SIGNIFICANCE OF HUMAN CAPITAL AND SOCIAL CAPABILITIES ON THE ECONOMICS GROWTH OF THE GAMBIA

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Abstract

Since time immemorial, economic growth has been a chief concern for macroeconomic policymakers in every country. The significance of human capital in achieving these concerns is making waves in the space of contemporary development economics. Much theoretical and empirical evidence has shown that human capital accumulation (education and health) and their collective capabilities are a vital variable for economic development. This paper investigates the existing literature on the importance of human capital and social capabilities on the economic growth of the Gambia from 1990- 2019. Using annual time series economic data, we applied the econometric techniques of the ADF test to prove stationarity, rejection, and acceptance of the hypothesis of Granger causality and rejection of the null hypothesis of Johansen's cointegration test. The Vector Error Correction Model (VECM) model was conducted, and the findings indicated a positive relationship between education and GDP in the long-run and a bidirectional relationship in the short-run. Thus, we recommended the policymakers to create strategic and prudent policies that would promote accessible and quality education with modern technologies to improve the economic growth of The Gambia. We concluded on the premise that investment in people translates to a country's economic growth.

Keywords: Economic growth, Human Capital, The Gambia, ADF, Granger Causality, Cointegration, Vector Error Correction Model Test

Introduction

Amid some natural and manmade disasters, the economic outlook of the African continent is indeed positive. The African Development Bank reported Africa to be the world's second-fastest-growing economy with an estimated average growth of 3.4% in 2017, has stabilized in 2019, and expected to pick up to 2.9% in 2020. The World Bank has forecasted Sub-Saharan Africa to have a GDP growth rate of 3.4 percent by the end of 2019. Economic growth is traditionally aligned with a country's natural resource, productivity, exports, business growth, industrialization, population or labor, physical capital, water resources, agro-based industry, and so forth. Arguably good government macroeconomic policy from the Keynesians or Monetarists is quite imperative to economic growth.

However, in the last two centuries, economists have seen human capital as one of the determinants of economic growth, and the model is seen to be suitable for both developing and developed countries. This has made human capital the subject of emerging African youths whose priority is changing the narrative of the continent. Human Capital formation is an investment in human beings. It is considered as the process of acquiring knowledge and increasing the number of persons with education, skills, and experience

which are critical for the economic and political development of a country. A Nobel Prize in economics Gary Becker argued that schooling, a computer training course, expenditures on medical care, and lectures on the virtues of punctuality and honesty are capital too in the sense that they improve health, raise earnings, or add to a person's appreciation of literature over much of his or her lifetime.

The centrality of human capital is education and health. Many economists argued that the development of humans is intrinsically the development of the world as human capital accumulation means a process of accelerating capacities and knowledge of the people of the world. In fact, the prospect of physical capital is essentially linked to human development. Through education, the global health system has blossomed. The amelioration of the health sector is unarguably the advancement of educational technology. The hygienic status of the people has become better due to widespread educative sensitization. Human capital in the form of education is also a great equalizer. The gender disparity gap has drastically decreased as the notion that if you educate a woman, you educate the world took a fine-tune around the globe. Despite the slow shrink of the gap, scores of statistics have proven that more women are being educated now than ever in the history of the world. The education of a woman has also been viewed as the antidote to the Malthusian population catastrophe as more educated women generally have fewer children, more desirable health care, and higher infant survival rates.

