



Education and the Challenge of Poverty Alleviation in Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author RO wrote the first draft of the manuscript. Author SIO read through the manuscript and made necessary corrections, while author OPO handled the statistical analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

Using Vector Autoregressive and Autoregressive Distributed Lag methods to examine the impact of education on poverty level and the interactive effect of education and economic growth on poverty level in Nigeria between 1985 and 2016, our results show that education promotes poverty level, instead of reducing it. We found significant cointegrating relationship among poverty, economic growth, education, employment rate, population growth rate, real physical capital formation, education level and real GDP. In the short-run, employment rate reduces poverty level, population growth rate increases poverty level both in the short and long-run. The results of interactive effect of economic growth and education on poverty growth show that jointly economic growth and education reduce poverty, although the results are not statistically significant. This shows that they have minimal impact on poverty level in Nigeria. Our findings may not be surprising, given the current slow-down in Nigeria educational system and the wide gap between the few rich and the larger poor. The study suggests improvement in Nigeria educational system so as promote employment and curb rising poverty level.

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1. INTRODUCTION

One of the major problems facing developing countries recently is high level of poverty. Among the badly affected countries is Nigeria. According to [1], Nigeria ranked 153 with a value of 0.471 among 187 countries. Poverty situation in Nigeria is quite alarming as both the qualitative and quantitative measurements have attested to the growing incidence and depth of poverty. Studies have shown that human capital development can be an expressway for poverty alleviation. To have human capital development, investment in education has been noted to be highly essential [see 2]. Education can be an instrument for increased productivity. For example, the sharp improvement in the economies of Asian Tigers: Taiwan, Singapore were noted to be a result of substantial investment in human capital. Given the importance of education to an economy, it was recommended by the United Nations that developing countries should invest a minimum of 26% on education.

According to [3], it was postulated that the well-being of people is determined by what their governments spend on education. This position was confirmed by [4] that an increase of national incomes and per capita income is a function of education, and disparities among nations can better be explained by the differences in the endowments of human rather than physical capital. Importance of education is buttressed by Asian Tigers experience that allocates 25–30 percent of their annual budgets to education sector, and their ability to reduce poverty level in their countries. There is widespread agreement that poverty and poor educational outcomes are related in the sense that poor educational outcomes cause low productivity and thereby results to low income and increased poverty. Nigerians have been witnessing a weakening in living standards, due partly to a fall and unstable GDP from an annual average of 10.5 percent in 1985 to 3.2 percent in 2007 and recession between 2003 and 2017 [5]. Consequently, the country also experienced a decline in its per capita income from US\$1600 in 1980 to US\$1160 in 2008, declining further to US\$560 in 2016 [6]. This value is further eroded by inflation rate with the increase of 15.7 percent as of 2016. A study by [7] on the relationship among education, economic growth and poverty rate in Nigeria suggests a long run relationship. Government expenditure on education was found

to have a positive and significant impact on economic growth (both in the short run and long run), literacy rate has positive but insignificant impact on growth. Possible reasons could be high rate of unemployment among school leavers, weak institutional mechanism, obsolete school curricula, shortage of critical infrastructure and brain-drain syndrome which characterize the economy.

In order to take advantage of the importance of education as one of the panacea that can provide a foundation for eradicating poverty and fostering economic development, Nigeria government had intensified various national development plans, yet poverty is still a major challenge. As at December 2015, poverty in Nigeria has been a problem for more than 50 percent of the population in the past 10 years, with increase of over 60 percent. In 1980 however, about 28 percent of Nigerians are living below the poverty line. Considering Nigerians real per capita income, poverty incidence has been on the increase since 1970. Despite being the 3rd biggest economy in Africa, Nigeria ranks around 160th out of 177 countries on the scale of Human Development Index (HDI). [8] has noted that despite the rebasing of Nigerian economy, almost 100 million people in Nigeria are living on less than \$1 per day despite strong economic growth in the country.

