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Human Capital Development and Poverty in Nigeria, 1960 - 2009: An Econometric Assessment

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Abstract

This study examined the relationship between human capital development and poverty in Nigeria using data spanning 1960-2009. The human capital development variable was measured using conventional variables i.e. education and health, with government expenditures on education and health being used as the proxies. Other variables on communication, transportation and utility were used as control. A readily available poverty measure, gross domestic product per capita was used to capture poverty status. This is based on the fact that poverty is mostly measured in monetary terms captured by income or consumption per capita or household in the absence of direct primary data observation. After carrying out the diagnostic tests, the cointegration analysis carried out proved that, to some extent, a cointegrating relationship exists between the poverty measure and human capital development indicators. However, the Granger causality estimation results show that both education and health expenditures are fundamental in reducing poverty level based on the uni-directional causality while no causality runs from poverty status to the indicators.

Keywords: Poverty, Human Capital Development, Cointegration, Granger Causality

1. Introduction

Widespread poverty is one of the major problems facing many developing nations today. It constitutes a major hindrance to the realization of human potentials that is the ultimate end of development. Consequently, most Less Developed Countries, Nigeria inclusive, devote considerable resources to programmes aimed at the reduction and / or elimination of poverty. Poverty is a multidimensional concept. In this sense it includes deprivation of sufficient health services and sanitation, a level of illiteracy, inadequate income and deprivation of basic right and security. These variables are the broad concepts that interact in many ways to produce widespread effects ranging from good health that results in higher productivity and improvement in the economic performance to literacy level which is a pre-requisite for introducing new skills and technology for quality output.

Long term educational attainment and good health are fundamental and have remained the measures often used to assess the quality of human capital and its development. Sustainable education and good health across human life span is indispensable to achieving high quality labour measured by higher skills and capabilities, and consequently higher productivity. Along this line of reasoning, education and health have therefore been added to the list of basic needs. Human capital development indicators are vital tools since their roles in poverty reduction cannot be underestimated. As a matter of fact, it appears impossible to eradicate poverty without educating and improving the health conditions of the populace. On the other hand, the extent of poverty in a society seems to be determined by the educational and health status of the populace.

Education and training are very critical ingredients in achieving a country's sustainable socio-economic development (URT, 2007). A strategy which aims at eradicating poverty would entail paying full attention to the development of human capital through equitable education policies (World Bank, 2000). Reducing poverty and achieving sound education of the populace is a priority among the Millennium Development Goals (MDGs). There is therefore some connection between these indicators based on sound intuitive, theoretical and empirical reasoning as observed in the neo-classical human capital theory (Schultz, 1961; Becker, 1964).

Undoubtedly, education gives the populace the required skills necessary to increase its efficiency in production. Thus, education can directly reduce poverty through the productivity impact on economic growth, and through its positive spill-over effects on society this can help to alleviate poverty. Investment in education through expenditure on education is a poverty reduction strategy and can enhance the skills and productivity among poor households. Looking at it from another perspective, it can be averred that poverty seems to be a constraint to educational attainment be it at the macro and micro levels. This is attributed to the fact that the poor bear much serious deprivation compared to the rich and this thus affects educational attainment level which in turn negatively affects productivity. Low productivity constitutes serious handicap to poverty reduction efforts since it aggravates poverty and unemployment and is negatively correlated with income (Rogers, 1977).

Health has mainly been regarded as a major component of a nation's socio-economic development. Not only that good health contributes to better quality of life but is also fundamental to improving labour efficiency. The wide range of significance attached to the health of the populace and the level of economic wellbeing calls for government commitment worldwide on health issues. A growing health and health care conditions tend to lower poverty incidence and vice-versa. It therefore follows that health is a major form of human capital. In fact, ssubstantial agreement exists in the literature on the relationship between health and economic development that seems to back this assertion (Strauss and Thomas, 1998).

