Human Capital Development and Economic Growth: Evidence from ECOWAS Countries

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Abstract: This research examines the nexus between HCD and GDP growth of ECOWAS nations. Using panel ARDL the study adapted the Solow Growth Model by including factors such as LE, MYS, EYS, and LF as determinants of economic growth from 1990 to 2021. Panel unit root tests were conducted to ensure that no variable was integrated of order 2. The Hausman test conducted revealed that the pooled Mean Group model was the most efficient and consistent estimator for this study. The estimated PMG model demonstrated a positive long-term relationship between HDC and GDP growth in the ECOWAS countries. However, the labor force variable in the ECOWAS countries had an insignificant impact in the long run. Conclusively, policymakers should formulate and implement appropriate social sector policies and programs to improve healthcare facilities for citizens, reduce adult illiteracy rates, and address undernourishment, thus harnessing the growth potential of human capital development in ECOWAS countries.

Keywords: Human Capital, Economic Growth, ECOWAS, Panel ARDL

JEL Classifications: J24, O4, C23

I. Introduction

Human capital is acknowledged as a catalyst for the progress of a nation in every country across the globe. Enhancing the caliber of individuals through the provision of education and healthcare services is a key approach to enhance the quality of human capital. Apart from being issues of social concern, both provide an economy with healthy trained human resources required for economic growth and development (Isola and Alani, 2012).

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Prior to the Second World War (1939-1945), academic discourse on the relationship between education and economy was insignificant. However, later studies by Schultz (1961), Denison (1962) and a host other economists confirmed that the economy depended on education to foster economic growth.Likewise, well-being is essential to financial progress and advancement and is one of the primary factors affecting economic achievement on both individual and societal scales. This derives from the fact that health is both a direct component of human well-being and a form of human capital that increases an individual's capabilities (Bloom and Canning, 2003). Grossman (1972) has equally demonstrated that health is a form of human

capital. Schultz (1992) argued that population quality is the decisive factor of production and emphasized the merits of investing in education and health (Bloom and Canning, 2000 and 2003).

The importance of human resources in economic progress cannot be overstated. The enhancement of human resources has been acknowledged by economists to be a crucial requirement for a nation's socio-economic and political evolution. Among the generally agreed causal factors responsible for the impressive performance of the economies of most of the developed and the newly industrializing countries is an impressive commitment to human capital formation (Adedeji and Bamidele, 2003; World Bank, 1995; Barro, 1991). This has been mostly accomplished through enhanced expertise, talents, and capacities obtained through schooling and instruction by all the individuals of these nations. Human capital plays a key role in versions of both neoclassical and endogenous growth models (Mankiw, Romer and Weil, 1992; Rebelo, 1991; Sianesi and van Reenen, 2003).

Truly, the condition of backwardness of numerous developing nations is not solely attributable to insufficient funds but rather because they lack sufficient knowledge and expertise to improve efficiency and boost domestic production. Numerous developing countries possess diverse types of raw materials which could be harnessed to transform the destiny of these nations. The continent accounts for over three-quarters of the world's diamond and manganese reserves and harbors over two-fifths of the world's gold reserves (Amaknwah and Anim-Sackey, 2003). The African continent is blessed with a significant amount of oil reserves in Nigeria, Angola, Equatorial Guinea, and more recently Ghana among a handful of other countries. Unfortunately, economic transformation continues to elude the continent due largely to human capital constraints in the form of knowledge, skills and technical knowhow to exploit the natural resources to promote growth and economic transformation (Baah-Boateng, 2013).

It is in light of this context that this investigation is carried out, and the central focus of our research is basically to examine the connection between HCD and the economic expansion in chosen African nations particularly ECOWAS. Additionally, the aim is to determine whether the growth of these developing countries is genuinely influenced by the development of human resources.

This research addresses this gap by incorporating human capital Development proxied by HDI indices. It should also be noted that this research was built on the Solow growth model. The Solow model explains growth of output in a neoclassical context which is based on Cobb-Douglas production function. In this dissertation, the researcher introduced HDI indices such as life expectancy, mean years of schooling, expected years of schooling, and labour force as independent variables into the Solow model as factors that could influence growth of these selected developing countries. And lastly, to my knowledge the scope of the research has not been covered by any research in previous time.

Nonetheless, economists can never completely explore the discussions that form the basis of the connection and correlation between human capital and economic growth. Our objective is not to conclude this debate but to contribute to the topic at hand.

II. Literature Review

Taniguchi (2003) in his work showed that both education and health cause each other and thus contribute to economic growth.

