

Human Capital Investment and Employment Growth in Nigeria

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SUMMARY

This paper mainly examines the link between human capital investment and employment growth in Nigeria for the period spanning 1980–2019 using timeseries data. The theoretical model is rooted in the simple theory of investment in human capital based on Ashton and Green (1996) relating to maximization of lifetime earnings and wealth. Diagnostic tests show that the ordinary least square (OLS) estimation technique is plausible. Results show that employment rate can positively induce government expenditure on education and health and secondary school enrollment. Creation of investment opportunities through basic infrastructural facilities – electricity, roads, etc. – is key to employment growth and human capital investment.

Keywords: Human capital investment; employment; Correlation LM Test; Heteroscedasticity Test, OLS

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INTRODUCTION

It has been argued that production depends not only on labour; labour is together with other factors and thus production cannot be identified only on the basis of number of heads or hours of work, since it depends on the quality of labour as determined by knowledge and skills subject to further development. The emergence of the economic transformation of many Western nations recognises knowledge and skills as key in enhancing greater output level, be it at the microeconomic or macroeconomic level. Hence, human civilization mainly focuses on education alongside with other factors and this has motivated nations to increase spending on education.

Human capital (HC) consists of general skills, specific skills and technical and scientific knowledge used in determining productivity at the individual and aggregate level at large. Accordingly, regions characterised by a high concentration of human capital often generally fare better economically in terms of employment growth and hence increases in productivity and income compared to other regions. Hence, human capital is directly related to the rates of employment, productivity and wage levels. Employment remains vital not only for the wellbeing of an individual but also for the society at large. Even though economic conditions differ from one region to the other, a general economic

policy goal is the delivery of employment opportunities accompanied by highly qualified skilled labour. It therefore follows that education and acquisition of skills remain crucial for facilitating sustainable growth and employment. While it is possible for acquisition of skills to lead to high employment rates, it is equally possible for educated individuals to move to areas in which higher employment rates exist. Thus, causality runs from both ends.

In Nigeria, attempts to effect stabilisation and structural adjustment policies over the last three decades to enhance economic growth and development have not successfully overcome the problem of unemployment. Just as many African nations, efforts towards increasing human capital development have not reduced the high rate of unemployment, just as investment in education has not resulted in expected output. The issue of employment and human capital development is fundamental, as this provides some of the explanations for the poverty growth thresholds of the economy. In spite of the low acquisition of skills in Nigeria compared to some other nations, on a yearly basis, the number of educated individuals on the aggregate level is comparatively higher than the rate of employment. The experience has been that unemployment has been on the increase and has continued to exist amidst a relatively high rate of educated individuals. Undoubtedly, this has cut across most of the notable sectors of the economy including industry, banking, education and

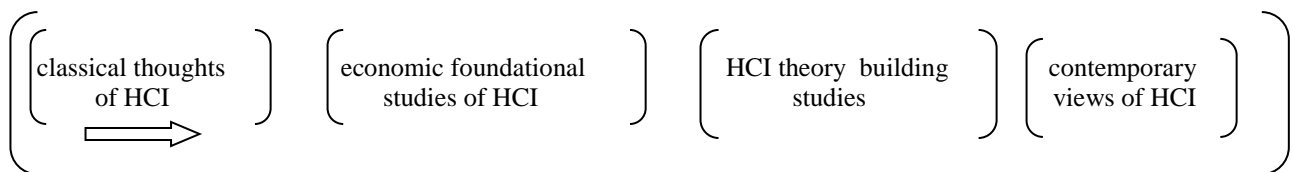
most importantly the private sectors as frequently observed and these have succeeded in adding to the present unemployment problems. Again, socio-economic problems including poor infrastructure such as roads, electricity supply etc, have also contributed in no small way to the current unemployment crisis. Recessions such as that of 2016 further aggravated the problem, as many sectors are unwilling to employ more workers, irrespective of the levels education and skill acquired.

