EFFECTS OF INSTITUTIONS ON ECONOMIC GROWTH IN AFRICA

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Abstract

The study examined the effects of institutions on economic growth in Africa by adopting the growth accounting equation as the core framework for the per capita GDP growth models that were estimated. These models comprised 7 equations, with the 7 forms of the World Governance Indicators (WGI) being made to feature one at a time in the 7 equations. The models were first estimated with the Random Effects estimation techniques and appropriate diagnostic tests were carried out and remedial econometric steps were taken by estimating the models with PCSE when the tests signalled the existence of problems, to ensure the validity of the estimates. Following the above methodology, the highlights of findings confirmed the relevance of those newly introduced factors and the continued relevance of a number of the existing factors as determinants of economic growth. Based on the findings, the study recommended that policymakers who have a quest to promote economic growth should focus on factors (i.e., voice and accountability, regulatory quality, rule of law, combined governance indicator, external conflict, religious tension, capital stock growth, financial depth, foreign direct investment, literacy rate, socioeconomic condition, and investment profile) that were found to have effects on economic growth.

Keywords: Capital Stock Growth, Economic Growth, Governance Indicators, Institution, Productivity Growth and
JEL Codes: *C33, O43, O55*

1. Introduction

Economic growth plays a crucial role in driving long-term improvements in living standards and reducing poverty, as well as in fostering innovation and economic dynamism. This underscores the preoccupation of policymakers with how to promote growth. For example, at the international or inter-governmental level, one of the policies aimed at promoting growth in Africa is Sustainable Development Goal (SDG) Number 8. This goal focuses on promoting sustainable and inclusive economic growth to drive progress, create decent jobs for all, and improve living standards. At the individual

country level, most countries have also introduced policies targeted at promoting economic growth.

In this regard, a question of interest for macroeconomists relates to the causes of the differences in economic growth among countries of the world. On this issue, Acemoglu & Robinson (2008) summarized and classified the causes of cross-country differences in economic growth to only two, namely the proximate cause and fundamental cause. Proximate cause of the most active and dominant cause comprises human capital, physical capital, and technology. On the other hand, some scholars have spoken about the place of institutions in pushing for economic growth and attribute to them the status of the fundamental cause. Thus, according to Acemoglu and Robinson (2008), institutions are the fundamental cause that causes the cross-country differences in world economic growth. Institutions shape how a society behaves and reacts to certain challenges in their lives. Institutions command a society to react by creating certain rules and regulations as guidelines

Studies by Aynur and Mehmet (2016), Emara and Jhonsa (2014), Aisen and Veiga (2013) and Valeriani and Peluso (2011) and a host of others have tested the effects of institutions on economic growth, with a number of them reporting positive effects and others reporting negative effects and, in some cases, a nil effect. The list of factors that have had their economic growth effects empirically investigated is rather endless; but in virtually all of them, there have been contradictory findings and a lack of consensus in the conclusions. This lack of consensus in the findings of the empirical studies thus underscores the need for more and continuous studies on this issue until a consensus emerges. Therefore, the main objective of the present study is to augment these existing studies by focusing on the examination of the effects of institutional factors on economic growth in Africa.

The rest of the paper is organised as follows: Section 2 is the literature review while Section 3 presents the methodology, which includes justification for the inclusion of variables and, a description of the data employed. The presentation and analysis of results are done in Section 4 and Section 5, which is the last Section about the conclusions.

2. Literature Review

2.1 A Review of the Growth Theory

Growth theories explain the factors that determine economic growth. There exist many such theories in the literature. The important and relevant growth theory discussed in this paper is the neo-classical growth.

Neoclassical growth theory, as narrated by Banton (2023), posits growth in output to be a function of growth in inputs: capital, labour and technological progress. Any increase in savings rate leads to only an increase in both the steady-state level of output per capita and per capita capital stock over time, without any affecting the growth rate of output. The growth rate of output remains unchanged due to the law of diminishing marginal product of capital because any further capital increase will lead to a fall in output back to the steady state. Also, population growth reduces the steady-state level of capita per head

and output per head, as it increases over time, and increases the steady-state growth rate of output. Long-run growth of output also depends on improvement in technology and an absence of this will allow output per person to converge to a steady state value, which depends positively on the savings rate and negatively on the population growth rate (Dornbusch et al., 2011).

2.2 Empirical Literature

There are numerous studies on economic growth, but the ones that are reviewed here are those that focus mainly on institutions. Among such studies are the ones that reported positive effects of institutions on economic growth in developing countries, most especially African countries (Kilishi et al., 2013; Uddin et al., 2019; Aynur & Mehmet, 2016; Nawaz et al., 2014). However, the findings are in line with what was reported by Noha and Chiu (2016), where positive relationships were also found between institutions and per capita income in Middle Eastern and North African countries. Also, the study conducted by Alam et al. (2017) using 81 sample countries, provided empirical evidence that government effectiveness impacts economic growth. The quality of institutions has been found to play an important role as reported by Chan et al. (2018), which conducted a study on the role of institutional quality on economic growth in 29 emerging market countries in 2002-2015.

However, Alesina et al. (1996) studied the effects of political instability on per capita GDP growth using 113 countries over the period 1950- 1982. The study reported that political instability lessens economic growth. Moreover, the results suggested that regime changes affect economic growth adversely. The same findings were reported by Feng (1997), Dam (2006) and Aisen and Veiga (2013). Also, Acemoglu et al. (2001), Polterovich (2008) and Valeriani and Peluso (2011) tested the role of institutions on economic growth, the results of their studies indicated that institutions have a significant positive effect on economic growth. The findings by Degbedji et al. (2024) and Huynuh and Jacho-Chavez (2009) in their investigations of the effects of institutions on economic growth with the use of WGI governance indicators reported neither positive nor negative effects of institutions on economic growth. Iskandar et al. (2023) examined the relationship between institutions and economic growth using institutional variable components from the WGI and GMM estimation techniques. They found that Regulatory Quality and Control of Corruption have a significant effect on economic growth in East Asian countries. The conclusion therefore is that strengthening the quality of institutions or institutions is an important requirement in increasing long-term economic growth in the East Asia region.