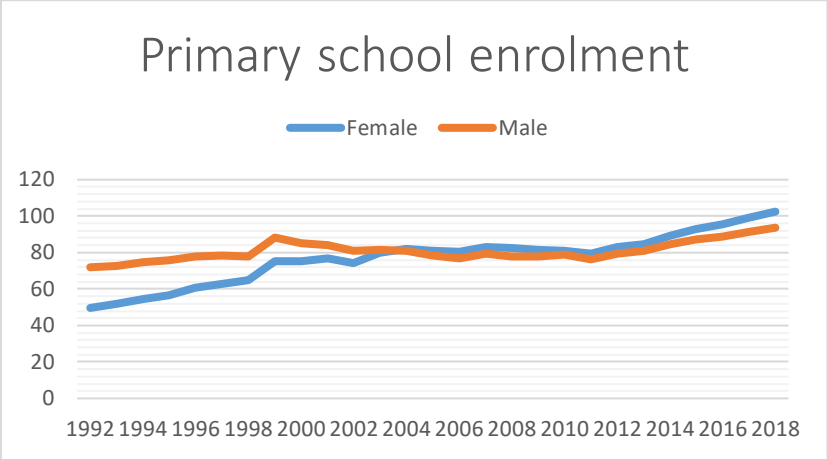
Human capital also seems to be more consequential of child survival than household income and riches. Africa has been seen as the habitat for dictators, but education is eroding these phenomena. Both formal, semi and informal educational under goings have played an effective role in individuals' cognitive abilities towards the democratization of the African continent. Through cognitive skills, tolerance, openness, ethnic and religious diversity has become the norm in lieu of conflicts. Criminality is crumbling due to its opportunity cost, education. People now prefer engaging in a self-developing process to create a favorable future for themselves which Adam Smith called the invincible hand in a country's economic growth. Moreover, human capital (education) is playing a pivotal part in attitudinal change towards the environment and its hazards such as climate change or greenhouse gases. Economists such as Mankiw, Romer, and Weil (MRW) also emphasize the significant role of education on economic development through their theories and the Augmented Solow Growth model.

The idea of human capital is related to the "social capability" concept of Abramovitz (1986). Social capabilities refer to the level of general education, norms, technical competence, and society's disposition that allow them to do something. Abramovitz emphasized the significance of social capabilities in the adoption and diffusion of technologies. He further argued that the extent to which human capital contributes to economic growth will be at least partly dependent on a country's social capabilities. Social capabilities include factors that allow economic agents to utilize their potential such as the quality of institutions, as reflected in the quality of governance, for instance. In other words, for technologically lagging countries to catch up with leaders, they need not only human capital, but also well-functioning institutions (Olofsdotter, 134: 1998). The Amartya Sen's Capability Approach is the choice

of focus upon the moral significance of individuals' capability of achieving the kind of lives they have reason to value. In his seminal contribution, Sen (1983) argued that improvement in the quality of life of citizens should be the objective of economic policy, instead of focusing narrowly on increasing overall output. This approach suggests that human and productive capabilities should be improved to facilitate human capital and that a higher level of human capital can only affect productivity if it is efficiently utilized by the economic system.

With the minimal availability of some natural resources like cruel oil, diamond, and other precious stones, the Gambia's most prestigious resource is its people. Being cognizant of this fact, the past and present Gambian governments are still yet to take a revolutionary step in investing in her people through education and health. Since independence in 1965, the education system improved at a very slow pace because it was plagued by a number of problems such as accessibility, quality, and relevance of education. The second republic saw an improvement and in 1995, the average gross primary enrollment rate was 77.1 percent and the net primary enrollment rate became 64.7%. In 2015, (UNICEF, 2015) report states that the overall Gross Enrolment Rates (GER) stands at 97% including the "Madrasah" (Arabic language Muslim schools). In enrolment, the Gambia ranked considerably high, surpassing the sub-Saharan average of 69 percent. Today the Gambia has five universities, two colleges, hundreds of other tertiary institutions, and thousands of primary and secondary schools. In 2016, (CIA, 2016) ranked the literacy rate in the Gambia to be 63.9% for males and 47.6% for females. Yet quality is an unfocused impediment. Constitutionally, The Gambia enshrined education as a basic right in 1997. The Education Policy (2004) and the Children's Act (2005) mandated free and compulsory basic education for all but remains inconsequential to the citizens of the Gambia. The Gambia's education system follows the British system. The official school going age starts from seven years with six years of primary schooling, three years of Junior Secondary schooling, three years of senior secondary schooling, and four years of University education. The 21st century has seen an increase in primary school enrolment. The graph shows how female enrolment surpasses male enrolment as people's consciousness improved.

Female and Male Primary School Enrolment from 1992-2018



The graph indicates that more female is enrolled than males. This is another proof that with more education, gender inequality has declined, and its eradication is a possibility in the Gambia.

