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The Impacts of Health and Education Components of Human Resources Development on Poverty Level in Nigeria, 1980-2013.

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Abstract: *An investigation of the effects of health and education components of human resources development on poverty level in Nigeria was carried out in this paper by employing cointegration test and VECM, using the data of annual time series for the period 1980-2013. The findings reveal the existence of 8 cointegrating vectors which show a long-rum relationship among the variables. The VEC result on health component shows that the variables (HEXP, LR, and FR) have no significant impact on poverty level in Nigeria. The VEC result on education component shows that the variables (EEXP, PER, and SER) have no significant effect on poverty level in Nigeria. In contrast, only the TER that is statistically significant with t-statistic and p-value -2.142393 and 0.0421 respectively. The results suggest that level of poverty can be reduced through increases in health programmes and urgent attention to the education system of the country. Thus, if the objective of a policy is to reduce poverty level in Nigeria priority should be given to health-care system and welfare packages that will positively impact on the health of the citizens. Also, the education system should be re-organized to provide functional education and enrolment rate encouraged to serve the poverty reduction objective. This paper finds support to health-education-poverty reduction link.*

Keywords: *cointegration, education component, health component, poverty reduction, VECM.*

I. Introduction

1.1 Background of the Study

Human resources development is seen as the process of increasing the knowledge, skills and capabilities of people. This implies empowerment of people to growth and development of the nation and the society at large. Studies have identified five major means of developing human resources which include-formal education, training, extension services, health services and migration (i.e. visits or travels) [1], [2], and [3]. An earlier study by [4] points that:

> Human resources-not capital or income, not material resources constitute the ultimate basis for wealth of nations. Capital and natural resources are passive factors of production. Human beings are the active agents, who accumulate capital, exploit natural resources, build social, economic and political organization and carry forward national development. Clearly, a country which is unable to develop their skills and knowledge, the national economy will be unable to develop anything else.

In summary, Harbison links national development to human resources development without which national economy will not develop. In their own study [5], notes that underdevelopment, poverty and other social ills in Nigeria is a consequence of decline in the quality and functional education in human resource development and linked poverty, underdevelopment and other social ills to education. Therefore, deductively poverty is linked to human resources development. To buttress the assertion, studies such as [6], and [7] recognized two aspects of human capital- health and education aspects of human resources. Their studies considered both the impact of health and education as components of human capital development on poverty reduction in Nigeria. They conclude that poverty reduction objectives or economic growth cannot be achieved except these two components are improved because of its causality from health-education- poverty reduction link. The studies opined that, all things being equal, healthier workers are more likely to work longer hours, be more productive and secure higher earnings than diseased- ridden workers. In the same vein, given good macroeconomic policy framework, better health status leads to higher human capital accumulation in the form of education, on-the-job training, physical and cognitive development, technological advancement and enterprise development that translate to poverty reduction in the form of higher levels of earnings and per capita gross national product.

There is a growing consensus amongst analysts that there is widening inequality, increasing poverty, poor health, and reduction in educational standard, and general poor socio-demographic indicators [6]. In an earlier study to find plausible solutions to the problems faced by the country, [8] notes that education is a leading instrument for promoting economic growth and reducing poverty.

It is against this backdrop that this paper aims to find out the structural relationship between human resources development and poverty level in Nigeria. The outcome will be important to policy makers in analyzing the structure and transmission mechanism of both health and education indicators to poverty and determine the best policy mix to achieve poverty reduction objective in the country.

This paper is organized into five sections: section one is the introductory background of the study, section two talks about the theoretical framework and literature review, section three gives information on the research methodology, while section four deals with empirical results and discussion and finally section five covers the summary of findings, policy implications and policy recommendations.

II. Theoretical Framework and Literature Review

1.2 Theoretical Framework

Human capital theory is premise on the notion that an increase in the person's stock of knowledge and health raises his or her productivity in both market and non-market activities. The theory emphasizes how education increases the productivity and efficiency of workers by increasing the level of their cognitive stock. The provision of education is seen as a productive investment in human capital. Human capital development presupposes investments, activities and processes that produce technical education knowledge, skill, health or values that are embodied in people. It implies building on appropriate balance and critical mass of human resource base and providing an enabling environment for all individuals to be fully engaged and contribute to goals of an organization or a nation. Any effort to increase human knowledge, enhance skills, health, and productivity and stimulate resourcefulness of individuals is an effort on human capital development [9] and [10] notes that human capital consists of inherited and acquired abilities of labour, with education being the primary source of acquiring these abilities. Studies such as [11] and [12], identified effective investment in human capital and human resources development as critical components of long-run economic growth and improved productivity.

