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Does Educational Investment Enhance Capacity Development for Nigerian Youths? An Autoregressive Distributed Lag (ARDL) Approach

Lotanna Ernest Emediegwu

Abstract

This paper employs the Autoregressive Distributed Lag (ARDL) Bound Test and Nigerian time series data spanning 1980 to 2016 to provide empirical evidence on the educational financing - (youths) capacity development nexus *via* secondary school enrollment channel. The greatest factor that is pivotal to developing the capacity of Nigerian youths is investment in the quantity of education, and more significantly in its quality. The paper's main results show that budgetary allocation to education has a positive and significant impact on secondary school enrollment, both in the long- and short-runs. The study, therefore, recommend amongst others a substantial investment into the educational sector even if there has to be a trade-off with other types of unproductive investment.

1 Introduction

Youth restiveness has become an increasing threat to national development, peace and governance in several developing countries, emerging economies as well as transition nations. Several authors have shown that a negative relationship exists between entrepreneurship and youth restiveness (Bennell, 2007; Awogbenle & Iwuamadi, 2010), as well as between youth unemployment and national development (Chigunta, 2002; Arowosegbe, 2009). These assertions can be justified against the backdrop that there are more young people in the world than ever before. According to the Office of the Secretary-General's Envoy on Youth, about 2 out of every 7 people in the world are youths[1], and many of them are concentrated in developing countries, including Nigeria. In Nigeria, statistics from the National Bureau of Statistics (2019) evidences that more than half of Nigeria's population are youths. Thirty percent of these are unenrolled into secondary school, 47 percent are illiterate, and 70 percent are

[1] Youths, in this regard, are regarded as young people between the ages of 10 and 24. However, the National Youth Development Policy (2001) defines youth as people between the aged between 18 and 35. For the sake of this paper, I will stick with the former definition.

unemployed. The aforementioned scenario is a ticking time bomb if no practical and pragmatic steps are taken to salvage the situation. Lack of education has been cited as one of the major causes of youth unemployment (Oyebade, 2003) with impacts ranging from increase in poverty to rise in societal vices such as kidnapping, militancy, robbery, prostitution, *etc* (Ajufo, 2013).

