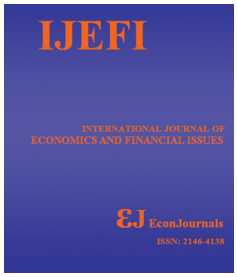

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Are Economic Growth, Institutional Quality and Natural Resources necessities for Human Development? Empirical Evidence from selected West African Economies

Yiseyon Sunday Hosu, Simion Matsvai*

Department of Business Management and Economics—Small-Scale Agribusiness and Rural Non-farm Enterprise Research Niche, Faculty of Economic and Financial Sciences, Walter Sisulu University, Mthatha 5117, South Africa. *Email: smatsvai@wsu.ac.za*

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ABSTRACT

The impact of institutions and natural resources on economic growth have been examined by several researchers with little attention being paid on the impact of such variables on human capital development. Premised on the Sustainable Development Goals that targets sustained and inclusive growth and development measured in both macro and per capita terms, the study seeks to examine the impact of economic growth, institutional quality and natural resources on human development in 14 West African countries for the period from 2010 to 2021. Panel data estimation techniques were used in this study. Due to many economic variables (human Capital development and human development index) being dynamic, Arellano-Bond's (GMM) dynamic panel-data analysis was justified and most appropriate. The dependent variable that is Human development was measured in two (human capital development and human development index) and hence two models under each were estimated. Results revealed that the lagged values of both human capital development index and human development index affect human capital development in west Africa positively. A negative and statistically significant relationship with human development (human capital index and human development index) was revealed on income from natural resources and real gross domestic product. Institutional variables like corruption control, political stability and government effectiveness were found to have positive and statistically significant relationships with human development indicators used in the study. By ensuring equitable distribution on wealth and natural resources rents, and enhancing institutional quality, human capital development in West African economies can be realised and sustainable development goals can be achieved. Governments should continue to control corruption, ensure political stability and government effectiveness.

Keywords: Human Development, Economic Growth, Institutional Quality, Natural Resources, Panel Data Estimation
JEL Classifications: G10; G18; G20; G21; G28

1. INTRODUCTION

Since 1980's, much of the attention of macro-economic theorists has largely focused on the determining factors of long-run economic development. In neo-classical theory, evidence is found that human capital is a progressive contributor of economic growth. However, empirically the relationship may not always hold across the countries (Aslam, 2020). Sub-Saharan Africa is estimated to be home to more than 1 billion people, more than 50% of whom will be under 25 years old by 2050 (World Bank, 2023) and is considered as a diverse continent offering human and natural resources that have more than full potential to achieve the sustainable development goals (SDGs) even before the 2030. According to World Bank (2023) Economic growth in Sub-Saharan Africa (SSA) slowed to 3.6% in 2022, from 4.1% in 2021; and economic activity in the region is projected to further slow down to 3.1% in successive years to come. Over the past two decades, the West African region has experienced much faster economic growth than other parts of the world (World Bank, 2023). However, despite this economic upturn, the region has continued to

experience high levels of inequality and poverty, despite economic growth being one of the critical drivers of poverty reduction (Kouadio and Gakpa, 2022).

Recent studies have looked at the key determinants of inclusive human development. For example, some studies have stressed the importance of information and communication technologies (ICT) and environmental degradation on human development (Asongu et al., 2019; Khan et al., 2019; and Asongu and Odhiambo, 2019), globalisation, natural resource rents and economic, political and institutional governance (Sinha and Sengupta, 2019; Nathaniel et al., 2021; and Pata et al., 2021) on inclusive human development. Also, studies are more biased towards the impact of human capital on economic growth (Raheem et al., 2018, Ogundari and Awokuse, 2018, Ngepah et al., 2021) while this study seeks to examine the impact of economic growth on human development (human capital and human development).

