A New Perspective on Growth Effects of Demand for Tertiary Education

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Abstract
The study examined the dynamic relationship between demand for university and polytechnic educations and the performance of the Nigerian economy for the period of 1985 to 2013. Time series econometrics (Granger Causality and Autoregressive Distributed Lag Model) was applied to test the causal, short run and long run relationship among the variables. The result of the Granger Causality test revealed that there is a unidirectional causality running from university enrolment to real gross domestic product. The test also shows that there is bidirectional causality between polytechnic enrolment and real gross domestic product. The bound test established the presence of a long run relationship among the series. Polytechnic enrollment constitutes a leakage to the Nigerian economy while University education has positive long run impact on the economy. The paper recommends that Government and other relevant stakeholders reviews the education system such that products of polytechnics are able to match up with Nigeria technological and labor market challenges and enhance their contributions towards national output in the bid to achieve sustainable development.

Keywords: tertiary education, growth effects, causality, bound test.

INTRODUCTION
The role of tertiary education in a knowledge-based competitive economy has been a prominent research area since Mincer (1958) and Schultz (1961) introduction of the concept of human capital. Tertiary Education is significant in producing scientific skills which generate new knowledge and technology through Research and Development (R&D) and contribute more than proportionately to increased productivity when combined with other intermediate factors. As a public good, it produces social benefits with spillover effect, which foster and enhance work and life skills, welfare and frees up resources to create new technologies, businesses, and wealth, [Romer (1989); Hellerstein and Neumark, (2004); Bloom, Canning and Cha (2006); Papademos (2007)]. Evidence abound indicating that demand for tertiary education has been on the increase throughout the world and Nigeria in particular. This is evident in the number of students seeking international studies across the world. Globally, in 2012, at least 4 million students went abroad to study, up from 2 million in 2000. It was also found that Central Asia, which played host to most of the mobile student population, experienced a steady rise in the number of students studying abroad. The group grew from 67,300 in 2003 to 156,600 in 2012, with the outbound mobility ratio more than doubling from 3.5% to 7.5% same period (NCES, 2014). Similarly, percentage of tertiary enrolment as measured by the Global Tertiary Education Enrolment percentage of Gross Enrolment Ratio (GER) witnessed a dramatic turn in the 21st century. It increased from 18.1% to 20% and 27.1% in 1999, 2000, 2009 respectively, with Europe and Central Asia accounting for over 55% of tertiary Gross Enrolment Rate (GER) of age youth enrolled in 2009 followed by Middle East and North American region. However, sub-Saharan African countries tertiary-level participation improved only marginally, from 3.9% in 1999 to 6.3% during the period (UNESCO, 2009; Rena, 2010).

In Nigeria, the share of tertiary enrolment as a percentage of gross enrolment rose from 1.8% in 1980 to 6.1% in 2000. It further increased to about 10% in 2005 (WDI, 2013). Similarly, application for the Unified Tertiary Matriculation Examination (UTME) reveals a consistent upward trend in the recent years. Statistics shows that total number of applicants received by the Joint Admission and Matriculation Board (JAMB) for UTME stood at 805,466 in 2006. However, the figure increased significantly to 1,306,718 in 2009 and 1,632,172 in 2014. This implies that more people are demanding for and enrolled into the tertiary institutions of learning. Similarly, the trend in the growth rate of Nigeria economy shows a sustained growth rate in the last decade. The Gross Domestic Product (GDP) grew at
11.3% in 1985 and dropped to about 5% in 2000. The growth rate since then had averaged 6.5% till 2012.

Though there are empirical studies investigating the relationship between tertiary education and economic performance, not much has been done in the context of Nigeria. Moreover, most studies on the relationship between demand for tertiary education and economic performance focused on the effect of aggregate tertiary enrolment, with no consideration for the relative impact of the disaggregated components of tertiary education on economic performance; hence this study investigates the causal and dynamic relationships between the components of tertiary enrolment and Nigeria economic performance between 1985 to 2013.

