities are well below 5%. Sargan's and serial correlation tests do not reject the null hypothesis of correct specification (P-value of Sargan's test and Arellano and Bond's (1991) AR (2) test are greater than 5%), supporting our estimation results.

Examining the results of Table 3, we can see that when the variable average number of years of schooling (AYS) is used as an indicator of education, the majority of the coefficients of the interactive variables are negative (-0.013 for AYS * Demacc, -0.020 for AYS*Lawor, -0.039 for AYS*Exconf, -0.003 for AYS*Invespro and -0.049 for AYS*Soeco) and not significant. Only the variables AYS * Demacc, AYS * Lawor and AYS * Exconf are significant at the 5%, 5% and 1% level, respectively. The estimation of education combined with governance on economic growth also resulted in insignificant coefficients in the countries of the MENA region. Our research indicates that, despite the efforts of the regional governments, the institutional quality has not yet been successful in promoting economic growth. The robustness test that we conducted with the interactive variables suggests that the latter have not had a significant impact on economic growth.

Table 3. Effect of interaction between education and governance on growth (model 2) - Measure of education (AYS)

	(1)		(2)		(3)		(4)		(5)		(6)	
	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD
Growth L1	0.159*** (0.000)	0.408*** (0.000)	0.150*** (0.000)	0.409*** (0.000)	0.186*** (0.000)	0.427*** (0.000)	0.192*** (0.000)	0.435*** (0.000)	0.176*** (0.000)	0.396*** (0.000)	0.165** (0.036)	0.360*** (0.000)
Trade	0.001 (0.86)	-0.057 (0.655)	0.003 (1.42)	-0.022 (0.771)	0.0006 (0.42)	0.027 (0.644)	0.001 (0.69)	0.061 (0.518)	0.001 (1.04)	-0.061 (0.637)	0.011 (0.59)	0.1 (0.7)
GSize	0.002 (0.46)	-0.347 (0.724)	-0.0003 (0.03)	-0.978 (0.211)	0.006 (1.32)	-0.007 (0.991)	0.006 (1.41)	0.227 (0.789)	0.003 (0.46)	-0.032 (0.976)	-0.336 (3.29)	-1.521 (0.194)
Population	0.007 (0.25)	-0.475** (0.011)	0.009 (0.39)	-0.541** (0.016)	0.009 (0.33)	-0.653*** (0.001)	0.017 (0.77)	-0.831*** (0.005)	0.012 (0.45)	-0.916*** (0.003)	-1.388 (2.74)	-0.704*** (0.002)
AYS* *Demacc*	-0.013** (0.045)	-0.171*** (0.000)										
AYS* *Lawor*			-0.020** (0.038)	-0.184*** (0.000)								
AYS* *Corp*					0.008 (1.10)	-0.01 (0.239)						
AYS* *Exconf*							-0.039 (1.63)	0.023*** (0.001)				
AYS* *Invespro*									-0.003 (0.71)	0.051*** (0.000)		
AYS* *Soeco*											-0.049 (0.93)	0.048** (0.044)
Wald test	55.21	7754.85	22.57	5143.20	67.15	9288.77	115.09	7918.29	78.48	5004.79	64.12	67.38
P-value Wald test	0.0000	0.000	0.0010	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000
AR(2) test	0.236	0.0924	0.277	0.079	0.173	0.063	0.159	0.053	0.196	0.217	0.564	0.056
Sargan test	215.630	35.994	214.232	35.484	214.127	35.163	211.610	36.048	215.483	34.429	7.124	745.623
P-value Sargan test	0.074	1.000	0.083	1.000	0.084	1.000	0.104	1.000	0.075	1.000	1.000	1.000

Notes: 1. The estimation method is GMM-in-System estimator. AR (2): Null test of zero second-order serial correlation, with N (0, 1) distributed under null. The null hypothesis is that errors in the first difference regression exhibit no second-order serial correlation. Sargan: Sargan test for validity of over-identifying restrictions, distributed as indicated under null. This test of over-identifying restrictions is asymptotically distributed as χ^2 under the null of instrument validity. 2. The numbers in parentheses are t-statistics. The symbols *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% levels of significance, respectively.

Table 4. Effect of interaction between education and governance on growth (model 2) - Measure of education (GER)