Many studies have either focused on human capital investment or employment related issues but attempts at linking the two have been grossly inadequate. For example, Kenny (2019) examined the effect of human capital on unemployment volatility in Nigeria, and Imide & Dania (2019) studied the human capital and economic growth relationship. These two studies mentioned do not connect human capital with employment issues and so making studies in this area scanty. Linking the two informs policy makers in striking a balance in such a way that the number of educated individuals does not outweigh available employment opportunities. This is necessary to curb the increasing level of poverty and move closer to attaining sustainable growth in Nigeria. In the search of the literature, emphasis has mostly been laid on impacts of human capital on employment/unemployment growth but the reverse is without adequate attention. This is

indeed a good motivation and thus, subsequently, the objective of this paper is basically to examine the role employment opportunities play in human capital investment, with an emphasis on the primary and secondary levels of formal education. Following the introduction, Section 2 provides relevant literature, Section 3 provides the theoretical model, estimation and discussion are provided in Section 4, while Section 5 concludes.

LITERATURE REVIEW

Studies in the literature have identified and recognised investment in human capital (HC) and the theory in line with it. Schultz (1963) as cited in Devadas (2015) was first to identify education as a form of capital with uncertainty that skills and knowledge are a form of capital (Schultz, 1961). In the studies of Becker (1960, 1961), he establishes a theoretical relationship between education and economic development or high income earnings with the use of an external rate of return on education (Becker, 1960) and internal rate of return (Becker, 1964). The evolution of HC theory has passed through some eras: classical economic thought, economic foundation studies of HC theory and contemporary views, as shown in Figure 1 below:



Source: Adapted from Devadas (2015)

Figure 1. Evolution of human capital investment (HCI) theory

Sweetland (1996) in an earlier review considers economic viewpoints, economic foundation studies, and HC theory. Therefore, consideration is given here to developments that took place after Sweetland's work.

To the classical economists, particularly Adam Smith, human efforts have been considered as the root of all wealth, as emphasised by Sweetland (1996). Other economists equally contribute in this area of HC. As noted by Sweetland (1996), Marshall considers human abilities as personal wealth, interpreting this as capital and as an agent of production. The commencement of HC formalised classical thought of HC. In this regard, Sweetland (1996) highlights some studies by Mincer (1958), Fabricant (1959), Becker (1960) and Schultz (1961) as cited in Devadas (2015), were significant contributors prior to the official establishment of the HC theory in the early 1960s. Mincer (1958) notes that training and skills to a large extent affected personal income dispersions. Fabricant (1959) in his studies emphasises the importance of intangible capital –improvement in basic science,

technology, business administration and education and training. Schultz (1961) identifies five major challenges of human activities (investments) in the areas of health facilities and services, on job training, formally organised education at various levels and migration of individuals and families in response to new job opportunities. According to HC theory, employee productivity is increased through development in their knowledge, skills and attitude that can facilitate better performance (Ofobruku & Nwakoby, 2015; Ofobruku & Yusuf, 2016; Anike et al., 2017).

In their contribution to HC, economic foundational studies highlight the role of education (training and skill) disparities in personal income (Mincer, 1958), the importance of intangible capital (Fabricant, 1959), appropriate methodologies for studying HC (Becker, 1960) and how education relates to HC, including the types of HC (Schultz, 1961). Similarly, Sweetland (1990) provides an insight into the various contributions of Denison (1962), Schultz (1963), Becker (1964) to the HC theory of development studies.

Based on the views of HC earlier in existence, Becker (1993) put forward a definition of HC and noted that expenditures on education, training and medical care are essentially investment in HC. Following this, using education as a yard stick has been criticized due to its limitations, including other proxies of education in subsequent studies. While other studies on HC have been extended to explain its link to other macroeconomic variables in diversity apart from growth/output/national income, particularly important factors are its expansion by quality of education (Wößmann, 2003; Gundlach, 1997), learning on the job impact (experience) and the role nutrition and health play (Gundlach, 1997). Criticisms have however followed various discussions on quality of education, life-long job, higher related earning, and unemployment, among other formal procedures (Livingstone, 1997) which explain HC theory. In recent times, complexity in the dimensions of HC is becoming noticeable. With reference to Natoli (2008), it is highlighted that HC is non-tradable (except in slavery conditions), possesses both quantitative and qualitative aspects, can be either general or specific, and equally possesses external effect with social environment and the institutional context where it exists.