1.3 Empirical literature

The vision of ensuring reduction of mass poverty at a meaningful magnitude is conventionally enshrined in Nigeria's vision 20:2020 development strategy document. In his study, [13] sees human capital as the stock of competencies, knowledge, social and personality attributes, including creativity, cognitive abilities, embodied in the ability of labour to perform so as to produce economic value. The increasing government expenditure on human capital development is justified based on its impact on individual's lifetime incomes, economic growth and fostering economic development and poverty reduction in general [14], [15], [16], [17] and [18]. [19], opined that health could be seen as physical and mental wellbeing of people which is measured using indicators such as life expectancy, adult mortality rate, and child mortality and survival rates and so on. Health has been considered to be very important in terms of how it affects productivity as well as other means of human capital formation. The level of productivity and growth in an economy will be hampered by ill- health and prevalence of diseases. According to [20], "health is a direct source of human welfare and also an instrument for raising income levels". This suggests that poverty is a direct incidence of ill-health because the major indices of poverty are the levels of income, and good health is an instrument for raising income levels. But adequate recognition has not been given to the health component of human capital resources. [21], in his study on the relationship between health and productivity in Canada found that health is an important driver of productivity. [22] studied the impact of health on economic growth in 52 countries drawn from Europe(thirteen), Africa (twelve), America (sixteen), and Asia (eleven) from 1970-1990, and found that health capital has significant positive impact on economic growth and recommended inclusion of health investment as a tool of macroeconomic policy. [23] studied the effect of health on the growth of countries. He used derivatives to show different channels through which improvement in a countries population health will impact on its long-run growth performance. He found that health raises the productivity and per-capita GDP relative to world technology leaders. Studies by [24], [25] and [26] found that human capital impact positively to economic growth in Nigeria. Most of the empirical literatures reviewed support that both health and education components of human capital impact positively to productivity of individuals and economic growth of Nigeria. But the structural and transmission mechanism of indicators of these two components to poverty reduction in Nigeria has not been robust.

III. Data and Method of Analysis

3.1 Data

The data used for this study are time series covering 1980-2013 periods and were obtained from the Bulletin of Central Bank of Nigeria (CBN) and the National Bureau of Statistics (NBS) of various issues.

3.2 Method of Analysis

This paper made use of econometric procedure in estimating the relationship between the variables. The Vector Error Correction Mechanism (VECM) was employed in obtaining the coefficients of the equation. The Augment Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to test the stationary of the variables. Equally, Johanson co-integration procedure was used to test the existence of long-run equilibrium (stationary) relationship among the variables. This is necessary because the existence of co-integration of the variables will lead us to employ VECM to capture and correct the short-run dynamics in the time services. In demonstrating the application of VECM, the multiple linear regression analysis was used where the poverty index, life expectancy rate, fertility rate, ratio of health expenditure to GDP, primary school enrolment rate, secondary school enrolment rate, tertiary school enrolment rate and ratio of education expenditure to GDP were the relevant variables. The poverty index was used as the dependent variable while others were used as independent variables.

3.3 Model Specification

This paper employed a multiple linear regression function of the form:

PI=f(LR, FR, HEXP, PER, SER, TER, EEXP) ---------- (1)

Where:

PI=Poverty index
LR =Life expectancy rate
FR=Fertility rate
HEXP= Ratio of health expenditure to GDP
PER=Primary school enrolment rate
SER=Secondary school enrolment rate
TER=Tertiary school enrolment rate
EEXP=Ratio of education expenditure to GDP

The general model is expressed in a mathematical equation as: $PI= bo +b_ILRt + b_2FR_t +b_3HEXP_t +b_4PER_t +b_5SER_t +b_6TER +b_7EEXP +u_t$..... (2)

3.3.1. Health component of the model:

$PI=bo + b_1 LR_t +b_2 FR_t+ b_3HEXP+ U_t$---------- (3)

3.3.2. Education component of the model:

$P1=bo+ b_1PER_t +b_2SER_t +b_3TER +b_4EEXP_t+U_t$---------- (4)

VI. Empirical Results and Discussion

4.1 Unit Root Test

We tested to determine if the variables in equation (2) are stationary and to know their order of integration. We applied both the Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) tests to find the existence of unit root in each of the variables. The results of both the ADF and PP tests are presented inTable1.