Seebens and Wosbst (2003), Moser and Eliot (2005) both have asserted that in the long run education increases substantially household income as well as economic growth while Bils and Klenew (2000), Williams and Levine (2001), Temple (2001), Bosworth and Collins (2003) have failed to establish positive association between human capital (years of schooling) and economic growth.

Soto (2002) and Tremblay (2005) find that education receives 4.9 % of GDP in OECD, 4.2% in WEI countries and 5.5% of national wealth in both. There is a narrower entry to higher secondary and tertiary education in WEI in comparison to OECD nations. The accumulation of human resources enhances economic growth via numerous avenues and external factors.

Engelbrecht (2003) observes countries in OECD and claims that human capital has a positive effect on economic growth. Especially schooling rate causes to diffuse information.

Adamu (2003) undertook an empirical investigation to determine the impact of human capital formation on economic growth in Nigeria between 1970 and 2000, using cointegration and error-correlation mechanisms. The outcome suggested that putting resources into human capital through education and training can result in economic expansion due to its influence on workforce efficiency.

Kar and Ağır (2003) explain the importance of human capital that includes 4 education and health as variables in Turkey between 1926- 1994. According to them, human resources in Turkey have a beneficial impact in Turkey.

Muysken*et. al.,*(2003) show positive association between per capita income and health status of an economy.

Nevertheless, the studies of Bratti, Bucci and Moretti (2004) Mustafa, Abbas and Saeed (2005) found a positive relationship between investment in education and economic growth. Investment in human capital through education has substantially increased productivity and economic development (World Bank, 1990; Okojie, 1995; Odusola, 1998) as the East Asian miracle attests to this fact. In East Asian economy, the swift expansion was enabled by the presence of highly proficient local engineers and laborers who could effectively utilize external expertise and imported funds. Skating over the human resource factor may not only imperil the growth and development process of the nation, it may ground it (Nkogbu, 2014).

Bloom, Canning and Sevilla (2004) tried to investigate the impact of human capital on economic growth by utilizing 2 stage least square approach, it was discovered that schooling and life expectancy both positively contribute to economic growth.

In a different dimension, Bratti*et al.,* (2004) estimated a model of economic growth and human capital accumulation based on a sample of countries at a different stage of development. The findings showed that the growth in the elementary and high school levels of education leads to a rise in productivity. They suggest that demographic factors influence the rates at which human capital is accumulated. For instance, they discovered that if life expectancy at birth should increase it will lead to an increase in higher education, while a decrease in the rate of dependency among young people has a negative impact on secondary education. Lastly, they noted that geographical factors play a significant role in the process of accumulating human capital. However, studies varied in their findings regarding the effect of human capital on the growth of productivity.

Park (2004) empirically investigates the growth implication in terms of educational attainment levels. Using a survey of 5-year periods between 1960 and 1965, which included data from 94 countries at varying stages of development, the research found that both the spread and the average level of human capital have a positive impact on productivity growth. The researchers determined that educational policies that increase the range of human capital will stimulate economic growth.

Khan (2005) tries to analyze the relationship between human capital and economic growth in 72 developing countries for the period 1980-2002. The research concludes that those who heavily invested in human resources have attained greater profits in relation to economic growth.

Khembo and Tchereni (2013) analyzed the importance of human capital formation on economic development in South African development community (SADC). The research utilized longitudinal data for the scope of 1990 to 2005 gathered from ASDC nations i.e. 13 countries. The findings indicate that there is a positive association between education and economic advancement. The research suggests that every economy should prioritize the provision of healthcare and educational resources in order to attain economic growth.

Alataş and Çakir (2016) explored the nexus of education expenditure and spending on healthiness with economic development in a panel of 65 nations. This study encompassed the time period from 1967 to 2011. The information of chosen factors were collected from WDI. FEM and REM were utilized for estimation purposes. Hausman test was also conducted to determine the most appropriate model for estimations. The researchers concluded that allocating resources to healthcare and education yields a favorable and statistically noteworthy effect on economic advancement.

Popoola, Alege, Gershon and Asaleye (2019) examined the relationship between human capital and productivity in Nigeria using Vector Error Correction Model to examine the joint short- and long-run causality, as well as long-run behavior of human capital channels on productivity within the period from 1980

to 2017. They found no combined short-run and long-run causality, and also found joint short-run causality in the basic channel whereas in the advanced channel they found both joint short- and long-run causality.

Chani, Sheikh, Mansha, Abbas and Iqbal (2021) studied the link between long-term investment in human capital and economic growth by focusing on a sample of 12 countries from the SAARC and ASEAN areas, including both Muslim and non-Muslim nations. According to panel FMOLS statistics, there is a positive relationship between inflation, gross fixed capital formation, labor force participation, and expenditures on health care, education, and labor.