The intensity of HC in a locality might influence the local employment rate through production related or consumption related mechanisms, or even both. Focusing on the consumption related mechanism in the first instance, some high-income educated individuals increase spending patterns in absolute terms and the share of their income on services that are not necessities, such as leisure activities and personal services, are considered to be income and education elastic. However, not all fall into this category; most of these services are characterised by being nontraded, nonsubstitutable (human labour) by technology in their availability, possession of low skills. Jobs belonging to this category are cleaning and security services together with services requiring personal contact like sales assistants and care workers.

The prediction of the above view is premised on the idea that continuity of high income and an educated population in a local area tends to boost the demand for low-skilled consumer service jobs. Hence, an upward sloping supply curve emanating from this implies rising wages and employment in these service jobs. Spatially differentiated growth of high skilled individuals in different areas of the economy could be explained by the attraction of cities to highly-skilled workers (those valuing them) due to the urban amenities and productivity gains being offered. From another perspective, operation of agglomeration economies in the local labour market of cities could enhance the productivity of highly skilled workers compared to those in diffusion areas. This essentially increases demand in agglomeration economies. Consequently, there would be an increasing inflow of highly-skilled individuals into these areas based on increasing returns to HC and rising employment opportunities which they

offer. Apart from this, spatial differentiation can result from local youth cohorts characterised by a higher educational level and moving into highly-skilled, highly paid occupations. For instance, as individual returns to HC in a certain area increases, local youth might be encouraged to receive higher training and skills. Even though skill requirements are low for highly-skilled jobs they have not become obsolete yet even in the presence of great advances in technology in recent times. For more than a decade now technology itself has not totally managed to replace labour for some services requiring personal contact.

There have been submissions from various contributors to urban literature. Glaeser et al. (2001) provides an important theorisation of the rise of the city as centre of consumption. They argue that cities as consumption centres amidst areas of rising incomes have remained crucial for the cities and urban resurgence. This is because urban centres provide a large variety of services and consumer goods that are non-traded, hence attracting increasingly rich workers. The attraction of richer and highly educated workers gives rise to high productive capacity and hence contributes positively to employment growth. Glaeser and Gottlieb (2006) and Shapiro (2006) offer some empirical evidence in support of this.

On empirical grounds, Morreti (2004) makes a distinction between spillovers in productivity and complementarities in production with the findings that the wage premium in cities characterized by large shares of college graduates declines as new knowledge is acquired. By implication, low-skilled individuals benefit most from the existence of a larger number of graduates. Mete and Schultz (2002), using the OLS method, examine labour force participation rate based on change in the quality of health. The study finds that labour force participation rate increases health quality and vice-versa.

THEORETICAL MODEL

Theoretically, an individual's investment in human capital is increased when the gains from this exceeds the losses, or put differently, when the revenues from such investment exceed the cost, and this applies to any other investment. In this context, investment in human capital is explained in terms of investment in education. A simple model based on Ashton and Green (1996) is therefore developed and is applicable to any form of investment. This model is concerned with maximization of life time earnings and wealth. In its simple form, while investment in compulsory education is fixed, the model leaves out all non-monetary revenues that are indirect revenues.

Consider the lifetime wealth accumulated by an individual defined by

$$W_i = \sum_{i=ca}^{Rt} (y_i(h_i)mS_i)(1-r)^{a-i} (1-t), \quad (1)$$

where W_i is future lifetime wealth accumulated in period i being the current period, ca is current age, Rt represents the retirement age (age at which economic activities diminish), $y_i(h_i)$ is the income in period i and h_i is human capital level, m is unit cost of education, S_i equals the amount of education obtained in the same period, r is the rate of discount and t represents tax.