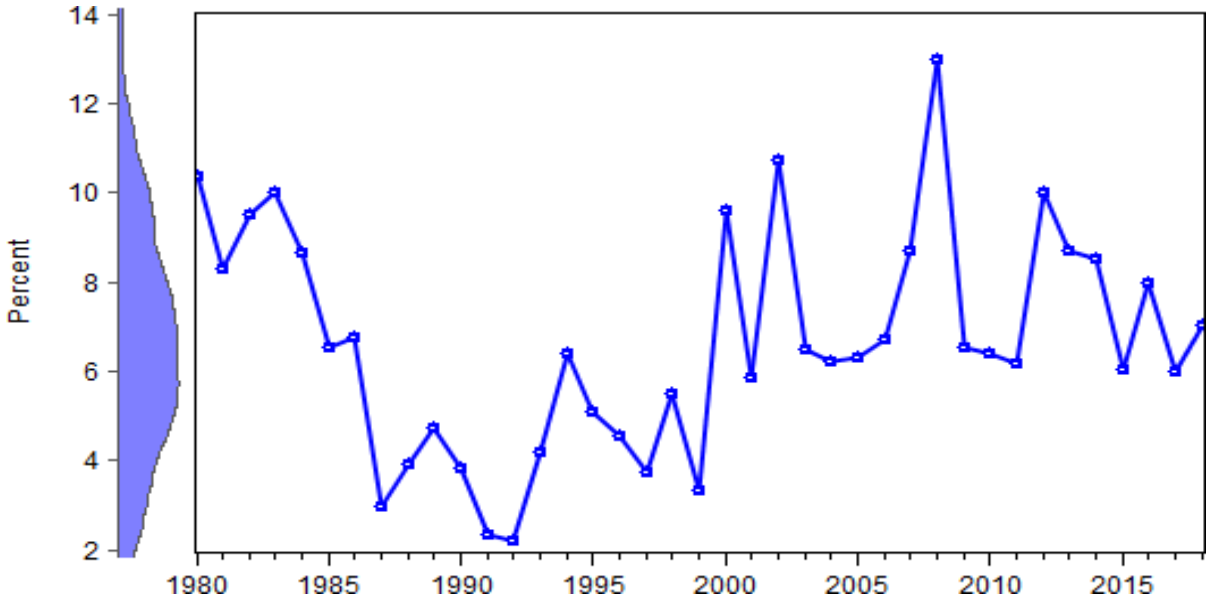
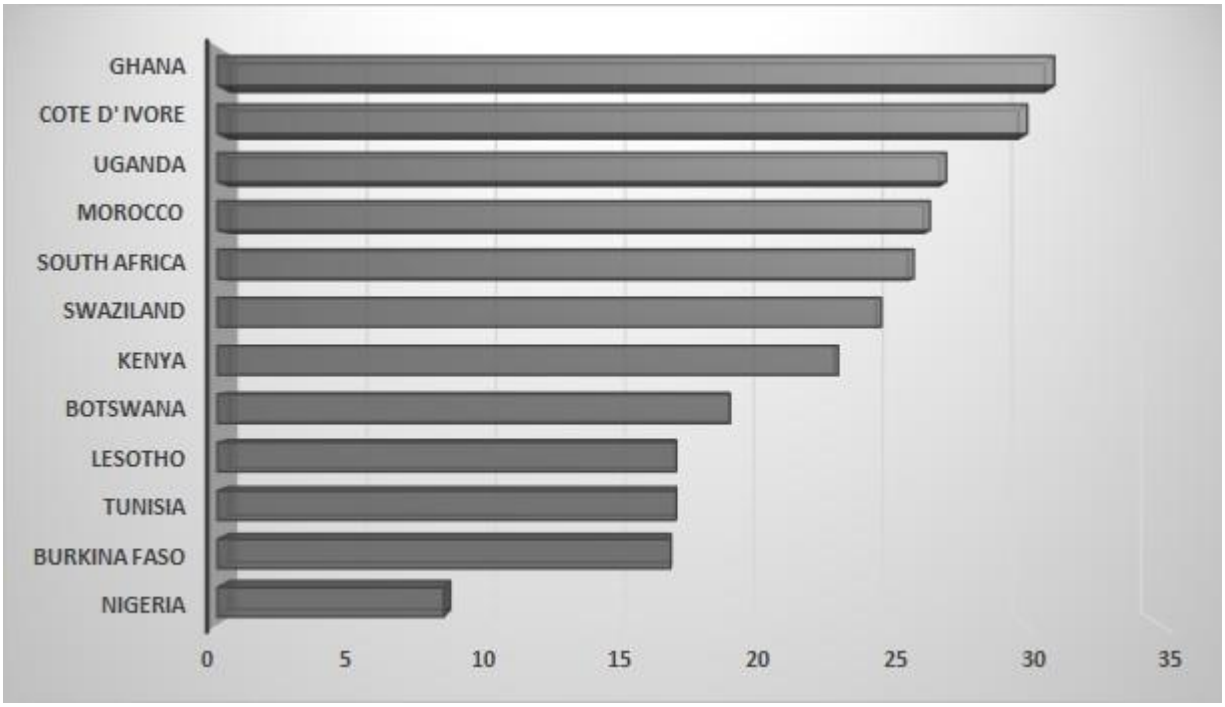


Figure 1.1: **Nigerian Budgetary Allocation to the Educational Sector (1980 - 2018)**

The importance of education to youth employment, capacity building and national development has been emphasized in a plethora of literature (see, Lochner & Moretti, 2004; Oreopoulos, 2006; Anyanwu, 2013). Todaro & Smith (2015) submit that human capital development is a *sine qua non* for development, and indeed, the only vehicle that can lead any nation to economic progress and prosperity. Education transforms a society's army of human resources into human capital. Also, Michaelowa (2000) states that any form of investment in education turns out to be very profitable to households at the micro-level and society at the macro level. Thus, a society that proves incapable of developing its citizens (youths inclusive) and making them functional in bringing about transformation in the economy will not be able to develop anything else in that economy. Despite the increasing evidence of the vital role and significance of education in capacity development for Nigerian youths, the education sector has suffered from poor funding amongst other challenges, which in turn, has

resulted in stagnated national development.[2] For example, the federal government expenditure on education between 1980 and 2018 as depicted in Figure 1.1 shows government commitment to education stood at 10.35% of its federal budget in 1980, from where it declined steadily till 1987, where it stood at about 2%. It, however,



Notes: Observation weighted by country's average GDP over the period.

