IMPACT OF HUMAN CAPITAL INVESTMENT ON NATIONAL INCOME IN NIGERIA

AKINDE, OLUWASEUN ABAYOMI
Department of Economics, University of Ilorin
Kwara State, Nigeria.
akindeseun@gmail.com

&

ONAFOWOKAN, IBiyemi AJOKE
Department of Economics, Lagos State University, Ojo.
Lagos State, Nigeria.
ioonafowokan@yahoo.com

Abstract
Investment in education and health are considered as human capital development. There are three main components of ‘human capital’ which are early ability (whether acquired or innate), qualifications and knowledge acquired through formal education; and skills, competencies and expertise acquired through training on the job. This study employed ADF unit root test, Johansen co-integration test and fully modified OLS of the time series data from 1981 to 2013. This study concludes that in the long run public spending and post-secondary school enrolment as an investment approach in human capital exhibit significant impact on per capita income in Nigeria, though government budgetary allocation to health sector exhibits negative impact. This study recommends that the government should integrate training and skill acquisition as an integral part of the post-secondary school curriculum. Since training add value to class room learning and breeds innovation. The culture of volunteer service by secondary school levers in small and medium enterprise should be encouraged.

Keywords: Investment, Human Capital

Introduction
The concept of human capital refers to the abilities and skills of human resources of a country while human capital formation refers to the process of acquiring and increasing the number of people who have the skills, good health, education and experience that are critical for employment and economic growth. Thus, investment in education and health are considered as human capital development. There are three main components of ‘human capital’ which are early ability (whether acquired or innate), qualifications and knowledge acquired through formal education; and skills, competencies and expertise acquired through training on the job. However, evidence from literatures points that it is possible to have a positive or a negative relationship between growth and unemployment, depending on the value of the elasticity of substitution between low and high-skilled workers (human capital) and the institutional structure of the economy (Quintana & Royeela, 2012; Bakare, 2012; Hodge, 2009; Berument, Dogan & Tansel, 2006; Zavodny & Zha, 2000).

Empirical investigation from various studies revealed that adequate investment in human capital serves as a catalyst for improved productivity, economic growth and development (Lawanson & Marimuthu, 2009; Bakare, 2006; Sanusi, 2003; Usman, 1986). However, most of the empirical analysis of knowledge based economy in developing country focused only on government spending on education and health neglecting the role of the post-secondary enrolment on manpower capacity development. According to a study by Hiro and Robert (2004), where the authors used the numbers of students as a percentage of the working age population (15 to 64 years old) as a proxy for investment by individuals in human capital development. They found that individuals in states that have high unemployment rate are more likely to invest in education and training. This fits with the general observation that individuals are more likely to invest in education and training when facing unfavourable employment situations at economic downturns not minding the investment of the government in human capacity development which is a noticeable trend in Nigeria.
The findings from this study could also provide a guide regarding economically sensitive policies since most economic policies that are directed to ease unemployment rates stem from approaches assuming that unemployment is directly linked with economic growth without considering the influence of formal manpower. Any increase in the rates of growth must be associated with quality human capacity which is a correct economic argument but limited in certain situations as evidence in Nigeria. Then, what is the effect of public human capital investment on per capita income in Nigeria? Also, how does post-secondary enrolment impact on per capital income in Nigeria?

Literature Review

Literature highlighted different ways to enhance human capital development via formal education at the elementary, secondary and tertiary level, on the job training, study programme for adult, adequate equipping of health facilities for affordable and quality healthcare services and labour market information system among others. Human capital development could reduce wide spread poverty, unemployment and inequality leading to inclusive growth and economic development in any economy.

Theoretical Review

Reviewed Romer’s Theory

Romer takes a different approach to accounting for technological progress in his article published in 1990. While he saw knowledge as part of the aggregate capital $K$ and related technological progress to an increase in capital/labour ratio in his 1986 article, Romer focused this time on the production of knowledge by research workers. This model assumes that technological knowledge is labour-augmented, enhancing their productivity.

The production function is expressed as:

$$Y = K^{\alpha} (AL)^{1-\alpha}$$  (i)

so that $AL$ denotes a knowledge-adjusted workforce. Further, the model assumes that workers create technological knowledge. In a simple form, this is expressed as:

$$dA/dt = \delta H_A A$$  (ii)

where $H_A$ is human capital of workers and $\delta$ is a parameter. It is plain to see that the more researchers, the more new ideas are created, and the larger the existing stock of knowledge $A$, the more new ideas are produced (i.e. effect of externalities).