This study is concerned with the impact of economic growth, institutional factors and natural resource income on Human development. Human development is measured in two as the dependent variable that is human capital and human development. Human capital being much concerned with the productivity of a future worker (World Bank, 2020) while human development is concerned with enhancing people's capabilities, enlarging their range of choices, expanding their freedom and promoting human rights for all citizens (UNDP, 2024). This study also to differentiate between human capital and human development where human capital development is concerned with the human capital base of the economy in terms of quality and quantity while human capital development captures the income, health and education components to come up with human development index. Given that, this study seeks to examine how human capital development and human development are affected by economic growth, institutional factors (corruption control, gender equality, political stability and economic freedoms) and natural resources income. The study used resource rich countries from west Africa to see if natural resource endowments play a role in human capital development and human development.

With vast natural resources in West Africa (mainly Oil), many of the growth studies revealed that the impact of natural resources on a country's development outcomes depends on human capital (Zallé, 2019), with others like Sala-i-Martin and Subramanian (2013) others revealing the significance of institutional quality. Ouedraogo et al. (2022) argued that the institutional quality is of undeniable relevance to the failure of economic recovery and hence underdevelopment can no longer be explained solely by economic factors, but also by non-economic factors, such as institutional quality. Some of the institutional variables found to derail human capital are lower levels of the rule of law (Norman, 2009), economic mismanagement (Badeeb et al., 2017) and high levels of corruption (Zallé, 2019). The effect of natural resources on development outcomes has equally been examined through its effects on human capital (Khan et al., 2020b; Ahmed et al., 2020). Several studies confirmed the validity of the resource curse hypothesis across various regions and countries (Shao and Yang, 2014; Badeeb et al., 2017) while others probed into the nexus between natural resources, foreign direct investment (FDI) and financial development (Yıldırım et al., 2020; Guan et al., 2020; Asif et al., 2020).

From a classical economist perspective, Rahim et al. (2021), argued that a country having bountiful supply of natural resources is more likely to be developed. Developed countries tend to have a strong human capital base and human development tend to be evidenced. However, this preconceived conception has been criticized by the theories of "Resource Curse" and "Dutch Disease." According to these hypotheses, natural resources are said to be growth and human development inhibiting. With several studies confirming the resource curse hypothesis (Asif et al., 2020; Khan et al., 2020b) and concluded that countries with plenty natural resources grow at a slower speed than those having limited natural resources. However, other researchers like Zallé (2019) opined that the effects of natural resources on economic growth are twofold, the direct and the indirect effects. According to Chen et al. (2023), natural resource abundance benefits a country (growth and development), but the literature debates whether it is a blessing or a curse. With vast natural resources, corruption has been identified is a major concern for developing countries as it has development and welfare devastating effects. Countries with the lowest scores in the United Nations Human Development Indicators (HDI) tend to also have low scores in Transparency International's corruption perception index. However, views towards the impact of corruption on economic and human development differs, Méon and Weill (2010) reported that corruption has a negative impact on growth, while Gründler and Potrafke (2019) opined that "grease the wheels" hypothesis holds that corruption increases economic growth through circumventing inefficient regulations. As highlighted in Chen et al. (2023), natural resources do not necessarily hinder human progress but when moderated by poor governance, human development will be impacted negatively because the natural resources income (rents) will not be channelled into productive use.

With scanty literature on the subject under review, Kouadio and Gakpa (2021) examined the role of economic growth and institutional quality on inequality and poverty reduction in West Africa. This study therefore builds on Kouadio and Gakpa (2021) by estimating two models built from human development indicators, one with human capital index and the other one with human development index as dependent variables to determine which variables among economic growth, institutional factors (such as corruption control index, government effectiveness, political stability index and gender equality) and income from natural resources have impact on human development in selected west African countries.

To the best of our knowledge, this is the first attempt to empirically establish the effects of economic growth, institutional quality and natural resources rents on human development in natural resource regions like West Africa in a panel data framework. This study therefore undertakes a comparative analysis based on human development indicators (human capital development and human development index). The study objectives are to examine the impact of economic growth (real gross domestic product), natural resources (income from natural resources), institutional quality

(control of corruption, government effectiveness, gender equality and economic freedoms) on Human Capital Development. The study also sought to examine other determinants of human Capital development. The section thereafter presents the literature review, followed by the methodology, results presentation and discussion and lastly, conclusions and policy recommendations.

