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Exploring the Impact of Institutional Quality and Economic Growth in West Africa

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Abstract

This study presents the theoretical and empirical evidence of institutional quality on economic growth in West Africa. The study employed two sources of institutional quality measures ranging from 1996-2018 and 1991-2017. The analysis is interactive, employing the General Method of Moments (GMM) estimation on a panel data. The result indicates a negative relationship between aggregate institutional quality index on economic growth but statistically significant at 5% and 10% level for the two data sources used for West Africa.

Keywords: Institutional Quality, Human Capital, Corruption, Economic Growth, West Africa, System GMM.

JEL Codes: B52, C38, C43, D73, O43, O55.

Introduction

Investing in human capital is crucial for any nation as it involves training, acquiring knowledge, and developing skills, among other initiatives that enhance competitive advantage, as noted by Schultz [1]. Numerous economic models, including the two-sector endogenous Uzawa-Lucas model of economic growth, incorporate human capital as a growth factor. However, various empirical studies, both recent and early, have demonstrated a correlation between institutional quality and long-term economic growth, including Mauro, Knack and Keefer, Barro, Rodrick, Subramanian, and Trebbi, Acemoglu Cutler, Finkelstein, and Lin, and Nawaz et al., [2-7]. In other words, countries with high institutional quality experience greater economic growth, while those with lower quality experience the opposite. Nonetheless, institutional quality differs significantly across countries, particularly in developing nations such as West African states. To illustrate, the 2020 Transparency International report shows that Nigeria, Liberia, Guinea, Togo, and Mali rank high among the most corrupt nations, while countries like Finland, Denmark, Iceland, and New Zealand have low levels of corruption. In addition, developing economies often face issues with the quality of their institutions. When the rule of law is constantly changing or not respected, when the government has unlimited discretion, when property rights are not secure, or when corruption is rampant and rule enforcement is weak, the long-term growth of these economies can be negatively impacted, as stated by Chong & Calderòn [8]. This can be observed in the correlation matrix of the two-sample data below. The correlation in Table 1 ranges between -0.053 and 0.128 for the 12 measures of institutional quality and GDP as an economic growth proxy. Similarly, in Table 2, the correlation between governance data and GDP ranges between -0.002 and 0.12.

Few studies have looked into the institutional factors affecting economic performance in Africa, and such studies are Ubi & Ubah, Ozioko, and Iheonu, Ihedimma, & Onwuanaku [9-11]. Ubi & Ubah used a quantitative approach to demonstrate how corruption and institutional quality affect economic performance in Nigeria, finding a significant and positive relationship between corruption, institutional quality (measured by contract-intensive money), and economic growth. Ozioko, on the other hand, conducted a panel data analysis of four West African countries (Nigeria, Ghana, Sierra Leone, and Burkina Faso) from 2005 to 2013 to assess the impact of institutional quality and government expenditure on economic growth. The study found that some economic institutions had a positive and significant effect on economic growth, while political institutions had a negative and insignificant effect on economic growth in these countries. Furthermore, Iheonu, Ihedimma, & Onwuanaku [11]. conducted a study on the impact of institutional quality on economic performance in 12 West African countries from 1996 to 2015, using fixed-effect, random effect, and panel two-stage least square techniques. The study found that all indicators of institutional quality had a positive and significant impact on economic performance in West Africa, except for government effectiveness,

which was found to be insignificant after accounting for endogeneity using the panel two-stage least square technique. Finally, Ouedraogo, Tabi & Ondoa investigated the role of institutional quality on human capital development in Africa, and found that improving the quality of institutions, such as government effectiveness, voice and accountability, rule of law, and political stability, promotes primary, secondary, and higher education in Africa [12].

In this paper, the authors aim to extend the Uzawa-Lucas model by examining the impact of institutional quality and human capital on economic growth in West African countries. The study will employ empirical analysis to investigate the relationship between institutional quality, human capital, and economic growth. The Uzawa-Lucas model is a theoretical framework used to explain the relationship between human capital accumulation and economic growth. By incorporating institutional quality into the model, the authors aim to contribute to the existing literature on the importance of institutions in economic growth in West African countries.