III. Methodology and Data

Methodology specifically explains theoretical viewpoint for understanding which set of strategies, or best practices are applicable to produce answers to the research question(s). This chapter presents and discusses the methods and methodologies that will be adopted by the researcher in achieving the cardinal objective of the study. Consequently, the section discusses the methods of data collection used for the study as well as the method of data analysis, model specification and ends with description of the variables to be used. The Panel Auto-Regressive Distributed Lag (ARDL) Model was also used for multivariate time series analysis to determine how human capital and economic growth interact over the long and short terms using ECOWAS member nations. The time series data ranged from 1990 to 2021. The World Bank Development Indicators was used as the data source.

The stationarity test (unit root test) was carried out using three panel unit root tests on each variable to test for stationarity so as to avoid spurious regression as suggested by Phillips and Moon (1999).

Panel data was used in this research. Data on annual GDP growth rate and labour force were obtained from the World Bank Development Indicators, 2023 while yearly HCD (represented by HDI) was collected from United Nation Development Program Reports, 2023 edition. The data sample size covers 31 years (1990 – 2021).

A. Econometric model

The Solow growth model was modified as:

$$GDPG = \alpha_0 + \alpha_1 lnLF_t + \alpha_2 lnMYS_t + \alpha_3 lnEYS_t + \alpha_4 lnLBF_t + U_t \quad (1)$$

Where:

GDPG = GDP Growth Rate

LF = Life Expectancy

MYS = Mean Years of Schooling

EYS = Expected Years of Schooling

LBF = Labour force

U = error term

t = time otherwise the scope of the study

In order to specify the panel ARDL model, this research work adapts the ARDL model specification following (Loayza and Ranciere, 2006) thus:

$$Y_{it} = \sum_{j=1}^{p-1} \gamma_y^i \, (y_i)_{t-j} \sum_{j=0}^{q-1} \delta_y^i \, (X_i)_{t-j} + \emptyset^i [yi)_{t-1} + \mu_{i\,+} \varepsilon_{it} \qquad (2)$$

Where $X_{i,t=}j$ the (k x 1) is vector of explanatory variables for group i and μ_i represents the fixed effect. From equation (2) we can specify the re-parametrized ARDL model as VECM thus;

$$\Delta Y_{it} = \theta_i \left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \delta_y^i \, \Delta \, (X_I) \quad _{t-j} + \mu_i + \varepsilon_{it} \quad (3)$$

Where the β_i are the long-run parameters and θ_i ; are the equilibrium (or error)-correction parameters. The pooled mean group restriction is that the elements are common across countries:

$$\Delta y_{it} = \theta_i \left(Y_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta (Y_i) t - j + \sum_{j=0}^{q-1} \delta_y^i \, \Delta \, (X_I) \quad _{t-j} + \mu_i + \varepsilon_{it} \quad (4)$$

Where;

y represents GDP growth rate which is the dependent variable.

X represents the independent variables such as MES, EYS, LE at birth and labor force.

γ and δ denote the short-term coefficients of the dependent and independent variables respectively.

βindicates the long-run coefficients, or the rate at which the long-term equilibrium is being adjusted.

Subscripts i and t represents the country and time, respectively.

While ECT =$\left(Y_{i,t-1} - \beta_i X_{i,t-1}\right)$, represents the error correction term

Therefore, going by the above the re-parametrized ARDL model as Vector Error Correction Model is re-specified thus;

$$\Delta gdpg_{it} = \theta_i \left(gdpg_{i,t-1} - \beta_i X_{i,t-1}\right) + \sum_{j=1}^{p-1} \gamma_y^i \, \Delta (gdpg_i) t - j + \sum_{j=0}^{q-1} \delta_y^i \, \Delta \, (X_I) \quad _{t-j} + \mu_i + \varepsilon_{it} \qquad (5)$$

All variables remain as earlier explained. Note that, equation (above) can be estimated by either PMG or MG or even DFE estimators where all the three models consider the long-run equilibrium and the heterogeneity of dynamic adjustment process (Demetriades and Law, 2006).

Moreover, the alleged connection between and or among the reliant or autonomous factors of the framework as ascertained by the assumptions of the Solow growth model. In this case, the investigator determines if the factors adhere to predictions or if there is a divergence. The table below summarizes the a priori expectation of the parameters in the research.

Table 1.Apriori Expected Signs of the Independent Variables in the Model

Variables	Description	Expected Signs	Source
LE	Life Expectancy at birth	Positive (+)	UNDP
MYS	Mean Years of Schooling	Positive (+)	UNDP
EYS	Expected Years of Schooling	Positive (+)	UNDP
LF	Labor Force	Positive (+)	WDI
GDPG	Gross Domestic Product Growth Rate	Dependent Variable	WDI

Source: **Author's** Compilation, 2023

From table 1 above Human Capital Development (HDC) is proxied by Human Development Index (HDI) in terms of Mean years of schooling, expected years of schooling, and life expectancy at birth.