Funds can be a major constraint, as the possibility of investment taking place is a function of cumulated amount of funds that can sustain an individual. The constraint in mathematical term then becomes

$$(y_i - mS_i)(1-t) \geq c, \quad (2)$$

where c is minimum expenditure required for survival in each period.

However, human capital in each period is a function of its previous and present level of investments, such that

$$h_i = \sum_{j=1}^{i-Ac} S_{i-j} (1+\delta)^{1-j} + hc (1+\delta)^{Ac-i}, \quad (3)$$

where Ac is age attained after compulsory education, hc is total human capital attained during compulsory education and δ represents the rate of depreciation of skills.

Given that an individual maximized his total lifetime earnings investment in human capital in every period, this can therefore be determined by a number of factors expressed in the following form:

$S_i = f_i(ca, c, \delta, r, h_A, m, Rt, t, \mu)$ with a priori expectations

$$\frac{\partial S_i}{\partial ca} < 0, \frac{\partial S_i}{\partial c} < 0, \frac{\partial S_i}{\partial \delta} < 0, \frac{\partial S_i}{\partial r} < 0, \frac{\partial S_i}{\partial h_A} < 0, \frac{\partial S_i}{\partial m} < 0, \frac{\partial S_i}{\partial Rt} > 0, \frac{\partial S_i}{\partial t} < 0, \frac{\partial S_i}{\partial \mu} < 0. \quad (4)$$

The simplicity of this model leads to certain imperfections such as the inability to predict consequences of changes in any of the variables, the assumption of constancy in most parameters throughout the life span, and neglecting varying costs involved in

human capital investment, among others. On this basis, the model is extended to a general approach to investment in human capital. Therefore the extended model is:

$$S_i = \beta_0 + \beta_1 S_{i-1} + \beta_2 ca + \beta_3 c + \beta_4 \delta + \beta_5 r + \beta_6 h_A + \beta_7 m + \beta_8 Rt + \beta_9 t + \beta_{10} \Delta S_i + \beta_{11} I_f + \beta_{11} I_f \quad (5)$$

The foregoing provides a guide to the baseline models as follows:

$$Ged = \alpha_0 + \alpha_1 Ged(-1) + \alpha_2 Agd + \alpha_3 Emr + \alpha_4 Gcf + \alpha_5 Geff + \alpha_6 Le + \varepsilon_1 \quad (6)$$

$$Gehlt = \beta_0 + \beta_1 Gedhlt(-1) + \beta_2 Agd + \beta_3 Emr + \beta_4 Gcf + \beta_5 Geff + \beta_6 Le + \varepsilon_2 \quad (7)$$

$$Pse = \sigma_0 + \sigma_1 Pse(-1) + \sigma_2 Agd + \sigma_3 Emr + \sigma_4 Gcf + \sigma_5 Geff + \sigma_6 Le + \varepsilon_3 \quad (8)$$

$$Sse = \rho_0 + \rho_1 Sse(-1) + \rho_2 Agd + \rho_3 Emr + \rho_4 Gcf + \rho_5 Geff + \rho_6 Le + \varepsilon_4 \quad (9)$$

where Ged is government expenditure on education, $Ged(-1)$ its lag by 1 year, $Gehlt$ is government expenditure on health, $Ghlt(-1)$ its one year lag, Pse is primary school enrollment as a percentage of gross enrollment, $Pse(-1)$, its one year lag and Sse is secondary school enrollment as a percentage of gross enrollment, with $Sse(-1)$ its one year lag. Each of these represents measures of human capital investment, Agd represents age dependency ratio as a percentage of the working age population, Emr is employment rate, Gcf denotes gross capital formation, $Geff$ is government effectiveness and Le is defined as life expectancy. $\varepsilon_1 = \varepsilon_2 = \varepsilon_3 = \varepsilon_4 = \varepsilon$ is the stochastic term. The ratios and percentages appear large in values and so the logarithmic transformation is taken in each case except for government effectiveness. α_0, \dots, ρ_0 represent the

intercept for each model in (6), (7), (8) and (9) while $\alpha_1, \dots, \alpha_9, \beta_1, \dots, \beta_9, \sigma_1, \dots, \sigma_6$ and ρ_1, \dots, ρ_6 are slope coefficients.