The study employed a dynamic panel data method, utilizing Generalized Method of Moments (GMM) estimators, which offer various advantages compared to instrumental variable and least square estimation methods [13]. Specifically, a system GMM (Arellano & Bover, Blundell & Bond) estimators were used while controlling for instrument proliferation [14-15]. These methods were selected for their ability to correct for endogeneity and heterogeneity concerns (Blundell et al), as well as for the correction of heteroskedasticity of unknown form. The remainder of the paper is structured as follows: Section 2 presents a basic theoretical model. Section 3 provides an overview of the data sources and methodology. Section 4 presents the empirical results, followed by conclusions in section 5.

Theoretical Model

According to the equation proposed by Neustroev, our study proposes a modification of the endogenous Uzawa-Lucas model of economic growth by incorporating institutional quality [16]. Specifically, we consider a two-sector model of economic growth (Equations 1-2) and assume that the subscripts of the parameters may vary across countries:

$$Y_{it} = A_{it}K_{it}^{\alpha} R_{it}^{\alpha}[u_{it} H_{it}]^{1-\alpha-\alpha} \quad 01$$

$$H_{it} = H_{it}\, s\, (1-u_{it}) - \gamma_h H_{it} \quad 02$$

Where Y is real output, A the level of technology which is constant, K the stock of real physical capital, R the institutional quality or rent seeking activities, H the total amount of accumulated human capital, γ_h the level of human capital depreciation, u the share of human capital devoted to output and s is the parameter which defines effectiveness of human capital formation. Moreover, including institutional quality to UL model implies that weak institutions channel resources or capital from productive sectors to unproductive sectors, consequently decreasing growth and promoting corruption or rent seeking (Chong & Gradstein, [17].

It is assumed that the subscripts of the parameters may vary across countries; therefore, we suppress them for notational simplicity. Also following the definition by (Neustroev, equations (1) and (2) can be written as [16].

$$y = Ak_{it}^{\alpha} r^{\alpha} (uh)^{1-\alpha-\alpha} \quad 03$$

$$\dot{h} = hs\,(1-u) - \gamma_h h \quad 04$$

Where *y,k,r* and *h* are per capita values of final output, fixed capital, institutional quality (rent seeking) and human capital (education) respectively.

$$\dot{k} = ik - \gamma_k k \quad 05$$

$$\dot{r} = r^{\eta_{it}} - \gamma_r r \quad 06$$

Equations (4), (5) and (6) describe the accumulation of physical capital, human capital, and institutional quality respectively. Where *ik* the per capita investments in fixed capital, γ_k the level of fixed capital depreciation, η_{it} describes the level of institutional quality, and γ_r is the rate of institutional quality or corruption. Assuming that a firm or country has strong institutions, the value of ŋ is likely to be close to 1, resulting in increased growth. Conversely, weak institutions would result in a lower value of ŋ, closer to 0. In terms of the link between institutional quality and education, poor institutional quality can lead to a lower productivity of skilled workers and hinder the transfer of knowledge to unskilled workers (Ouedraogo, et al, [12]. To study the growth patterns of West African countries over the long term, intertemporal utility is maximized by examining individual investment and consumption subject to dynamic budget constraints. The representative agent's utility function can be expressed in an iso-elastic form.

$$u_{it} = \frac{c_{it}^{1-\varphi-1}}{1-\varphi} \quad 07$$

Where c represents per capita private consumption and φ is the constant elasticity of intertemporal substitution for consumption.

The structure of intertemporal utility maximization and the infinite planning horizon are characterized by the following form.

$$max \int_0^{\infty} = \frac{c_{it}^{1-\varphi} - 1}{1-\varphi} e^{-\rho t} dt \quad 08$$

Where ρ is the rate of preference, ρ > 0, φ > 0 and φ ≠ 1 which shows that the elasticity of marginal utility equals the constant –φ.