IV. Results and Discussions

Table 2. Descriptive Statistics

	GDPG	LE	MYS	EYS	LF
Mean	4.037193	4.015788	1.061660	1.994996	4.098747
Median	4.265796	4.035298	1.081144	2.080241	4.175694
Maximum	19.18264	4.338503	8.028582	2.601250	4.443710
Minimum	-30.14513	1.739829	-0.580855	0.722497	2.001038
Std. Dev.	4.432851	0.159238	0.664218	0.407876	0.366059
Skewness	-1.765089	-6.071620	2.179984	-1.105665	-3.604489
Kurtosis	16.60582	88.40026	26.70823	3.154694	17.08287
Jarque-Bera	3951.608	148813.3	11621.79	112.4097	5005.933
Probability	0.900000	0.800000	0.100000	0.200000	0.000000
Sum	1937.853	1927.578	509.5970	957.5980	1967.399
Sum Sq. Dev.	9412.430	12.14583	211.3281	79.68767	64.18565
Observations	**480**	**480**	**480**	**480**	**480**

Source: Author's Estimations, 2023

The table above shows the mean, median and standard deviation for each variable used in the research. With respect to Skewness normal Skewness value is zero. We can see that GDPG mirrors negative skewness -1.765089 and has a long-left tail. Life Expectancy mirrors negative skewness -6.071620 has a long-left tail. Mean Years of Schooling has a long-right tail (positive skewness) 2.179984. Expected Years of Schooling has a long-left tail (negative skewness) -1.105665. Labour Force has a long-left tail (negative skewness) -3.604489.

Kurtosis value of 3 means the distribution is normal (Mesokurtic), more than 3 means it is leptokurtic, and less than 3 means it is Platykurtic. For GDPG the Kurtosis is leptokurtic because 16.60582 > 3. For Life Expectancy the Kurtosis is leptokurtic because 88.40026 > 3. For Mean Years of Schooling the Kurtosis is

leptokurtic because 26.70823 > 3. For Expected Years of Schooling the Kurtosis is Mesokurtic (because Kurtosis = 3.15) while for labour force the Kurtosis is leptokurtic because 17.08287 > 3.

Looking at the Jarque-bera test the null hypothesis states that "The Distribution is Normal"
Now if the Probability value is above 0.05 level of significance we cannot reject the null hypothesis. Hence, we say that the variable is a normally distributed curve i.e. it has a normal distribution.

And if the *P-value* is less than 0.05 level of significance we reject the null hypothesis of a normal distribution. Hence, we say that the variable is not normally distributed.

Gross Domestic Product Growth: The Jarque-Bera value is 3951.608 while the *p-value* is 0.900000. The *P-value* is above 0.05 we cannot reject the null hypothesis; hence, we say that GDPG is normally distributed and GPDG has a normally distributed curve.

Mean Years of Schooling: The Jarque-Bera value is 11621.79 while the *p-value* is 0.100000. The *P-value* is above 0.05 we cannot reject the null hypothesis; hence, we say that MYS is normally distributed and MYS has a normally distributed curve.

Expected Years of Schooling: The Jarque-Bera value is 112.4097while the *p-value* is 0.200000. The *P-value* is above 0.05 we cannot reject the null hypothesis; hence, we say that EYS is normally distributed and EYS has a normally distributed curve

Labour force: The Jarque-Bera value is 5005.933 while the *p-value* is 0.000000. The *P-value* is less than 0.05 we reject the null hypothesis of a normal distribution; hence, we say that LF is not normally distributed and LF does not have a normally distributed curve.

Therefore, before you carry out your analysis it is essential for you to have a good idea of the summary statistics otherwise called descriptive statistics of the data you will be working with, you can easily see whether there is an outlier in the data.

Correlation Analysis

Table 3. Pairwise Correlation Matrix

	gdpg	***ln*le**	***ln*mys**	***ln*eys**	***ln*lf**
gdpg	1.0000				
***ln*le**	0.1016*	1.0000			
	0.026				
***ln*mys**	0.002	-0.1064*	1.0000		
	0.065	0.0197			

***ln*eys**	0.1020*	0.4135*	0.6116*	1.0000	
	0.0254	0.0000	0.0000		
***ln*lf**	0.0518	0.0682	0.2597*	0.3985*	1.0000
	0.2577	0.1355	0.0000	0.0000	
Note: pwcorrgdpg*ln*le*ln*mysl*n*eys*ln*lf, sig star(5)					
Source: Author's Estimations, 2023					

We used the correlation matrix table above to test for correlation between the variables used in the research to show that the regressors do not have perfect or exact linear representations of one another. Based on the above result we can say that the independent variables are not linearly dependent on one another. Therefore, the model can pass the multicollinearity test.