The rest of the study is organized as: section 2 reviews the literature on the relationship between tertiary education and economic growth. The empirical model, methodology and data description are discussed in the section 3, and section 4 presents the conclusions and policy recommendations.

LITERATURE REVIEW
The Lucas (1988) endogenous growth model considered human capital as one of the factors of production and education as a means of human capital accumulation. This way, education became a vehicle for human capital accumulation also treated as a factor of production in addition to labour and physical capital. This implies that progress in the educational attainments of the labour force could have an impact on productivity and improve economic performance. The endogenous growth models argued that total factor productivity is determined within the model, instead of being driven by exogenous technological progress. Unlike the neoclassical theories, endogenous growth models have explicitly included education by emphasizing its role in increasing the innovative capacity of the economy through developing new ideas and technologies. Arguing in the similar direction, Romer (1989) identified three types of skills possessed by individuals in a given country; physical skills (in-born in individuals), educational skills acquired in primary and secondary school, and scientific talent acquired in post-secondary education. However, total stock of educated and scientific talent in a country should be related to the growth in output and capital in the economy which is achieved through a combination of new technology from Research and Development, with other intermediate inputs.

Empirical investigations into the relationship between tertiary education and economic often follow from the Neo-classical growth theory. Investigating the impact of State University of New York on the State economic growth from 1960 to 2001, Vogel and Keen (2010) studied the interaction among investment expenditure on the University, growth in output and income of the state, and established that the State University of New York positively and significantly contributed to the economy of New York over a long run period.

De Meulemeester and Rochat (1995) examined the causal relationships between higher education and economic growth of six developed countries and concluded in the study that strong uni-directional causality exists from higher education to economic growth in Japan, France, UK and Sweden, but no causality in Italy and Australia. Similarly, Moroto and McMullen (1996) examined the connection between higher education and economic development in three emerging economies in Latin America (Argentina, Brazil, and Chile) from 1960 to 1996. Employing the Granger pair wise causality test the study concludes that there is a non-uniform result for the countries included. In Brazil, higher education was found to impact GDP growth unidirectional, and in the case of Chile and Argentina, no causal relationship was found between these variables.

Investigating the cointegrating and causal relationship between higher education and economic growth in Turkey from 1970 to 2008, Erdem and Tugcu (2010) employed the ARDL bounds testing approach and Dolado and Lutkepohl Granger causality method. The study deduced that higher education is cointegrated to economic growth and either higher education or economic growth has significant causal relationship on each other. Therefore, there is a bidirectional causal relationship between higher education and economic growth in Turkey. In a related study Jaoul (2004), investigated the correlation between higher education and economic growth in France and Germany since Second World War, employing a nonparametric and VAR technique. He examined the relationship between the increasing number of higher education qualifications and the GDP of France. The study revealed that there is a high correlation between higher education and economic growth in France. Saima, Janaran and Tesfa (2012) analyzed the relationship between economic growth and higher education in West Virginia using the three Stage Least Square to estimate a system of simultaneous equations. The results show that income growth and education growth are positively related while education growth reduces population growth in West Virginia. Furthermore, increase in education increases income in West Virginia, while change in income growth increases educational growth.