First Order Optimality Condition

Furthermore, to address the representative agent's optimization problem, we adopt a centralized economy framework with no externalities, which is also referred to as social planning. In this setup, the central planner makes decisions based on individual preferences. We establish a relationship between consumption, investment in fixed capital, institutional quality and the output of the production sector through equation 3.

$$c_{it} + ik + r^{\eta_{it}} = y = Ak_{it}^{\alpha} r^{\alpha} (uh)^{1-\alpha-\alpha} \quad 09$$

To maximize the utility function, we will employ the technique

of optimum control theory to determine how individuals should allocate their resources. To derive the optimal allocation using equations (4) through (8), we formulate the current-value Hamiltonian as follows:

$$\mathcal{H} = \frac{c_{it}^{1-\varphi} - 1}{1-\varphi} \lambda_1 [A k_{it}^{\sigma} r_{it}^{\alpha} (uh)^{1-\sigma-\alpha} - c_{it} - r^{pit} - \gamma_k k] + \lambda_2 [hs(1-u) - \gamma_h h] + \lambda_3 (\eta \bar{r} - \gamma_r r) \quad 10$$

The Lagrange multiplier λ represents the current value of shadow prices, and the terms within the first, second, and third brackets correspond to k_{it},h_{it} and r_it respectively. By taking the partial derivative of the Lagrange function with respect to the state variables k_it,h_it and r_it and the control variables c_{it},u_{it} and r^{pit}, the first order necessary conditions are:

$$\frac{\partial \mathcal{H}}{\partial c} = 0 \frac{\partial \mathcal{H}}{\partial u} = 0, \frac{\partial \mathcal{H}}{\partial r^{pit}} = 0$$

$$\lambda_1 = \rho \lambda_1 - \frac{\partial \mathcal{H}}{\partial k}$$

$$\lambda_2 = \rho \lambda_2 - \frac{\partial \mathcal{H}}{\partial h} \quad 11$$

$$\lambda_3 = \rho \lambda_3 - \frac{\partial \mathcal{H}}{\partial r}$$

We get the following equalities using these first order conditions

$$c_{it}^{-\varphi} - \lambda_1 = 0 \quad 12$$

$$\lambda_1 (1-\sigma-\alpha) \frac{y_{it}}{u} - \lambda_2 h_{it} = 0 \quad 13$$

$$-\lambda_1 + \lambda_3 r^{pit} = 0 \quad 14$$

$$\lambda_1 = \rho \lambda_1 - \lambda_1 (\sigma \frac{y_{it}}{k} - \gamma_k) \quad 15$$

$$\lambda_2 = \rho \lambda_2 - \lambda_1 (1-\sigma-\alpha) \frac{y_{it}}{h} - \lambda_2 [s(1-u) - \gamma_h] \quad 16$$

$$\lambda_3 = \rho \lambda_3 - \lambda_1 \alpha \frac{y_{it}}{r} + \lambda_3 \gamma_r \quad 17$$

We apply the transversality conditions

$$\lim_{n \to \infty} [k_{it} \lambda_1 e^{-\rho t}] = 0$$

$$[h_{it} \lambda_2 e^{-\rho t}] = 0 \quad 18$$

$$[r_{it} \lambda_3 e^{-\rho t}] = 0$$

The UL model is adjusted to incorporate education as a proxy for human capital and rent seeking as a proxy for institutional quality. By taking logarithms, Equation (9) is reformulated, allowing for an analysis of how education and institutional quality affect economic growth:

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 h_{it} + \beta_3 r_{it} \quad 19$$

Where y is the GDP growth rate, k the physical capital, h human capital and r is rent seeking a proxy of institutional quality.

Data and Methodology

Data

The study covers two different time periods using panel data: 1991-2017 and 1996-2018, which correspond to 27 and 23 years respectively. We analyze 13 ECOWAS countries for the earlier period and 15 for the latter, based on data availability. Our analysis considers two measures of governance that cover the same region but different timeframes, with some overlap in their definitions. The first measure is the World Governance Indicators (WGI) developed by Kaufmann, Kraay & Mastruzzi, which includes six components: voice and accountability (V/A), political stability/no violence (PS), government effectiveness (GE), regularity quality (RQ), rule of law (RL), and control of corruption (CC) [18]. Each component is rated on a scale from -2.5 to +2.5, where higher values indicate better governance.