The model shown in this research was estimated using Panel ARDL method using Stata. To achieve the objectives of the research, firstly, we used the following panel unit root tests in order to ascertain the order of integration between all the variables used in the research as presented in the table below. Note that the order of integration of the variables is not necessary for applying ARDL model as long as the variable of interest are I(0) and (1), (Pesaran and Smith 1995; Pesaran2001; Pesaran*et al.*, 1999), we introduce these tests just to make sure that no variable is integrated of order I(2).

Panel Unit Root Test

Table 4. Panel Stationarity Test Results

	Level			**First Difference**		
	Im, Pesaran and Shin	**Breitung**	**Levine, Lin-Chu**	**Im, Pesaran and Shin**	**Breitung**	**Levine, Lin-Chu**
GDPG	-10.3265***	-7.2622***	-5.7033***	-15.6991***	-9.6340***	-13.9775***
LE	2.9370	0.8157	3.9128	-10.4097***	-0.4953***	10.9037***
MYS	8.3119	13.1087	1.10403	-11.0541***	-0.5378***	1.2004***
EYS	2.8011	1.4356	-1.9280***	-17.4358***	-0.6017***	26.9342***
LF	-5.3906**	1.6207	4.0242	-14.9666***	-3.4249***	-57.1246***
Note: *, **, * inticates significance at 10%, 5% and 1% respectively**						
Source: Author's Estimations, 2023						

Table 4 reports the results of panel unit root tests which indicate that all the variables in used in the research are stationary at first difference with constant and trend except GDPG which was stationary at level. Due to the existence of mixed levels of integration amongst the variables we proceed to apply the Panel ARDL approach rather than traditional static or panel cointegration test (Asteriou and Monastiriotis, 2004). The ARDL panel approach is distinguished by numerous benefits, which it highlights and permits the estimation of various variables with varying degrees of stationarity, just like in our situation as presented above i.e. the variables can be or can consist of mixture of I(0) and I(1) variables. The can be all I(0) variables or can be all I(1) variables but cannot be I(2) stationary at second difference. On top of that the parameters of interest in ARDL gives the long-run coefficients, short-run coefficients and also shows the speed of adjustment.

Panel Cointegration Test

Table 5. Pedroni'sCointegration Tests

No. of Panel Units: 15		
No. of obs.: 480		
Date has been time-demeaned.		
Test Stats.	Panel	Group
v	2.494	.
rho	-8.339	-7.735
t	-12.92	-15.12
adf	-12.19	-13.31
All test statistics are distributed N (0,1), under a null hypothesis of no cointegration and diverge to negative infinity (save for panel v)		
Source: Author's Estimations, 2023		

Here we perform the Pedroni (1999) cointegration tests. On the assumption of long-run homogeneity, as stated in chapter 3 this step can be skipped because Cointegration is determined by the statistical importance of the long-term coefficients and the error correction term. Therefore, based on table 4.5, the null hypothesis of no cointegration is dismissed at a 1% level of significance for both panel and group statistics, as the coefficients in the table above are all greater than 2 in absolute terms.

Panel ARDL Estimates of 15 ECOWAS Countries

Table 6. Panel ARDL Estimates of 15 ECOWAS Countries

	Pooled Mean Group		mean Group		Dynamic Fixed Effect	
Variables	Long Run	Short Run	Long Run	Short Run	Long Run	Short Run
Error Correction		-0.9313725***		-0.175208***		-0.8302104***
		(0.000)		(0.000)		(0.000)
Δ Life Expectancy		0.094319***		0.9151823***		0.0274703***
		(0.000)		(0.000)		(0.000)
Δ Mean Years of Schooling		0.038387***		0.0476179***		0.997724***
		(0.000)		(0.000)		(0.000)
Δ Expected Years of Schooling		-0.7121082		-0.0180158		-0.557335
		(0.610)		(0.900)		(0.583)
Δ Labor Force		-0.5543574		-0.016521		-0.0254678
		(0.261)		(0.800)		(0.800)
Hausman Test[1] (PMG or MG)	**25.82 (Prob> Chi^2 = 0.10)**					
Hausman Test[2] (PMG or DFE)	**6.00 (Prob> Chi^2 = 0.30)**					
Life Expectancy	0.2648692***		0.3288747***		0.0169562***	
	(0.000)		(0.000)		(0.000)	
Mean Years of Schooling	0.2919833***		0.2913682***		1.177536***	
	(0.000)		(0.000)		(0.000)	
Expected Years of Schooling	0.1877368***		1.742405***		0.468998***	
	(0.000)		(0.000)		(0.000)	
Labor Force	0.0117013		0.3531354		0.1053185	
	(0.831)		(0.72)		(0.174)	
Cnstant		9.230582***		55.34036***		3.306191***
		(0.000)		(0.000)		(0.000)
Country	15	15		15		15
Observations	480	480	480	480	480	480