In a regional study of the relationship of higher education and economic growth, Kwabena, Oliver and
Workie (2006) investigated the effect of higher education human capital on economic growth in African countries. They used panel data over the period of 1960-2000. The study found that all levels of education human capital, including higher education human capital, have positive and statistically significant effect on the growth rate of per capita income in African countries. In the same line, Pegkas (2014) investigated the link between educational level and economic growth. The study employed the Granger causality test and Vector Error Correction to analyze the potential impact of differential educational levels on economic growth in Greece over the period of 1960 to 2009. The empirical findings show that there is a long run relationship between educational levels and gross domestic product, and a long run and short run causality running from higher education to economic growth. Hence it is deduced that tertiary education has long and short run impact on the growth of Greek economy. The study supports the finding of (Khoras-gani, 2008). Examining the long-run relationship between higher education and economic growth in Iran using ARDL methodology, he found that higher education has positive and significant effects on economic growth both in the short and the long-run. In another study, Babatunde and Adefabi (2005) explained the long run relationship between education and economic growth for Nigeria during 1970 to 2003. They applied the Johansen cointegration technique and the vector error correction. The results of the cointegrating technique suggests that there is a long run relationship between enrolments in primary and tertiary level as well as the average years of schooling with output per worker. Results of the vector error correction model revealed that a well-educated labour force significantly influenced economic growth both as a factor in the production function and through total factor productivity.

Okuneye and Adelowokan (2014) examining the impact of tertiary enrolment on economic growth in Nigeria over the period of 1980 to 2010, employed the Ordinary Least Square (OLS) estimation technique for empirical analysis. The variables considered are real GDP and tertiary school enrolment. The result shows that tertiary enrolment is positively related to economic growth in Nigeria. They assert that without human capital development, sustainable economic growth may not be achieved. Contrarily, Olomola (2007) analyzed the relationship between increasing enrolment in tertiary institutions of learning and economic growth in Nigeria from 1970 to 2002. The study adopted vector error-correction mechanism and granger causality test on annual data from 1970 to 2002; and tertiary education was decomposed into three components; university enrolment, polytechnic enrolment and enrolment into vocational schools. The result reveals that economic growth granger-cause enrolment in tertiary institutions. Furthermore, he argued that human capital drives economic growth both in short and long run. However, no causality was detected between economic growth and enrolment in Nigerian universities and colleges of education. This is in line with (Madhav, 2010). In his investigation of the interrelationship between higher education enrolment and real gross domestic product of Nepal from 1975 to 2009, he found that causality runs from real GDP to enrolment in higher education. Employing Engle-Granger cointegration and Granger causality analysis Amatul, Asim and Yasir (2009) similarly, supporting the long run relationship between higher education and economic growth, argued that the number of enrolled students at the universities of Pakistan over 1975 to 2005 had a long run relationship with economic growth. However, they established through the Toda-Yamamoto Causality test that there is only a unidirectional causality running from economic growth to higher education over the period. They argued that low proportion of highly educated labor in the total population and the low enrolment and high dropout ratio at basic level of education of Pakistan are the reasons for the findings.

**METHODOLOGY AND DATA DESCRIPTION**

**Multivariate Granger Causality Model**

To determine the causal relationship between tertiary education and Nigeria economic performance, a dynamic model of vector autoregressive (VAR) representation of Engel and Granger (1987) is employed. The equation in matrix identification is shown in equation 1 below.

\[
Y_t = \delta_0 + \tau_t, X_{t-1} + \varepsilon_{it} \]

Where \(Y_t\) is a matrix of the dependent variables, \(\delta_0\) is the matrix of the intercepts, \(\tau_t\) is a matrix of the estimated coefficients in the VAR model, \(X_t\) is a matrix of the explanatory variables and \(\varepsilon_{it}\) a matrix of the error terms. The Granger Causality model specified in a VAR set up is as stated below;

\[
\begin{bmatrix}
\Delta GDP \\
\Delta Uni_t \\
\Delta Poly_t
\end{bmatrix}
= \begin{bmatrix}
\Delta_1 \\
\Delta_2 \\
\Delta_3
\end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix}
\alpha_{1i} & \beta_{1i} & \theta_{1i} & \gamma_{1i} \\
\alpha_{2i} & \beta_{2i} & \theta_{2i} & \gamma_{2i} \\
\alpha_{3i} & \beta_{3i} & \theta_{3i} & \gamma_{3i}
\end{bmatrix}
\begin{bmatrix}
\Delta GDP_{t-1} \\
\Delta Uni_{t-1} \\
\Delta Poly_{t-1}
\end{bmatrix}
+ \begin{bmatrix}
\varepsilon_{1t} \\
\varepsilon_{2t} \\
\varepsilon_{3t}
\end{bmatrix}
\]

where:

(\(\Delta\) denotes the first lag operator, \(\Delta_i = \Delta_i, 0 \leq i \leq \rho\), and \(\rho\) is the lag length, to be selected for each variable using the Akaike Information criterion (AIC) and the Final Prediction Error (FPE) and the \(\tau > 0\). AIC and FPE are most appropriate for this study because they are superior to other criteria in a small sample (60 observations and below), because they minimize the chance of under
estimation while maximizing the chance of recovering the true lag (Liew, 2004).

A Wald test is conducted on the coefficients of the relevant variables in equation 2 to determine the causality. Granger and Newbold (1974) pointed out that there is a possibility of spurious causality, hence the series were evaluated for unit root using the Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) unit root tests, while their cointegrating relationship (Granger, 1988) was ascertained using Johansen Cointegration test.

**Auto-Regressive Distributed Lag (ARDL) Model**

To determine the dynamic relationship between the variables of tertiary education and economic growth, the study employs the Autoregressive Distributed Lag model (Pesaran et al, 2001). The model of the ARDL is presented below.

\[
\Delta \text{RGDP}_t = \delta_0 + \sum_{\pi=1}^{\pi} \Delta \text{RGDP}_{t-\pi} + \sum_{\gamma=1}^{\gamma} \Delta \text{GCF}_{t-\gamma} + \sum_{\psi=1}^{\psi} \Delta \text{Uni}_{t-\psi} + \sum_{\phi=1}^{\phi} \Delta \text{Poly}_{t-\phi} + \theta_0 \text{RGDP}_{t-1} + \gamma_0 \text{GCF}_{t-1} + \psi_0 \text{Uni}_{t-1} + \phi_0 \text{Poly}_{t-1} + \mu_0 
\]

Where, \(\gamma > \alpha\) and \(\gamma\) is a vector of the estimated parameters \((\alpha, \pi, \beta, \lambda, \theta, \gamma, \psi, \phi)\) in equation 3. \(\Delta\) denotes the first lag operator of the series, \(\alpha, \pi, \beta, \lambda, \theta, \gamma, \psi, \phi\) and \(\mu\) are the short run estimated parameters of Real Gross Domestic Product, Gross Capital Formation, University enrolment and polytechnic enrolment respectively, and \(\theta, \gamma, \psi\) and \(\phi\) are the long run estimated parameters of the respective variables. Equation 3 measures the long run and short run dynamics of tertiary education and economic growth. If the long-run relationship is supported, the error-correction model (ECM) from equation (3) is estimated as the second stage of the ARDL procedure.

\[
\Delta \text{RGDP}_t = \delta_0 + \sum_{\pi=1}^{\pi} \Delta \text{RGDP}_{t-\pi} + \sum_{\gamma=1}^{\gamma} \Delta \text{GCF}_{t-\gamma} + \sum_{\psi=1}^{\psi} \Delta \text{Uni}_{t-\psi} + \sum_{\phi=1}^{\phi} \Delta \text{Poly}_{t-\phi} + \gamma_0 \text{GCF}_{t-1} + \psi_0 \text{Uni}_{t-1} + \phi_0 \text{Poly}_{t-1} + \mu_0 + \epsilon_t 
\]

Where the parameters are as explained in equation 3 above.

ARDL is considered a better approach because it has ability to accommodate heterogeneous order of integration so far as there is no variable in the model that is integrated at second order (Pesaran and Shin, 1999; Pesaran, Shin and Smith, 2001).