Recently, intensification of government's efforts to promote literacy among the citizens, coupled with establishment and various licensed private secondary and tertiary institutions had led to an increase in literacy rate in Nigeria. With this, one would have expected reduction in poverty level, however, opposite is the case. This has prompted the need to re-examine the relationship between education and poverty; as well as the interactive effect of education and economic growth on poverty incidence between 1985 and 2016.

2. LITERATURE REVIEW ON EDUCATION AND POVERTY

Many studies agree that from the macroeconomic perspective the accumulation of human capital improves the labour productivity, facilitates technological innovations, increases the returns to capital and make growth more sustainable which in turn supports poverty reduction [see 9]. From the microeconomic

perspective, education increases the probability of being employed in the labour market and improves earning capacity. [10] observed that education is an important tool to empower people to overcome exclusion based on gender, location and other links of poverty. In virtually all countries, developed and developing alike, there is tremendous popular demand for education particularly schooling due to its inherent benefits. Education plays crucial roles in securing economic and social progress, thus it improves income distribution which may consequently salvage people from poverty.

Poverty reduction studies lay much emphasis on human capital for curbing poverty because it is realized that without human capital formulation, the goal of development and poverty reduction is inevitable. [11] postulates how the inter-relationship between education and poverty can be understood in two ways: Investment in education increases the skills and productivity of poor household. Also poverty may constitute a major constraint to educational attainment in three perspectives: According to [12] and [13], poverty may impede the acquisition of learning and other school materials, poverty may generate social pressures which could mar the attitude of poor students. [14] analysed the impact of education expenditures on human capital development. The study used historical data to establish the correlation between public education expenditure and human capital development in Nigeria and noted that inadequate and uncertain budgetary allocations to education have resulted in the decline of its impact on human capital development. In an empirical study by [15] on the impact of education on poverty reduction, a co-integration analysis on Pakistan, extracted 34-time series annual observations, employed Augmented Dickey Fuller (ADF) causality and Johansen co-integration methodology to test for the existence of long-run relationship between the relevant variables. The test concluded that literacy rate and gross enrolment (secondary) has negative and significant impact on poverty reduction in long-run but life expectancy has positive impact on poverty reduction.

In the work of [16] on the role of education and income in poverty alleviation: A Cross-Country Analysis. They used a panel of 40 Countries for the period 1999 to 2007 with Generalised Least Square technique and explained that education has direct and indirect effects on human well-being and development. The direct effect leads

to skill acquisition and human capital formulation that improves productivity of individuals and nation as a whole, and this engenders economic growth and reduces poverty. The indirect effects convey human mobility that creates employment and awareness that impacts positively on health and human capabilities. Improvements in health increases productivity which ultimately increases economic growth and poverty alleviation.

According to [15], it was observed that higher level of education of the population, leads to lower number of poor people because education imparts knowledge and skills which are helpful in higher wages. The direct effect of education on poverty reduction is through increasing the earnings\income or wages. The indirect effect of education on poverty is important with respect to human poverty because as education improves income, achievement of basic necessities become easier and raises the living standard indicating a reduction in human poverty. [17] also noted that education reduces poverty by playing a very crucial role in building of human capabilities and enhances economic growth through skills and knowledge. It serves as a necessary part of human proficiency and power. Also, [18] postulated that education helps to lower income inequalities, crime rate, terrorism and child labour. Govinda [19] tried to find the relationship between non-formal education and poverty alleviation analysis of field experiences from Asia. The objective is to capture the dynamics of the relationship between non-formal education programmes, especially income-generation activities and poverty reduction. He found that the low level of literacy and life skills is a major factor contributing to the perpetuation of poverty in an intergenerational framework.

2.1 Connection among Economic Growth, Poverty and Education

Oladeji [20] ascribed education as a key to poverty reduction and vehicle for promoting equity, fairness and social justice and also helps to supply the essential human capital which is a paramount condition for sustained economic growth. [21] observed that in the past, much of the planning in Nigeria was centered on accumulation of physical capital for rapid growth and development without regard to the role human capital plays as assets if not the most important asset. Human resources have been identified not only as a major growth determinant and a channel to ease poverty but it is also very

important in building or improving the quality of human in general.