Note:*, **, and *** indicate significance at 10 %, ** at 5 % and *** at 1 %.
Source: Author's Estimations, 2023

Analysis were conducted using the (xtpmg) routine in Stata. PMG, MG and DFE methods were utilized, all while controlling for country and time effects. From the table above Hausman test indicates that PMG provides a superior, consistent, and more efficient estimation compared to MG and DFE estimation. The lag structure follows ARDL (1, 0, 0, 0, 0), and the variables are ordered as follows: GDP Growth, LE, MYS, EYS, and Labour Force. The analysis includes all ECOWAS countries, with annual data from 1990 to 2021.

Consistent with this claim, the research found that the development of human resources has a notable immediate contributory impact in each of the 15 ECOWAS nations. Taking a closer look at this evidence, the research evaluated the contributory effects of each factor on GDP using the short-term PMG, MG, and DFE models. In the PMG & MG models, life span and average years of education have an immediate effect on GDP, while projected years of education and the workforce have a detrimental and statistically insignificant impact on GDP in the short term.

For instance, from the PMG model results presented in table 4.8 above a percentage change in life expectancy will lead to 0.094% change in GDP growth holding others constant in the short run. Similarly, a percentage change in mean years of schooling will lead to 0.038% changes in the level of economic growth in the short run. However, percentage change in expected years of schooling will lead to -0.712% decrease in economic growth of the ECOWAS countries in the short run. And finally a percentage change in labour force will lead to -0.554% decrease in economic growth of the ECOWAS countries in the short run.

Under the DFE model it was found that life expectancy, mean years of schooling all have a positive and significant impact on GDP while labour force and expected years of schooling have a negative and insignificant impact on GDP.

This means that the number of people employed in these countries and the projected years of education have no immediate benefits for promoting economic growth. This fact may be explained by the fact that most of the workforce in those countries is illiterate, there is insufficient and unequal entrepreneurial distribution, which contributes to high unemployment, there is a lack of technological knowledge, and there is no educational planning that could encourage investment in education. Rapid policy changes brought on by frequently changing governments and a lack of government support for the educational sector could make the issue even worse. Furthermore, the unequal distribution of economic resources in these countries can be a key factor. Similarly, inadequate funding, a lack of resources, ignorance, a failure to apply research findings, low scores on indices of human capital, brain drain, etc. are issues that could contribute to the disregard of national economic progress as well as the devastation of economic goals. In addition, compared to the short-term evidence, the long-term examination of the PMG, MG, and DFE shows a more favorable result. In that analysis, the GDP was significantly impacted by life expectancy, the average number of years spent in school, and, interestingly, the anticipated number of years spent in school over the long run.

For instance, based on the PMG model results presented in table 4.8 above, a change in life expectancy percentage will result in a 0.264% alteration in GDP growth while keeping other variables constant in the long term. Similarly, a change in the percentage of mean years of schooling will lead to a 0.291% variation in the level of economic growth in the long term.

However, a change in the percentage of expected years of schooling will result in a 0.187% increase in economic growth for the ECOWAS countries in the long run. Nevertheless, the labor force variable for the ECOWAS countries, although positive, does not have a significant impact in the long term. It is important to note that labor is a crucial factor in the growth of any economy, and therefore, a country's economic growth primarily relies on the availability of labor. In order for these ECOWAS countries to achieve economic growth and development, it is necessary to make an optimal choice regarding male and female labor force participation.

The accuracy of the findings of this research is backed by the ECM, which is negative and statistically noteworthy in all three short-term models. Overall, the results show that the contribution of labour force to the economic growth of ECOWAS countries is low. This may be related to the high rate of underemployment and unemployment especially of the educated labour force. Moreover, inadequate use of the stock of human capital accumulation affects aggregate income, which reduces consumption levels of domestically produced goods and services. This results in slow economic growth. In the ECOWAS countries, the output of the local industries (except the oil) is mostly traded in the domestic markets because of therelatively low level of their competitiveness. Besides, the quality and efficiency of human capital in ECOWAS countries cast doubt on its contribution to economic growth especially when viewed against the backdrop of the labour market condition which encourages brain drain. Moreover, due to corruption and in an attempt to gain public favor and maintain their positions of power, politicians and government officials in these nations occasionally boost spending and investment in unproductive ventures or in products that the private sector can produce more effectively. Consequently, government actions at times result in the misallocation of resources and hinder the expansion of the country's overall output. Regrettably, the increased government expenditure has not resulted in substantial growth and development, as certain ECOWAS countries still rank among the most impoverished nations globally.For example, we are aware that Nigeria is a part of the ECOWAS and in Nigeria, numerous Nigerians persist to suffer in extreme destitution, while over 50% survive on under US$2 per day. Furthermore, there are deteriorated infrastructures (particularly roads and electricity provision) that have resulted in the downfall of numerous sectors, including a significant rise in joblessness.