The new 2016 government has now considered education as a priority in its National Development Plan (NDP). In it, the government pledged to enhance access to early childhood education, improve quality learning, with special emphasis on science, technology, engineering and mathematics (STEM), health, agriculture and special needs at the basic, post-secondary/tertiary and higher education levels; promote technical, vocational, education and training and other skills enhancing initiatives to match the job market; and enhance access to non-formal education in order to build a more skilled and productive workforce in the health and economic system. To solidify the NDP, the approved 2020 budget has shown a better increment in the allocation of education at all levels.

It is an indispensable means for 'unlocking' and protecting human, economic, and social rights by providing the framework required to secure good health, security, and economic well-being, social and political participation which is crucial for the development of The Gambia. Knowing that economic growth is necessary for a nation's sustainable economic development, this paper aims to analyze the economic importance of human capital and social capabilities on the economic growth of the Gambia from 1990 to 2019. During most of this period, the Gambia had been ruled by dictatorship thus restricting all forms of personal and social capabilities. To many extents, human capital flight (brain drain) became at its highest ever as there was no freedom of speech and the Sahara desert or Mediterranean Sea to Spain or Italy was the option to instant riches. This paper attempts to add to the existing findings and shall investigate the diversity of the human capital structure with its capacity to positively change the status quo; decrease unemployment and crime, increase cognitive ability, thus this could be an alternative aspect of concentration in our development goals. In our quest to determine their relationship, we shall determine if any causal relationship exists, that is, if education leads to economic growth or vice versa. Through our findings, we shall recommend policymakers or government on the consequentiality of education towards Gambia's economic growth.

Literture Review

In terms of the theoretical and empirical literature, there are numerous studies that have been conducted to find the nexus between education and economic growth; however, the debate with respect to education being a key factor for economic growth has been happening since time immemorial.

The importance of education can be tracked down from the founding fathers of modern economic thought, the classical. The ideas of the classical economists on the wages of unskilled workers and skilled workers who are educated, by which they usually meant those who received general and more technical education in institutions of learning. Smith (1776) stated that the difference between the wages of skilled labor and those of common labor was based on the principle that "it must be expected, over and above the usual wages of common labor, will replace to him the whole expense of his education, with at least the ordinary profits of equally valuable capital." Also,

Smith (1776) stated that educated workers had fewer delusions of enthusiasm and superstition and more decent and orderly than an ignorant and stupid one. The neo-classical continued by emphasizing on how impactful education is to economic growth. Uzawa (1965) and Lucas (1988) imply that education promotes growth by making the productivity of labor increase more rapidly and has a positive effect on income distribution by increasing wages. Denison (1961), Schultz (1963), Becker (1964) all worked and investigated the positivity of education on growth or more generally the source of economic growth.

In the empirical literature, there are multiple findings with regards to these studies and it has been substantiated by researchers and economists that there exists a relationship between education and economic growth; although some findings showed the addition of health in order to be impactful. For instance, Papageorgiou (2003), made a research on Benhabib and Spiegel in examining the effect of human capital accumulation on economic growth. The paper was innovative in two ways. First, it took the R&D-based models more seriously which more structural specifications in which human capital affects growth as an input of final output and as a catalyst of technological innovation and imitation. Second, owing to data availability it was possible to disaggregate human capital and assign different roles to primary and post-primary education. Regression estimates obtained from these alternative specifications suggested that the relative contribution of human capital to technology adoption and final output production vary by country wealth. More importantly, regression estimates suggested that primary education contributes mainly to the production of the final output, whereas post-primary education contributes mainly to innovation and imitation of technology.

Dookhan and Fauzel (2010) examined the impact of investment in education on economic growth in Mauritius with a data set for the period 1990 to 2006 obtained from the central statistical office and Bank of Mauritius reports. They attempt to explore the extent to which the education level of the Mauritian labor force affects its economic growth that is its output level. They used the Cobb-Douglas production function with constant returns to scale where human capital is treated as an independent factor of production in the human capital augmented growth model. The results reveal that human capital plays an important role in economic growth mainly as an engine for improvement of the output level. There is compelling evidence that human capital increases productivity, suggesting that education really is productivity-enhancing rather than just a device that individuals use to signal their level of ability to the employer.