Human capital indicators such as education, health and nutrition have shown a deplorable state in Nigeria and these worsening condition seem to be critically above those of developing countries and Sub-Saharan African countries. It has been claimed that the poverty stricken state of the Nigeria's economy has some links with the nation's level of education and health conditions just as these indicators too contribute in many extent to the worsening state of poverty. Thus considerable controversy has been generated regarding the main contributors to the nation's poor economic welfare with variables ranging from non-implementation of macroeconomic policies capable of reducing the poverty tensions, diversification of resources into unproductive sectors and corruption being among the most mentioned.

On this note, the major objective of this study was to critically examine the link between poverty and human capital development indices with focus on education and health and then test the nature of the relationship between them to determine whether it is one way or two ways. The paper is divided into five sections. This brief introduction is followed by session II which is based on highlights of the trend in government expenditure behaviour on human capital development indicators most importantly education and Session III is concerned with health relevant conceptual frame work relating to poverty and human capital development while session IV presents the model and empirical discussion. Session V concludes along with recommendations.

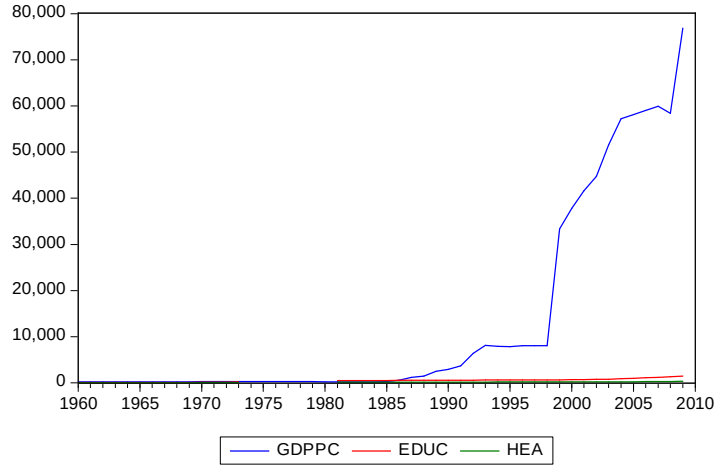
2. Government Expenditure on Human Capital Development In Nigeria: Comparative Evaluation of Education and Health Expenditures Relative to Per-Capita GDP.

Statistics on the expenditures on human capital development, most importantly on education and health is as presented in the graphical illustration below. It appears that generally, government expenditure increases with time except in few cases. Expenditure on education was N64.2 million in 1960 and it increased through 1966 when it was N110.8 million before dropping to N89.8 million in 1967. During the same 1960-1967, expenditures on health were comparatively lower than those of education indicating that expenditures were much more concentrated on education. Since 1970 however, expenditures on education has been on the increase and reached about N1,442.25 million as at 2009. Even though expenditure on health too increased over time, it is not comparable with the expenditure on education in terms of magnitude. Health expenditure was N12.6 million in 1960 which was about one-sixth of the expenditure on education for the same period. Expenditure on health dropped marginally in 1968 to N19 million and thereafter started increasing being N331.01million by 2009. This may be connected to the increasing campaign for the need to restructure the health sector through various reform programmes.

In growth rate terms, Expenditures on Health (HEA) exceeded those of Education (EDUC) especially during most periods in 1960-1973. Thereafter, the growth rates of expenditures for both seemed approximately the same. The Gross Domestic Product Per Capita (GDPPC), a proxy for the living standard of the populace, appears to be higher than the expenditure pattern on education and health for most periods with the exception of the periods 1981-1984 when the GDPPC values were lower than expenditure on education. As the data has shown, the increase in the GDPPC may have reflected the cumulative benefit from other sectors other than education and health. Given the proportion of education and health expenditures in the total expenditures, it is unlikely to have stimulated the expected growth in the living standard. On a comparative level, the growth rates among the three indicators did not match. For most cases, growth rates of GDPPC appear to have been lower than those of education and health expenditures and in some cases negative. This is obvious for most periods in the early 1960s with highest GDPPC growth of 0.21 and lower than the growth rate of health indicator of about 0.22.