2. LITERATURE REVIEW

2.1. Theoretical Underpinnings

The role of human capital in explaining growth can be traced to the initial neoclassical growth theory developed in 1956 by the 1987 Economics Noble Prize Winner, Robert Solow. Although Solow Growth theory (Solow, 1956) does not lay emphasis on various components of human capital, it makes use of physical and human capital as important inputs to production. Nevertheless, the importance of human capital development in the growth process of every economy has been emphasized by the endogenous growth theory (Lucas, 1988; Romer, 1990; Pack, 1994). For the natural resources and human development, the resource curse hypothesis in the main theory as in (Sachs and Warner, 2001). In relation to this study, the theories are relevant in reverse as the study sought to evaluate the impact of economic growth, institutional factors and natural resources on human development in West Africa unlike human development on economic growth. Specific theories and hypothesis that directly connect to the impact of economic growth, institutions and natural resources have been tested in studies highlighted below.

2.2. Empirical Literature Review

Summarised five groups of hypotheses that included public policies that remove constraints to financing human capital and overcome market failure, highlights demographic, historical, religious, and cultural factors as determinants of human capital formation, examines the effects of different education systems on educational outcomes. Lastly asserted that human capital accumulation depends on the quality of institutions. Oludimu and Alola (2022) confirmed the hypothesis of Dutch-disease in Nigeria's oil boom. They reported the validity of the hypothesis. However, the study found that the resource curse hypothesis in Nigeria can be over-turned when the CRUDE oil output attains double thresholds over time.

Using supply and demands paradigm to explain resource-based view of human capital development in Pakistan and reported that revitalisation and advancement of human capital competitiveness through access to education; quality of education, synergies between government, industry, and higher education; industry linkages; and incentives. On the issue of import importance of institutional quality effect of human capital development, Aljarallah (2020) reported that the natural resource dependency dampens human capital in Kuwait, UAE and the Kingdom of Saudi Arabia, and that corruption shows a significant negative impact on human capital in Kuwait and the Kingdom of Saudi Arabia in the long-term.

Chen et al. (2023), examined the influence of natural resources on human development with the role of governance. The study divided the 44 major NR exporting (by oil, natural gas, and coal) groups for the period 1990–2021 using the dynamic panel data analysis (system GMM) and bootstrap causality procedure with interaction terms introduced. Results revealed that oil and gas rents follow the resource blessing hypothesis while coal rents neutral hypotheses. Good governance was found to promote human development. However, the bootstrap causality results revealed country-specific evidence of the resource blessing, resource curse and resource neutral assertions.

Nchofoung et al. (2021) empirically examined the effects of natural resource rents on inclusive human development in developing countries using IV Tobit regression. Results revealed a positive relationship between natural resources rent and inclusive human development in developing countries despite that the relationship varied by regional groupings, income levels, level of development and export structure. However, when interactive variables (governance and environmental quality) were introduced in the analysis, governance transformed natural resources and human development relationship into negative for all the selected developing countries and maintained positive synergy effects for Africa. Environmental quality (carbon emissions) also transformed the relationship into negative for Africa and a positive net effect for Asia and the Latin America and Caribbean and varies by Carbon emissions thresholds. However, for high and upper-middle income countries, a negative net effect of resource rents on inclusive human development was revealed. Also, Zallé (2019) examined the impact of natural resources on human capital in Africa by employing the ARDL modelling approach. Results indicated that natural resources enhance human capital development in Africa.

Kausar et al. (2021) examined the effect of human capital accumulation together with its determinants (expenditure on education and quality of education, labor force), free trade and investment all on economic development. Data for economic indicators of 181 countries was utilized in a panel econometric technique. Findings revealed that enhancing the education quality and level by increasing national budget expenditure to the education sector promote a capable work force (human capital) that will translate into economic growth.