There is a consensus that expansion of skills, knowledge and capacities of increasing human capital is critical for economic growth and poverty reduction. Human capital theory predicts that more educated individuals are more productive and good education from childhood enhances cognitive functions and reduces future poverty. Also educated individuals would have more incentives to invest in future education and training of their children and contribute to the entire society. Another side of the argument revealed that the educational systems of many developing countries act to increase income inequalities, due to inegalitarian educational system [see 22].

An empirical study by [23] on the nexus of poverty, GDP growth, dependency ratio and employment in developing countries using cross data from forty-one countries, selected from Asia, Latin America and sub-Saharan Africa, found that economic growth, poverty reduction and industrial employment significantly affect age dependency ratio. The study observed that dependency ratio is generally high in developing countries and this factor perpetuates poverty from one generation to the next. The possible solution of stable economic growth with an increase in labour productivity coupled with labour-intensive technology is a remedy vicious cycle of poverty in the region. Developing countries are characterized by poor and unstable economic growth of GDP which further worsen the living conditions and increase poverty incidence [24]. [25] found that in Caribbean countries, the causes of poverty are interrelated and complex and that, this is attributable to factors such as negative and unstable economic

growth, macroeconomic instability and decline in the quality of social services. It was opined appropriate policy measures and active implementation process will break the jinx of poverty.

2.2 Conceptual Framework

The conceptual framework of this study is explained in Fig. 1. The Figure showed the interconnection among education, poverty and economic growth. Education reduces poverty by increasing the productivity of individuals, households and nations. Improved productivity enhances living standards and socioeconomic status of the citizenry, it is generally believed to be an instrument of poverty reduction, it can transform a society from poverty to prosperity. When education is taken in broader form, to include Research and Development, technology advancement, innovation and inventiveness, its contribution to poverty reduction is immense. In the same vein, poverty reduction impacts economic growth positively. When there is substantial reduction in poverty of an economy, it generates high levels of savings and investments, development of rural sector where the majority of the poor are concentrated, occurrence of distribution of assets and other means of production and increasing the capabilities of the poor. The poor through reduction of their poverty can now invest in health and education, this will enable workers to seek enhanced economic opportunities while health investment will reduce the burden of disease. There is a positive link between economic growth and broader measures of human development. Strong growth and employment opportunities improve incentives for families to invest in education by sending their children to school.

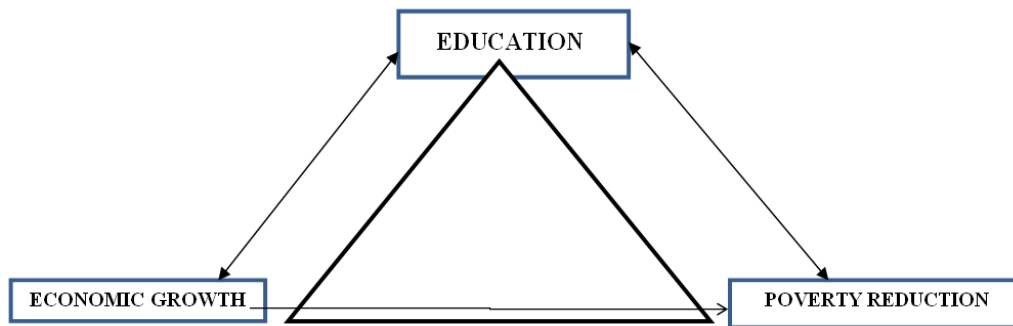


Fig. 1. The interrelationship among education, economic growth and poverty reduction