As much as it is expected that education and health expenditure growth rates would induce improvement in living standard and vice-versa, such expected relationship does not seem to be realized. Ordinarily, increasing expenditure on education and health is an indication of building manpower skills and capacity for production efficiency which amounts to improving total productivity in general and improving the living standard in particular. By implication, a well-coordinated educational and health systems through adequate funding is likely to improve welfare. In the same way, an improvement in welfare improves quality of education and health in the society. Hence, there seems to be a two way relationship among these variables.

Fig. 1: Per Capita GDP, Education And Health Expenditure (1960-2009)



In spite of the growth that Nigeria's economy claims to have over time, it is ironical that the proportion of Nigerians living in poverty has continued to be higher every year. Between1960-2004, the proportion of population living below the poverty line increased significantly as shown below:

Table 1: Relative Poverty Head Count In Nigeria, Selected Years 1960-2010

Year	Poverty Incidence (%)	Estimated Population (Million)	Population in Poverty (Million)
1960	15.0	42.7	6.4
1980	27.2	64.6	17.1
1985	46.3	75.4	34.7
1990	44.0	86.6	38.0
1992	42.7	91.5	39.2
1996	65.6	102.3	67.1
2000	70.0	115.2	80.6
2004	54.4	126.3	68.7
2010	69.0	163.0	112.47

Sources: Compiled / calculated from National Bureau of Statistics HNLSS 2010 ; Oyeranti and Olayiwola, 2005; CBN Annual Reports, 2004; http://www.populstat.info/Africa/nigeriac.htm (for 1960 population figure)

The proportion of the core poor rose from 6.2% in 1980 to 29.3% in 1996 and dropped to 22.0% in 2004. The moderately poor proportion rose from 21.0% to 34.2% in 1980 and 1985 respectively. This figure dropped slightly between 1996 and 2004 from 36.3% to 32.4%. In 1980, the proportion of non-poor was much greater and was about 72.8% compared to 57.3% in 1992 and 34.4% in 1996. Even though this rose to 43.3% in 2004 and later dropped to 31% in 2010.

Table 2: Distribution of Poverty Incidence in Nigeria

Year	Non-Poor	Moderately Poor	Extremely Poor
1980	72.8	21.0	6.2
1985	53.7	34.2	12.1
1992	57.3	28.9	13.9
1996	34.4	36.3	29.3
2004	43.3	32.4	22.0
2010	31.0	30.3	38.7

Source: National Bureau of Statistics, Harmonized Nigeria's Living Standard, 2010

3. Relevant Literature

Several works have established that a close association exists between education and poverty. This highlights the need for investment in education since poverty and underdevelopment are in part the results of lack of education (Wedgwood, 2005; UNESCO, 2002, 2003). Akanni (2012) emphasized that education has to be relevant, functional and fulfill social obligations. According to Sen (1999), education contributes to development directly due to its relevance to the wellbeing and freedom of people and also indirectly through influencing social change and economic production thereby playing an important role in poverty reduction.

The relationship between health and growth has grown over time in the literature. At least three channels have been identified to support the argument that health matters for growth (Aghion, Howitt and Murtin, 2010). In the

first case, higher life expectancy tends to translate to higher domestic and national savings which may results in higher capital accumulation and this results in higher growth. Second, higher life expectancy may bring about higher investment in education which implies higher human capital formation which is also expected to result in growth. Third, better health may results in higher productivity, creativity and better adaptation to technologies. Healthier people are better workers. These three channels would in the long run reduce extent of poverty in the economy.