Based on the literature reviewed, many studies have analyzed the impact of institutions on economic growth, but there is no consensus. This study aims to contribute to reaching a consensus. Aside from adding to the existing studies, this study has identified some gaps in the previous studies to be filled. Particularly, the study has not only provided updated evidence on the effects of conventional measures of institutional and non-institutional factors on economic growth, it also widens the list of institutional factors to include new or "virgin" ones, the effects of which had never been tested before. Such new institutional factors include external conflict, religious tension, culture, executive constraints, bureaucratic quality, religious factors, and colonization or colonial history

3.0 Methodology

3.1 Theoretical Framework

This study uses the growth accounting approach, which is an important part of neoclassical growth theory. This theory explains how economic growth is determined by the growth of factors of production and how economic decisions can influence them. The derivation of the growth accounting framework or equation that forms the basis of the models specified in the study starts from a generalised linear homogeneous production function with a neutral technology of the form:

$$Y = Af(K, L) \qquad (1)$$

where Y is the GDP or level of output, K is capital stock, L represents Labour and A is the Productivity or technology level. After various derivations, the study arrived at the following equation

$$\frac{\Delta Y}{Y} = (1-\alpha)\frac{\Delta L}{L} + \alpha\frac{\Delta K}{K} + \frac{\Delta A}{A} \qquad (2)$$

To transform the growth rate of output to per capita terms, the growth of labour force $\frac{\Delta L}{L}$ (which is assumed to be equal to the growth rate of the population) is subtracted from both sides of Equation 2 thus:

$$\frac{\Delta Y}{Y} - \frac{\Delta L}{L} = (1-\alpha)\frac{\Delta L}{L} + \alpha\frac{\Delta K}{K} + \frac{\Delta A}{A} - \frac{\Delta L}{L} \qquad (2a)$$

Since, by definition, $\frac{\Delta k}{k} = \frac{\Delta K}{K} - \frac{\Delta L}{L}$, then $\frac{\Delta K}{K} = \frac{\Delta k}{k} + \frac{\Delta L}{L}$. Substituting this in Equation 2 yields:

$$\frac{\Delta Y}{Y} - \frac{\Delta L}{L} = (1-\alpha)\frac{\Delta L}{L} + \alpha\left(\frac{\Delta k}{k} + \frac{\Delta L}{L}\right) + \frac{\Delta A}{A} - \frac{\Delta L}{L} \qquad (2b)$$

Simplifying Equation (2b) gives the expression below:

$$\frac{\Delta y}{y} = \alpha\frac{\Delta k}{k} + \frac{\Delta A}{A} \qquad (3)$$

where $\frac{\Delta y}{y}$ is the growth rate of output per person (or $\frac{\Delta Y}{Y} - \frac{\Delta L}{L}$) that measures economic growth. Under the simplifying assumption that the population and labour force grows at the same rate, $\frac{\Delta y}{y}$ is also the growth rate of output per worker.

Based on Equation (3), the growth rate is the weighted sum of two components: the rate of Total Factor Productivity (TFP) growth, $\frac{\Delta A}{A}$, and the growth rate of the capital-labour ratio or 'capital deepening' component multiplied by the share of capital owners in total output, $\alpha\frac{\Delta k}{k}$. The first one measures the portion of economic growth attributable to technological progress and the second measures the portion attributable to the rate of capital accumulation.

3.2 Model Specification

Mathematical Equation Specification for Productivity Growth ($\frac{\Delta A}{A}$)

Based on the above, below is the mathematical specification of a simplified deterministic model for productivity growth, $\frac{\Delta A}{A}$. It is in the form of a panel-data-based linear econometric model and it is as specified in Equation (4) thus:

$$(\frac{\Delta A}{A})_{it} = \psi_1 BQ + \psi_2 INT_{it} + \psi_3 LITR_{it} + \psi_4 CUL_{it} + \psi_5 FDE_{it} + \psi_6 INPROF_{it} + \psi_7 SECON_{it} + \psi_8 DEMA_{it} + \psi_9 EXCON_{it} + \psi_{10} EXC_{it} + \psi_{11} RELTENS_{it} + \psi_{12} MUSPOP_{it} + \psi_{13} QOG_{it} + \psi_{14} FDI_{it} + \psi_{15} COL1_{it} + \psi_{16} COL2_{it} + \psi_{17} CPI_{it} + \psi_{18} TOP_{it} + \psi_{19} WGI_{it} + \alpha_i + \varphi_t + U_t \text{..............................(4)}$$

where α_i *and* φ_t = *individual effect and time effect respectively*; U = *error term*; $\psi_1 - \psi_{19}$ =*parameters to be estimated;*

BQ= Bureaucratic quality; LITR= Literacy rate; CUL= Indicator of culture; FDE= Financial depth; FDI = Foreign direct investment; INPROF= Investment profile; CPI = Corruption perception index; EXC= Executive constraints; SECON = Socioeconomic condition; EXCON = External conflicts; RELTENS = Religious tension; QOG = Quality of governance; DEMA = Democratic accountability; MUSPOP = Muslim Population (% of total); COL1 = Dummy for French colonised countries; COL2 = Dummy for British colonised countries; TOP = Trade openness; RER = Real exchange rate; INT = Real interest rate and WGI = Governance indicators

In line with the description of variables and postulated signs above, the expected signs of the parameters are as stated below:

$\psi_1, \psi_2, \psi_3, \psi_4, \psi_5, \psi_6, \psi_7, \psi_8, \psi_{10}, \psi_{13}, \psi_{14}, \psi_{17}, \psi_{18}$ *and* $\psi_{19} > 0$, $\psi_9, \psi_{11} < 0$, and β_{12}, β_{15} *and* $\beta_{16} \lesseqgtr 0$

To investigate the effect of institutions on economic growth, Equation (4) is re-specified. This is done by substituting Equation (4) into Equation (3) to produce the econometric model of economic growth that is now named Equation (5) below.

$$(\frac{\Delta y}{y})_{it} = \alpha_1 \frac{\Delta k}{k}_{it} + \psi_1 BQ + \psi_2 INT_{it} + \psi_3 LITR_{it} + \psi_4 CUL_{it} + \psi_5 FDE_{it} + \psi_6 INPROF_{it} + \psi_7 SECON_{it} + \psi_8 DEMA_{it} + \psi_9 EXCON_{it} + \psi_{10} EXC_{it} + \psi_{11} RELTENS_{it} + \psi_{12} MUSPOP_{it} + \psi_{13} QOG_{it} + \psi_{14} FDI_{it} + \psi_{15} COL1_{it} + \psi_{16} COL2_{it} + \psi_{17} CPI_{it} + \psi_{18} TOP_{it} + \psi_{19} WGI_{it} + \Lambda_i + \varphi_t + u_{it} \text{.........................(5)}$$

where $\frac{\Delta k}{k}$ is the capital stock growth, α_i its parameter; Λ_i is the individual effect, φ_t is the time effect and u is the error term, and all other acronyms and notations are as defined in connection with Equation (4).

In deriving the estimation of equation (5), the WGI is unbundled into its 7 different categories and, due to the observed high intercorrelations among them, only one component of the WGI is made to feature at a time in the estimated equations to guard against a serious multicollinearity problem, so that 7 variants of Equation (5) are estimated and reported.

3.3 Estimation Techniques

The study uses descriptive and inferential analyses. Descriptive analysis involves creating a table of summary statistics for each variable. Panel data-based models are estimated using Pooled OLS and Random Effects methods. Diagnostic tests and post-estimation tests were performed to ensure the reliability of the regression models. The model estimates are presented using the Panel-corrected Standard Error (PCSE) approach, which corrects errors in the data automatically.

3.4 Sources of Data and Measurement of Variables

This study covers 54 African countries. All the datasets are every year and they cover a period of 1996 – 2022. The definitions of the variables employed in the study, their sources and how they are measured are described below.

Control of corruption (COC) is the perception of the extent to which controls are exercised on the extent to which public power is exercised for private gain, including petty and grand forms of corruption. It is on a scale of -2.5 to 2.5, with -2.5 being for the worst performance and +2.5 being for the best performance. Political stability and absence of violence (PSV) is the preservation of an intact and smoothly functioning government or political system, avoiding significant disruptions or changes over an extended duration. Regarding rule of law (ROL), is the extent to which government power is used by the law rather than the arbitrary wills of officials. Concerning voice and accountability (VACC), this captures perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression, freedom of association, and free media. Regulatory quality (REQ) captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Government effectiveness (GOVTEFF), on the other hand, measures the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. The PSV, ROL, VACC, REQ and GOVTEFF are each on a scale of -2.5 to +2.5, similar to that of Control of Corruption (COC). In the case of composite governance indicator (CGI), this is just a simple average of all the 6 WGI indicators above so that it too is on a scale that is similar to that of COC above. Data on all these governance indicators have a common source, which is the World Bank's World Governance Indicators, WGI (2022).

Bureaucratic Quality (BQ) is how government policies are constructed and implemented accurately, swiftly, competently, and impartially. It is also about the institutional strength and quality of the bureaucracy. It is measured on a scale of 0 – 4, with 0 denoting low bureaucratic quality while 4 connotes high level of bureaucratic quality. Concerning democratic accountability (DEMA), 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. It is measured on a scale of 0 – 6, with 0 denoting the lowest democratic accountability while 6 connotes the highest level of democratic accountability. External Conflict (EXCON) is a brawl that occurs between a country and an external force, such as another country, society, nature, or a situation. It is on a scale of 0 – 12, with 0 denoting the lowest external conflict while 12 connotes the highest external conflict. Religious Tensions (RELTENS) a situations in which religious adherents are involved in serious disagreements or arguments with one religious group or another. It is on a scale of 0 – 6, with 0 denoting the lowest religious tensions while 6 connotes the highest religious tensions. Concerning Socioeconomic Conditions (SECON), is about the status of an individual or group on the socioeconomic scale. This is measured on a scale of 0 – 12, with 0 denoting the lowest socioeconomic condition while 12 connotes the highest level of socioeconomic condition. In the case of investment profile (INPROF), it is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components and it is measured on a scale of 0 – 12, with 0 indicating the lowest investment profile and 12 indicating highest investment profile. Quality of Governance (QOG) is an average of all the ICRG institutional variables. It is on a normalised scale of 0 – 1, with 0 denoting the least quality of governance while 1 connotes the highest quality of governance. All the variables in this paragraph have the same data source, which is the ICRG Data (2022).