Figure 1.2: **Average Budgetary Allocation to Education (in %) of some Selected African Countries (2000 - 2018)**

fluctuated between 1987 and 2008. The highest allocation to education, 13% of total expenditure, is in 2008, from where there is a gradual fall before picking up again in 2012 with 10% from where it hit the plateau of 6.08% in 2015 and 2017. Information from the kernel density on the left axis of Figure 1.1 reveals that the average budgetary allocation to education over the years is about 6 percent which is well below the minimum measure of 26% of annual budget advocated by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). Furthermore, a comparison of a 19-year (2000 - 2018) average of budgetary allocation to education, weighted by average GDP (in current US$), for 12 African countries as seen in Figure 1.2 shows that Nigeria ranks the lowest despite generating more income than the rest of the countries.

[2] For details on the challenges besetting the Nigerian education sector, the interested reader can see Ifionu & Nteegah (2013); Emediegwu & Clement (2016).

The implication of lack of financial commitment to education has translated into a stagnation of several education indices. Table 1.1 shows a general rise in adult literacy rate and pupil per teacher ratio in primary schools between 1986 and 2015. However, the pupil per teacher ratio in primary schools is still a far cry from the United Nation's recommendation of 25. Whereas there has been an appreciable increase in enrollment figures across all tiers of education as shown in Table 1.1, this has not been complemented with a commensurate rise in the number of educational institutions to accommodate this burgeoning increase leaving much to be desired in the education sector.

Table 1.1: **Nigerian Educational Development Indicators (1970 - 2015)**

Sources: NBS (2010); WDI (2017)

Indicators	**1970**	**1986**	**1997**	**2005**	**2010**	**2015**
Adult literacy rate (%)[3]	N/A	49.8	57	62	61.34	59.57
No of pupils per teacher (primary)	34	44	52	40	38	40
No of pupils per teacher (secondary)	21	30	39	27	33.08	19.32
Number of educational institutions						
Primary[4]	14,903	35,434	43,950	54,434	58,348	62,406
Secondary	1,378	5,731	7,310	12,611	N/A	N/A
Tertiary[5]	5	24	137	199	365	378
School Enrollment Figures						
Primary	3,515,827	12,914,870	21,161,852	22,115,432	21,558,461	23,129,927
Secondary	357,027	3,094,349	5,578,255	6,534,000	9,056,768	12,500,000
Tertiary	14,468	135,783	862,023	930,000	1,375,671	1,391,527

Although funding has been identified as a key challenge to effective education delivery, it is important to add that issues such wasteful imbalance within the educational system; inordinate demand for education; asymmetry between costs and revenues from education; lack of employment opportunities for graduates; and the provision of non-market-oriented education curriculum needs to be addressed for education to produce the desired results of improving the human resource stock of the nation (Emediegwu & Clement, 2016).

In terms of empirics, Barro & Lee (1993) were the first to investigate the relationship between youth empowerment and economic growth using constructed average years

[3] Adult literacy rate is the percentage of people ages 15 and above who can both read and write with understanding a short, simple statement about their everyday life. Although this encapsulates part of those in the youth age bracket, figures for youth literacy rate would have been better. Data for youth literacy rate in Nigeria, however, is highly fraught with missing observations.

[4] The figures show public primary schools only. I do not have data for private primary schools; however, these figures will increase if private primary schools are included

[5] Only those accredited by the Joint Admission Matriculation Board (JAMB) are counted, and they include universities, polytechnics and colleges of education/agriculture.

of schooling generated from census and enrollment figures. Analysing 129 countries, they report a significant and positive relationship between average years of secondary schooling for males and economic growth. Using panel data from two new data sets on educational attainment, Gyimah-Brempong (2011) finds that different levels of education affect development outcomes differently. In the paper's final analysis, primary, secondary and tertiary levels of education have different effects on economic growth with tertiary having the most effect. In like manner, Anyanwu (2014) in examining the factors that affect economic growth in Africa finds that secondary education positively and significantly affects African economic growth. Specifically, the paper estimates a one percent increase in secondary education enrollment would increase economic growth by 0.3%. Emediegwu & Clement (2016) applied the twin method of cointegration and error correction methodology to investigate the impact of education spending on Nigerian economic growth. They find a positive and significant effect flowing from education investment to economic growth. Adusei (2016) sampled a panel data comprising of 12 African economies from 2004–2011 to investigate if entrepreneurship affects their growth processes. The study's results indicate that entrepreneurship, even if replicative, positively and significantly influences economic growth in African economies.