3. RESEARCH METHODOLOGY

To fulfil the aims of this study which is to examine the effects of economic growth, institutional quality and natural resources on human development in West Africa[1], data on economic indicators, human development indicators and institutional quality factors from World Bank database on the representatives of the of West African block from the period of 1990 to 2022 was collected. The study further estimated system GMM (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998, Blundell and Bond, 2023 for more details). The dynamic panel data estimation technique was chosen because the GMM estimator is more efficient

1 7West Africa is an area comprising 16 countries: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo. Due to data availability or long series, the following countries were used as representative of the block: Ghana, Nigeria, Senegal, and T

than the simple instrumental variable techniques, it exploits the time-series variation in the data, accounts for unobserved country-specific effects, reduces finite sample biases and controls for endogeneity of all the explanatory variables Baum et al. (2003). Given that the system GMM is the best technique in dealing with potential endogeneity, heterogeneity and heteroscedasticity issues. Data for 14 West African economies (Benin, Ivory Coast, Nigeria, Senegal, Togo, Ghana, Cameroon, Burkina Faso, Gambia, Mali, Guinea, Mauritania, Niger and Siera Leone) was used for the period 2010 to 2021 making 12 observation per country per variable. Given that, other models such as the panel ARDL (PMG, MG and DFE) were not applicable because they need more observations per cross-section than the number of cross-sections. The countries were selected on condition of data availability and natural resource endowments since the study also valued the impact of income from natural resources as a potential determinant of human development (Hunam Capital Index and Human Development Index). The GMM model was estimated in STATA17 following the guidance from Kripfganz and Sarafidis (2021) and Kripfganz and Schneider (2020).

3.1. Model Specification

The study followed and adopted the simple panel data specification in Kausar et al. (2024) and Kouadio and Gakpa (2021) guided by Kripfganz and Sarafidis (2021) and Kripfganz and Schneider (2020) in specifying the model for the current study. Given that, the proposed fixed effects and random effects models from equation (1) to (4) are as follows:

3.1.1. Human capital index models

$$HCI_{it} = \alpha_0 + \alpha_1 rgdp_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it} \quad (1)$$

$$HCI_{it} = \alpha_0 + \alpha_1 rgdp_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it}\text{-}e_{it} \quad (2)$$

3.1.2. Human development index models

$$HDI_{it} = \alpha_0 + \alpha_1 rgdp_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it} \quad (3)$$

$$HDI_{it} = \alpha_0 + \alpha_1 rgdp_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it}\text{-}e_{it} \quad (4)$$

Where the dependent variables HCI and HDI represent, respectively, the indicators of human development (human capital index and human development index), ynr, represents income from natural resources, rgdp is the growth rate of real GDP per capita, cci is the corruption control index, demo represents economic freedoms, gei is for government effectiveness index and psi is political stability index while geq is the gender equality index. Lastly, u and ε are the error terms of the models with t, being the time dimension and i, is the individual country/cross-sectional dimension (Table 1).

Following the panel data models presented and estimated as in Kausar et al (2024), the models when then transformed into dynamic panel data models in congruence to the works of Roodman (2009, Roodman (2014), Dandi et al (2024) and Jie and Lan (2024), in conjunction with Kripfganz and Sarafidis (2021) and Kripfganz and Schneider (2020). The dynamic panel data models for the two models took the following forms where Equations (5) and (6) below were estimated using the system GMM where represents the coefficient of the lag of the dependent variables.

Table 1: Data sources, and variable description

Variable	Code	Proxy/Indicator	Data source
Dependent variables			
Human capital index	hci	Human Capital Index (between 0 and 1)	World Bank
Human development index	hdi	Human Development Index (between 0 and 1)	World Development Indicators
Independent variables			
Real gross domestic product	rgdp	the rate of change of real GDP	World Development Indicators
Income from natural resources	ynr	Income from natural resources, percent of GDP	World Development Indicators
Institutional variables			
Control of corruption	cci	Control of corruption (-2.5 weak; 2.5 strong)	World Development Indicators
Economic freedoms	demo	Economic freedom, overall index (between 0 and 100)	World Development Indicators
Government effectiveness	gei	Government effectiveness index (-2.5 weak; 2.5 strong)	World Development Indicators
Political stability	psi	Political stability index (-2.5 weak; 2.5 strong)	World Development Indicators
Gender equality	geq	Gender Equality Index (between 0 and 1)	UNDP- Human Development Reports

$$HCI_{it} = \alpha_0 + \Phi HCI_{it-1} + \alpha_1 ynr_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it}\text{-}e_{it} \quad (5)$$

$$HDI_{it} = \alpha_0 + \Phi HDI_{it-1} + \alpha_1 rgdp_{it} + \alpha_2 ynr_{it} + \alpha_3 cci_{it} + \alpha_4 demo_{it} + \alpha_5 gei_{it} + \alpha_6 psi_{it} + \alpha_7 geq_{it} + u_{it}\text{-}e_{i} \quad (6)$$