	(1)		(2)		(3)		(4)		(5)		(6)	
	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD	MENA	OECD
Growth L1	0.159*** (0.000)	0.385*** (0.000)	0.158*** (0.000)	0.428*** (0.000)	0.187*** (0.000)	0.429*** (0.000)	0.178*** (0.000)	0.429*** (0.000)	0.174*** (0.000)	0.379*** (0.000)	0.173*** (0.000)	0.395*** (0.000)
Trade	0.001 (0.86)	0.093 (0.453)	0.003 (1.60)	-0.004 (0.944)	0.001 (0.96)	0.014 (0.910)	0.002 (1.48)	0.035 (0.668)	0.002 (1.55)	-0.115 (0.411)	0.002 (1.53)	0.015 (0.811)
GSize	0.002 (0.46)	-1.270 (0.193)	-0.001 (0.15)	-0.382 (0.552)	0.005 (1.05)	-0.277 (0.622)	0.003 (0.68)	0.206 (0.712)	-0.0002 (0.04)	0.816 (0.489)	0.001 (0.23)	-0.464 (0.582)
Population	0.007 (0.25)	-0.583 (0.223)	-0.010 (0.42)	-0.667*** (0.000)	0.010 (0.45)	-0.554 (0.114)	0.004 (0.17)	-0.865*** (0.000)	0.0004 (0.02)	-1.075*** (0.000)	0.006 (0.24)	-0.811* (0.093)
GER* *Demacc*	-0.013** (0.045)	0.003* (0.09)										
GER* *Lawor*			-0.003** (0.039)	-0.003** (0.037)								
GER* *Corp*					-0.002 (1.21)	0.0004 (0.683)						
GER* *Exconf*							-0.001* (0.082)	0.005*** (0.000)				
GER* *Invespro*									-0.001 (1.49)	0.008*** (0.000)		
GER* *Soeco*											-0.001* (0.091)	0.008*** (0.000)
Wald chi2(6)	55.21	94.50	84.43	4034.34	76.09	11616.56	75.34	10571.97	77.84	7714.58	61.36	4400.38
P-value Wald test	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000	0.0000	0.000
AR(2) test	0.236	0.056	0.244	0.061	0.199	0.053	0.173	0.061	0.203	0.354	0.224	0.137
Sargan test	215.630	35.843	214.277	35.507	212.607	35.189	213.822	36.288	214.376	34.243	213.254	33.282
P-value Sargan test	0.074	1.000	0.083	1.000	0.096	1.000	0.086	1.000	0.082	1.000	0.091	1.000

Notes: 1. The estimation method is GMM-in-System estimator. AR (2): Null test of zero second-order serial correlation, with N (0, 1) distributed under null. The null hypothesis is that errors in the first difference regression exhibit no second-order serial correlation. Sargan: Sargan test for validity of over-identifying restrictions, distributed as indicated under null. This test of over-identifying restrictions is asymptotically distributed as χ^2 under the null of instrument validity. 2. The numbers in parentheses are t-statistics. The symbols *, **, and *** denote rejection of the null hypothesis at the 10%, 5%, and 1% levels of significance, respectively.

This result is consistent with our theoretical predictions and rooted in the list of works that demonstrate that education does not promote economic growth, in the presence of an unfavorable government environment for developing countries. Moreover, the poor institutional quality of the countries of the MENA region does not reinforce the benefits of growth in education, in terms of the number of years of study. Our results confirm the conclusions proven by Pritchett (2001) that for a group of developing countries, the impact of education on growth is negative and significant, following the weakness and inefficiency of the institutional quality that explains weak growth in these countries.

Similarly, for Table 4, using the variable Enrollment rate in higher education (GER) as a measure of education, all the coefficients of the interactive variables are negative (-0.013 for GER*Demacc, -0.003 for GER* Lawor, -0.002 for GER*Corp, -0.001 for GER*Exconf, -0.001 for GER*Invespro and -0.001 for GER*Soeco), and only the variables GER*Demacc, GER*Lawor, GER*Exconf and GER*Soeco are significant at the 5% and 10% level. This validates the results found previously in Table 3.

After using the interactive variables in Tables 3 and 4, we find that for the MENA region, institutional quality has not yet been achieved, so before investing in education, strong governance must be initiated. For MENA countries, Barkhordari *et al.* (2019) find that institutions, human capital and research are the foundations of the knowledge economy. They suggested that governments in this region should consider knowledge-related policies to accelerate the transition to a knowledge economy and improve economic performance.

According to Sommer and Fallon (2020) and Akinwale and Grobler (2019), strong governance has the potential to increase the efficiency of education spending to improve education and development. Institutional quality and governance are future policies and closely linked to education and economic growth policies in MENA countries (Dumciuviene, 2015; Saad and Ayoub, 2019). Abdelbary and Benhin (2019) find that for Arab countries, the governance coefficient is significant and negatively determines economic growth. The findings unequivocally demonstrate the significance of governance and human capital in enhancing the economic growth prospects of Arab nations.

In the presence of an unfavorable quality of governance, education is not an engine of growth and does not promote development. In fact, the lack of respect for democracy, the control of laws and orders, external conflicts and poor socio-economic conditions have a negative impact on education, and therefore on economic growth. Tebaldi and Elmslie (2013) show that the fight against corruption and a more efficient judicial system both stimulate the innovation rate of an economy. According to Huang and Ho (2021), encouraging good governance can assist emerging nations' economies expand.