Data employed is mainly from the World Development Indicators and the Central Bank of Nigerian Statistical Bulletin and IndexMundi for the period 1980–2019. Data for *Ged* and *Gehl* began from 1981 and ended in 2016. *Emr* data only started from 1981 and ended in 2017. Estimation technique is the ordinary least squares (OLS) method because it follows basic classical linear assumptions. The OLS is known to be the best linear unbiased estimator (BLUE)

among the class of estimators and is a special property recognised in econometric study.

ESTIMATION

First, the unit root test is conducted to understand the stationarity condition of the process. With a non-stationary process, law of large numbers and central limit theorem are violated, therefore familiar test statistics become inapplicable. Any attempt to apply this renders results to be spurious. The Augmented Unit root test is employed here because it is usually valid in large samples. Therefore, the sample observations employed in this paper fit into the ADF unit root test method.

Table 1
Stationarity test

Variable	Test statistics	Test Type	Prob.	Decision	Order of Integration
Agd	Intercept	ADF	0.000	Stationary	I(1)
Emr	Intercept	ADF	0.084	Stationary	I(0)
Gcf	Intercept	ADF	0.000	Stationary	I(1)
Ged	Intercept, Trend	ADF	0.034	Stationary	I(0)
Geff	Intercept	ADF	0.011	Stationary	I(0)
Le	Intercept	ADF	0.000	Stationary	I(0)
Pse	Intercept	ADF	0.003	Stationary	I(1)
Sse	Intercept	ADF	0.021	Stationary	I(0)

Source: Author’s computation.

The test for stationarity in Table 1 shows that only government expenditure on education, government effectiveness, life expectancy and secondary school enrollment and employment rate variables are stationary

in their levels, although the latter fulfills this at the 10% level. Gross capital formation and primary school enrolment variables are stationary in their first differences.

Table 2
OLS regression

Variable	Ged Model	Gehl Model	Pse Model	Sse Model
C	-23.309	8.215	2.279	-40.439
Ged (-1)	0.659**	-----	-----	-----
Gehl(-1)	-----	-0.617**	-----	-----
Pse (-1)	-----	-----	0.567	-----

Sse (-1)	-----	-----	-----	0.324
Agd	4.183	-13.313	5.730	3.716
Emr	1.229	0.910	-0.564	7.963**
Gcf	-1.540*	-0.670	0.194	0.113
Geff	-0.260	-0.466	-0.147	0.113
Le	5.089	-3.077**	-0.051	2.967*
AR(1)	-----	-----	-----	-----
AR(2)	-----	-0.451	-----	-----
R-Squared	0.944	0.424	0.343	0.937
R-Squared Adj	0.916	0.115	-0.149	0.890
S.e	0.304	0.339	0.057	0.077
Prob. F stat	0.000	0.296	0.661	0.000
DW	2.293	2.418	1.463	2.123
Residual JB-Prob	0.569	0.679	0.552	0.765
Correlation LM Test	0.048, 0.013	0.232, 0.087	0.045, 0.008	0.045, 0.008
Heteroscedasticity test: ARCH	0.056, 0.076, 0.705	0.348, 0.298, 0.850	0.918, 0.836, 1.000	0.467, 0.363, 0.982

Source: Author's computation

The analysis is based on four basic baseline models: Government expenditure on education (Ged) model, Government expenditure on health (Gehlt) model, Primary school enrollment (Pse) model and secondary school enrollment (Sse) model. For each model, applicability of the OLS is tested (Table 2) with reference to the normality, correlation LM to Heteroscedasticity tests. For the Ged model, the normality test statistics indicates that residuals are normally distributed while the correlation LM test statistics, at least in part, show that residuals are not serially correlated and for the Breusch-Pagan-Godfrey heteroscedasticity test the assumption of equal variance is maintained, hence, OLS is applicable here. The normality test correlation test and heteroscedasticity test results show that residuals are normally distributed and that null hypotheses of serial correlation and heteroscedasticity are rejected for the Government expenditure on health model with second order autoregressive scheme.