Different types of government expenditures affect poverty through different channels. Increasing education and health expenditures gives rise to quality and skilled human capital which tends to accelerate growth and improves standard of living of the masses (Barro, 1996; Romer, 1986). According to Wei (1994), there tends to be some positive link between poverty reduction and human resources improvement and increasing investment in human capital. A study carried out by Fan, Hazel, and Thorats (2000) have indicated that government expenditure on education and health gives rise to poverty reduction in India. In the study of the possible link among poverty, health and economic growth using panel data for India, Gupta and Mitra (2004) concluded that although economic growth reduces poverty, health improvement is also essential in alleviating poverty. The proposition here is that improved health situation brings about increased economic growth and vice-versa. For a high living standard and growth, increased investment in growth promoting sectors such as industry, education and health is a pre-requisite. A “virtuous circle” of swift progress in poverty reduction can be generated through effective and growth enhancing program. The adoption of a pro-poor growth strategy and enhancing human development creates an avenue for poverty reduction (Kemal 2000).

In Nigeria, the educational attainment of household is a major determinant of welfare in the household. The findings of Olaniyan and Bankole (2005) show that educational attainment impacts positively on welfare status of household in Nigeria. It has been argued that rising poverty trend in many households is traceable to the refusal of these households to send their children to school (Olaniyan and Bankole, 2004). However, low level of income on the other hand has been identified as one of the main reasons that parents withdraw their children from school (Ray, 2000).

In the same vein, many studies have indicated a positive relationship between education and poverty reduction. Bowman (1964), Lucas (1988), Barro (1991) and Romer (1990) have all reported a significant positive impact of education on growth. According to Melin(2002), improvement in education leads to reduction in poverty which in turn transforms into increase in demand for education, thus further improving the education status of the populace. It was argued further that education has the potential for making the gains in poverty reduction more effective and sustainable, even though it seems to be a long term measure in nature and effect. Mtey(2006) finds that education and poverty relates negatively to each other. This is an indication that the higher the level of education of the populace, the lower the proportion of poor people in a given total population based on the believe that education provides the knowledge and skills that are associated with higher wages or earnings. In a study conducted in Tanzania, Fan, Nyange and Rao (2005) reveal the usefulness of household survey in assessing the impacts of public investments on growth and poverty. The study shows that additional investments in rural education favours poverty reduction.

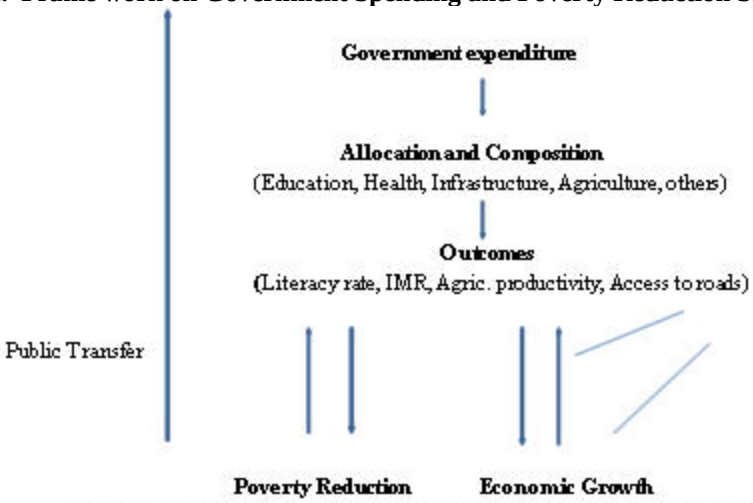
4. The Underlying Theory and the Model

Debates on the relevance of education in development have been influenced greatly by human capital theory. According to the human capital theory, there are substantial effects of education on social development (Michaelowa, 2000). The assumption here lies in the fact that formal education is a great contributory and even necessary factor towards improvement in the production capacity of a population (Olaniyan and Okemakinde, 2008). The argument put forward by human capital theorists is that educated population is productive because education increases people’s productivity and efficiency through increasing level of cognitive stock of economically productive human capability. A basic justification for increasing public expenditure on education both in developing and developed nations is provided by human capital theory with the assumptions that education initiates skills, which tends to give room for levels of productivity. The believe here is that higher level of education tends to create, on the average, higher levels of productivity. In the same vein, an effective anti-poverty policy needs to incorporate the enhancement of education and skills among the poor households. Thus such an approach is a pointer to improving productivity in the informal urban and rural economy.