Table 1: Unit Root Test Result

Time series variables	ADF (intercept and Trend)	PP (intercept and Trend)	1 % level	5 %	10 %	Order of integration
PI	-5.554150 _____	_____ -5.554150	-3.653730 - 3.653730	-2.957110 -2.957110	-2.617434 -2.617432	1 (1) 1 (1)
FR	-9.183670 _____	_____ -8.761026	-3.661661 -3.661661	-2.960411 -2.960411	-2.619160 -2.619160	1 (2 1 (2))
LR	-3.564308 _____	_____ -7.649353	-3.661661 -3.661661	-2.960411 -2.960411	-2.619160 -2.619160	1 (0) 1 (2)
HEXP	-8.446214 _____	_____ -9.459204	-3.653730 -3.653730	-2.957110 -2.957110	-2.617434 -2.617434	1 (1) 1 (1)
PER	-8.112114 _____	_____ -5.297566	-3.689194 -3.653730	-2.971853 -2.957110	-2.625121 -2.617434	1 (1) 1 (1)
SER	-4.902747 _____	_____ -4.902747	-3.653730 -3.653730	-2.957110 -2.957110	-2.617434 -2.617434	1 (1) 1 (1)
TER	-5.790630 _____	_____ -5.794101	-3.653730 -3.653730	-2.957110 -2.957110	-2.617434 -2.617434	1 (1) 1 (1)
EEXP	-8.140236 _____	_____ -7.224702	-3.646342 -3.646342	-2.954021 -2.954021	-2.615817 -2.615817	1 (0) 1 (0)

Note: Mackinnon (1996) one sided P-value and critical value for rejection of hypothesis of unit root were applied. Source: Author's estimation using E-views 7.0.
The above table (Table 1) reveals that EEXP is stationary at levels while PI, HEXP, PER, SER and TER are stationary at first difference. Only FR is stationary at second difference while LR is stationary at levels in ADF at 5% and 10% levels of significance and stationary at second difference in PP at 1%, 5% and 10% levels of significance. On these bases, the null hypothesis of non-stationary of the time series is rejected we conclude that the series are stationary.

4.2 Cointegration Test Result

As we confirmed the stationary of the variables, we proceeded to examine the presence or non-presence of cointegration among the variables. When a cointegration relationship is present, it means that the variables share a common trend and long-run equilibrium as suggested theoretically. We started the cointegration by employing the Johansen and Juselius multivariate cointegration test.

Table 2: unrestricted Cointegration Bank Test (Race)

Hypothesized No. of CE (s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.933127	302.1717	159.5297	0.0000
At most 1*	0.873081	215.6131	125.6154	0.0000
At most 2*	0.793710	149.5585	95.75366	0.0000
At most 3*	0.679443	99.04741	69.81889	0.0001
At most 4*	0.504312	62.64118	47.85613	0.0011
At most 5*	0.387955	40.18329	29.79707	0.0023
At most 6*	0.319373	24.47288	15.49471	0.0017
At most 7*	0.316163	12.16116	3.841466	0.0005

Trace test indicates 8 cointegrating eqn (s) at the 0.05 level; *denotes rejection of the hypothesis at the 0.05 level; **Mackinnon-Haug-Michelis (1999) P-values.
Source: Author's Estimation using E-views 7.0.

Table 2 shows the result of the cointegration test. The trace statistic indicates Eight (8) cointegrating equations at the five percent (5%) level of significance. It shows existence of long-run relationship among all the variables tested. The result in the Table 2 was obtained after the sample was adjusted from 1980 to 1982-2013, i.e by including 32 observations. Linear deterministic trend assumption and lags interval (in first differences) 1 to 1 in the series were made.

4.3 VECM Test Result

The presence of long-run equilibrium relation among the variables led us to apply VECM. With this approach, both the long-run equilibrium and short-run dynamic relations among the variables were established.

Table 3: VECM with P-values (Health component of poverty index)

Error Correction	Coefficient	Std. Error	t-statistic	P-value
CointEq1 = C(1)	-0.594161	0.234033	-2.538794	0.0175
D(P1(-1)) = C(2)	0.192913	0.218480	0.882978	0.3853
D(LR(-1)) = C(3)	2.574259	1.921056	1.340023	0.1918
D(FR(-1)) = C(4)	27.08952	19.30076	1.403547	0.1723
D(HEXP(-1))=C(5)	3.608051	1.969103	1.832332	0.0784
C = C(6)	0.694616	0.561199	1.237735	0.2269

R^2 =0.339656, F-Statistic = 2.674688, Prob(F-Statistic)=0.044385, DW=1.902756.
Source: Author's Estimation using E-view 7.0.

From the results in Table 3 above, the t-statistic for LR, FR and HEXP are 1.340023, 1.403547 and 1.832332 respectively while their p-values are 0.1918, 0.1723 and 0.0784 respectively and the chosen level of significance is 0.05 that is less than the p- values, it shows that the variables have no significant impact on poverty level in Nigeria. From Table 3, the coefficient of ECM(-1) is -0.594161 satisfying the negativity condition and its p-value is 0.0175 that is less than 0.05 level of significance satisfying the second condition of statistical significance. The coefficient indicates that the speed of adjustment between the short-run dynamics and the long-run equilibrium is 59.42% in absolute value. The computed coefficient of determination (R^2) =0.339656. It

shows that 34% of the total variations in the dependent variable are accounted for by the variations in the explanatory variables while 66% of the total variations in the poverty level are attributable to the influence of other factors not included in the regression equation.