Similarly, Barro (1991) asserted that for 98 countries in the period 1960-1985, the growth rate of real per capita GDP was positively related to initial human capital (proxied by 1960 school enrollment rates) and negatively related to the initial (1960) level of real per capita GDP. Countries with higher human capital also have lower fertility rates and higher ratios of physical investment to GDP. Growth is inversely related to the share of government consumption in GDP, but insignificantly related to the share of public investment. Growth rates are positively related to measures of political stability and inversely related to a proxy for market distortions.

Borojo and Yushi (2015) in their study used an empirical econometric model to analyze the impact of education and health (human capital) on economic growth from 1980-2013 in Ethiopia. Human capital stock was proxied by primary, secondary, and tertiary school enrolment. Human capital investment was proxied by expenditure on education and health. Augmented Dickey-Fuller test and Johansen's Co-integration technique were used to testing unit root and to validate co-integration among variables, respectively. Their findings of the study have shown public expenditure on health and education, primary and secondary school enrolment have a positive statistically significant effect on economic growth both in the long run and short run. In addition, physical capital has positive whilst inflation has a negative effect on economic growth. However, tertiary school enrolment has an insignificant effect on economic growth both in the long run and short run.

Başar (2007) investigated the effect of education on economic growth for 24 transition economies from 1998-2005 periods. For this purpose, some equations were estimated by dynamic panel regressions. When investigating the effect of education on economic growth, human capital, education index, enrollment ratio, and literacy rate data were proxies for education. In his one-step GMM estimation results, while human capital, education, and literacy rate positively affect economic growth, enrollment ratio has a positive but statistically insignificant effect in transition economies in the short run. Even the effect of human capital and literacy were bigger than physical capital. The effect of human development and literacy rate continued in the long run.

Liao, Du et al (2018) explored the cointegration and causality between the investment in education and sustainable economic growth in Guangdong province by using the panel data of 21 cities from 2000 to 2016. They constructed a variable intercept panel data model with an individual fixed effect based on the Cobb-Douglas production function, estimating the contribution of the investment in education to economic growth by introducing lags. Their findings showed the existence of the feedback causality between education and sustainable economic growth. Also, their results reveal that the local financial investment in education plays a positive and statistically significant role in promoting sustainable economic growth. However, the contribution of the local financial investment in education to economic growth varies in different areas. The investment in education in the Pearl River Delta region had the most obvious pull effects on its regional economy, whereas the Western region takes the second place. Meanwhile, the local financial investment in education for its role in promoting economic growth had a two-year hysteresis effect.

Lin (2003) investigated the effect of education and the role of technical progress on economic growth in Taiwan over the 1965–2000 periods. She applied a structural earnings function and indicator for average schooling years to a measure of education, and a transcendental production function was used in the model. Her findings reveal that education has a positive and significant effect on growth, but the role of technical progress does not appear to be extraordinarily important. According to the complementarity test, no markedly significant relationships exist between capital and education, or between education and technical progress.

Methodology

Variable and Data

The purpose of this paper is to examine the importance of human capital and social capabilities on the economic growth of The Gambia. The study uses annual time series data set which was sourced from the World Bank Development Indicator and African Development Bank database covering the period 1990-2019. The examination is based on five economic variables and they are Gross Domestic Product. (GDP), Education (ED), Gross Capital Formation (GCF) Agriculture (AG), and Inflation (IN).

Model Specification

In the study, we used the neoclassical growth model as a base for the analysis. Human capital has been added to the model to conform to the arguments made by endogenous theorists such as Becker (1964) and Luca (1988).

$$Y_t = A_t K^{a}_t L^{h}_t H^{g}_t \varepsilon_t \quad ,\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

In the neoclassical model, Y is the output of production, A is technology, K is physical capital and L is labor. With the inclusion of H as a proxy for human capital in the model, Y is represented by real annual GDP growth, A is represented by annual inflation, K by annual gross capital formation, L by annual agricultural growth, and ε is the residual. A multiple linear regression model has been conducted as follows:

$GDP = \beta_0 + \beta_1 ED + \beta_2 GCF + \beta_3 AG + \beta_4 IN + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$

which is interpreted as;

β_0 = the intercept

β_1 —— β_4= Coefficients of the explanatory variables

ED= primary school enrollment (Human Capital)

GCF= gross capital formation

AG= agriculture

IN= inflation

ε_t= the error term

In order to avoid Heteroscedasticity, the model has been converted into their natural logarithms.