The same goes for primary and secondary school enrollment models. The test results show normal

distribution of residuals, no serial correlation and absence of heteroscedasticity (Table 2).

Starting the discussion of results with the government expenditure on education, initial government spending on education is positive (0.659) with significant effect on the current spending. This demonstrates that past efforts on human capital development trend into the present. In contrary, the lag value of government expenditure on health is significantly negatively (-0.617) related to current spending on health. Hence past health expenditure patterns seem not to favour the present. Age dependency ratio (8.895), employment rate (1.229) and life expectancy (5.953) largely impact positively on government expenditure on education. Most importantly, increasing population within the age range of compulsory education can stimulate government preparedness to spend more on attaining quality education.

Similarly, for the government expenditure on health, an increasing employment rate encourages knowledge attainment through education and subsequently more spending on education. Longevity

sustains more expertise and thus encourages more spending on education, as a longer life expectancy complemented by a long period of wealth accumulation gives rise to more investment in human capital. The employment rate (0.910) facilitates government expenditure on health and has a lower impact compared to its impact on expenditure on education.

Government effectiveness and gross capital formation impact negatively on both education and health expenditures. The negative coefficient of government effectiveness is a measure of low quality of governance in the system. In the same way, concentration on accumulating unproductive investments retards spending on both education and health.

For the other category of human capital measure, initial primary school enrolment relates positively (0.567) with current levels of enrollment. Hence, past education tend to encourage more education, particularly as more people are willing to accept new training. The same is true for the initial level of secondary enrollment (0.324) but with lower impact on the current level. Age dependency ratio influences both primary and secondary school enrollment positively. An increasing dependency ratio increases the desire for both levels of education, but more so for primary education. Interestingly, employment rate is positive (7.936) and significantly related to secondary enrollment but negatively related to primary school enrollment (-0.564). Thus, a greater level of employment encourages secondary education compared to primary school education. Quality of governance lowers primary school enrolment, as indicated by the negative value (-0.147), but improves secondary education (0.113). Life expectancy is significantly and positively related to secondary education while its effect on primary enrollment is on the reverse.

The models appear adequate as confirmed by the probability F-statistics (0.000), especially for government expenditure on education, primary and secondary school enrollment models.

CONCLUSION AND POLICY IMPLICATIONS

The paper examined the relationship between human capital investment and employment growth during the period 1980-2019. A weak structural adjustment programme together with ineffective stabilisation policies have not changed the trend in unemployment rate in Nigeria. Undoubtedly, the government is making an effort to ensure a low level of unemployment but this has not yet been achieved as expected. In most cases, the low level of output resulting from a low level of industrialization and human capital investment has been a fundamental issue. Due to frustration from the unemployment crisis, the few cases of human capital development are accompanied by brain drains as opportunities arise abroad. This is indeed a major withdrawal from the domestic economy and injection to foreign ones; more so that individuals are trained again to acquire further skills. There are many ways out of this persistent problem. The major one is focusing on massive investment creation in education infrastructure, particularly technology that can ensure a better quality education. This will encourage the skilled, semi-skilled and unskilled workers in Nigeria through demonstrating hidden positive talents. Nigerians are creative if they can be encouraged. Health infrastructure should be available and well equipped to keep productive labour in good health conditions. Research and development should be strongly encouraged, as this will usually increase the extent of collaboration of ideas, particularly on the need to improve human capital. Electricity and road infrastructures for national and international routes should be put in good shape to further stimulate more trade integration and investment opportunities. In the long run these measures should improve employment opportunities and subsequently investment in human capital.

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