Table 4: VECM with P-Values (Education component of poverty index)

Error Correction	Coefficient	Std. Error	t-statistic	P-value
Cointeq1=C(1)	0.051920	0.047822	1.085691	0.2880
D(PI(-1))=C(2)	-0.102616	0.195058	-0.526078	0.6035
D(EEXP(-1))=C(3)	-0.288963	0.582524	-0.496053	0.6242
D(PER(-1)) =C (4)	-0.146097	0.092535	-1.578834	0.1269
D (SER(-1))=C (5)	0.096026	0.067065	1.431840	0.1646
D(TER(-1))=C(6)	-0.554104	0.258638	-2.142393	0.0421
C =C(7)	0.427916	0.278734	1.535215	0.1373

R^2 =0.175028, F-statistic = 0.884010, prob (F-statistic) =0.521034, DW= 1.790435. Source: Author's Estimation using E- view 7.0.

From the results in Table 4 above, the t-statistic for EEXP, PER, and SER, are -0.496053,-1.578834 and 1.431840 respectively while their p-values are 0.6242,0.1269 and 0.1646 respectively and the chosen level of significance is 0.05 that is less than the p- values, it shows that the variables have no significant impact on poverty level in Nigeria. In contrast, the t-statistic and p-value for tertiary school enrolment rate (TER) are -2.142393 and 0.0421 respectively. This shows that the variable (i.e. tertiary school enrolment rate (TER) has significant impact on poverty index in Nigeria. From Table 4, the coefficient of ECM (-1) is 0.051920 that does not satisfy the negativity condition and its p-value is 0.2880 that is higher than 0.05 level of significance and does not satisfy the second condition either. This implies that the educational system in Nigeria, taking ratio of education expenditure, primary school enrolment, secondary school enrolment and tertiary school enrolment into consideration do not significantly impact on poverty reduction in Nigeria. By extension, this result suggests non functionality of the education system. That is the system does not provide the functional education needed to help reduce poverty. The coefficient indicates that the speed of adjustment between the short-run dynamics and the long-run equilibrium is 5.2%. This is statistically very low, the computed coefficient of determination (R^2) = 0.175028. It shows that only 17.5% of the total variations in the dependent variable are accounted for by the variation in the explanatory variables while 82.5% of the total variation in the poverty level is attributable to the influence of other factors.

V. Summary Of Findings, Policy Implications And Policy Recommendations.

This paper has attempted to investigate the effects of health and education components of human resources development on poverty level in Nigeria by employing co integration test and VECM, using the data of annual time series for the period 1980-2013. The Johansen multivariate co integration test indicates 8 co integrating equations, showing a long-run relationship between ratio of health expenditure to GDP (EEXP),life expectancy rate (LR), fertility rate (FR), primary school enrolment rate (PER), secondary school enrolment rate(SER),tertiary school enrolment rate (TER) and poverty index (PI). The VEC result on health component shows that the variables (HEXP, LR and FR) have no significant impact on poverty level in Nigeria. The VEC result on education component shows that the variables (EEXP, PER, and SER) have no significant impact on poverty level in Nigeria. In contrast, only the tertiary school enrolment rate (TER), that is statistically significant with t-statistic and p-value -2.142393 and 0.0421 respectively. The finding shows that, the health component of human resources development satisfy the first and second ECM(-1) conditions of negative coefficient and p-value less than 0.05 chosen level of significance with -0.594161 coefficient and 0.0175 p-value. The finding also indicates that the education component of human resources development did not satisfy the first and second ECM(-1) conditions of negative coefficient and p-value less than 0.05 chosen level of significance with 0.051920 coefficient and 0.2880 p-value. The results on health component support the findings by World Bank, Levine & Renelt, Barro & Sala-i-, Martin, Romer, Lucas and Bloom & Canning. The results on education component support the finding by Oshofowo, and Ibidapo-Obe. The results suggest that level of poverty can be reduced through increases in health programmes that will enhance life expectancy rate, fertility rate and increase in health expenditure. The results also suggest urgent attention to the education system of the country for it to have significant impact on poverty reduction. Thus, if the objective of a policy is to reduce poverty level in Nigeria priority should be given to health-care system and welfare packages that will positively impact on the health of the citizens. Also, the education system should be re-organized to provide functional education and enrolment rate encouraged to serve the poverty reduction objective. Equally, the findings of this study by extension find support to health-education-poverty reduction link.

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