4. EMPIRICAL RESULTS PRESENTATION AND DISCUSSION

From the descriptive statistics presented in Table 2, the overall mean for Human Capital Development Index was found to be 0.362 (with the between and within means of 0.047, 0.041 and 0.025 for overall, between and within standard deviations respectively) and Humana development Index overall mean was 0.48 with 0.066, 0.059 and 0.021 for overall, between and within standard deviations respectively. For real GDP per capita, the overall mean was found to be 4.7157, with an overall standard deviation of 3.729, minimum and maximum of −20.27 and 21.3 respectively. For the income from natural resources, an overall

mean of 8.5243, standard deviation of 5.257, minimum of 2.3 and maximum of 33.27 were found. Industrial value added was found to have a mean of 22.417, standard deviation of 6.828, minimum of 4.43 and a maximum of 44.11. On the institutional variables, government effectiveness index, an overall means and standard deviation of −0.793 and 0.318 were found respectively with minimum and maximum of −1.39 and 0.06 respectively. The corruption control index has got a mean of −0.658, standard deviation of 0.355, minimum of −1.28 and maximum of 0.06 while Political stability index was characterised by a mean of -0.751, standard deviation of 0.694 (with 0.651 and 0.294 for between and within respectively), minimum of −2.35 and maximum of 0.36. Gender equality was characterised by an overall mean of 15.683, standard deviation of 9.475, minimum of 3.38 and a maximum of 43.33. For democracy, a mean of 55.3869, standard deviation of 3.5913, minimum of 47 and maximum of 64 were found for the selected West African states.

Table 2: Descriptive statistics

Variable	Mean	Std. Dev	Min	Max	Obs
Human Capital Index (hci)					
Overall	0.362	0.047	0.1829	0.483	N=168
Between		0.041	0.2721	0.409	n=14
Within		0.025	0.2732	0.448	T=12
Human Dvt Index (hdi)					
Overall	0.4791	0.066	0.319	0.632	N=168
Between		0.059	0.3605	0.587	n=14
Within		0.021	0.4077	0.532	T=12
Real GDP per Capita					
Overall	4.7157	3.729	-20.49	21.08	N=168
Between		1.092	2.801	6.134	n=14
Within		3.577	-20.27	21.299	T=12
Income from Natural Resources (ynr)					
Overall	8.5243	5.257	2.3	33.27	N=168
Between		3.577	3.395	13.197	n=14
Within		3.898	-2.23	28.596	T=12
Government Effectiveness Index (gei)					
Overall	-0.793	0.318	-1.39	0.06	N=168
Between		0.297	-1.182	-0.191	n=14
Within		0.138	-1.27	-0.323	T=12
Corruption Control Index (cci)					
Overall	-0.658	0.355	-1.28	0.06	N=168
Between		0.329	-1.157	-0.121	n=14
Within		0.150	-1.196	-0.187	T=12
Political Stability Index (psi)					
Overall	-0.751	0.694	-2.35	0.36	N=168
Between		0.651	-1.995	0.047	n=14
Within		0.294	-1.494	0.764	T=12
Gender Equality Index (geq)					
Overall	15.683	9.475	3.38	43.33	N=168
Between		8.867	5.855	39.24	n=14
Within		4.042	-0.885	31.05	T=12
Economic Freedoms (demo)					
Overall	55.3869	3.5913	47	64	N=168
Between		2.462	53.761	51	n=14
Within		1.872	49.123	36	T=12

Presented in Table 3 are the results for the stationarity tests from the Lin, Pesaran and Shin (IPS) test. Variables including real gross domestic product, income from natural resources, gender equality and democracy were found to be stationary in levels (integrated of order 0) while the dependent variables (human capital index and human development index), government effectiveness, corruption control and political stability were stationary after first differencing meaning the are integrated of order 1.