As depicted in Fig. 1, building of human capabilities through education reduces poverty and engenders economic growth. In the same vein, inclusive and broad-based economic growth reduces poverty. Poverty reduction enables individuals, households and nations to invest in education and development of human capacities. Education backs the growth of an economy through acquisition of skills and training. Human capital formation through schooling forms part of the wealth of nations, development of high-level manpower. It is a way of enlarging human capabilities, impliedly empowerment of people, enables their active participation in the development process. Increasing employment has been crucial in delivering higher growth. Economic growth influences poverty reduction through pro-poor growth and trickle-down effects. For economic growth to reduce poverty, the growth has to be substantially higher than population growth and has to be broad-based. Economic growth is pro-poor, through inclusion of the poor by maximising their opportunities and by utilising their skills, time and physical resources. Through this they will be enabled to contribute to economic growth and benefit from increased national income. The emphasis is on expansion of opportunities and capabilities of the poor, employment or job creation with the aim of achieving enhanced growth with greater equity.

Poverty tends to increase educational dropouts; generally the number of enrolments at all levels cannot be equated to number of graduates at each level. Weak economic growth implies vicious circles in which poor human development contributes to economic decline, leading to further decline in human development. As levels of per capita income increases, there is higher rates of primary and secondary schools enrolments. The educated have the tendency to apply a measure of intricacy in the production. However, high levels of poverty can have a

negative impact on overall economic growth rates, aggravates social tensions, limit the functionings of markets and adversely affects the employability of the poor and the underprivileged. High and sustainable economic growth increase educational investment. As global economy is becoming more knowledge-based, there is an increased areas of comparative advantage for people endowed with relevant skills and training which can be made possible through improved and accelerated investment in education. One of the reasons that limit Research and Development, technology advancement is poverty. Through technology development, efficient and effective means of production, intensive research and technological innovations are formulated. Poverty becomes endemic due to lack of capabilities. From this conceptual framework, it can be stated that education, economic growth and poverty incidence are interrelated therefore there is a dynamic relationship among them. In Fig. 1, the relationship among these variables can also be viewed as cycle: It is widely agreed that the relationship between education and poverty operates in this direction. Poor people are often unable to obtain access to adequate education and without adequate education people are often constrained to a life of poverty.

3. METHODOLOGY, DATA MEASUREMENT AND SOURCES

In this study, the relationship between education and poverty in Nigeria was examined using the Vector Autoregressive (VAR) method to analyse the dynamic interactions and the relationship between education and poverty. From the conceptual framework, there is interconnectedness among education, economic growth and poverty level; hence either of the variables can act as dependent variable. We specify our VAR as:

$$\begin{bmatrix} \Delta POV_t \\ \Delta EDU_t \\ \Delta RGDP_t \\ \Delta PC_t \end{bmatrix} = \begin{bmatrix} \eta 1 \\ \eta 2 \\ \eta 3 \\ \eta 4 \end{bmatrix} + \sum_{m=1}^p \begin{bmatrix} \alpha_{1m} & \beta_{1m} & \delta_{1m} & \gamma_{1m} \\ \alpha_{2m} & \beta_{2m} & \delta_{2m} & \gamma_{2m} \\ \alpha_{3m} & \beta_{3m} & \delta_{3m} & \gamma_{3m} \\ \alpha_{4m} & \beta_{4m} & \delta_{4m} & \gamma_{4m} \end{bmatrix} \begin{bmatrix} \Delta POV_{t-m} \\ \Delta EDU_{t-m} \\ \Delta RGDP_{t-m} \\ \Delta PC_{t-m} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \quad (1)$$