Equation (ii) shows that the rate of technical progress will be determined by the stock of human capital of research workers. In other words, an economy with a larger total stock of human capital will grow faster (Romer, 1990). It is worth emphasizing that unlike his previous model, the second Romer model explicitly recognizes the role human capital plays in economic growth. Also the model differs from human capital models such as the one developed by Becker et al. (1990) that treats all forms of intangible knowledge as being analogous to human capital skills that are rival and excludable. The second Romer model includes two distinct ways in which knowledge enters production. One is the contribution of new ideas (or designs in Romer’s term) to producing new goods. Research workers employed by firms undertake the production of new designs. New designs are no rival but excludable as their property rights are protected by patents. At the same time, new designs also increase the total stock of knowledge shared by the community of research workers and thereby increase the productivity of human capital in the research sector as a whole. Knowledge spillovers imply externalities: knowledge is thus non-excludable in this realm (Romer, 1994).

Endogenous Growth Theory

Endogenous growth is long-run economic growth at a rate determined by forces that are internal to the economic system, particularly those forces governing the opportunities and incentives to create technological knowledge. In the long run the rate of economic growth, as measured by the growth rate of output per person, depends on the growth rate of total factor productivity (TFP), which is determined in turn by the rate of technological progress. The neoclassical growth theory of Solow (1956) assumes the rate of technological progress to be determined by a scientific process that is separate from, and independent of, economic forces.

Neoclassical theory thus implies that economists can take the long-run growth rate as given exogenously from outside the economic system. Endogenous growth theory challenges this neoclassical view by proposing channels through which the rate of technological progress, and hence the long-run rate of
economic growth, can be influenced by economic factors. It starts from the observation that technological progress takes place through innovations, in the form of new products, processes and markets, many of which are the result of economic activities. For example, because firms learn from experience how to produce more efficiently, a higher pace of economic activity can raise the pace of process innovation by giving firms more production experience. Also, because many innovations result from Research and Development expenditures undertaken by profit-seeking firms, economic policies with respect to trade, competition, education, taxes and intellectual property can influence the rate of innovation by affecting the private costs and benefits of doing Research and Development.

The empirical evidence on the relative effect of public and private investment on growth has been limited. A number of recent studies have concluded that private investment has a larger positive impact on growth than public investment (Khan & Reinhart, 1990; Coutinho & Gallo, 1991; Serven & Solimano, 1990).

**Empirical Review**

There is an extensive literature estimating the impact of education expenditures on income (Bensi et al., 2004); economic growth (Keller 2006); income inequality (Sylwester 2002); individual earnings, employment probabilities (Lechner 2000; Jenkins et al., 2003) and welfare of the disabled (Chatterjee & Mitra 1998). Matthew (2011) as well as Oluwatobi and Ogunrinola (2011) found that government recurrent expenditure on education and health, enrollment in both primary and tertiary institutions have positive and significant effect on economic growth in Nigeria. Kanayo (2013) also confirmed that there is a positive relationship between human capital development and economic growth in Nigeria (Isola & Alani, 2012; Johnson, 2011; Sankay, Ismail & Shaari, 2010; Dauda, 2010) but other studies refuted such relationship (Amassoma & Nwosa, 2011).

**Methodology**

This study employed secondary time series data covering 1981 to 2013 sourced from the Statistical Bulletin of Central Bank of Nigeria (2013) total government expenditure on education and health while post-secondary school enrolment was sourced from World Development Index of 2014. Then, conducted ADF unit root test, Johansen co-integration test and Fully Modified Ordinary Least Square.

**Theoretical Framework**

McMahon (1998) and Oketch (2006) implicit production function was stated as:

\[ Y_t = Y(K_t, H_t, N_t) \]  

(i)

Where, \( Y \) = aggregate output, \( K \) = stock of physical capital, \( H \) = stock of human capital and \( N \) = aggregate employment of the economy and \( t \) = time.

This study however, modified equation 1 as follows; \( Y_t = Y(K_t, H_t) \)  

(ii) 

Totally differentiating the reduced form of equation (2), with respect to time \( t \) and dividing through by \( Y \), we have:

\[ \frac{1}{Y} \left( \frac{\delta Y}{\delta t} \right) = \frac{1}{K} \left( \frac{\delta Y}{\delta t} \right) \left( \frac{\delta K}{\delta t} \right) + \frac{1}{H} \left( \frac{\delta Y}{\delta t} \right) \left( \frac{\delta H}{\delta t} \right) \]

\[ y = MPP_K \frac{I_K}{Y} + MPP_H \frac{I_H}{Y} \]  

(iii)

Here, \( y \) represent rate of growth of output, \( I_K \) and \( I_H \) stand for investment in physical and human capital respectively. In generalized Cobb-Douglas production stated below;

\[ Q = \Lambda L^\mu K^{\mu_2} H^{\mu_3} \]  

(iv)

\( Q \) represent productivity growth rate, \( H \) is decompose into education and health. \( L \) represents the labour which is proxy by the post-secondary school enrolment, \( K \) represent the gross capital formation growth rate but kept constant. While the technology is constant in the short run, hence, the author held “\( \Lambda \)” constant.