Coming to the Executive Constraint (EXC) measures the constraints on the executive and is measured on a scale of 0 – 10 such that 0 signifies worst performance while 10 stands for best performance and it is sourced from the Polity IV dataset (2022). The Corruption Perception Index (CPI), on the other hand, is an index that ranks countries by the perceived levels of public sector corruption, as determined by expert assessments and opinion surveys. It is normalised to a scale of 0 - 10 in such a way that 0 denotes the most highly corrupt while 10 connotes the least corrupt and is sourced from Transparency International (2022). Concerning culture (CUL), this refers to the shared beliefs and preferences of respective groups and its relation to economic outcomes. It is on a scale of 0 – 1, with 0 signifying worst performance and 1 connoting best performance and the variable is sourced from the World Value Survey, WVS (2022). Concerning French Colonised Countries (COL1) and British Colonised Countries (COL2), these are dummies for countries that are formerly French colonies (which are: Algeria, Benin, Burkina Faso, Cameroon, Congo Democratic Republic, Central Africa Republic, Cote d'Ivoire, Gabon, Guinea, Madagascar, Mali, Mauritania, Morocco, Niger, Senegal, Togo, Tunisia, Chad, Comoros, Djibouti, Sao Tome and Principe and Reunion) and British colonies (which are: Botswana, Egypt, Gambia, Ghana, Kenya, Malawi, Namibia, Nigeria, Sierra Leone, South Africa, Sudan, Tanzania, Uganda, Zambia, Mauritius, Zimbabwe, Seychelles, Swaziland and Lesotho). Thus, the French and British former colonies are 22 and 19 respectively, adding up to 41 countries out of the 54 African

countries covered by the study, so that the remaining 13 countries serve as the benchmark countries. Concerning Muslim Population the Total Population (MUSPOP), is the share of Muslims in the total population and the variable is sourced from Statista (2023).

Foreign direct investment (FDI) represents the net inflow of investment from abroad as a percentage of the country's GDP. Real interest rate (INT) is the lending interest rate adjusted for an inflation rate that is proxied by the annual percentage change in GDP implicit deflator. Financial depth (FDE) is proxied by domestic credit to the private sector by banks as a percentage of GDP. Literacy rate (LITR) is the percentage of people aged 15 and above who can both read and write with an understanding of a short simple statement about their everyday life. Trade openness (TOP) is measured by adding exports and imports of goods and services and expressing the result as a percentage of that country's GDP. Data on all the variables in this paragraph are from the World Bank's World Development Indicators, WDI (2022).

4.0 Research Findings/Results

4.1 Descriptive Statistics

This sub-section presents and discusses the descriptive statistics for each of the variables employed in the study. The descriptive analysis provides an overview and summary of the salient characteristics of the data. These statistics are summarised in Table 1, which presents in Columns 1 to 5 the variables description, mean, standard deviation, minimum value and maximum value. In a situation where outliers exist in this study, data are "filtered" by taking the average of the preceding and succeeding values and the outcome is used to supplant the outlier.

Table 1: The Descriptive Statistics

Variables Description	**Mean**	**Std. Dev.**	**Min**	**Max**
Δy/y: Economic Growth, GDP per capita growth in percentage	1.30	3.01	-8.64	7.99
Δk/k: Per Capita Capital Stock Growth in percentage	0.88	1.42	1.61	-9.00
CGI: Composite Governance Indicator, an average of the six governance indicators, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.61	0.49	-1.76	0.72
VACC: Voice and Accountability, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.61	0.62	-1.98	0.86
PSV: Political Stability & Absence of Violence, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.57	0.80	-1.91	0.63
GOVTEFF: Government Effectiveness, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.50	0.81	-1.84	1.28
REQ: Regulatory Quality, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.66	0.59	-2.35	0.80
ROL: Rule of Law, in units scaled between -2.5 to 2.5 for worst performance and best performance respectively	-0.69	0.58	-2.13	0.73
COC: Control of Corruption, in units scaled between -2.5 to +2.5 for worst performance and best performance respectively	-0.63	0.50	-1.27	0.33
BQ: Bureaucracy Quality, in units scaled between 0 to 4 for worst performance and best performance respectively	1.31	0.74	0.00	3.50
CUL: Culture, in units scaled between 0 to 1 for worst performance and best performance respectively	0.39	0.24	0.01	0.79
DEMA: Democratic Accountability, in units scaled between 0 to 6 for worst performance and best performance respectively	3.05	1.13	0.00	5.50
EXC: Executive Constraint, in units scaled between 0 to 10 for worst performance and best performance respectively	4.29	1.49	2.00	7.00
EXCON: External Conflict, in units scaled between 0 to 12 for worst performance and best performance respectively	9.62	1.39	6.48	11.75

CPI: Corruption Perception Index, with higher values connoting better performance	2.98	1.06	0.98	6.40
QOG: Quality of Governance, in units scaled between 0 to 1 for worst performance and best performance respectively	0.40	0.12	0.11	0.88
RELTENS: Religious Tension, in units scaled between 0 to 6 for best performance and worst performance respectively	4.14	1.21	2.00	6.00
FDE: Financial Depth, private sector bank credit, percentage of GDP	19.58	21.42	1.02	81.71
FDI: Net Foreign Direct Investment Inflows, % of GDP	2.95	3.45	-10.73	40.17
INPROF: Investment Profile, in units scaled between 0 to 12 for worst performance and best performance respectively	4.00	2.57	0.00	11.50
INT: Real Interest Rate, percentage per annum	6.83	7.51	-6.68	19.79
LITR: Literacy Level, % of people aged 15 and above who can both read and write with understanding a short simple statement about their everyday life	61.29	19.59	22.47	92.01
MUSPOP: Muslim as % of the Total Population	44.25	38.57	0.30	99.80
SECON: Socioeconomic Conditions, in units scaled between 0 to 12 for worst performance and best performance respectively	4.09	2.32	0.00	11.00
TOP: Trade Openness, Export plus Import of Goods and Services as % of GDP	61.27	22.65	17.86	108.60

Author's computation, (2023*)*

Explanatory Notes: Std Dev = standard deviation, Coeff of var = coefficient of variation, Min = minimum, max = maximum. The total number of observations for each variable is 936.