For the Human Capital index model, the researchers tested for multicollinearity using the correlation matrix and found that there was no problem of multicollinearity among the variables used. This is evidenced from Table 4 where no value was found to be >0.8 which is the indicator or benchmark that shows the variables are correlated with each other. Given that no variable was dropped for that model. Likewise, as presented in Table 5 for the human development index model, no value was found to be greater than 0.8 again and hence no variable was dropped as

Table 3: Stationarity tests

Variable	IPS-Stat	P-value	Conclusion	Integration
Human Capital Development (hci)	3.244	0.994	Non-stationary	
Human Capital Development (d.hci)	5.1630	0.000	stationary	I[1]
Human Development (hdi)	2.2864	0.989	Non-stationary	
Human Development (d.hdi)	4.1109	0.000	stationary	I[1]
Real GDP (rgdp)	2.2279	0.003	stationary	I[0]
Natural Resources Income (ynr)	2.7592	0.003	stationary	I[0]
Government Effectiveness (gei)	1.1751	0.8801	Non-stationary	
Government Effectiveness (d.gei)	2.4927	0.0063	stationary	I[1]
Corruption Control (cci)	1.0667	0.1430	Non-stationary	
Corruption Control (d.cci)	3.9178	0.000	stationary	I[1]
Gender Equality (geq)	6.8303	0.000	stationary	I[0]
Political Stability (psi)	0.3816	0.352	Non-stationary	
Political Stability (d.psi)	4.4746	0.000	stationary	I[1]
Democracy (demo)	0.9552	0.1697	Non-stationary	
Democracy (demo)	2.6348	0.0042	stationary	I[0]

Table 4: Multicollinearity (Human capital index model)

Variable	iphci	rgdpc	ynr	cci	psi	gei	geq	demo
iphci	1							
rgdpc	0.066	1						
ynr	0.306	0.103	1					
cci	0.322	0.106	0.182	1				
psi	0.493	0.093	0.184	0.477	1			
gei	0.623	0.123	0.659	0.279	0.443	1		
geq	0.784	0.213	0.157	0.082	0.399	0.683	1	
lgdemo	0.165	0.080	0.251	0.488	0.07	0.721	0.179	1

Table 5: Multicollinearity (Human development index model)

Variable	hdi	rgdpc	ynr	cci	psi	geq	demo
hdi	1						
rgdpc	0.051	1					
ynr	0.151	0.103	1				
cci	0.085	0.106	0.182	1			
psi	0.199	0.093	0.183	0.477	1		
gei	0.714	0.123	0.659	0.279	0.443		
geq	0.471	0.213	0.157	0.082	0.399	1	
demo	0.229	0.080	0.251	0.488	0.07	0.519	1

Table 6: Variance inflation factor (VIF)

Variable	VIF	1/VIF
Government Effectiveness Index (gei)	4.11	0.243065
Corruption Control Index (cci)	3.06	0.326446
Income from Natural Resources (ynr)	1.84	0.543641
Political Stability Index (psi)	1.53	0.654510
Real Gross Domestic Product (rgdp)	1.05	0.949256
Government effectiveness (gei)	3.71	0.772451
Gender Equality (geq)	2.19	0.374138
Democracy (demo)	2.54	0.496139
Mean VIF	2.28	

a corrective measure of multicollinearity and the variables were all included in the model.

The models were found not to suffer from multicollinearity given that no Variance Inflation values were >10 as shown in Table 6. The results therefore confirmed to the findings from the correlation matrix presented in Tables 4 and 5. Given, no variable was dropped or added to the model and proceeded to run the main regression models that is the Fixed Effects, Random Effects (Static Panel Data Models) and Generalized Method of Moments (Dynamic Panel Data Models).