Equation (iv) was linearized by logging both sides of the equation, which gives equation below

\[ \log(Q) = \log(A) + \mu_1 \log(L) + \mu_2 \log(K) + \mu_3 \log(H) \]  

(v)
Model Specification
Equation (iv) was rewritten as follows;
\[ \text{GDP}_t = (\text{SECENR}_t \mu_1 + \text{DOMI}_t \mu_2 + \text{GEH}_t \mu_3 + \text{GEEDU}_t \mu_4) \]  
(vi)
Q in equation (v) was proxy by per capita income and K which represents the gross capital formation (DOMI). In order to assess the effect of human capital investment on the per capita income (GDPK) while human capital input was decomposed into federal government budgetary expenditure on health and education, L which is labour was proxy by post-secondary school enrolment (SECENR). Equation (vi) was linearized by logging both sides of the equation, which gives equation below;
\[ \ln \text{GDP}_t = \mu_0 + \mu_1 \ln \text{SECENR}_t + \mu_2 \ln \text{DOMI}_t + \mu_3 \ln \text{GEH}_t + \mu_4 \ln \text{GEEDU}_t + \varepsilon_t \]  
(vii)

Analysis and Discussion of findings

Unit Root Test
The results of the Augmented Dickey Fuller (ADF) unit root test statistics shows that all the variables are stationary at first difference. The decision rule for the ADF Unit root test states that the PP Test statistic value must be greater than the critical value at 5% absolute term for stationarity to be established at level and if otherwise, differencing occurs using the same decision rule. This implies that the variables are I(1) series. Table 1 presents the results of the stationarity test in summary and the order of integration.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF Test Statistic Value</th>
<th>5% Critical Value</th>
<th>Remark</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(gdpk)</td>
<td>-5.6716</td>
<td>-2.9604</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Gdpk</td>
<td>-0.0066</td>
<td>-2.9571</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(domii)</td>
<td>-8.4397</td>
<td>-2.9640</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Ldomi</td>
<td>-0.3409</td>
<td>-2.9763</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(lgeedu)</td>
<td>-13.50105</td>
<td>-2.960411</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lgeedu</td>
<td>-0.095863</td>
<td>-2.957110</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
<tr>
<td>D(lgeh)</td>
<td>-9.870216</td>
<td>-2.960411</td>
<td>Stationary</td>
<td>I(1)</td>
</tr>
<tr>
<td>Lgeh</td>
<td>-0.238879</td>
<td>-2.957110</td>
<td>Non-Stationary</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Source: Author’s Computation from Eviews 9.0

Johansen Co-integration Test
Both the trace statistics and the Max-Eigen Statistics indicated the present of one co-integrating equations at 5 percent level of significance. Thus the result confirm the present of co-integration between per capita income (lgdpk), post-secondary enrolment (lsecenr), gross capital formation (ldomi) and human capital development (lhcd) (see table 2). Hence, these variable exhibits long run association.

<table>
<thead>
<tr>
<th>Max Rank</th>
<th>Eigenvalue</th>
<th>Trace Statistics</th>
<th>5% Critical values</th>
<th>Max-Eigen Statistic</th>
<th>5% Critical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>*None</td>
<td>0.754268</td>
<td>99.15132</td>
<td>69.81889</td>
<td>40.70191</td>
<td>33.87687</td>
</tr>
<tr>
<td>At most 1*</td>
<td>0.627532</td>
<td>58.44941</td>
<td>47.85613</td>
<td>28.64053</td>
<td>27.58434</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.444121</td>
<td>29.80888</td>
<td>29.79707</td>
<td>17.02892</td>
<td>21.13162</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.329790</td>
<td>12.77996</td>
<td>15.49471</td>
<td>11.60477</td>
<td>14.2646</td>
</tr>
</tbody>
</table>
At most 40.039714 1.175195 3.8415 1.175195 3.8415

Note **”** indicate the co-integrating equation
Source: Author’s Computation from Eviews 9.0

**Fully Modified OLS**

This is used to evaluate the long run impact of the independent variables on the dependent variable since Johansen co-integration test confirm the present of long run association of the variables employed. From the FMOLS results presented in table 3, the adjusted R² of 0.9312 indicates that the independent variables in the model jointly explain 93.12 percent variations in the dependent variable (per capita income) whereas other variables not captured in this model explained 6.08 percent variations in the dependent variable. The probability value of the individual explanatory variable reveals that all the explanatory variables are statistically significant at 10 percent significant level. Specifically 1 million naira raise government expenditure to education will induce 0.28 naira rise in per capita income; 1 million raise in government expenditure to health will induce 19.08 per capita incomes and 1 million naira rise in domestic investment will induce 19.60 increases in per capita income.