On the other hand, for the OECD countries, the majority of the coefficients of the interactive variables for the two measures of education are positive (0.023 in column 4, 0.051 in column 5 and 0.043 in column 6 for Table 3, and 0.0004 in column 3, 0.005 in column 4, 0.008 in column 5 and 0.008 in column 6 for table 4) and significant at the 1% level. This indicates that good governance in advanced countries leads to good education and, therefore, economic growth. The Corruption*Education variable is not significant in both tables. These results are consistent with our theoretical predictions and rooted in the body of work that confirms the positive effect of good governance on economic growth. As we have just seen, the figures reported in Tables 3 and 4 clearly corroborate the acceptance of the idea that the interaction between education and institutions has a significant effect on economic growth for developed countries.

By way of conclusion, the economic growth of nations depends on the quality of governance. Zhuo *et al.* (2020) find a significant direct effect of the rule of law, control of corruption, voice and accountability on economic growth in developed countries, indicating that economic growth in developed countries increases due to improving the rule of law, controlling corruption, or voice and accountability. The results of this study show the importance of governance indicators in improving the economy of developed countries.

Always in this order of ideas, Oluwatobi *et al.* (2018) accept that the knowledge economy is therefore a development accelerator for both advanced and developing economies, and there is potential for developing economies to catch up with advanced economies as well.

They examined how the interaction effect between elements of the knowledge economy and governance affects economic growth in developing countries. The study found that institutions and human capital in developing countries mitigate the effect of education on the region's economic growth, which in effect engenders a lean knowledge economy. Similarly, Nistor *et al.* (2018) show that government effectiveness has a positive and significant impact on countries' economic growth rates.

Similarly, for Nasirnatery *et al.* (2020), they go further in their analysis in order to explain the structures of good governance in the public education system. They argue that commitment structures for quality assurance, participation, decentralization, development of life skills, empowerment of human capital, ethics, development of satisfaction, commitment to consensus public, the development of interactive flexibility, the development of equipment, the development of educational justice, accountability, transparency and the rule of law, explain good governance in the public education system. According to these authors, these structures are important in explaining the phenomenon of good governance. The relationship between education policy, its implementation, effective governance and economic growth is interdependent (Chohan and Rehman, 2019).

5. Conclusion

The results of this study illustrate clearly that an improvement in governance will lead to a greater increase in the growth impact of education because they have an immediate potential for fostering education-economic growth impact. MENA countries need to achieve a minimum level of institutional quality in order to benefit from the advantages offered by investments in education and human capital. The results suggest that authorities in MENA countries must build appropriate institutions to increase the rate of economic growth.

In conclusion, the economic growth of nations depends on the quality of governance. Zhuo *et al..* (2020) and Nasirnatery *et al.* (2020) find a significant direct effect of the rule of law, control of corruption and voice and accountability on the economic growth of developed countries, indicating that the economy of developed countries is growing as a result of improving the rule of law, controlling corruption or voice and accountability. The results of this study show the importance of governance indicators in improving the economy of developed countries. Our estimate for OECD countries confirms the positive impact of good governance on growth.

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Appendix

Table A1. Definitions of all variables

Variables	Definition	Source
Economic Growth	Real GDP per capita growth	WDI
Trade	Import plus export divided to GDP	WDI
Government size	Ratio of Government final consumption to GDP	WDI
Population	Growth rate of total population	WDI
Education	Average years of Schooling Enrollment rate for tertiary education	WDI
Law and order	"Law and Order" form a single component, but its two elements are assessed separately, with each element being scored from zero to three points. To assess the "Law" element, the strength and impartiality of the legal system are considered, while the "Order" element is an assessment of popular observance of the law. Thus, a country can enjoy a high rating – 3 – in terms of its judicial system, but a low rating – 1 – if it suffers from a very high crime rate if the law is routinely ignored without effective sanction (for example, widespread illegal strikes).	International Country Risk Guide (ICRG)
Corruption	This is an assessment of corruption within the political system. Such corruption is a threat to foreign investment for several reasons: it distorts the economic and financial environment; it reduces the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability; and, last but not least, introduces an inherent instability into the political process.	International Country Risk Guide (ICRG)
Socioeconomic conditions	This is an assessment of the socioeconomic pressures at work in society that could constrain government action or fuel social dissatisfaction. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.	International Country Risk Guide (ICRG)
Investment profile	This is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.	International Country Risk Guide (ICRG)
External conflicts	The external conflict measure is an assessment both of the risk to the incumbent government from foreign action, ranging from non-violent external pressure (diplomatic pressures, withholding of aid, trade restrictions, territorial disputes, sanctions, etc) to violent external pressure (cross-border conflicts to all-out war). The risk rating assigned is the sum of three subcomponents, each with a maximum score of four points and a minimum score of 0 points. A score of 4 points equates to Very Low Risk and a score of 0 points to Very High Risk.	International Country Risk Guide (ICRG)
Democratic accountability	This is a measure of how responsive government is to its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violently in a non-democratic one.	International Country Risk Guide (ICRG)