Where,

RGDP = real gross domestic product (is used as a proxy for economic growth, EDU = primary school enrolment, PC = real physical capital formation, POV = real per capita consumption expenditure (is used as a proxy for poverty reduction. The interactive effect of education and economic growth on poverty incidence during the period of study was analysed on the basis of the autoregressive distributed lag model as follows:

$$\Delta POV_t = \beta_0 + \sum_{j=1}^p \alpha_j \Delta POV_{t-j} + \sum_{j=1}^p \beta_j \Delta EDX_{t-j} + \sum_{j=1}^p \Phi_j \Delta RGDP_{t-j} + \sum_{j=1}^p \delta_j \Delta EDU * RGDP_{t-j} + \sum_{j=1}^p \omega_j \Delta POPN_{t-j} + \sum_{j=1}^p \Omega_j \Delta EMP_{t-j} + \lambda_1 EDU_{t-1} + \lambda_2 RGDP_{t-1} + \lambda_3 RGDP * EDU_{t-1} + \lambda_4 POPN_{t-1} + \lambda_5 EMP_{t-1} + \lambda_6 ECM_{t-1} + \varepsilon_t \tag{2}$$

Where,

POPN = population growth rate, EMP =employment growth rate, RGDP = real gross domestic product (is used as a proxy for economic growth, EDU = primary school enrolment, PC = real physical capital formation, POV = real per capita consumption expenditure (is used as a proxy for poverty reduction)

We use annual time series from 1985 to 2016. Data on economic growth (RGDP), primary school enrolment rate (EDU), poverty level (POV), population growth (POPN), real physical capital formation (PC) and employment rate (EMP) were obtained from World Bank Development Index (2016). RGDP is used to proxy economic growth. POV = real per capita expenditure, a proxy for poverty reduction. This indicator is consistent by the definition given by the World Bank which defines poverty as “the inability to reach the subsistence level of life” measure in terms of basic consumption needs [26]. Data analyses are carried out based on the aforementioned models including descriptive and inferential statistics and using the software Eviews-8.

4. RESULTS OF THE FINDINGS, DISCUSSION AND CONCLUSION

Before the analysis of our variables, we first examine the summary statistics of our variables. The results are shown in Table 1.

Our variables showed level of consistency as most of the means and medians have values within the maximum and minimum values. The low levels of standard deviation show that the dispersions of the actual data from their mean were very small. We also subjected our data to unit roots tests to determine their stationarity or otherwise using Augmented Dickey-Fuller (ADF),

Phillips-Perron (PP) and Structural Break Tests. From the tests, it was observed that some of the variables were not stationary at I(0) and I(1), so there was a need to test for structural break in the variables. The results showed that there was structural break in population growth rate in 2001, real GDP in 1997, real per capita consumption expenditure in 1997, real physical capital formation in 2009, employment rate in 2015 and primary school enrolment in 2007. After adjusting for the structural break, some of the variables were stationary at I(0) while some were stationary at I(1). We then employed a Vector Autoregressive (VAR) methodology to analyse the effects of education on poverty incidence in Nigeria between 1985 and 2016. Our VAR results show that primary school enrolment and poverty are positively related both at the first and second lags and they are statistically significant. It can be inferred from these results that previous year of poverty is important in accounting for the existing state of poverty incidence. This is an indication that poverty incidence can be generational and be in vicious cycle if not broken through intervention such as education, training or other forms of increasing the poor capabilities. The results indicate that previous years of primary education enrolments are important for the current rate of primary enrolments and also the previous poverty level determines the primary enrolments. These results are presented in Table 2.

Table 1. Summary statistics of variables

	POPN	EMP	EDU	PC	POV	RGDP
Mean	2.57	-8.40	92.20	27.48	28.00	28.37
Median	2.55	0.01	93.27	27.45	28.27	28.71
Maximum	2.68	0.01	106.24	30.12	29.59	29.76
Minimum	2.49	-0.01	78.61	24.99	25.86	26.35
Std. Dev.	0.07	0.01	6.76	1.67	1.15	1.08
Skewness	0.28	-0.03	0.08	0.24	-0.71	-0.69
Kurtosis	1.38	2.81	2.34	1.89	2.27	2.15
Jarque-Bera	2.44	0.03	0.52	1.22	2.13	2.18