**EMPIRICAL RESULT**

The results of the Augmented Dicky-Fuller (ADF) and the Phillips-Perron (PP) unit root tests indicated that the variables are non-stationary at levels, but after differencing once, the ADF and Phillips-Perron tests show that they were all integrated of order one; I(1). The result is presented in tables 1 and 2 below.

### Table 1: Philip-Perron Unit Root tests (constant without trend)

<table>
<thead>
<tr>
<th>Series name</th>
<th>PP test at level</th>
<th>PP test at 1st difference</th>
<th>Order integration</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly</td>
<td>-1.6732</td>
<td>-2.9719</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>Uni</td>
<td>1.0631</td>
<td>-2.9179</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>RGDP</td>
<td>3.8008</td>
<td>-2.9719</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>GCF</td>
<td>-1.2674</td>
<td>-2.9719</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, 2016

### Table 2: ADF Unit Root tests constant (without trend)

<table>
<thead>
<tr>
<th>Series name</th>
<th>ADF test at level</th>
<th>ADF test at 1st difference</th>
<th>Order integration</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly</td>
<td>-1.7582</td>
<td>-2.9719</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>Uni</td>
<td>0.4669</td>
<td>-2.9810</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>RGDP</td>
<td>3.8008</td>
<td>-2.9719</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
<tr>
<td>GCF</td>
<td>-1.0170</td>
<td>-2.9185</td>
<td>I(1)</td>
<td>Stationary</td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, 2016

The optimum lag length of four (4) used for the analysis is based on the suggestions of the Final Prediction Error (FPE) and the Akaike Information Criteria (AIC). Following the suggestion of Granger (1988), a test of possible cointegrating relationship between the series was conducted using the Johansen cointegration test. The trace statistic indicates that there is one cointegrating relationship among the variables. See table 3 below.
The multivariate Granger causality test was employed to investigate the causal relationship among the series. The result of the causality test based on the Wald test Chi-square statistic at 5% significance level is presented in table 4 below:

<table>
<thead>
<tr>
<th>Null hypothesis (Ho)</th>
<th>$X^2$ test Statistics</th>
<th>$X^2$ Critical value</th>
<th>Probability</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCF does not Granger cause RGDP</td>
<td>6.1553</td>
<td>11.8076</td>
<td>0.0461</td>
<td>Reject Ho</td>
</tr>
<tr>
<td>POLY does not Granger cause RGDP</td>
<td>27.0063</td>
<td>11.8076</td>
<td>0.0000</td>
<td>Reject Ho</td>
</tr>
<tr>
<td>UNI does not Granger cause RGDP</td>
<td>30.1203</td>
<td>11.8076</td>
<td>0.0000</td>
<td>Reject Ho</td>
</tr>
<tr>
<td>RGDP does not Granger cause POLY</td>
<td>10.5451</td>
<td>11.8076</td>
<td>0.0051</td>
<td>Reject Ho</td>
</tr>
<tr>
<td>GCF does not Granger cause POLY</td>
<td>0.2093</td>
<td>11.8076</td>
<td>0.9007</td>
<td>Accept Ho</td>
</tr>
<tr>
<td>RGDP does not Granger cause UNI</td>
<td>0.9354</td>
<td>11.8076</td>
<td>0.6264</td>
<td>Accept Ho</td>
</tr>
<tr>
<td>RGDP does not Granger cause GCF</td>
<td>0.5115</td>
<td>11.8076</td>
<td>0.7743</td>
<td>Accept Ho</td>
</tr>
<tr>
<td>GCF does not Granger cause UNI</td>
<td>0.0917</td>
<td>11.8076</td>
<td>0.9552</td>
<td>Accept Ho</td>
</tr>
<tr>
<td>POLY and UNI do not jointly Granger cause RGDP</td>
<td>51.9646</td>
<td>10.5197</td>
<td>0.0000</td>
<td>Reject Ho</td>
</tr>
</tbody>
</table>

Source: Author’s Computation, 2016.