Whereas there are several studies (Lawal, 2011; Ifionu & Nteegah, 2013; Emediegwu & Clement, 2016, for example) that have investigated the impacts of educational investment on economic growth, the effect of government educational spending on youth capacity development has received little attention in the Nigerian economic literature. The aim of this paper, therefore, is to use current data to assess how budgetary allocation to education affects youth capacity development *vis-a-vis* enrollment into secondary schools. The rest of the paper is ordered as follows. Data description and model specification are considered in the next section. The main results are discussed in Section 3, and finally, Section 4 summarises the paper with some policy recommendations.

2 Data and Model Specification

2.1 Data Description and Sources

This study employs five annual time-series variables for the period 1980 to 2016 to model the relationship between educational financing and youth empowerment in Nigeria. Data for these variables – youth capacity development measured by secondary

school enrollment figures (*SSE*), budgetary allocation to education (*BAE*), gross domestic product per capita (per capita income) (*PCY*), youth population (*YP*), primary school enrollment rate (*PPE*) – are from WDI (2017) and National Bureau of Statistics (2019). Table 2.1 presents the summary statistics of the data used in this study, while Figure 2.1 shows the trend of each series (in log) for the given period.

Table 2.1: **Summary Statistics of Dataset for Youth Development Model**

Variables	Mean	SD	Min	Max
SSE (in mill.)	5.52	2.99	1.86	12.53
BAE (in bill.)	95.18	117.90	0.16	390.42
PCY (current US$)	1430.54	867.68	474.23	3222.69
YP (% of total population)	59.91	0.62	51.88257	53.59112
PPE (in mill.)	17.69	4.78	8.07	26.17

Note: SD denotes standard deviation. Years = 37.

2.2 Model Specification

The dependent variable is secondary school enrollment rate. The baseline model contains the main independent variable, budget allocation to education and other controls that impact the outcome variable. The model is specified as

$$Y_t = G_t\,\gamma + C_t\beta + \varepsilon_t \tag{2.1}$$

where Y_t is an $N \times 1$ vector of dependent variable observations at time t;[6] G_t is an $N \times 1$ vector of the principal explanatory term, budgetary allocation to education; C_t is an $N \times K$ matrix of relevant controls such as GDP per capita, youth population and primary education enrollment. ε_t is an $N \times 1$ vector of error terms which vary non-stochastically over time. In terms of parameter notations, $\boldsymbol{\gamma}$ and $\boldsymbol{\beta}$ are vectors of parameters to be estimated. In line with extant literature, equation (2.1) is estimated in logarithmic form to allow for elasticities.

[6] For notational purposes, this paper will use standard matrix notations.