Table 2. Results of effects of education on poverty incidence

	Poverty level	Primary school enrolments
Poverty Level(-1)	0.92 (0.245) [3.62]	-1.25 (1.14) [-1.10]
Poverty Level(-2)	-0.14 (0.27) [-0.50]	2.42 (1.23) [1.97]
Pry School Enrolments(-1)	0.10 (0.04) [0.28]	1.25 (0.20) [6.35]
Pry. School Enrolments(-2)	-0.01 (0.04) [-0.19]	-0.53 (0.18) [-2.97]
C	5.51 (4.97) [1.11]	-7.86 (22.3) [-0.35]
R-squared	0.63	0.74
Adj. R-squared	0.56	0.68
F-statistic	7.86	12.70

Table 3. Computed F-statistics

K	5%		10%	
	Lower	Upper	Lower	Upper
6	2.04	3.24	1.75	2.87
Computed F-Statistics	4.052033			

4.1 Results of Interactive Effects of Education and Economic Growth on Poverty Incidence

We conduct Cointegration/Bound test before verifying the interactive effects of education and economic growth on poverty incidence using ARDL bound test. The results are presented in Table 3. The results generated by [27] at 5 per cent level of significance suggest that the calculated F-Statistics is 4.0520, is higher than the upper bound critical value of 3.24. Thus, we conclude that there is highly significant cointegrating relationship among poverty level and the explanatory variables; the interacted economic growth and education, employment rate, population growth rate, real physical capital formation, education level and real GDP.

We also conducted Stability test. The purpose was to confirm that the estimated parameters for the model are not changing overtime, because unstable parameters can result in mis-specified model and a biasness of results. To test for parameter stability, the study employed the Cumulative Sum (CUSUM) test. The null hypothesis of this test is that the regression

equation is correctly specified. Figs. 2a and 2b present the CUSUM test graph and parameter consistency, if the CUSUM graph remains within the two straight lines, the null hypothesis of correct specification is accepted. Otherwise, the null hypothesis is rejected and it can be concluded that the regression equation is mis-specified. It is observed from Figs. 2a and 2b that the model employed for this study is stable and correctly specified.

4.2 Results of Restricted Error Correction Model

The Autoregressive Distributed Lag (ARDL) approach proposed by [28] and [29], is used to examine the interactive effect of economic growth and education on poverty incidence in Nigeria in the period of study. This approach by [27] is adopted to provide long-run relationship among the variables, because it yields consistent and robust results for long-run and short-run relationships among variables [30]. The error correction model is to present short-run relationship of the selected variables. Real per capita consumption expenditure is used as a proxy for poverty level, an increase in real per

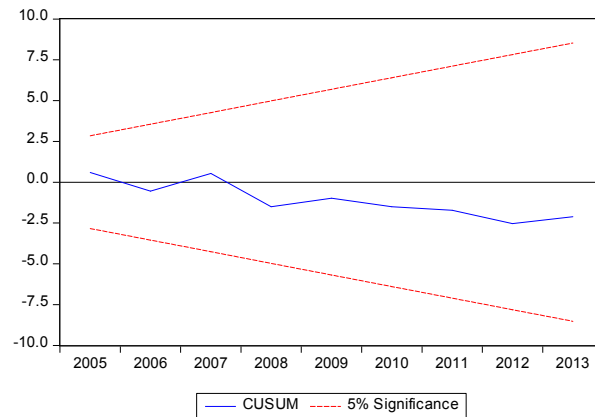


Fig. 2a. Cusum chart

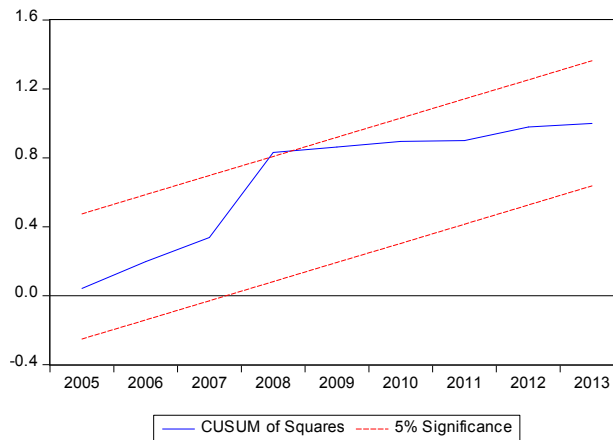


Fig. 2b. Cusum of squares

capita consumption expenditure means there is poverty reduction, while a decrease means poverty level is increasing, therefore a positive relationship with any of the variables means poverty reduction while a negative relationship with any of the variables means poverty level is increasing.