Low health status has been regarded as the principal non-income characteristic of poverty. The vulnerability of the poor to sickness and consequently to untimely death due to dietary reasons are not subject to question. Following this are the children having less birth weight with poor medical care. Therefore, poor people face more ill health than the rich. To support this assertion, the World Health Organization (WHO) reports that “the poorest 20% of the global population are just 14 times more exposed to death in childhood than the richest 20% of the world’s population. To the poor, illness is probably the largest cost borne when a sole household depended upon is not able to earn his income. Poor health status could be attributed to malnutrition, bad sanitary conditions

and lack of standardized medical facilities. Therefore, good health is an important element of poverty reduction. Apart from good education, better health care is expected to improve work output of existing and potential generations. The reverse causality may also be possible i.e. transmitting low poverty incidence into better education and health.

Fig. 2. Frame work on Government Spending and Poverty Reduction Strategy



Source: Main part of flow chart extracted from Wilhelm and Fiestas (2005)

An understanding of how government spending that results in outcomes such as literacy rates, infant mortality rate etc affects poverty reduction can be created through some transmission mechanism. The flow chart above shows that government spending relates indirectly with poverty reduction. The effects on poverty reduction is obvious through the workings of the government spending resulting in outcomes such as literacy rate, infant mortality rate, agricultural productivity etc and it may have direct effects in the same or opposite directions as reduction in poverty.

The above theory throws more light on the direction which our model estimation takes. The foregoing discussion explains the significance of human capital indicator variables such as education and health which are the major focus of this study. In the same way, the significant contribution of reduced poverty level to education and health care status is also being considered. In effect, a two-way relation between poverty and human capital indicators is being postuated. Following the study of Sabeen, Mohammed, and Natasha on the impact of education and health on poverty in Pakistan, the major techniques carried out in our study is the multivariate cointegrating relationship among the variables. This is followed by examining the causal relationship among them. A multivariate cointegrating methodology in this context could be specified as:

$$(C_t) = (lgdppc, leduc, lhea, lcomm, ltrans, lutil) \quad \text{..... 1}$$

Where *lgdppc* describes the poverty status, *leduc* is government spending on education, *lhea* is government spending on health, *lcomm* is the government spending on communication, *ltrans* is the spending on transportation and *lutil* is the amount spent on utility. In a more specific case, the Johansen's Multivariate Methodology (JMM) was adopted. The starting point of the JMM takes the form of Vector auto-regression (VAR) system of order *p* such that:

$$y_t = \mu + \eta_1 y_{t-1} + \eta_2 y_{t-2} + \ldots\ldots + \eta_p y_{t-p} + \varepsilon_t \quad \text{.....2}$$

Where y_t is an n x 1 vector of variables integrated in its first difference [I(1)] and ε_t is an n x 1 vector of innovation. In a more explicit form, the VAR can be written as:

$$\Delta y_t = \mu + (\sum_{i=1}^{p} \eta_i - I) y_{t-1} + \sum_{i=1}^{p-1} (-\sum_{j=i+1}^{p} \eta_j) \Delta y_{t-i} + \varepsilon_t \quad \text{.....3}$$

If we let $\Pi = \sum_{i=1}^{p} \eta_i - I$ and $\Gamma_i = -\sum_{j=i+1}^{p} \eta_j$ and the coefficient matrix Π is such that the rank is reduced $r < n$, then there comes up nxr matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is stationary. r reflects the number of cointegrating relationships, the α components are called the adjustment parameters in the vector error correction specification and each column of β defines the cointegrating vector. It is easily shown that for a given r, the maximum likelihood estimator of β defines the

combination of y_{t-1} that yields the r largest canonical correlations of Δy_t with variables.