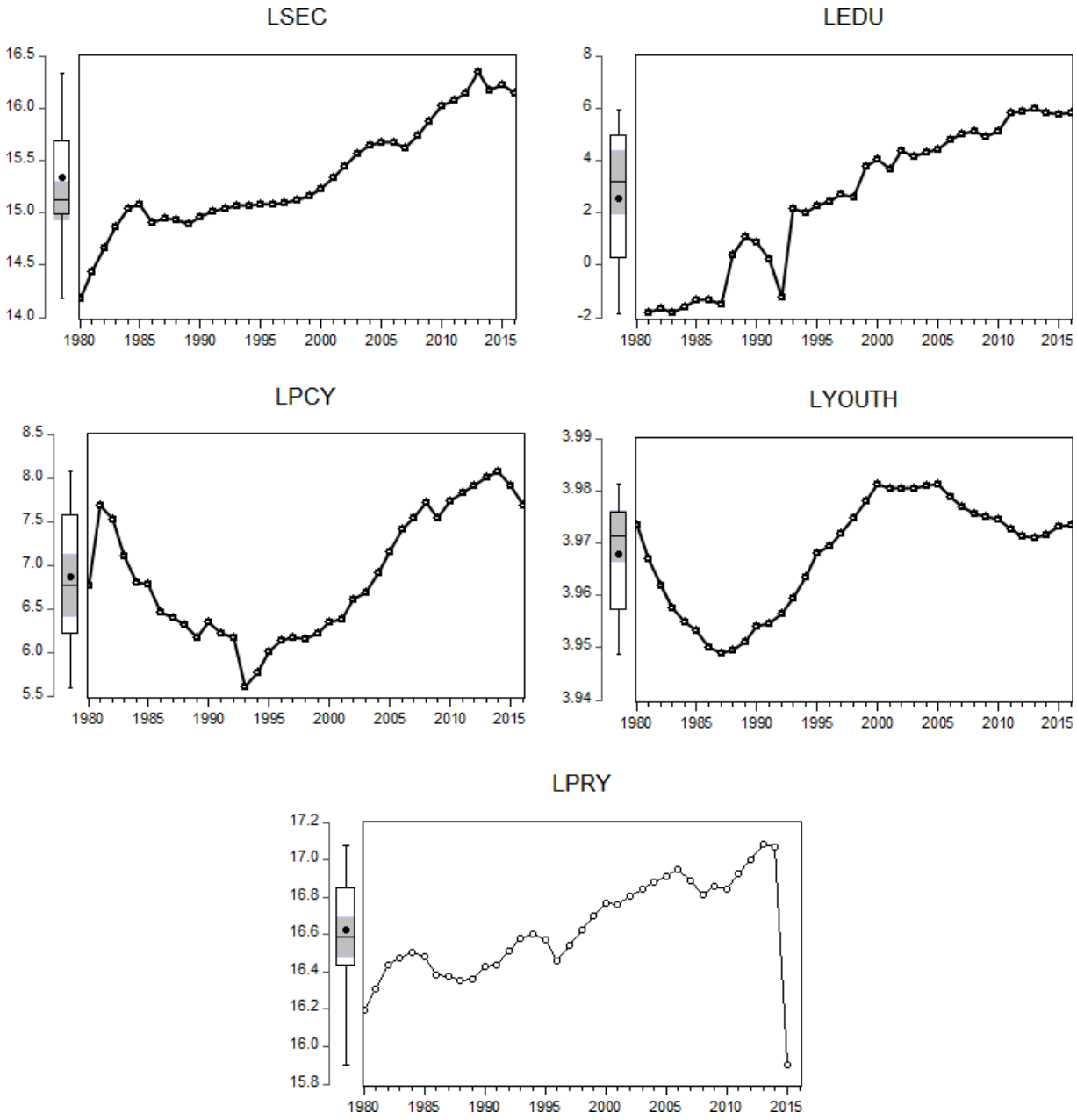


Figure 2.1: **Series of Variables (log-transformed)**

2.3 Empirical Strategy

I employ the autoregressive distributive lag (ARDL) technique to estimate the long-run relationship among the variables, as well as the short-run dynamics of the model. The ARDL model, which, unlike the Error Correction Model (ECM), does not require all variables to be *I(1)* is given below:

$$\triangle y_t = \varphi_0' z_{t-1} + \sum_{j=0}^{p} \triangle z_t + \varepsilon_t, \quad t = 1, \ldots, T \qquad (2.2)$$

where $\triangle$ is first difference operator; $z_t = (1, y_{t-1}, ..., y_{t-p}, G_{t-1}..., G_{t-p}, C_{t-1}, ..., C_{t-p})'$; p, the autoregressive order, is dictated using a bottom-up sequential testing approach to control for any serial correlation in ε_t, other variables are as defined previously. Before estimating the model, stationarity test is conducted on the variables using the Augmented Dickey-Fuller (ADF) unit root test to establish the order of integration. This is necessary to avoid spurious regression results usually associated with the use of non-stationary variables. A cointegration test is also conducted to ascertain the existence or otherwise of a long-run relationship using the Johansen cointegration techniques. Once a cointegrating relationship is established, it implies that a long-run relationship exists among the variables and both the short-run dynamics and the speed of adjustment to long-run equilibrium from a possible short-run distortion can be analysed.