After running the Fixed and Random effects presented in Table 7, the researchers contacted the Hausman test to see the most appropriate model between the two for the Human Capital Index models and the Human Development Index models. As a result, exceptionally low P-values of the Hausman tests for the two models (Human Capital Index and Human Development Index with 0.02 and 0.001 P-values respectively) indicating significance at 5% and 1% levels of significance respectively resulted in the rejection of the null hypothesis in both cases. The result of the Hausman tests thereby suggested that the fixed effects estimation technique is most appropriate to the random effects estimation technique. However, given that the number of cross-sections (14) is greater than the observations per cross-section (12) according to Adeleye et al. (2017) and Blundel and Bond (2023), the estimation of dynamic panel data models was justified and further confirmed by the statistical significance of the lagged dependent variables in influencing the dependent variables in the two dynamic panel data models estimated. The presence of this autoregressive component (lagged values of the dependent variables) on the right-hand side of the equality may however lead to endogeneity problems, since the lagged variables will be correlated with the individual effects present in the error terms. To overcome this endogeneity problem, the researchers resorted to the generalized methods of moments (GMM). The results for the GMM models are presented in Table 8.

The p-values of the lagged dependent variables were significant at 1% levels of significance for both models justifying the use of the GMM model estimations (the lagged values of the dependent variable significantly influence the dependent variables hence there is dynamism in the models). The Hansen statistics of 0.183 and 0.147 for the Human Capital Index and the Human Development Index models shows that the instruments used in the two models are valid hence we did not reject the instruments validity hypothesis at 5% levels of significance. Also, the probability Chi-square values of the models indicates that the short run GMM estimates are jointly significant. The first and second lags of Human Capital and Human Development were all positive and statistically significant at least at 5% level of significant. This means the current level of human capital and human development are positively determined by their previous year(s) levels. This therefore justified the relevance of the dynamic panel data model estimation techniques used in the study.

From the two models, a negative relationship was revealed between human capital and income from natural resources and human development and natural resources. As income from natural resources increases, human capital and human development tend to decrease. This indicates that the natural resources are not translating into the development of the human capital base of the West African states. Despite, the West African region of Africa being richly endowed with natural resources with the world's significant deposits of petroleum, oil, natural gas, gold, diamonds bauxite and uranium among others, there is a negative relationship between the natural resources and human capital and human development. This can also be because the ownership of the natural resources is skewed towards a few individuals. Also, the natural resources are exported raw hence instead of value addition that should have created employment and result in improvements in human capital development indicators, employment is being exported thereby result in natural resources resulting in a negative

Table 7: Fixed effects and random effects results for HCI and HDI models

Variable	Fixed Effects Models		Random Effects Models	
	FE (HCI Model	FE (HDI Model	RE (HCI Model	RE (HDI Model
rgdp	−0.001*(0.0005)	−0.008 (0.004)	−0.003*(0.001)	−0.001 (0.0001)
ynr	−0.003***(0.002)	−0.002***(0.04)	−0.04***(0.001)	−0.002***(0.001)
cci	0.06***(0.011)	0.071***(0.009)	0.061***(0.011)	0.069***(0.009)
psi	−0.14**(0.006)	−0.014***(0.005)	−0.007 (0.006)	−0.021***(0.005)
gei	0.0102 (0.017)	0.0533***(0.0134)	0.048 (0.0372)	0.0101 (0.0123)
geq	0.0011**(0.005)	−0.0135**(0.0058)	−0.0041 (0.0037)	0.2927**(0.1538)
demo	0.0289 (0.0514)	0.5289 (0.2124)	0.0021 (0.0054)	0.132**(0.128)
constant	0.392***(0.05)	0.511***(0.011)	0.782***(0.06)	0.509***(0.02)

Values in parenthesis are Standard errors. *, **, *** indicate significant at 10, 5 and 1% level, respectively