The JMM proposes two basic different likelihood ratio tests of the significance relating to these canonical correlations and hence the reduced rank of the Π matrix; these are the trace test which tests null hypothesis of r cointegrating vectors against the alternative hypothesis of n cointegrating vectors and the Maximum Eigen value test which in its own case tests the same null hypothesis against the alternative of $r+1$ cointegrating vectors.

Trace test statistic = $-T\sum_{i=r+1}^{n}\ln(1-\hat{\lambda}_i)$ 4

Maximum Eigen value test statistic = $-T\ln(1-\hat{\lambda}_{r+1})$ 5

None of these tests however follows a Chi-square distribution generally; asymptotic critical values are contained in Johansen and Julius (1990). The critical values used for the Maximum Eigen value and trace statistics are based on a pure unit-root assumption and would not be correct when the variables in the system are near-unit root processes. Establishing stationary variables in the system may not be an issue even though Johansen's methodology is typically used where all variables in the system are integrated in their first differences. Johansen (1995) observes that there is little need to pre-test the variables in the system in order that their order of integration may be achieved. If a variable is integrated in level instead of first differences, this would be revealed through a conitegrating vector whose space is spanned by only stationary variable in the model. Next we give a brief review of Granger causality test.

The Granger Causality test is the most commonly used method to estimate causality and demonstrates the direction of causality. This test as proposed by Granger and Sims (1972) is used to test if one variable is capable of forecasting another variable and vice-versa. Causality may run from one direction or both. Suppose there exists a two variable case model, the estimable equations are

$$y_t = \sum_{i=1}^{m}\tau_i x_{t-1} + \sum_{i=1}^{m}\varphi_i y_{t-1} + \mu_{1t} \quad .....6$$

$$x_t = \sum_{i=1}^{m}\sigma_i y_{t-1} + \sum_{i=1}^{m}\delta_i x_{t-1} + \mu_{2t} \quad .....7$$

Where μ_{1t} and μ_{2t} are serially uncorrelated random process with mean = 0. If it the case that x_t Granger causes y_t then $H_0 : \tau_1 = \tau_2 = \tau_3 = ...\tau_m = 0$ is rejected against the alternative hypothesis H_1 and similar reasoning goes for the case where y_t Granger causes x_t.

An application of causality test method requires the unit root test as a pre-condition. If the variables are stationary, then the causality test method follows. An application of Granger causality test to non-stationary series just as cointegration test leads to spurious regression.

The unit root test specification

For the specific case of the variables used in this study, we specify the unit root test equations as follows:

$$\Delta \lg dppc = \alpha_0 + \alpha_1 + \beta \lg dppc_{t-1} + \sum \sigma \Delta \lg dppc_{t-1} + \mu_t \quad 8$$

$$\Delta leduc = \beta_0 + \beta_1 + \beta leduc_{t-1} + \sum \sigma \Delta leduc_{t-1} + \mu_t \quad 9$$

$$\Delta lhea = \eta_0 + \eta_1 + \eta lhea_{t-1} + \sum \sigma \Delta lhea_{t-1} + \mu_t \quad 10$$

$$\Delta lcomm = \gamma_0 + \gamma_1 + \gamma lcomm + \sum \sigma \Delta lcomm + \mu_t \quad 11$$

$$\Delta ltrans = \theta_0 + \theta_1 + \theta ltrans + \sum \sigma \Delta ltrans + \mu_t$$

$$\Delta lutil = \varphi_0 + \phi_1 + \varphi lutil + \sum \sigma \Delta lutil + \mu_t \quad 13$$

Where "Δ"is the difference operator and applicable once the series is not stationary in level, the coefficients represent the constant, "t" is the trend and "μ_t" is the random term. The decision as to whether the series is stationary or not may be taken based on the probability values. If the probability value is less than a given threshold say 5%, then the series is stationary at 5% and thus the null of non-stationarity is rejected.