$LGDP = \beta_0 + \beta_1 LED + \beta_2 LGCF + \beta_3 LAG + \beta_4 IN + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$

and L= log

4. Estimation Techniques

We employed the Unit roots test to check for stationarity attributes, Granger Causality test for causality, and Cointegration test to determine the long-run relation between the two variables. The results from the cointegration would determine whether the vector autoregressive or vector error correction model will be used.

4.4.1. Wald Test

In finding the connection between human capital and economic growth, the methods used for estimation were first, the Wald Test (also called the Wald Chi-Square Test) which we used to test the goodness of fit of an explanatory variable. It is a test that indicates the meaninglessness of the variable in the model. The hypothesis for the test is the 5% significance level.

Table 1. Wald Test

Test Statistic	Value	df	Probability
F-Statistic	11.54469	(4,25)	0.0000
Chi-square	46.17874	4	0.0000

From table 1., the result shows that the p-value is less than the 5% significance level, thus the rejection of the null hypothesis. This proved that the variables are important and different from zero thus should be included in the model.

4.4.2. Unit Roots Test

Upon confirming the significance of the variables from the Wald Test, we now test for unit root. Unit Root Test is done to determine whether a variable stationary or not. The stationarity or non-stationarity of the data series could be tested by using many tests presented in economic literature such as the KPSS test, Phillps, and Person (PP) test but the well-known test is the Augmented Dickey-Fuller (ADF) technique which we used here. The ADF test at AR(2) is used and it consists of regressing the series of the first difference against the series lagged once, lagged difference terms in addition to the constant and time trend which is optional. It can be written as follows:

$\Delta Y_t = \alpha + \delta Y_{t-1} + \beta \Delta Y_{t-1} + \mu_t$.....(4)

We added more lags in equation (5) in other to remove serial correlation from the error term which might not affect the consistency of our OLS estimator but might disrupt its efficiency:

$\Delta Y_t = \alpha + \delta Y_{t-1} + \sum_{i=1}^{h} \beta \Delta Y_{t-i} + \mu_t$.....(5)

In the regression process, the unit root test is directed on the coefficient of Y_{t-1} from equation (5). The set hypotheses: the null hypothesis is that the variable Y_t is non-stationary (H_0: $\delta = 0$) while the alternative is that Y_t is stationary (H_1: $\delta < 1$). If the coefficient of Y_t is equal to zero, it means the variable Y_t contains a unit root otherwise n the other hand, if the coefficient is less than 1, we reject the null and conclude that Y_t is stationary. We used the E-views statistical software to run the regression on each data series and MacKinnon (1996) one-sided p-values served as the benchmark for rejection and otherwise.

4.4.3. Granger causality test

The Granger causality test was developed to test if one time series is beneficial in forecasting another variable. It was proposed by Clive Granger in 1969 and he argued that if a variable (education) "Granger-causes" another variable (GDP), then the past values of education should contain information that helps predict GDP. For better illustration, let's consider the bivariate linear autoregression model of our two variables i.e. GDP and education by stating a basic AR(1) model:

$(gdp)_t = \alpha_0 + \beta 1(gdp)_{t-1} + \mu_t$.....(6)

From the equation (6), we create our vector autoregressive (VAR) distributed lag model where the summation helps us to get rid of serial correlation. The equations are as follows:

$(gdp)_t = \alpha + \sum_{i=1}^{p} A_i(gdp)_{t-i} + \sum_{i=1}^{p} \delta_i(ed)_{t-i} + \mu_t$.....(7)

$(ed)_t = \alpha + \sum_{i=1}^{p} A_i(gdp)_{t-i} + \sum_{i=1}^{p} \delta_i(ed)_{t-i} + \varepsilon_t$.....(8)

The p is the highest lagged value that can be included in the model and A and δ are the coefficients of the variable while μ and ε are the unused variables (error term). The hypotheses are as follows:

Education (ED) does not Granger cause Economic growth (GDP)

Economic growth (GDP) does not Granger cause Education (ED)

In equation (7), Education does not Ganger cause GDP if the coefficient δ is insignificant (H0: δ= 0) but does if otherwise. From equation (8), GDP does not Granger cause Education if the coefficient A is insignificant (H0: δ= 0). In a similar manner, if the reduction in the variance of the error term μ (or ε) was due to the inclusion of ED (or GDP) in both equations, then we can infer that ED (or GDP) Granger causes GDP (or ED). Using E-views statistical software, our null and alternative hypotheses are as follows respectively:

H_0: Education (ed) does not Granger cause Economic growth (GDP) and vice versa.

H_1: Education (ed) does Granger cause Economic growth (GDP) and vice versa

4.4.4. Cointegration Test

After observing for unit root and Granger causality of the data series, we are to determine if there is a long-run relationship between the variables. So to investigate the long-run economic growth and education nexus, we applied the Johansen Cointegration using the maximum likelihood test procedure. This approach is based on two test statistics, the maximum eigenvalue test statistic and trace test statistics. The Johansen test implies estimating unrestricted vector autoregressive (VAR) model:

$Y_t = A_o + \sum_{j=1}^{p} A_j\, Y_{t-i} + \mu_t$.....(8)

Where Y_t = K which is a vector non-stationary I(1), Ao is a vector of constant, p is the maximum lags value, Aj is the matrix of variables that can be estimated and μ_t is the vector of innovation that is independent and identically distributed. This study used E-views statistical software to check if GDP and education have a long-run relationship.

Lag Length Selection Test.

We do not arbitrarily determine lags as it may cause the model to lose its degrees of Freedom, bring statistically insignificant coefficient, multicollinearity, and specification error. We, therefore, use the lag length selection test to know which lag is the best fit for investigating the relationship between the variables. There are up to four ways to choose from the test such as Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). However, the most common is the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SC) and in this study, we use lag 3 in table 2 as it is the common one with the asterisk.

Table 2. Lag Length Selection Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-480.4349	NA	2.85e+09	35.95814	36.19811	36.02950
1	-407.7922	112.9997	86648754	32.42906	33.86887*	32.85719
2	-373.6965	40.40978*	54669878	31.75530	34.39496	32.54021
3	-335.7687	30.90412	39780797*	30.79768*	34.63720	31.93937*

Source: Author's own calculation using E-views.

5. Results, Findings and Discussion

5.1. Stationarity Test

The stationarity of the model depends on the result of our unit root test. As explained above, we used the Augmented Dickey-Fuller test on the model as shown in Table 3

Table 3: Augmented Dickey-Fuller Test Results

Variables	Level				First Difference	
	Critical values 1%	**Critical values 5%**	**Critical values 10%**	**T-value**	**P-value**	**T-value**	**P-value**
GDP	**-3.68**	**-2.98**	**-2.63**	**-6.62**	**0.00**	**-6.54**	**0.00**
ED	**-3.67**	**-2.97**	**-2.63**	**-0.59**	**0.86**	**-5.48**	**0.00**
GCF	**-3.68**	**-2.97**	**-2.62**	**-6.56**	**0.00**	**-6.72**	**0.00**
AG	**-3.69**	**-2.97**	**-2.62**	**-5.11**	**0.00**	**-6.79**	**0.00**
IN	**-369**	**-2.97**	**-2.63**	**-3.70**	**0.00**	**-4.82**	**0.00**

Source: Author's own calculation using E-views.

The results from Table 3 show that the ADF test for stationarity and the critical value of 10, 5, and 1 percent levels of significance were employed. The null hypothesis of the presence of unit root is accepted for ED at its level as the p-value is greater than 0.05 while GDP, GCF, AG, and IN rejected the null hypothesis at their levels. However, all the variables rejected the null hypothesis at their first difference. Therefore, in the first difference, the variables are stationary and integrated into the same order of one, which is I (1).

5.2. Granger Causality Test Results

Since all the variables were stationary at their first difference, the Granger causality test has been conducted to investigate if past values of education help predict GDP or vice versa.