Note: sample size = 29 and degree of freedom = 2; $X^2 = \text{chi-square}$

The bounds test statistics were computed using the Eviews 9.0 and the values for the lower bound I(0) and upper bound I(1) at 10%, 5%, 2.5% and 1% significance levels. The result as shown in table 5 below indicate that the value of the F-Statistic (24.2617) lies above the upper bounds at 10%, 5%, 2.5% and 1% significant levels respectively. Hence, the null hypothesis of no long-run relationships among the variables was rejected.

<table>
<thead>
<tr>
<th>Null hypothesis (Ho)</th>
<th>No long-run relationships exist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance level</td>
<td></td>
</tr>
<tr>
<td>1(0) Bound</td>
<td>2.72</td>
</tr>
<tr>
<td>1(1) Bound</td>
<td>3.77</td>
</tr>
<tr>
<td>F-Statistic:</td>
<td>24.2617</td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, 2016.

Thus, there is a long run relation among polytechnic enrolment, university enrolment, gross fixed capital formation and real gross domestic product in Nigeria. Based on this result, the long-run relationship equation for the variables is estimated as well as the short-run dynamics. The result is presented in table 6 below:

The result shows that the coefficient of polytechnic enrolment (-0.000790) is negative and not significantly different from zero in the current period but positive and significant in the first lag period (0.000243) during the short run. This suggests that an increase in the number of enrolments into Polytechnics contributes negatively to the economy in the current year but positively in the latter years. Although the coefficient of University enrolment (0.000051) was positive and not significant in the current period, it has a significant negative (-0.000362) relationship with real gross domestic product in the first lag period.

The coefficient of the error correction term (-0.339459) is correctly signed (negative) and significant. It
therefore suggests that given a long run equilibrium condition with short run deviations, the system corrects about 33.9 percent of the deviations in the current year. However, the long run estimate shows that polytechnic education has significant negative impact on the Nigerian real output. Conversely, university education has a long run significant positive impact on the performance of the economy. It is argued that polytechnic education in Nigeria today offers about 70% of technological programmes which are veritable tools for national development (Asibeluo, 2015), designed to prepare middle level personnel, technicians and input for the intermediate market, and at university level prepare engineers and technologists for higher management positions (UNIESCO, 1978).

Table 6: ARDL Cointegrating and Long Run Form

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cointegrating or Short run form</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(POLY)</td>
<td></td>
<td>-0.000005</td>
<td>0.000091</td>
<td>-0.057649</td>
<td>0.9551</td>
</tr>
<tr>
<td>D(POLY(-1))</td>
<td></td>
<td>0.000243</td>
<td>0.000084</td>
<td>2.898869</td>
<td>0.0145</td>
</tr>
<tr>
<td>D(POLY(-2))</td>
<td></td>
<td>-0.000176</td>
<td>0.000090</td>
<td>-1.960614</td>
<td>0.0757</td>
</tr>
<tr>
<td>D(UNI)</td>
<td></td>
<td>0.000051</td>
<td>0.000079</td>
<td>0.638774</td>
<td>0.5360</td>
</tr>
<tr>
<td>D(UNI(-1))</td>
<td></td>
<td>-0.000362</td>
<td>0.000124</td>
<td>-2.921620</td>
<td>0.0139</td>
</tr>
<tr>
<td>D(GCF)</td>
<td></td>
<td>0.664247</td>
<td>0.213413</td>
<td>3.112492</td>
<td>0.0099</td>
</tr>
<tr>
<td>D(GCF(-1))</td>
<td></td>
<td>-0.380527</td>
<td>0.254743</td>
<td>-1.493768</td>
<td>0.1634</td>
</tr>
<tr>
<td>D(GCF(-2))</td>
<td></td>
<td>0.483090</td>
<td>0.230818</td>
<td>2.092952</td>
<td>0.0603</td>
</tr>
<tr>
<td>D(GCF(-3))</td>
<td></td>
<td>-1.049442</td>
<td>0.272311</td>
<td>-3.853832</td>
<td>0.0027</td>
</tr>
<tr>
<td>CointEq(-1)</td>
<td></td>
<td>-0.339459</td>
<td>0.111591</td>
<td>-3.041981</td>
<td>0.0112</td>
</tr>
</tbody>
</table>