The descriptive analysis in Table 1 shows that the mean value ranges from 61.29 and 0.39, which occurred in literacy rate and culture respectively. The range of the minimum values is 0.00 and 17.86 with a maximum value that ranges from 0.33 to 108.60 respectively.

4.2 Results of Regression Equation

After the procedure of choosing the better method between Pooled OLS and Random Effects and the models specified in Sub-section 3.3, the results of estimating the 7 models are presented in Table 2. One of each of the 7 WGI governance indicators features in each equation estimates that are labelled Models 1 to 7, which are all per capita output growth or $\frac{\Delta y}{y}$ models that are variants of Equation (5) of Sections 3, with the difference among them being just the specific one among the 7 WGI governance indicators that features in each. It would be observed that the sole criterion adopted in categorising the equation estimates into 7 sets is the form of WGI governance indicators that feature in

each set, bearing in mind that two or more WGI governance indicators have to be prevented from featuring in a particular estimated model on account of the observed high intercorrelations between each pair of them.

In evaluating the results, a p-value of less than or equal to 5% is interpreted to imply that the coefficient is statistically significant and, hence, that the affected explanatory variable affects the dependent variable, while on the contrary, the variables are statistically insignificant if a p-value exceeds 5%. The Wald chi-squared statistic reported in the table is used to assess the power of the model and, hence, to determine its goodness of fit. The chi-squared statistic is interpreted as showing a good fit if its p-value is equal to or less than the 5% significance level. The decision rule is to reject the null hypothesis that the test statistic is not significant and, hence, the model does not have a good fit if its p-value is higher than 0.05 and not to reject the null hypothesis if otherwise.

Table 3a: Estimates of the Economic Growth Models

Variable	Model 1			Model 2			Model 3			Model 4		
	Coeff.	z-stat	p-value	Coeff.	z-stat	p-value	Coeff.	z-stat	p-value	Coeff.	z-stat	p-value
?? ??	0.318	4.28	0.000	0.308	4.19	0.000	0.321	4.32	0.000	0.324	4.37	0.000
CUL	0.412	1.07	0.286	0.695	1.73	0.084	0.519	1.27	0.203	0.424	1.10	0.273
EXCON	-0.199	-2.45	0.014	-0.191	-2.58	0.010	-0.128	-1.74	0.82	-0.114	-1.55	0.122
RELTENS	-0.132	-2.13	0.033	-0.118	-1.61	0.107	-0.180	-2.28	0.023	-0.147	-1.99	0.047
DEMA	0.118	1.35	0.178	0.056	0.64	0.522	0.153	1.72	0.086	0.144	1.67	0.096
BQ	0.172	1.23	0.219	0.162	1.13	0.260	0.167	1.20	0.229	0.165	1.17	0.244
FDE	0.171	2.70	0.007	0.018	2.81	0.005	0.010	1.54	0.124	0.011	1.72	0.086
FDI	0.117	3.55	0.000	0.111	3.47	0.001	0.113	3.49	0.000	0.109	3.33	0.001
INPROF	0.104	2.29	0.022	0.125	2.65	0.008	0.042	0.92	0.360	0.018	0.43	0.670
INT	0.012	1.03	0.303	0.013	1.07	0.284	0.016	1.32	0.186	0.015	1.26	0.206
LITR	0.026	4.13	0.000	0.020	2.69	0.007	0.026	3.89	0.000	0.026	3.92	0.000
TOP	0.004	0.58	0.559	0.002	0.36	0.720	0.001	0.21	0.834	0.000	0.05	0.961
SECON	0.158	3.55	0.000	0.121	2.79	0.005	0.127	2.83	0.005	0.115	2.52	0.012
CPI	0.402	2.40	0.017	0.381	2.53	0.011	0.560	3.98	0.000	0.594	4.28	0.000
COL 2	0.536	2.02	0.043									
COL1				0.297	1.00	0.317	0.356	1.17	0.241	0.335	1.10	0.273
MUSPOP	0.002	1.21	0.287	0.003	0.64	0.524	0.002	0.64	0.521	0.003	0.74	0.458
EXC	0.210	2.58	0.010	0.226	2.82	0.005	0.171	2.18	0.029	0.176	2.31	0.021
QOG	2.070	1.55	0.121	3.542	2.79	0.005	3.835	2.89	0.004	4.607	3.45	0.001
CGI	1.151	2.33	0.020									
VACC				1.044	3.90	0.000						
PSV							0.206	1.05	0.296			
GOVTEFF										-0.113	-0.44	0.657
REQ												
ROL												
COC												
CONSTANT	3.094	2.01	0.045	2.724	2.39	0.017	1.581	1.29	0.197	0.875	0.72	0.470
? ² Statistics	235.00	–	0.000	271.17	–	0.000	230.12	–	0.000	232.56	–	0.000
VIF Test Statistics for Multicollinearity	1.80	–	–	1.76	–	–	1.65	–	–	1.59	–	–
Modified Wald-Test Statistics for Heteroscedasticity	17.66	–	0.000	17.73	–	0.000	13.87	–	0.000	11.77	–	0.000
Woodridge Test Statistics for Autocorrelation	59.068	–	0.000	117.51	–	0.000	82.317	–	0.000	14.676	–	0.000
Jarque-Bera Test Statistics for Normality	72.543	–	0.000	61.184	–	0.000	76.196	–	0.000	76.874	–	0.000
Pesaran CSD Test Statistics for Cross-sectional Dependency	17.440	–	0.000	16.747	–	0.000	16.855	–	0.000	16.791	–	0.000

Source: Author's Computation, 2024

Explanatory notes: The following are the meanings of the acronyms appearing in the Table: CUL = culture, EXCON = external conflicts, RELTENS = Religious tension, DEMA = democratic accountability, BQ = bureaucratic quality, FDE = financial depth, FDI = foreign direct investment, INPROF = investment profile, INT = real interest rate, SECON = socioeconomic conditions, CPI = corruption perception index, MUSPOP = Muslim population, EXC = executive constraints, QOG=, quality of governance, RER = real exchange rate, COL1=French colonised countries, COL2 = British colonised countries, VACC = voice and accountability, and CGI = composite governance

indicator, PSV = political stability and absence of violence and GOVTEFF = government effectiveness, REQ = regulatory quality and ROL = rule of law and COC = control of corruption. The "coeff", "z-stat" and "p-value" stand for coefficients, z-statistics and probability value respectively.