3 Results and Findings

3.1 Unit Root Test

To determine the level of stationarity of the variables, this paper uses the ADF test to conduct unit root test on all the variables, and the results are as presented in Table 3.1. The results show that youth population is the only variables that is stationary at levels at 5% significance; other variables are stationary at first differences, hence they are integrated of order one, that is, I(1).

Table 3.1: **Results of Augmented Dickey-Fuller (ADF) Test for Unit Root**

Variables	I(0)	I(1)	Remark
SSE	-0.1543	-3.9306	Nonstationary
BAE	-2.8046	-3.8883	Nonstationary
PCY	-1.4714	-3.1076	Nonstationary
YP	-5.1198		Stationary
PPE	-2.8277	-3.9306	Nonstationary

Note: Variables are log-transformed. 5% critical values: ADF -2.9571. I(0) and I(1) are tests at level and first difference, respectively. The results are also similar to those from Phillips-Perron (PP) unit root test (results are available on request).

3.2 ARDL Test of long-run and short-run Relationship of Variables

The realisation in the previous sub-section leads to the hypothesis that the series

are co-integrated, following the postulation of Engle & Granger (1987) that the linear combination of two or more variables that possess unit roots will ensure that the resultant residuals would be stationary, that is, integrated of order zero at level. However, to be doubly sure, I verify the above postulation by testing for the existence or otherwise of long-run relationship amongst the explanatory variables. I use the ARDL bounds test to achieve this, and the results are presented in Table 3.2.

Table 3.2: **ARDL Bound Test**

Lag Order	F-Stat	5% Lower Bound	5% Upper Bound
1	6.6672	2.86	4.01

Table 3.2 shows that the null hypothesis of no long-run relationship is rejected because the calculated F-statistic (6.6672) is greater than the upper bound value of F-statistic at 5% critical level. Consequently, this study can safely conclude that there exists a long-run relationship among the variables. Basing the optimal lag sizes of the variables in the ARDL model on the Akaike Information Criterion (AIC), I present the results of the long-run relationship of the model in Table 3.3.

Table 3.3: **Long-run Coefficients of ARDL**

Regressors	Estimates
BAE	0.732***
	(0.094)
PCY	2.313**
	(0.126)
YP	1.910***
	(0.108)
PPE	-0.058
	(0.325)
Constant	-9.179
	(3.995)

Note: Variables are log-transformed. ***p<0.01, **p<0.05, *p<0.1. Standard errors (in bracket).

The results from Table 3.3 reveal that, in the long-run, budgetary allocation to education affects secondary school enrollment (SSE) in Nigeria positively and significantly. Specifically, an increase of 10% in the amount allocated to education from the budget will lead to a response of about 7% increase in the secondary school

enrollment rate. Similarly, a 10% increase in per capita income of Nigerians will on the average boost SSE by about 20% in the long-run. Following the direction of the trend, an increase in the percentage of youths in the populace will affect secondary school enrollment positively at 1% significance level. On the other hand, primary school enrollment does not appear to have any significant effect on secondary school enrollment. This at first could sound counterintuitive, however, the empirical works of Lawal (2011); Emediegwu & Clement (2016) evidence that the enrollment at this educational level has not fully attained the stage where it can positively affect SSE. This may be as a result of truancy on the part of teachers – especially in public schools; poor learning infrastructures; and lack of policies and programmes geared towards revamping the sub-sector.

Results from Table 3.4 show the short-run impact of the current value of regressors, as well as the one-period lagged values of the independent and dependent variables on secondary school enrollment. The one-period lagged value of SSE comes out positive but insignificant. Contemporaneous budgetary allocation to education (BAE) turns out to have a direct and significant impact on SSE. The coefficient, which is significant at 5% level, shows that a 10% increase in BAE will bring about a 1.3% rise in SSE. In like manner, the coefficient of the one-period lagged value of BAE reveals a direct and significant relationship to TFP. While the current and one-period lagged values of PCY have similar coefficients and signs, their levels of significance differ. For PCY, a 10% increase will translate to an 11.4% increase in SSE, and this significant even at 1% level: but, PCY_{t-1} is significant only at 10% level. The results further indicate that youth population (YP) has a positive and significant impact on TFP. Specifically, a 10% rise in YP will result to a 1.8% increase in SSE. However, the lagged version is both negative and insignificant. Regarding primary education enrollment, both the current and one-period lagged values come out as insignificant determinants of SSE.[7]

[7] The reason for this counterintuitive result has been cited in the previous sub-section.