Secondly, to test the robustness of our analysis, we obtained information on institutions and political risk data from the International Country Risk Guide (ICRG), produced by the Political Risk Services (2017). The ICRG provides 12 different risk indicators related to political risk and political institutions, including government stability, socioeconomic conditions, investment profile, internal and external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucratic quality. We rescaled all 12 indicators to a range of 0-1, where higher values represent better quality institutions, to ensure uniformity and ease of interpretation. However, we acknowledge that these indicators are correlated with each other to varying degrees, with some indicators closely related to others. For example, POLIT and INTCONF are closely correlated at a 5% level of significance, and CORRUPT is partially correlated with SOCIO at 0.56, as shown in Table 1. Additionally, most of the institutional measures are negatively related to growth, suggesting poor institutional quality in the countries analyzed. To address the issue of multicollinearity, we constructed an institutional quality index using Principal Component Analysis (PCA), a statistical technique that compresses and extracts useful information from multivariate datasets.

Table 1: Correlation of ICRG Institutional quality measures

Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) GDP	1.000												
(2) polistab	0.128	1.000											
(3) sociec-con	-0.140	-0.149	1.000										
(4) inves-prof	0.024	0.420	0.181	1.000									
(5) in-terconf	-0.053	0.413	0.083	0.452	1.000								
(6) ex-terconf	0.038	0.249	0.083	0.376	0.455	1.000							
(7) cor-rupti	-0.110	-0.118	0.555	-0.092	-0.025	-0.105	1.000						
(8) mi-liipow	0.047	0.070	0.266	0.340	0.303	0.308	0.153	1.000					
(9) re-ligitens	-0.061	0.085	0.365	0.279	0.330	0.186	0.233	0.146	1.000				
(10) laword	-0.047	0.301	0.317	0.346	0.369	0.111	0.339	0.064	0.340	1.000			
(11) ethn-tens	-0.145	0.034	0.289	0.270	0.344	0.165	0.205	0.384	0.369	0.535	1.000		
(12) demo-cacc	-0.150	0.091	-0.011	0.059	0.124	0.031	0.039	0.213	-0.093	-0.115	-0.050	1.000	
(13) bur-quali	-0.274	-0.164	0.518	0.157	0.124	0.269	0.266	0.096	0.243	0.085	0.031	0.237	1.000

Table 2: Correlation of Governance measures

Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) GDP	1.000						
(2) V/A	0.120	1.000					
(3) PS	0.046	0.612	1.000				
(4) GE	0.033	0.743	0.626	1.000			
(5) RQ	-0.002	0.634	0.625	0.830	1.000		
(6) RL	0.068	0.775	0.763	0.854	0.817	1.000	
(7) COC	0.039	0.780	0.654	0.828	0.730	0.888	1.000

Furthermore, using PCA to construct an institutional quality index is a common technique in empirical research. PCA allows researchers to create a single composite index from a set of correlated variables, which can help to reduce the effects of multicollinearity and simplify the analysis. The resulting index can be used as a proxy for institutional quality and is often easier to interpret than a set of individual variables. In the case of this study, the PCA is used to create an institutional quality index from the 12 different risk indicators provided by the ICRG. This allows the researchers to capture the overall quality of institutions in the sample countries, rather than analyzing each individual variable separately. By reducing the dimensionality of the data, the researchers are able to retain most of the information contained in the original variables while avoiding issues related to multicollinearity. Overall, using PCA to construct an institutional quality index is a useful technique for empirical research and can help to improve the accuracy and interpretability of the results [7, 13, 14, 20].

The variable used to measure economic growth in this study is

gross domestic product per capita (GDPPC), which is adjusted for inflation and expressed in 2010 US dollars. This measurement considers the relative population or country size. The GDP data used in the study are sourced from World Development Indicators [21]. The study hypothesizes that all independent variables, such as human capital and capital stock from PWT 9.0, will have a positive correlation with GDP. The study also uses data on labour force participation rate, gross fixed capital formation, and population growth from World Bank [21].