Table 3b: Estimates of the Economic Growth Models cont'd

Variable	Model 5			Model 6			Model 7		
	Coeff.	z-stat	p-value	Coeff.	z-stat	p-value	Coeff.	z-stat	p-value
?? ??	0.318	4.35	0.000	0.319	4.41	0.000	0.334	4.46	0.000
CUL	0.306	0.78	0.434	0.232	0.62	0.537	0.253	0.66	0.512
EXCON	-0.169	-2.25	0.024	-0.176	-2.40	0.016	-0.167	-2.12	0.034
RELTENS	-0.135	-2.15	0.036	-0.127	-1.73	0.084	-0.125	-1.67	0.094
DEMA	0.054	0.59	0.557	0.094	1.08	0.279	0.142	1.63	0.103
BQ	0.162	1.16	0.248	0.178	1.28	0.202	0.177	1.27	0.205
FDE	0.019	2.60	0.009	0.022	3.54	0.000	0.013	2.17	0.030
FDI	0.117	3.65	0.000	0.106	3.25	0.001	0.109	3.41	0.001
INPROF	0.050	1.23	0.217	0.094	2.29	0.022	0.164	2.46	0.010
INT	0.007	0.58	0.563	0.009	0.83	0.407	0.016	1.39	0.165
LITR	0.027	4.05	0.000	0.028	3.76	0.000	0.031	4.16	0.000
TOP	0.003	0.49	0.625	0.005	0.75	0.456	0.003	0.56	0.579
SECON	0.138	3.09	0.002	0.187	4.37	0.000	0.140	3.18	0.001
CPI	0.392	2.72	0.007	0.333	2.13	0.034	0.512	3.26	0.001
COL 2				0.375	1.44	0.149	0.610	2.37	0.018
COL1	0.470	1.58	0.115						
MUSPOP	0.003	0.74	0.458	0.004	0.99	0.324	0.003	0.85	0.396
EXC	0.182	2.32	0.020	0.256	3.15	0.002	0.196	2.49	0.013
QOG	4.071	3.30	0.001	1.599	1.13	0.257	3.130	2.41	0.016
CGI									
VACC									
PSV									
GOVTEFF									
REQ	0.91	3.80	0.000						
ROL				1.462	4.41	0.000			
COC							0.414	1.19	0.236
CONSTANT	2.969	2.42	0.016	4.078	3.09	0.002	1.927	137	0.172
? ² Statistics	249.66	–	0.000	287.51		0.000	256.10	–	0.000
VIF Test Statistics for Multicollinearity	1.65	–		1.76	–	–	1.71	–	–
Modified Wald-Test Statistics for Heteroscedasticity	10.96	–	0.000	11.18	–	0.000	15.44	–	0.000
Woodridge Test Statistics for Autocorrelation	97.384	–	0.000	124.862	–	0.000	84.351	–	0.000
Jarque-Bera Test Statistics for Normality	79.549	–	0.000	77.975	–	0.000	72.954	–	0.000
Pesaran CSD Test Statistics for Cross-sectional Dependency	16.975	–	0.000	16.163	–	0.000	16.805	–	0.000

Source: Author's Computation, 2024

Explanatory notes: The following are the meanings of the acronyms appearing in the Table: CUL = culture, EXCON = external conflicts, RELTENS = Religious tension, DEMA = democratic accountability, BQ = bureaucratic quality, FDE = financial depth,

FDI = foreign direct investment, INPROF = investment profile, INT = real interest rate, SECON = socioeconomic conditions, CPI = corruption perception index, MUSPOP = Muslim population, EXC = executive constraints, QOG=, quality of governance, RER = real exchange rate, COL1=French colonised countries, COL2 = British colonised countries, VACC = voice and accountability, and CGI = composite governance indicator, PSV = political stability and absence of violence and GOVTEFF = government effectiveness, REQ = regulatory quality and ROL = rule of law and COC = control of corruption. The "coeff", "z-stat" and "p-value" stand for coefficients, z-statistics and probability value respectively.

4.2.3 Evaluation of the Robustness and Diagnostic Test Statistics

The estimates reported underwent diagnostic tests to assess their reliability. These tests evaluated multicollinearity, heteroscedasticity, autocorrelation, normality, and cross-sectional dependency. The results indicate that all models exhibit the identified issues, except for multicollinearity.

The explanatory power and goodness of fit of the models are examined based on the Wald Chi-squared statistics, which show in Table 3 that all the seven models have satisfactory explanatory powers and are of good fit, as they all have a p-value of 0.000 in each case.

Since the PCSE estimation method was employed in deriving all the estimates reported in Table 3 to address the problems arising from the above tests, all the problems identified above have been corrected automatically so that it can be affirmed that the reported estimates in Tables 3 are all free from all such problems.

4.2.4 Performance of the Institutional and Other Non-economic Explanatory Variables

This sub-sub-section discusses the performance of each of the institutional and other non-economic explanatory variables, which are control of corruption, voice and accountability, political stability and absence of violence, regulatory quality, rule of law, government effectiveness, composite governance indicator, external conflict, religious tension, democratic accountability, bureaucratic quality, quality of governance, culture, corruption perception index, executive constraints, religion (proxied by the relative size of Muslim population) and colonial history (French and British colonised countries). These are discussed sequentially in the paragraphs below.