Test of Hypotheses

The objective of the paper is to explore the correlation between human capital and economic growth of ECOWAS member nations. For this purpose five research hypotheses were formulated. The finding that human capital play significant role on economic growth of ECOWAS member countries is in accordance with Asghar (2012), Solaki (2013), Zivengwa (2012) and Kefela and Rena (2007).

H_{01}: Human capital development and economic growth of the ECOWAS member countries do not have a long-run relationship.

The extended analysis reveals a superior result in comparison to the short-term evidence. In that examination, life expectancy, average years of education and anticipated years of education demonstrated a noteworthy long-term contribution to the economic growth of the ECOWAS member nations. The validity of this discovery was supported by the negative and statistically significant error correction coefficient, indicating that there is a co-integration among the variables in the panel. In simpler terms, there is a co-integration to long-term balance at the 1% level of significance, and any deviations from this balance are corrected at a 93% adjustment speed, as shown in table 6 above.

Based on these findings, the null hypothesis, which posits that there is no long-run connection between HCD and economic growth in the ECOWAS member countries, was refuted, while the alternative hypothesis, which posits that there is a long-term connection between HCD and economic growth in the ECOWAS member countries, was affirmed.

H_{02}: There is no short-run impact of HCD on economic growth of the ECOWAS member countries.

Based on the findings presented in table 6 earlier, it was found that the development of human capital has a noteworthy immediate contributing effect in all the 15 ECOWAS nations. Upon further examination of this information, the study assessed the contributing influences of each variable aside from GDP. As a result, the null hypothesis, which assumes that there is no short-run impact of HDC on the economic growth of the ECOWAS member nations, was refuted. Conversely, the alternative hypothesis, which suggests that there is an immediate impact of HCD on the economic growth of the ECOWAS member nations, was accepted.

H_{03}: The impact of human capital development is not homogenous or heterogeneous across the ECOWAS member countries.

One of the assumptions of the PMG estimator is that only the long-term coefficients are the same or uniform across all the groups that make up the panel. Another assumption of the PMG estimator is that the short-term coefficients and the error variances are not the same diverse for each country in the panel because all the ECOWAS countries are diverse but may have some level of similarity or something common to them. From the result of the Hausman test the PMG is the more efficient estimator used because under the assumption of long-term slope uniformity, the PMG estimator offers an increase in the efficiency of the estimates with respect to mean group estimators (Pesaran et al., 1999). With the PMG results, we can draw the conclusion that while the impact of human capital development is variable in the short term across the ECOWAS member nations, it is homogenous over the long run. Therefore, the null hypothesis which states that the impact of human capital development is not uniform or diverse across the ECOWAS member countries is rejected while the alternative hypothesis which states otherwise is accepted.

H_{04}: Life expectancy has no influence on economic growth of the ECOWAS member countries.

In line with the results in table 6 above, it can be deduced that Life expectancy at birth has a positive and

significant impact on the economic development of the ECOWAS nations both in the short-term and long-term. One of the primary factors behind this is that healthier individuals are able to work for longer periods of time, leading to increased income for the countries. In simpler terms, longer life expectancy allows the citizens of the ECOWAS countries to work for a longer duration and have more time to accumulate financial stability, which in turn supports longer lifespans. As a result of these findings, the null hypothesis, which suggests that life expectancy has no effect on the economic growth of the ECOWAS member countries, was rejected. Conversely, the alternative hypothesis, which proposes that life expectancy does have an impact on the economic growth of the ECOWAS member countries, was accepted.

H_{05}: Mean years of schooling does not affect economic growth of the ECOWAS member countries.