**Table 3: FMOLS Results**

Dependent Variable: LGDPK
Method: Fully Modified Least Squares (FMOLS)
Sample (adjusted): 1982 2013
Included observations: 32 after adjustments
Cointegrating equation deterministics: C
Long-run covariance estimate (Prewhtening with lags = 3 from AIC maxlags = 3, Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGEEDU</td>
<td>0.281042</td>
<td>0.142577</td>
<td>1.971157</td>
<td>0.0594</td>
</tr>
<tr>
<td>LGHE</td>
<td>-19.08013</td>
<td>10.71274</td>
<td>-1.781069</td>
<td>0.0866</td>
</tr>
<tr>
<td>LDOMI</td>
<td>19.59951</td>
<td>10.71679</td>
<td>1.828860</td>
<td>0.0789</td>
</tr>
<tr>
<td>LSECENR</td>
<td>1.398490</td>
<td>0.317711</td>
<td>4.401763</td>
<td>0.0002</td>
</tr>
<tr>
<td>C</td>
<td>-30.47259</td>
<td>3.903100</td>
<td>-7.807279</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared 0.940333 Mean dependent var 9.330664
Adjusted R-squared 0.931154 S.D. dependent var 2.348055
S.E. of regression 0.616096 Sum squared resid 9.868936
Durbin-Watson stat 1.289110 Long-run variance 0.039675

Source: Author’s Computation from Eviews 9.0

The findings from the model estimation in this study suggest that government expenditure on health (lghe) exact negative and significant effect on per capita income (lgdpk) contrary to the a priori expectation. The converse relationship between income per head and public expenditure on health could be due to the fact that most of governments spending on health over the years were for recurrent expenses with structural defects, inefficiency and ineffectiveness which affect the level and utilization of human capital development in Nigeria. In fact, the rate of medical tourism by Nigerians to other developed economies further buttressed the unimpressive scenario in the health sector. Furthermore, government spending on education exhibits positive impact on the per capita income in Nigeria in the long run. Also, the estimation results suggest that the more the number of post-secondary school enrolment the better the per capita income of the country while investment in domestic real sector is crucial to the growth and development of developing economies like Nigeria.

**Conclusion and Recommendations**

This study concludes that in the long run public spending and post-secondary school enrolment as an investment approach in human capital exhibit significant impact on per capita income in Nigeria though government budgetary allocation to health sector exhibits negative impact. Therefore, the challenges of
transforming education and health sectors in Nigeria cannot be met by quick fix solutions or isolated reforms. However, in order to empower the educational sector to qualitatively contribute to economic growth in Nigeria, the government should integrate training and skill acquisition as an integral part of the post-secondary school curriculum. Since training adds value to classroom learning and breeds innovation, the culture of volunteer service by secondary school leavers in small and medium enterprise should be encouraged, in order to develop entrepreneur capacity in them at early stage. Also, internship by undergraduates and graduates should be compulsory and well supervised requirement for the award of degree.

The Federal Government should also strive to resolve labour crisis in both the health and education in Nigeria; such that manpower hours will be gained. Labour loss due to prolonged disputes causes government to incur unproductive expenses since the government usually pays the worker for the periods of their strike. These expenses consist part of the public expenditure in these sectors with no productivity. In fact, the frequency of labour shut down in these sectors is alarming.

Federal Government should collaborate with the industries regarding human capital development (HCD) in Nigeria. Since, a common theme in developing countries is the prevalence of the state led strategy in HCD. There are a number of challenges with this approach, the most prominent being that it is supply-side driven. This system fails to recognize that skill requirements can change with shifts in demand, evolving patterns of international competition, and new technology, these supply oriented policies often result in mismatches between skills supplied by public training institutions and those needed by industry (Tan & Batra, 1995). These partnerships help create synergies that can be leveraged during the training and education process. A study by Walther (2007), reveals that “training cannot achieve maximum efficiency unless all the stakeholders are directly involved” (Walther, 2007). Thus developing countries should actively seek the involvement of indigenous and foreign enterprise partners in HCD to improve the efficiency of strategies adopted.

Reference