From the estimated result in Table 4, the adjusted R^2 , 0.96, showed that primary school enrolment, economic growth, population growth, physical capital formation and employment rate explain about 96 per cent of variations in poverty level. This is an indication that, in Nigeria, these variables are strong in explaining total variation in the poverty level.

Evidence from the Error Correction Model results shows that employment rate has positive relationship with poverty reduction. A 1 per cent increases in employment rate reduces poverty level by 3.32 per cent in the current period and

8.11 per cent in the first period. This gives credence to previous studies [31]; [26] that employment opportunities generate capabilities, incomes and greater access to resources, including the essential social services. Apart from income generation, employment opportunities offer other benefits to employees of an organization, such as subsidized education and health facilities, access to credit facilities and other welfare packages that raise living standards.

Population growth rate has negative relationship with poverty level in the current period and in the first period. This means that population growth will increase poverty level. There is population trap, whereby there is no increase in living standards due to rapid population growth and low savings rate which characterize Nigerian economy. The experience of East Asian countries over the past three decades showed that rapid economic growth and falling fertility

rate can interact to create virtuous circle of prosperity instead of vicious circle of poverty as experience by the county.

Economic growth has positive relationship with poverty reduction in the short-run. In current period a 1 per cent increases reduces poverty level by 0.95 per cent and by 1.77 per cent in the first period. This is consistent with previous studies [32]; [33], that economic growth is essential for poverty reduction especially when it leads to increase in employment and improvement in productive activities among the people that are poor. Economic growth that emphasized labour-intensive is more effective in reducing poverty. Due to trickle-down effect of economic growth, it is one of the fundamental determinants affecting a country's capacity to generate employment and income, its capacity to provide greater access to resources, including the essential services. Although economic growth is not synonymous with economic development and widespread improvements in the welfare of the population, however, economic

growth and increases in average income are central to development process.

Real physical capital formation is insignificant in the current period but positive and significant in the first period. A 1 per cent increases in real physical capital formation in the first period reduces poverty level by 0.27. One characteristic of investment is the future benefits, capital accumulation augment future output and income. It generates job opportunities and hence stronger demand for labour. Investment provides livelihood opportunities, a source of job and wealth creation, an avenue of skill acquisitions and improvement and an engine of economic development.

There is negative relationship between poverty level in the current period and poverty level in the first period. This is perpetuating nature of poverty, since poverty incidence is multidimensional, all the aspects reinforces one another in a circular motion. The poor are vulnerable to all sorts of shocks and their living

Table 4. Results of error correction model

Dependent Variable: D(LPOV)			
Variables	Coefficient	Standard error	t-statistics
D(EDU *LRGDP)	- 0.00	0.00	0.00
D(EMP)	3.32*	11.50	0.29
D(POP)	- 2.70*	1.21	-2.23
D(PC)	0.1	0.09	1.11
D(LRGDP)	0.95*	0.07	13.57
EDU * LRGD(-1)	-0.01	0.01	1
EMP(-1)	8.11*	4.05	2.00
POP(-1)	-3.69*	1.47	-2.51
PC(-1)	0.27*	0.09	3.00
EDU(-1)	0.08	0.06	1.33
LRGDP(-1)	1.77*	0.38	4.66
LPOV(-1)	-1.68*	0.37	-4.54
ECM(-1)	-1.6756*		
R-squared	0.988460		
Adjusted R-squared	0.967304		
Durbin-Watson stat	2.497596		