Based on the results presented in table 6, it was determined that there is a positive and statistically significant relationship between mean years of schooling and economic growth in both the short and long term. This finding leads us to conclude that the level of education, as represented by mean years of schooling, has a direct impact on the economic growth of ECOWAS member countries. This variable serves as an indicator of both the quantity and quality of human capital within these countries. A higher value indicates a larger proportion of the adult population with higher levels of education, which suggests a well-performing educational system. The implications of this research are that policymakers should prioritize the measurement and improvement of human capital within ECOWAS countries, as it has a significant impact on economic growth. This can be achieved through the implementation of policies aimed at enhancing the education system and its overall contribution to human capital formation. As a result of this finding, the null hypothesis, which suggests that mean years of schooling has no effect on economic growth in ECOWAS member countries, was rejected. Conversely, the alternative hypothesis, which proposes that mean years of schooling does affect economic growth in ECOWAS member countries, was accepted.

V. Conclusion

A key component of contemporary expansionary thinking is human resources. Despite a wealth of literature on the topic, there is still much to learn: there is disagreement on this role's contribution to growth and development, probably because it changes depending on the institutional context and the context of a given country. The purpose of this study was to learn more about the circumstances facing ECOWAS member countries. The objective of this study was to examine the relationship between the development of human resources and the economic growth of ECOWAS countries (using the growth rate of GDP as a proxy for economic growth and life expectancy, average years of schooling, expected years of schooling as proxies for human resources, as well as the labor force as a control variable) from 1990 to 2021. The results of this study are consistent with economic theory and with previous empirical research conducted on the subject. The growth rate of GDP remained stable at a certain level, while life expectancy, average years of schooling, expected years of schooling, and the labor force became stable after taking their first difference. The findings support a significant positive long-term impact of human resource

development on economic growth by confirming a direct positive long-term relationship between economic growth and the measures of human resource development included in the model, such as life expectancy, average years of schooling, and expected years of schooling. The existence of a stable long-term relationship between economic growth and both measures of human resources is confirmed by the statistical significance of the long-term coefficients and the error correction term, and further confirmed by the Pedroni'sCointegration Test. The study also reveals the existence of long-term, short-term, and joint causality between economic growth and human resource development for the ECOWAS countries.The findings of this research concerning the long-run positive impact of human capital development are consistent with the endogenous growth theories (mainly advocated and/or developed by Lucas (1988), Romer (1990), Mankiw, Romer and Weil (1992) which argue that improvement in human capital (skilled and healthy workers) leads to productivity improvement and thereby output growth. With respect to the researches made, the finding of this research is also similar to Woubet (2006) and Tofik (2012).

VI. Policy Recommendations

Economic theory proposes that, human resources are a crucial element for economic development, and empirical data from various sources validate this connection. Nations that allocate resources to human capital will experience accelerated growth relative to their initial per capita GDP and policy-related factors. The research findings have demonstrated that human capital, represented by life expectancy, average years of education, anticipated years of education, and labor force, significantly influence economic growth as represented by the GDP growth rate in the ECOWAS countries. In view of the foregoing findings it is recommended that

- In accordance with the discoveries of this study, it is crucial for the decision-makers in these ECOWAS nations to allocate greater resources to the enhancement of human capital and strive to give priority to the allocation of funds for education and healthcare, taking into consideration the long-term impact of human capital development and the growth prospects in these ECOWAS nations.
- As a result of the short-run impact of HCD on GDP growth, it is advised that the governments of these ECOWAS nations should enhance school enrollments to their maximum potential with the aim of enhancing the marginal productivity of labor, thereby promoting economic growth.
- Given that the effect of human resource enhancement is consistent across the ECOWAS nations in the future, it follows that the ECOWAS governments should give priority to enhancing skills that promote GDP growth in order to enhance the well-being of their citizens. However, the short-run impact of HDC varies across the ECOWAS member countries. In light of this discovery, policymakers are urged to exert maximum effort to stimulate the main factors that drive economic growth (human capital).
- The research also uncovered that the longevity of life has a beneficial effect on the long-term economic development of ECOWAS nations. Therefore, in order to achieve an increase in GDP, governments in these countries must devise and execute suitable policies and initiatives in the social sector. This includes expanding healthcare facilities for the population, reducing the rate of

adult illiteracy, and addressing malnutrition, all of which will contribute to enhancing the life expectancy of citizens in ECOWAS countries.

- Furthermore, the findings demonstrates that average years of education has a beneficial effect on economic development, therefore, the governments of ECOWAS nations should create and enforce effective education strategies formulated by public officials for the successful provision of public education. In this manner, education strategies are initiatives created by public officials, influenced by principles and concepts, aimed at education participants, and further executed by administrators and education experts in these ECOWAS nations.

Acknowledgements

We wish to thank the editor Journal of Economic Integration and the anonymous referees for their valuable comments and suggestions.

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Appendix

This research considered countries from one regional bloc that ECOWAS member states to include: Benin, Burkina Faso, Cabo Verde, Co´te d'Ivoire, Ghana, Guinea, Gambia, The, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.