CointEq = RGDP - (-0.0008*POLY + 0.0011*UNI + 1.8058*GCF + 83.3502 )

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>POLY</td>
<td>-0.000790</td>
<td>0.000315</td>
<td>-2.508316</td>
<td>0.0291</td>
</tr>
<tr>
<td>UNI</td>
<td>0.001059</td>
<td>0.000157</td>
<td>6.724842</td>
<td>0.0000</td>
</tr>
<tr>
<td>GCF</td>
<td>1.805833</td>
<td>0.626682</td>
<td>2.881578</td>
<td>0.0149</td>
</tr>
<tr>
<td>C</td>
<td>83.350208</td>
<td>29.949358</td>
<td>2.783038</td>
<td>0.0178</td>
</tr>
</tbody>
</table>

Source: Authors’ Computation, 2016.

Over time, the intermediate market has diminished significantly in Nigeria with the growth of more sophisticated technology and production process requiring engineers and technologists, favoring university products. This gap affects the absorption rate of polytechnic products into the production process and distorts the linkage through which polytechnic education could contribute to output level of the economy. Therefore, investment in polytechnic education constitutes a leakage and reduces productive capacity of the Nigerian economy. Therefore, more enrolments into universities compared to the polytechnics contribute to meet the sophisticated manpower need of the labour market in Nigeria today than the technicians. Similarly, the admission requirements for university and polytechnic education in Nigeria contributes to a major dichotomy in the labour markets, which sees university products as superiors to their counterparts from the polytechnics. A process requiring a cutoff point of 200 and above for university admission and less than 180 for polytechnic enrollment in the Unified Tertiary Matriculation Examination (UTME) suggests that the best brains are admitted into the universities while the weaker ones are in the polytechnics. It psychologically affects the personnel and their contribution to production.

CONCLUSION

The objective of the study was to investigate the dynamic relationship between tertiary education and the performance of the Nigerian economy over a period of 1985 to 2013. The multivariate granger causality test was employed to test the causal relationship between University enrollment, polytechnic enrollment and real gross domestic product of Nigeria. The test revealed that although both university and polytechnic enrolment jointly Granger caused real gross domestic product, there are bidirectional causal relationship between real gross domestic product and polytechnics enrolment in Nigeria, and unidirectional causality running from university enrolment to real gross domestic product.

The ARDL-Bounds test also suggests that there is a long run relationship between the variables. However, polytechnic education which was designed to produce manpower for the intermediate market has contributed a leakage to the Nigeria economy because the products could not fit into the present day sophisticated production process tailored towards engineers and technologists. Contrarily, university enrolment has a sustainable long run positive impact in the Nigeria output performance. This is partly because the production process favors the university graduates, and
provides them avenue to employ their skills effectively in production. It is also a reflection of the dichotomy between polytechnic and university education in Nigeria, which favors the later. Hence, the feeling that polytechnics are less superior to Universities affects the productive capacity of their products compared to their university counterparts and national output.

Therefore, we recommend that Government and all relevant stakeholders carry out a review and restructuring of the polytechnic curriculum to meet the present day technological need in the production sector and forestall the discrepancy between university products and those of the polytechnics. The process should take into consideration ways to harmonize the standards for admission into the universities and polytechnics; eliminating the present dichotomy in cutoff marks and other admission requirements into any of the institutions. Government and authorities of the universities should make university education more accessible and affordable for the low income earners and Nigerian youths. This is to enable the country increase her stock of skilled manpower both in quantity and quality, in line with global best practices and towards the achievement of sustainable development.

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