T**able 3.4:** ARDL Estimates: short-run Results

Regressors	**Estimates**
SSE_{t-1}	0.160
	(0.186)
BAE	0.134**
	(0.049)
BAE_{t-1}	0.003*
	(0.001)
PCY	1.139***
	(0.034)
PCY_{t-1}	0.005*
	(0.003)
YP	0.176**
	(0.067)
YP_{t-1}	-0.013
	(0.010)
PPE	-0.182
	(0.242)
PPE_{t-1}	0.011
	(0.113)
Constant	-7.472
	(4.642)
Adj. R^2	0.59
F-Stat	4.07**
Dub-Wat Stat	1.60

Note: Variables are log-transformed. ***p<0.01, **p<0.05, *p<0.1. Standard errors (in bracket).

Additionally, the adjusted R^2 indicates that the combined effect of the regressors explains about 59 percent of the variation in SSE; while the F-statistic (4.07) which measures the overall significance of the regression model is significant at 5% level. Lastly, it is noticed that the model is fairly free from autocorrelation since the DW statistic reported in the model is approximately 1.60, which is close to 2. This means that the model is reliable in explaining the factors that determine youth education, *vis-a-vis*, secondary education in Nigeria.[8]

[8] Due to limitation of data, I could not use tertiary enrollment data. I, therefore, cannot ascertain if this

4 Summary and Policy Implications

This paper uses the ARDL method to estimate the impact of educational investment on capacity development for Nigerian youths. As a precursor to the econometric estimation setting, this also included some indicators affecting youth capacity development. The main results show that the main variable of interest – budgetary allocation to education – has a positive and significant impact on *SSE*, both in the short- and long-runs. The findings in this piece of research are consistent with Oreopoulos (2006); Bouznit et al. (2015) who find in their respective works that making secondary education compulsory increases the human capacity of developed countries. Most labour economists believe that education and training of the populace to acquire and upgrade skills and knowledge will lead to a higher-skilled and more productive workforce. Results obtained in this paper reflects the above hypothesis conditional on adequate funding. Sadly, the plague of insufficient funding has been rocking the educational sector in Nigeria. The 2020 national budget shows that only a meagre 6.7 percent of total expenditure was allocated to education. This figure is about 200 percent below the minimum measure of 26 percent of annual budget advocated by UNESCO. From the aforementioned, this can safely infer that education (including secondary education) in Nigeria has been grossly underfunded to initiate any meaningful, sustainable productivity in Nigeria. For youths to be efficient and effective leaders of tomorrow, their development today, must be prioritised by the governments at all levels. Consequently, given the necessity to boost the quality of education by investing substantially in it, it is therefore paramount that government should as a matter of first concern increase the budgetary allocation to the education sector to at least the standardised United Nations' 26 percent even if there has to be a trade-off with other types of unproductive investment.

It is important to stress that *mere* investment into youth's capacity development *via* education will not automatically translate to futuristic national development in any country if it is not complemented by sound educational and economic policies. In other words, the nation's macroeconomic framework must create and sustain a market which supports trade and investment, and efficient and functioning capital and labour markets. Furthermore, the education setting of the nation must be re-aligned to meet labour market needs. Perhaps, courses and disciplines may need to be re-defined, re-

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additional control might alter the results in this study significantly or otherwise.

designed and re-engineered to position students to meet the challenges of globalisation and internationalisation. In addition to creating an enabling environment in all educational institutions, governments at all levels (federal, state and local) can forge partnership with the organised private sector and international agencies, like the African Development Bank to mobilize resources to furnish educational institutions at all levels and provide them with adequate and appropriate facilities, laboratories equipment, libraries, computers and modern instructional materials. This will invariably improve the quality and quantity of education and thereby boost productivity, human capital development as well as guarantee lasting growth and development.

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