Methodology

Based on the theoretical framework the study investigates the following equation

$$lngdp_{it} = \alpha lngdp_{it-1} + \beta I_{it} + \varphi h_{it} + \rho I_{it} * h_{it} + \delta k_{it} + \gamma V'_{it} + \mu_i + \varepsilon_{it} \quad (20)$$

where Ingdp is the natural logarithm of gdp per capita, Ingdp_(it-1) is the natural logarithm of the lagged gdp per capita, I indicates the institutional quality index (IQI), I*h is the interaction of institutional quality and human capital, K represents capital stock, V^' is the vector of control variables, μ is the unobserved country-specific fixed effects, α,β,δ,φ,ρ,γ are parameters, ε is the error term, i the number of cross-section and t the number of time series. The control variables include population (POP), labour force (LBF) and gross fixed capital formation (GFCF).

In terms of the panel analysis, we utilize the system GMM model suggested by Arellano and Bover (1995) and Blundell and Bond (1998) to compute the regression equation coefficients, and apply the Frisch-Waugh theorem for verifying the robustness of the results. The GMM estimation methods enable efficient estimation in the presence of unknown form heteroskedasticity [14, 15]. Additionally, the Arellano-Bond approach addresses the issue of autocorrelation of the residuals, by adding the lagged dependent variable as an extra independent variable, and deals with weakly exogenous instruments, making it suitable for short panel datasets [13].

In any estimation method that uses instruments, it is important to test for the validity of the instruments to ensure that they are correlated with the endogenous instrumented variables and satisfy the orthogonality condition to the errors [22]. In the GMM framework, the Hansen J statistic test proposed by Hansen is used as it is consistent in the presence of autocorrelation and heteroscedasticity [23]. If the p-value from the Hansen J test confirms the validity of the instruments, then it also validates the GMM results. However, having too many or too few instruments can complicate the quality of GMM estimation. A high number of instruments can result in over-fitting of endogenous variables, while a low number of instruments may satisfy moment conditions even if the instruments are invalid. To address this issue, we followed the rule of thumb and kept the number of instruments below the number of groups, which is equivalent to the number of countries in our case [13-24].

Frisch-Waugh Theorem

For the robustness check, we employ the Frisch-Waugh theorem as suggested by Balli & Sørensen [25-26]. This theorem allows us to isolate the effects of the variables of interest by removing the influence of other variables through orthogonalization. We model the interactions between the variables of interest without any additional or control variables.

$$y_{it} = \alpha_0 + \alpha_1 IQI_{it} + \alpha_2 H_{it} + \alpha_3 IQI^{*}_{it}(H_{it} - \bar{H}_{it}) + \varepsilon_{it} \quad (21)$$

Where IQI the institutional quality index; H the log of human capital; $H^{*}_{it} = M_2 H^{*}_{it}$ and M_2

the residual maker from regressing IQI on α_0 andH.

The FW theorem implies that the multiple regression coefficient of any single variable can also be derived by first netting out the effect of other variable(s) in the regression model from both the dependent variable and the regressor.

Estimation Results

Table 3 reveals summary statistics of all the variables used in this study

Table 3: Summary statistics

Variable	Mean	Std. Dev.	Mean	Std. Dev	Obs.	Obs.
Gross Domestic Product	1.61	4.21	1.48	0.80	309	316
Human capital	0.47	0.34	0.56	0.36	341	344
Growth Determinants						
Labour force	4.21	0.14	4.24	0.64	351	345
Gross fixed capital formation	2.74	0.55	2.84	0.57	341	340
Population growth	0.99	0.31	0.95	0.32	344	345
Capital Stock	9.26	5.10	10.57	1.44	351	345
Interaction	0.62	5.47	0.03	0.85	340	345
ICGR Indicators						
ICGR Index	6.81	1	-	-	350	
Government stability	7.67	2.03	-	-	351	
Socioeconomic conditions	3.70	1.49	-	-	351	
Investment profile	6.41	1.77	-	-	351	
Internal conflict	7.96	4.81	-	-	351	
External conflict	9.36	1.65	-	-	351	
Corruption	2.14	0.75	-	-	351	
Military in power	-1.99	1.09	-	-	351	
Religious tensions	3.95	1.34	-	-	351	
Law and order	2.70	0.76	-	-	351	
Ethnic tensions	3.13	1.07	-	-	351	
Democratic accountability	3.40	1.31	-	-	351	
Bureaucratic quality	1.03	0.88	-	-	351	
Kaufmann et al. (2010)						
Governance index	-	-	-4.21	1.00		345
Voice and Accountability	-	-	-0.39	0.62		345
Political Stability	-	-	-0.50	0.84		345
Government effectiveness	-	-	-0.78	0.48		345
Regulatory quality	-	-	-0.62	0.42		345
Rule of law	-	-	-0.66	0.59		345
Control of corruption	-	-	-0.65	0.52		345