Table 8: Generalised method of moments (GMM) results for HCI and HDI models

Variable	GMM (HCI)	Standard error	GMM (HDI)	Standard error
	Coefficient		Coefficient	
L1	2.975***	0.819	0.776***	0.153
L2	1.913*	0.802	0.139**	0.130
ynr	−0.23*	0.007	−0.140**	0.004
rgdp	−0.024***	0.002	−0.080**	0.001
cci	0.1143**	0.003	0.071***	0.010
psi	0.0783*	0.005	0.003**	0.003
gei	0.010	0.075	0.0223***	0.0174
geq	0.007	0.004	0.004	0.002
demo	−0.091	0.0763	0.696**	0.574
constant	−0.03383**	0.01889	−0.0358***	0.038
Diagnostic statistics				
Year Dummies	Yes		Yes	
Number of Observation	140		140	
Wald Chi-square	2592.28		1073.40	
Prob Chi-square	0.000		0.000	
Groups/Instruments	71/14		43/14	
AR (2)	0.734		0.986	
Hansen statistics	0.183		0.147	

Values in parenthesis are Standard errors. *, **, *** indicate significant at 10, 5 and 1% level, respectively

Table 9: Summary of results

Variables	HCI model	HDI model
	Impact	Impact
Lag1	Positive***	Positive***
Lag2	(Negative)**	Positive***
Real GDP (rgdp)	No impact	(negative)***
Income from Natural Resources (ynr)	(Negative)*	No impact
Control of Corruption (cci)	Positive**	Positive***
Political Stability (psi)	Positive*	Positive**
Government Effectiveness (gei)	No impact	Positive***
Gender Equality (geq)	No impact	No impact
Economic Freedom (demo)	Positive	No impact

relationship. This finding confirms the Resource Curse Hypothesis. Likewise, real gross domestic product was also found to have a negative relationship with the two indicators that is human capital and human development. As the real GDP grows the human capital index and human development index decreases. This can be attributed to the fact that there are large income inequalities within the economies of West Africa which can also be the reason of the widening gap between the rich and the poor in such natural resource endowed economies. As a result, the income component in human development is overshadowed by the education and health components that result in the steady growth in the human development index.

Corruption control was found to positively influence both the human capital and human development indexes. As corruption control increases, human capital and human development indicators tend to improve also. Likewise, political stability was found to positively influence both human capital and human development in West Africa. Politically stable economies enhance human capital development (no disruptions in education and health care systems). Government effectiveness and economic freedom were only found to positively influence human development index. As the government effectiveness improves and economic freedoms/democracy improves, the Human development index tend to improve also. Table 9 for the summary of the results obtained from this study.

5. CONCLUSION AND POLICY RECOMMENDATIONS

The study aimed at examining the impact of economic growth, institutional quality and natural resources on human development (measured by human capital index and human development index) in selected West African states. A positive relationship between the previous levels (first lag) of both human capital index and human development index was found to affect human development in West Africa. The second lag of human capital index was found to negatively affect the current levels of human capital while the second lag of human development was found to positively affect the current levels of human development index. Real GDP was found to have no impact on Human capital index while negatively affecting human development index. Income from natural resources was found to negatively affect human capital index while no impact on human development index. Corruption control and political stability positively affect human development (human capital and human development). Government effectiveness revealed a positive relationship with human development index while economic freedom only affects human capital development.

Policy recommendations included the that the West African governments should ensure that there is equitable distribution of income given that they are rich in natural resources hence the extraction of natural resources should positively translate into human capital development and human development. Also, the natural resources constitute a significant proportion on the West

African countries' domestic productivity hence its clear that the natural resources ownership is biased towards a few elites since the GDP does not affect human capital development and not even related to human development index. The quality of institutions also matters in West Africa, control of corruption, political stability and government effectiveness should be ensured for human development (human capital development and human development in general). A suitable policy mix for the better utilization of resource rents with good governance and quality institutions that will positively translate to both human capital development and human development is recommended.

More control variables that may affect Human Capital development can be added to the model such as inflation in future studies. Further studies can also utilise the modest Human Development Indicators that is the Augmented Human Development Index (AHDI) and or the Inequality Adjusted Human Development index (IHDI) though conditioned by data availability as it affected the current study. Sun et al. (2018) point out that the adverse impacts of resource abundance are sensitive to the methods employed for the empirical estimation hence in future studies different methodologies can be applied to check the impact of natural resources to economic variables.

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