Table 4: Granger Causality Test Results

Null Hypothesis	F-Statistic	Probability	Decision
LED does not Granger Cause LGDP	**6.69394**	**0.0051**	**Reject**
LGDP does not Granger Cause LED	**0.25524**	**0.7769**	**Accept**

Source: Author's own calculation using E-views

Table 4. results show the Granger causality and the significant value used is alpha 0.05 percent level. Citing from the probability value, the null hypothesis that education does not Granger-Cause GDP was rejected as the p-value was less than 0.05. But the hypothesis that GDP does not Granger-Cause export was accepted at a 5 percent level of significance. So the conclusion from the Granger causality test is that the past values of education do affect GDP.

5.3. Cointegration Test

After conducting the Lag Length selection test which confirmed the use of 3 lag and all variables were stationary at first difference then a cointegration test has been conducted to examine the long-run relationship between education and economic growth.

Table 5: Johansen's Cointegration test statistic

Hypothesized No. of CE (s)	Eigenvalue	Trace Value	5 percent Critical value	Prob.**
None*	0.990844	197.4847	69.81889	0.0000
At most 1*	0.856352	75.45753	47.85613	0.0000
Hypothesized No. of CE (s)	**Eigenvalue**	**Max-Eigen Statistic**	**5 percent Critical value**	**Prob.****
None*	0.990844	122.0270	33.87687	0.0000
At most 1*	0.856352	50.45021	27.58434	0.0000

Source: Author's own calculation using E-views

Our results from table 5. show the long-run relationship between GDP and education. The existence of Cointegration implies the existence of Granger causality at least in one direction (Granger, 1988). The Johansen Cointegration method has been used in our investigation and the findings of the Trace test portray a long-run relationship between education and GDP, in other words, we reject the null hypothesis of no cointegration between the two variables. The Maximum eigenvalue test also ascertained this result. Therefore, we can conclude that our two variables of investigation have a long-run relationship between them so we cannot use the Vector Autoregression (VAR) instead we use Vector Error Correction Model (VECM) test to appropriately examine the causal relationship between education and GDP.

5.4. Vector Error Correction Model (VECM)

Since there is a long-run relationship between education and economic growth, the VECM shall be conducted to determine the short-run dynamics of long-run equilibrium relationships of variables. Vector Error Correction Model (VECM) is a restricted VAR and uses the adjustment coefficients to measure the forces that push the relationship towards long-run equilibrium. However, the error correction term (ECT) from the VECM measures the speed of adjustment towards long-run equilibrium. The equation for the ECT is as follows:

$$ECT_{t-1} = (Y_{t-1} - \delta_j X_{t-1} - \lambda_m R_{t-1})$$

It represents the cointegration equation and the long-run model.

Table 6. Estimates for Vector Error Correction Model Regression

$GDP_{t-1} = 0.217\ ED_{t-1} + 0.012GCF_{t-1} + 0.059AG_{t-1} - 0.052IN_{t-1} + 8.775$

Error Correction	D(GDP)	D(ED)	D(GCF)	D(AG)	D(IN)
CoinEq1	-0.384017	-0.056738	-3.047126	-1.010469	-0.564017
	[-1.44712]	[-0.48353]	[-2.40493]	[-1.27699]	[-6.73864]
D(GDP(-1))	-0.199516	0.278828	2.499509	1.636446	0.441902
	[-0.52437]	[1.65726]	[1.37585]	[1.44234]	[3.68221]
D(GDP(-2))	-0.014187	0.102466	5.277128	1.486547	0.262132
	[-0.03721]	[0.60782]	[2.89907]	[1.30765]	[2.17996]
D(ED(-1))	0.398486	0.231448	-3.119310	-3.159902	-0.327360
	[0.32072]	[0.79060]	[-0.98679]	[-1.60063]	[-1.56768]
D(ED(-2))	0.595768	0.030606	1.784223	0.807129	-0.273064
	[0.62885]	[0.07306]	[0.39444]	[0.28571]	[-0.91382]
D(GCF(-1))	0.093956	0.043175	-0.612431	0.355387	0.033747
	[1.58371]	[1.64582]	[-2.16205]	[2.00892]	[1.80351]
D(GCF(-2))	0.057417	0.013909	-0.217591	0.264167	0.006982
	[1.16857]	[0.64020]	[-0.92749]	[1.80301]	[0.45054]