GMM Estimation Results

Table 4: System GMM estimates (Dependent variable: GDP (log))

Variables	[1]	[2]
Constant	0.0120 (0.0927)	-0.0466 (0.0877)
Log GDP_1	-0.4633 (0.0343)***	-0.4734 (0.1786)***
ICRG Index	-2.4354 (0.1442)**	-
Governance Index	-	-7.2767 (1.7844)***
Log Human capital	0.0065 (0.8921)	-0.0666 (2.8459)
Log Labour force participation	-1.3649 (1.2182)	0.0425 (0.0104)***
Log Gross fixed capital formation	-1.2497 (0.5974)*	-0.5207 (0.1966)**
Log Capital stock	0.7351 (0.5610)	1.6325 (0.4957)***
Population Growth	1.6042 (1.7160)	1.4935 (1.6057)
Interaction	-0.4126 (0.3275)*	14.5984 (3.8065)***
No of observations	230	251
GMM Instrument lag	3	3
Number of Instruments	21	21
Number of countries	13	15
F-statistics	1.61	1.85
AR [1]	0.044	0.012
AR [2]	0.185	0.568
Hansen test	0.750	0.450

Note: std. errors in parenthesis; column [1] indicate sample 1991-2017 using icrg data while column [2] show sample 1986-2018 using Kaufmann et al. [30] data; *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

The outcomes presented in column [1] of Table 4 indicate that the past growth rate is not a robust forecaster of the current growth rate, although it is statistically significant at the 1% level. This suggests that growth in these countries is not persistent and is not reliant on prior trends. Furthermore, the coefficients for both the labor force and gross fixed capital formation are negative, indicating that an increase in these variables would lead to a decline in growth. Although the gross fixed capital formation coefficient is negative, it is statistically significant at the 10% level according to the results.

The analysis reveals that there is a positive correlation between economic growth and capital stock, human capital, and population growth. Specifically, a one-percentage-point increase in these variables leads to an increase in economic growth by 0.006, 0.73, and 1.60, respectively. On the other hand, the ICRG aggregated index shows a negative relationship with economic growth, and a one-unit increase in this index for the 13 West African countries in our sample reduces growth by 2.44, which contrasts with the findings of previous studies such as Nawaz et al, Barro, Knack & Keefer, Acemoglu, et al, [3-6]. Acemoglu, Johnson & Robinson, and Busse & Hekefer However, the result of the control variables in column [1] Table 4 is not very good, which could be attributed to the unavailability of data for Benin and Cape Verde in the sample. Finally, we find that the interaction effect between the institutional quality index and human capital is negative and statistically significant at the 10% level [27, 28].

Additionally, column [2] results show that all control variables have expected signs, except for gross fixed capital formation which is negatively related to growth with a coefficient of -3.66. On the other hand, human capital, labour force, capital stock, and population growth are positively related to growth, but only population growth is statistically significant at the 5% level. Therefore, these variables enhance and promote growth during the study period. The results for Kaufmann, Kraay & Mastruzzi indicators show that a one percentage point improvement in aggregate governance for the entire sample reduces economic growth by 1.17. The AR (2) specification results demonstrate no issues with second-order correlation, and the Hansen test results indicate that the instruments utilized are not over-identified [18].

The results are not surprising given that the West African region, being a developing area, is known for having weak and unstable institutions. Political instability, as seen in recent events like the coup d'état in Mali on May 24th, 2021, and socio-environmental issues such as insecurity, insurgency, terrorism by Boko Haram in Mali, Niger, and Nigeria, and kidnapping, among others, destabilize growth in this region.