Regarding the results for voice and accountability (VACC), it is indicated in Table 3 that the coefficient of VACC is positive and statistically significant. This is reliable evidence that VACC has a positive effect on economic growth. This finding is in line with what has been postulated in Section 3 of this study. Also, the observed positive economic growth effect is in line with what several previous studies, like North and Weingast (1989), North and Thomas (1973), and Acemoglu et al. (2005), had previously reported. In addition, Table 3 shows that the coefficient of political stability and absence of violence (PSV) is positive but statistically insignificant, implying that it has no significant effect on economic growth. This study's finding of no effect on economic growth contradicts the previous suggestion that PSV should have a positive impact, as described in Section 3. Also, the observed lack of its effect on economic

growth is contrary to what several previous studies, like Bernanke (1993), and Canes-Wrone and Park (2012; 2014), had previously reported. In this same vein, the coefficient of government effectiveness (GOVTEFF) is negative but statistically insignificant, implying that it does not affect economic growth. This finding is contrary to what has been postulated in Section 3 of this study that it should have a positive effect on economic growth and this lack of its effect on economic growth is noted to be contrary to the positive effects that several previous studies, like Kurtz and Schrank (2007) and Quibria (2006), had previously reported.

The coefficient for regulatory quality (REQ) is positive and statistically significant, indicating a positive impact on economic growth. This finding is in line with what has been postulated in Section 3 of the study, just as it is in accord with what several previous studies, like Glaeser, La Porta, de Silva, and Shleifer (2004) and Hoggard and Tiede (2011), had previously reported. Similarly, the coefficient of rule of law (ROL) is positive and statistically significant, which means that it has a positive effect on economic growth, in line with what has been postulated in Section 3 of this study and also in common with what several previous studies, like Barro (1991), Knack and Keefer (1995), Mauro (1995), Sachs and Warner (1995), Rogobon and Rodrik (2004), Butkiewicz and Yanikkaya (2004) and Hoggard and Tiede (2011), had previously reported. However, the coefficient of control of corruption (COC) is positive but not significant, implying that it does not affect economic growth, contrary to the positive effect that was posited in Section 3 of this paper as well as the positive effects that many previous studies, like North (1994), Mauro (1995), and Rodrik (2008), had previously reported. Finally, the coefficient of the composite or combination of all the above 6 individual governance indicators (CGI) is positive and statistically significant, which means that it has a positive effect on economic growth in line with what has been postulated in Section 3 of the paper and consonance with what several previous studies, like Knack and Keefer (1994), Mauro (1995), Rogobon and Rodrik (2004) and others, had previously reported.

Regarding the economic growth effect of external conflict (EXCON) based on the 7 model estimates reported in the same Table 3, the coefficients of EXCON are negative and statistically significant in 5 of the 7 Models (viz: in Models 1, 2, 5, 6 and 7), which means that the evidence is reliable that EXCON has a negative effect on economic growth, in line with what has been postulated in Section 3 of the paper. Coming to the economic growth effect of religious tension (RELTENS), the coefficients are negative and statistically significant in 4 out of the 7 models, which constitute evidence that RELTENS has a negative effect on economic growth. This finding is in line with what has been postulated in Section 3. On the economic growth effect of democratic accountability (DEMA), it is observed from Table 3 that its coefficients are positive but statistically insignificant in all the 7 models, which constitute reliable evidence that DEMA does not affect economic growth, which is contrary to what has been postulated in Section 3. Concerning the economic growth effect of bureaucratic quality (BQ), its coefficients in the 7 model estimates are all found to be positive but statistically insignificant, based on which it is therefore concluded that BQ does not affect economic growth, contrary to the positive effect postulated earlier in Section 3 of the paper. Coming to the economic growth effect of quality of governance (QOG) in

the 7 economic growth model estimates reported in Table 3, all the 7 coefficients of QOG are positive, out of which 4 are statistically significant so there is robust evidence that QOG has a positive effect on economic growth, in line with the expectation, as earlier stated in Section 3. As the present study has no known (at least, to the present researcher) previous empirical study to fall back upon on the effect of all the variables in this paragraph on economic growth, comparison with the previous empirical findings is not applicable.

Regarding the economic growth effect of the corruption perception index (CPI) based on the 7 per capita GDP growth model estimates reported in Table 3, all its 7 coefficients are positive and statistically significant, thereby furnishing convincing evidence of a positive effect of CPI on economic growth. This evidence is in line with what has been postulated and justified in Section 3 of the paper and in consonance with the empirical findings from several previous studies, including those reported by Kaufmann and Wei (1999) and Knack and Keefer (1995). Concerning the economic growth effect of executive constraints (EXC), all its 7 coefficients are positive and statistically significant, so the same conclusion reached in the case of CPI applies here also and this finding is in accord with the empirical findings from several previous studies, including those reported by Cox and Weingast (2018) and Mikhailovna (2018). Concerning the economic growth effect of culture (CUL) based on the model estimates reported in Table 3, its coefficients are found to be positive but statistically insignificant in all the models. There is, therefore, no evidence that CUL has a positive effect on economic growth. This unconvincing evidence of its effect on economic growth is contrary to what has been postulated in Section 3 of the paper.