There is however an inevitable data issue in this study. There are incomplete data set for literacy rate, life expectancy and other proxies that can capture education and health variables. On this basis, we capture these by

the expenditure pattern of the government in these areas on the assumption that these tend to impact on the literacy rate and /or health status. The GDPPC variable captures the poverty status and is in line with the fact that poverty is often determine by monetary variables and can be captured by income or consumption per capita or per household. Other control variables such as communication, transportation and utility are also incorporated. Data on these are carefully collected from Central Bank of Nigeria Statistical Bulletin (CBN) from 1960-2009 and are available upon request.

5. Estimation Results and Discussion

Table 3: Unit Root Test Result

Variable	Prob	Decision
LGDPPC	0.71	N
Δ_{LGDPP}	0.00	S
LEDUC	0.92	N
Δ_{LEDUC}	0.11	N
$\Delta_{LEDU,2}$	0.00	S
LCOMM	0.89	N
Δ_{LCOMM}	0.00	S
LTRANS	0.77	N
Δ_{LTRANS}	0.00	S
LUTIL	0.36	N
Δ_{LUTIL}	0.00	S
LHEA	0.10	N
Δ_{LHEA}	0.99	N
Δ_{LHEA2}	0.00	S

N = Non-stationary, S = Stationary. Test at 5% level.
Source: Computed by the Authors

The unit root test results are as provided in table 1 above. None of the variables is stationary in level while two of the variables (LEDUC and LHEA) are stationary in their second differences while four of them namely LGDPPC, LCOMM, LTRANS and LUTIL are stationary in their first differences. This is in line with the fact that most economic variables are stationary in their first differences.

Some Diagnostic test

We next carry out some diagnostic test but this may involve lag length selection criteria. The first step begins here by choosing an optimal lag length as presented below:

Table 4: VAR Lag Order Selection Criteria for the Endogenous Variables LCOMM, LEDUC, LGDPPC, LHEA and LTRANS

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-119.83	NA	$3.62e^{-05}$	6.80	7.06	6.89
1	176.29	480.20	$2.91e^{-11}$	-7.26	-5.43*	-6.61
2	220.81	57.75	$2.16e^{-11}$	-7.72	-4.32*	-6.52
3	302.77	79.74*	$2.85e^{-12}$*	-10.20*	-5.24	-8.45*

The lag lengths are computed from various selection criteria such as sequential modified LR test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion(HQ). Each of these criteria is based on different penalty factors. The SC criterion supports the lag 1 while LR, FPE, AIC and HQ support lag 3. Lag length "3" is therefore chosen on the basis of the LR, FPE, AIC and HQ.

Table 5: VAR Residual Portmanteau Autocorrelation

Lags	Q-stat	Prob	Adj Q-stat	Prob	df
1	17.52	NA*	17.98	NA*	NA*
2	59.86	NA*	62.61	NA*	NA*
3	93.44	0.00	98.99	0.00	36

df = degree of freedom for (approximate) Chi-square distribution

As indicated in table 3, at lag 3, the null hypothesis of no serial correlation up to lag h is rejected at the 5% level.

Table 6: VAR Residual Serial Correlation LM test

Lags	LM-stat	Prob
1	71.94	0.00
2	57.18	0.01
3	49.21	0.07

Prob from chi-square with 25 df

The residual serial correlation test also confirms the existence of serial correlation at the given lags uptill the optimum lag 3.For lag 3, it is only significant at 10% level. Thus the hypothesis of no serial correlation is rejected.