Robustness Check

Dependent variable: Gross domestic product (log)

Variables	(1)	(2)	(3)	(4)
Constant	1.7962*** (0.1180)	0.0014 (0.0662)	1.6591 (0.0802)	0.0595 (0.555)
ICRG Index	-0.1894** (0.0842)	-	-	-
Governance Index	-	-	0.0047 (0.0951)	-
Log Human capital	-0.3695** (0.2015)	-	-0.3373*** (0.1205)	-
ICGR*H	0.0162 (0.0148)	-	-	-
WGI*H	-	-	0.1310 (0.1109)	-
$ICRG^{\Psi}$ (H- $\bar{H}$)	-	-0.1322** (0.0660)	-	-
WGI^{Ψ} (H- $\bar{H}$)	-		-	0.16684 (0.0710)
No of observations	298	298	315	315
R^2	0.0245	0.0134	0.0414	0.0173
F-statistics (p-value)	0.0627	0.0460	0.0043	0.0194

Note: std. errors in parenthesis; column (1) and (3) show a pool OLS estimation of both the two samples used in this study. While column (2) and (4) indicates the results of the new variables created according to Frisch-Waugh theorem of sample 1991-2017 and sample 1986-2018 respectively; *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

The results indicate that human capital has a negative effect on growth, but it is statistically significant at both the 1% and 5% levels in both models. Regarding the institutional quality index, when using Kaufmann et al [18]. indicators, the results in column (3) show that a 1% change in the index of aggregate governance will increase growth by 0.004. However, in the case of political risk indicators, a 1% change in the aggregate ICRG index will reduce growth by 0.18, and it is also statistically significant at the 5% level. The robustness of the findings is tested by using the Frisch-Waugh residuals on the institutional quality index and human capital. The results in column (4) show that there is a negative interaction between the ICRG index and human capital with a coefficient of 0.13, and it is statistically significant at the 5% level. However, the FW coefficient of the interaction between WGI index and human capital is positive but statistically insignificant [29-32].

Conclusion

This research paper explores the impact of institutional quality on economic growth in West Africa using both theoretical and empirical evidence. To achieve this, the Uzawa-Lucas model is used, with a focus on the role of institutions in economic growth. Two sources of institutional quality measures from 1996-2018 and 1991-2017 are employed, and the analysis is conducted using the General Method of Moments (GMM) estimation on a panel data. The findings reveal a negative correlation between the aggregate institutional quality index and economic growth, which is statistically significant at both the 5% and 10% levels for the two data sources used in West Africa.

References

1. Schultz, T. W. (1993). The economic importance of human capital in modernization. Journal of Education Economy, 1, 13–19.
2. Mauro, P. (1995). Corruption and growth. Quarterly Journal of Economics, 110, 681–712.
3. Knack, S., & Keefer, P. (1995). Institutions and economic performance: Cross-country tests using alternative institutional measures. Economics and Politics, 7, 207–227.
4. Barro, R. J. (1997). Determinants of economic growth: A cross-country empirical study. MIT Press.
5. Rodrik, D., Subramanian, A., & Trebbi, F. (2002). Institutions rule: The primacy of institutions over geography and integration in economic development. NBER Working Paper No. 9305. Harvard University.
6. Acemoglu, D., Cutler, D., Finkelstein, A., & Linn, J. (2006). Did Medicare induce pharmaceutical innovation? American Economic Review, 96, 103–107.
7. Acemoglu, D., Cutler, D., Finkelstein, A., & Linn, J. (2006). Did Medicare induce pharmaceutical innovation? American Economic Review, 96, 103–107.
8. Chong, A., & Calderón, C. (2000a). Causality and feedback between institutional measures and economic growth. Economics and Politics, 12, 69–82.
9. Ubi, P., & Ubah, E. (2014). Corruption, institutional quality and economic performance in an emerging economy: Lessons from Nigeria. British Journal of Economics, Management and Trade, 4, 1708–1722.
10. Ozioko, E. (2014). Institutional quality, government expenditure and economic growth: Panel evidence from four selected