Regarding the economic growth effect of religion as proxied by the relative size of the Muslim population (MUSPOP), all the 7 coefficients of MUSPOP are positive but not significant, so there is no reliable evidence that MUSPOP has any effect on economic growth. This lack of evidence on the economic growth effect of religious factors (as proxied by MUSPOP) does not contradict the position adopted in Section 3 of the paper, where the direction of the net effect of this factor is left open for empirical determination. The present study has no known (at least, to the present researcher) previous empirical study that has tested the effect of these variables on economic growth, it therefore makes the comparison with the previous empirical findings inapplicable. Bearing in mind that a typical African country is almost wholly populated by Muslims and Christians (with adherents of other faiths accounting for much less than 10% of the population), this evidence also invariably implies that the share of Christians in the total population would not affect economic growth. Finally, coming to the economic growth effects of being former colonies of French and British (COL1 and COL2), as compared with the rest of African countries, all 4 coefficients of COL1 (i.e., the dummy for a former French colony) are positive but statistically insignificant in those 4 models where COL1 features while the 3 coefficients of COL2 (i.e., the dummy for being a former British colony) in those 3 models where it features are positive and statistically significant in 2 of the 3 models. The evidence is therefore that COL1 has no effect on economic growth and COL2 has a positive effect on economic growth when compared with the rest of African countries that are not former colonies of France and Britain.

4.2.5 Performance Evaluation of the Economic Explanatory Variables

This sub-sub-section is on the discussion of the performance of each of the 8 economic explanatory variables, which are capital stock growth, financial depth, foreign direct investment, investment profile, real interest rate, socioeconomic conditions, literacy rate trade openness and real exchange rate. These are discussed sequentially in the paragraphs below.

Starting with the per capita capital stock growth ($\frac{\Delta k}{k}$), all its coefficients are positive and statistically significant in all the models, which means that $\frac{\Delta k}{k}$ has the expected positive effect on economic growth, which is in line with the prediction of the growth accounting Equation (7). Concerning the effect of financial depth (FDE) on economic growth, all of the 7 coefficients are positive, with 5 of them (viz: in Models 1, 2, 5 6 and 7) being statistically significant while the remaining 2 are not significant so that the evidence indicates a positive effect of FDE on economic growth, which aligns with the expectation stated and justified earlier in Section 3 of the paper as well as what had been previously reported by Leandro et al. (2017) and Maheswaranathan and Jeewanthi (2021), among others. Coming to the economic growth effect of foreign direct investment (FDI), the results reported in Table 3 show overwhelming evidence of the positive effect of FDI on economic growth because all its coefficients are positive and statistically significant, with the findings being in agreement with the postulation made and justified earlier in Section 3 as well as what was previously reported by Busse and Hefeker (2007), Barassi and Zhou (2012), Leandro et al. (2017) and Maheswaranathan and Jeewanthi (2021), among others. On the economic growth effect of investment profile (INPROF), all its coefficients are positive with these being statistically significant in 4 out of the 7 models, which means that INPROF has a positive effect on economic growth, in accord with the expectation stated earlier in Section 3. The current study does not have any previous empirical research on the impact of INPROF on economic growth to refer to. Therefore, comparing the results with any previous empirical findings is not applicable here.

Concerning the coefficients of real interest rate (INT), all 7 are positive but statistically insignificant in all 7 models, so there is no evidence that INT affects economic growth. This evidence does not contradict the position adopted and duly explained in Section 3 of the paper. But the finding is contrary to the positive effect that has been reported in several studies by McKinnon and Shaw (1973), Levine (1997), Reis (2013), Gorton (2016), and Ordonez (2016), among others. In the case of the economic growth effect of socioeconomic condition (SECON), all the coefficients are positive and statistically significant, so that there is very convincing evidence that SECON has a positive effect on economic growth, according to what has been postulated and justified in Section 3. On the economic growth effect of literacy rate (LITR), which has all its coefficients positive and statistically significant, the evidence is very strong that LITR has a positive effect on economic growth, with this conclusion conforming with what has been postulated in Section 3 as well as the findings previously reported by Sandberg (1982), Barro (1991), Mankiw, Romer and Weil (1992), Cohen and Soto (2007) and Barro and Lee (2013), among others. Regarding the economic growth effect of trade openness (TOP), all 7 coefficients are positive but not statistically significant, so the conclusion is that TOP does not have the expected positive effect on economic growth,

contrary to the position adopted and justified earlier in Section 3 as well as what has been reported by several existing studies, like Frankel and Romer (1999), Dollar and Kraay (2004), Chang et al. (2009), among others.

5. Conclusion and Recommendations

The study analyzes the impact of institutions and related factors on economic growth in Africa, focusing on the challenges faced by policymakers. It aims to improve understanding of growth factors and the role of institutions.

The study used the growth accounting equation from neoclassical growth theory to create seven per capita output growth models, incorporating economic variables, Worldwide Governance Indicators (WGI), and non-WGI institutional variables. Economic variables included capital stock growth, financial depth, foreign direct investment, investment profile, interest rate, literacy rate, trade openness, and socioeconomic conditions. WGI indicators included voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Non-WGI institutional indicators encompassed bureaucratic quality, corruption perception index, culture, democratic accountability, executive constraints, external conflict, governance quality, religious tension, and dummies for French and British colonized countries.

The study used the Random Effects variant for estimating equations and conducted diagnostic tests to address any econometric issues. It utilized annual balanced panel data from 1996 to 2021, covering 54 African countries, collected from various secondary sources.

Based on the methodology, WGI governance indicators and certain institutional factors have a positive effect on economic growth, while external conflict and religious tension have negative effects. Economic factors like capital stock growth, financial depth, foreign direct investment, literacy rate, socioeconomic condition, and investment profile also positively impact economic growth.

The study therefore recommends that policymakers emphasized those factors (e.g., capital stock growth, financial depth, foreign direct investment, investment profile, literacy rate, socioeconomic conditions, various indicators of governance and other institutional factors) that have been found to have positive effect on economic growth and guard against those factors that have been found to have negative effects on economic growth (e.g., external conflict and religious tension) to achieve sustainable economic growth.

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