D(AG(-1))	0.029823 [0.23565]	-0.061928 [-1.10664]	-0.281574 [-0.46599]	-0.606063 [-1.60602]	0.029911 [0.74933]
D(AG(-2))	0.031387 [0.21948]	0.070787 [1.11943]	-0.848687 [-1.24295]	-0.126113 [-0.29574]	0.039827 [0.88299]
D(IN(-1))	-0.203634 [-0.30525]	*-0.354229* [-1.20082]	2.923315 [0.91777]	-2.209081 [-1.11050]	-0.028099 [-0.13354]
D(IN(-2))	0.246965 [0.51210]	-0.138044 [-0.64734]	-2.932640 [-1.27361]	0.018078 [0.01257]	-0.056769 [-0.37321]
C	2.295313 [1.38121]	0.915392 [1.24572]	1.886792 [0.23779]	2.693304 [0.54351]	0.472387 [0.90124]
R-squared	0.817190	0.442947	0.861809	0.702308	0.851135
Ad R-squared	0.683129	0.034441	0.760469	0.484000	0.741968
F-statistic	6.09565	1.084310	8.504136	3.217056	7.796606

Source: Author's own calculation using E-views.

From the cointegration equation, ceteris paribus, in the long-run each percentage-point increase in education will cause an increase of 21.7 percentage points in GDP. Similarly, ceteris paribus, a percentage-point increase in both gross capital formation and agriculture will cause GDP to increase by 1.2 and 5.9 percentage points respectively in the long-run. However, other things equal, a percentage-point increase in inflation will cause GDP to decrease by 5.2percentage-point.

Also, in the short run, all things being equal, there is a positive relationship between lag 1 and 2 of education and GDP. A percentage-point increase in education lag 1 and 2 will lead to the increment of GDP by 39.8% and 59.7% respectively. Similarly, ceteris paribus, there exist a positive cointegration between the lag 1and 2 of GDP and education. A percentage-point increase in GDP lag 1 and 2 will cause education to increase by 28.8% and 10.2% respectively in the short-run. So, it can be concluded that in the long-run, education has a positive impact on GDP, however, there exists a bidirectional relationship between education and GDP in the short-run.

Conclusion and Recommendation

The argument that human capital is a determinant of economic growth is a heated topic of discussion in the economic development spectrum. Some literatures and different empirical evidence shows different results. This research was conducted to examine the effect of human capital on economic growth for 30 years period in The Gambia. In our quest to advance the existing research on the investment in humans, we employed the popular econometric methodologies by firstly using the Wald test to check for the relevance of the variables in the model. The outcome of the Wald test shows that the variables were relevant to be used. The ADF unit root test was also conducted, and the findings discovered that all the data series were stationary at first difference. The Granger causality procedure rejected the null hypothesis for the Edu-GDP causality but accepted the null of no causality for the GDP-Edu. After determining the best lag at 3, we used the Johansen Cointegration test and the indicated results of the existence of cointegration in the two variables which permitted us to conduct the Vector Error Correction Model (VECM) test. The outcome of the VECM test showed a positive effect of human capital

(education) on GDP in the long-run and a bidirectional relationship in the short-run.

These findings are clear empirics that education (human capital) is vital to the economic growth of The Gambia. The development of people means the development of the country because these people shall be doctors, teachers, entrepreneurs, businessmen, or women et al. Thus, the government or policymakers are recommended to devise well-carved policies that are essential to the micro and macroeconomics of the country and invest in all educational sectors. Education opens multiple doors for other sectors thus increase GDP. The education system policies should be revitalized to avoid a primitive, traditional system of schooling. Teachers training programs should be encouraged and incentivized to allow qualified teachers to move from urban to rural or peri-urban schools in order to create an all-inclusive development where everyone's right to quality education is achieved. The modern, innovative, and technological method should be encouraged to promote the 21st-century education system and make The Gambia a learning hub in Africa.

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