*Significant at 5% Source: Author's computation using E-views 8 (2018)

Table 5. Long run elasticity of poverty level

Variable	Coefficients	Standard error	t-statistics
LRGDP * EDU	-0.00	0.00	
EMP	-3.17	10.95	-0.29
POP	-2.10*	0.78	-2.69
PC	0.16*	0.04	4.00
EDU	0.04	0.04	1.00
LRGDP	1.05*	0.04	26.25

*Significant at 5%

conditions are worsening by social and economic uncertainties. The speed of adjustment to equilibrium is given by the coefficient of ECT (-1) as 1.67, this depicts that a deviation in poverty level from equilibrium is corrected by more than 100 per cent in the following year.

In the long run population growth rate promotes poverty level. This is consistent with studies such as that of [34] which noted that rapid population growth is not desirable for economic growth. A 1 per cent increase in population growth rate will increase poverty level by 2 per cent. Nigeria population is already high and further increase will only deteriorate living conditions. Unrestrained population increase is seen as the major cause of poverty level, low levels of living, malnutrition, ill health, environmental degradation and a wide array of other social problems. Rapid population growth will increase the inequalities of opportunities that the poor faces and further reduce their access to basic health, education and skills training. Similarly, government expenditure on education and health is spread thinly with increased population and deteriorate living conditions. Public resources that would have reduced poverty would become grossly inadequate to meet basic needs.

The contribution of real physical capital formation to poverty reduction is significant and positive but very minimal in Nigeria; a 1 per cent increase in real physical capital formation will reduce poverty level by 0.16 per cent. The experience of Asian Tigers has shown that they achieved massive poverty reduction between 1975 and 1995 by investing a greater percentage of their GDP; even the financial crises of 1997 did not reverse it. Investment was promoted by effective macroeconomic management, low inflations, stable and accountable government, transparency and low levels of corruption, effective institutions and a secure legal environment. In case of Nigeria, all the factors that will make investment to thrive are lacking or inadequate. The contribution of Nigeria to global manufacturing valued added (MVA) and manufactured exports (ME) is on the average 0.9 per cent between 1985 and 2015 [35]. These two variables are function of real physical capital formation. A 1 per cent increase in real economic growth will reduce poverty by 1 per cent. Economic growth has positive effect on poverty reduction due to trickle-down effect, affords a country the opportunity to increase the availability and widen the distribution of basic life-

sustaining goods such as food, shelter, health and protection; grants a country the prospects to raise the living standards, the provision of better jobs, better education and health facilities; and increase the country and individuals social and economic choices. What Nigeria needs to escape poverty is rapid and sustainable economic growth and equitable distribution of income [see [36,37,38]].

The contribution of interactive effect of economic growth and education on poverty incidence is below the anticipated. It is expected that the interactive effect of education and economic growth on poverty level will be significant and positive, but the empirical results show contrary results in Nigeria. Some of the probable reasons could be low investment in education, exponential growth in educational industry, explosive enrolment growth, sub-optimal enrolment, quality deficit, mismanagement, examination malpractice, brain drain syndrome, and market failure problems. These shortcomings are likely to render education incapable of solving the nation's growth and development problems and this can create a binding force on meaningful employment generation and poverty alleviation instead of serving as instrument of empowerment.

4.3 Conclusion

In conclusion, the non-effectiveness of the education on poverty level could be attributed to lack of economic incentive and poor institutions, semi-skilled and unskilled labour force, underdeveloped innovation system and inadequate modern information and communication technology. The significant cointegrating relationship between poverty level and the explanatory variables: the interacted economic growth and education, employment rate, population growth rate, real physical capital formation, education level and real GDP suggests that adequate attention should be put on these variables. Reduction of poverty level by employment rate in the short run shows the importance of education which improves skills of labour and allows employment opportunities also signifies the necessity of policy makers' attention.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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