West African countries [Master's thesis, University of Nigeria Nsukka].
11. Iheonu, O., Ihedimma, I., & Onwuanaku, C. (2017). Institutional quality and economic performance in West Africa. MPRA Paper No. 82212.
12. Ouedraogo, I., Tabi, H., & Ondoa, A. (2020). Institutional quality and human capital formation in Africa.
13. Carkovic, M., & Levine, R. E. (2005). Does foreign direct investment accelerate economic growth? In Baiashvili, T., & Gattini, L. Impact of foreign direct investment on economic growth: The role of country income levels and institutional strength. European Investment Bank. EIB Working Paper No. 02.
14. Arellano, M., & Olympia, B. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics, 68, 29–51.
15. Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87, 115–143.
16. Neustroev, D. (2013). The Uzawa-Lucas growth model with natural resources. MPRA Paper No. 52937.
17. Chong, A., & Gradstein, M. (2007). Inequality and institutions. Review of Economics and Statistics, 89, 454–465.
18. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The Worldwide Governance Indicators: A summary of methodology, data and analytical issues. World Bank Policy Research Working Paper No. 5430.
19. Topal, M. H., & Sahin, M. (2017). Governance quality and taxation: A panel co-integration evidence of OECD countries.
20. Deeman, Y. M. (2018). Principal component analysis. Dataset pre-processing. ResearchGate.
21. World Bank. World Development Indicators. Washington, DC: World Bank.
22. Baum, C., Schaffer, M., & Stillman, S. (2003). Instrumental variables and GMM: Estimation and testing. Stata Journal, 3, 1–31.
23. Roodman, D. (2007). The anarchy of numbers: Aid, development and cross-country empirics. World Bank Review, 21, 255–277.
24. Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. The Stata Journal, 9, 86–136.
25. Frisch, R., & Waugh, F. W. (1933). Partial time regressions ascompared with individual trends. Econometrica, 1, 387–401.
26. Balli, O. H., & Sørensen, B. E. (2012). Interaction effects in econometrics. Empirical Economics, 45, 583–603.
27. Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. American Economic Review, 91, 1369–1401.
28. Busse, M., & Hefeker, C. (2005). Political risk, institutions and foreign direct investment. European Journal of Political Economy, 23, 397–415.
29. Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies, 58, 277–297.
30. Lucas, R. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22, 3–42.
31. PRS Group. (2017). International Country Risk Guide: Political risk (3b). http://www.icrgonline.com/page/default.aspx
32. Uzawa, H. (1965). Optimum technical change in an aggregative model of economic growth. International Economic Review, 6, 18–31.

APPENDEX:

Variables	[1]	[2]	[3]	[4]
ICRG Index	-	-	-0.1004 (0.1048)	-0.7294 (0.0872)
Governance Index	0.0543 (0.1849)	0.1417 (0.1190)	-	-
Log Human capital	-1.4619 (1.0767)	0.2916 (0.1997)	-3.2752* (1.6811)	0.2416 (0.0872)
Log Labour force participation	0.0031 (0.0658)	0.0027 (0.0639)	-2.2820*** (0.8710)	-0.4889 (0.5336)
Log Gross fixed capital formation	0.3013** (0.1395)	0.1159 (0.1098)	0.2245 (0.1655)	0.1628 (0.1332)
Log Capital stock	0.1870 (0.1611)	0.0135 (0.0399)	0.5850*** (0.2179)	0.0400** (0.0184)
Population Growth	1.3698*** (0.2985)	1.1115 (0.2707)	0.2446 (0.2507)	0.1496 (0.2373)
Interaction	0.0923 (0.3124)	-0.0255 (0.1418)	0.0162 (0.0150)	0.0122 (0.0133)
Constant	1.6992 (1.4257)	-0.0484 (0.7158)	6.2835* (3.6104)	2.4415 (2.2577)
F-stat (prob)	4.33 (0.001)	25.67 (0.006)	2.53 (0.015)	11.48 (0.119)
No of observations	306	306	269	269
No of groups	15	15	13	13

Note: std. errors in parenthesis; *** significant at 1% level; ** significant at 5% level; * significant at 10% level.

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