Table 7: Unrestricted Cointegration Test for Trace and Max-Eigen tests

Hypothesized no. of cointegration	Trace test stat	5% critical value stat	Max Eigen test stat	5% critical value stat
None*	128.85	95.75	61.52	40.08
At most one	67.33	69.82	30.22	33.88
At most two	37.11	47.86	18.98	27.58
At most three	18.14	29.80	13.67	21.13
At most four	4.47	15.49	4.42	14.26
At most five	0.05	3.84	0.05	3.84

*denotes rejection of the hypothesis at the 5% level, ** Mackinnon-Haug-Michelis (1999) p values

The results of cointegration as depicted in table 7 shows that exactly one cointegrating vectors are present as given by the two test statistic: Trace test statistic and the Maximum Eigen test statistic. For the cointegrating vectors, both the trace test statistic and the Maximum Eigen values are greater than the 5% critical value statistic. i.e. 128 > 95.75, for trace test and 61.52 > 40.08. This demonstrates a long run relationship among the variables under study although this is not likely to be stable due to the small number of cointegrating vector. The intuition behind this is based on the interrelationship among them. Theoretically, an increasing expenditure on education increases knowledge and skills in the production of better quality output and again increases efficiency in production which transforms into declining poverty level. In the same way, increasing expenditures on health gives more physical capacity in contributing more to the work and hence increases output. This may further induce reduction in poverty. On the other hand, reduction in poverty is likely to increase the chance for better health care and education; all transmitting into further reduction in poverty. This may result in general improvement in facilities such as communication, transportation and so forth. However, the highest unrestricted cointegrating coefficient is for one cointegrating vector and is 56.02b for LEDUC and the lowest is -36.23 for LHEA.

Table 8: Normalized Cointegrating Coefficients (Standard Error in Parenthesis) for 1 Cointegrating Coefficient

LCOMM	LEDUC	LGDPPC	LHEA	LTRANS	LUTIL
1.00	-10.19	0.15	6.59	1.59	-0.95
	(0.52)	(0.02)	(0.33)	(0.09)	(0.04)

Under the normalized cointegrating coefficients for one cointegrating equation, the highest coefficient estimated is produced by LHEA of 6.59 while the lowest here is -10.19 and is for LEDUC. This is shown in table V(b) above.

Table 9: The Pair -Wise Granger Causality Test Results

Null	Prob. at lag 3
LGDPPC does not Granger Cause LCOMM	0.01
LCOMM does not Granger Cause LGDPPC	0.52
LGDPPC does not Granger Cause LEDUC	0.56
LEDUC does not Granger Cause LGDPPC	0.08
LGDPPC does not Granger Cause LHEA	0.09
LHEA does not Granger Cause LGDPPC	0.80
LGDPPC does not Granger Cause LTRANS	0.89
LTRANS does not Granger Cause LGDPPC	0.20
LGDPPC does not Granger Cause LUTIL	0.21
LUTIL does not Granger Cause LGDPPC	0.89

The pair-wise Granger Causality test is as shown in table above. The result is not in total disagreement with what is observed in the cointegrating relationship. The one cointegrating vector observed does not make the system to be stable. The causality results only show that there is a uni-directional causality running from spending on education to poverty measure but at 10%. By implication, it is likely that improvement in skills and knowledge is fundamental to reducing poverty level. In the same way, spending on health through health facility improvement is likely to have similar effect on poverty as demonstrated by the uni-directional causality. This is really showing the significant impact that increasing expenditures on education and health may play on reducing poverty in Nigeria. However, it is unlikely that a reduced poverty level may be transformed into improvement in education and health status. Neither one nor two way causality run from other controlled variables such as communication, transport and utility as indicated by the causality test results.

6. Conclusion and Recommendations

This study examined the relationship between human capital development as measured by expenditures on education and health, and poverty reduction. Over time, efforts to intensify poverty reduction strategies seemed not to be matched by development in human capital. Although the result showed that a long run relationship exists between indicators of human capital development used and poverty level but such relationship is not likely to be stable. This is re-emphasized by the causality test which demonstrated uni-directional causality from each of expenditure on education and health to poverty reduction and not vice-versa. On this note, in order that a sustainable poverty reduction programme be maintained through quality education and health services, it is important that:

i. increasing expenditures on education and health be encouraged through investment in productivity enhancing facilities that can spur growth in both education and health sectors.
ii. poverty reduction strategies pay increasing focus on education and health care development.
iii. pro-poor educational and health policies be pursued as priority development objectives.

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