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IMPLICATIONS OF HUMAN CAPITAL FORMATION ON OUTPUT AND EMPLOYMENT: EVIDENCE FROM NIGERIA

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ABSTRACT

Many studies have documented that human capital formation is important to boost output both empirically and theoretically. However, studies on the implications of human capital on employment are still scanty, especially for developing countries. Against this background, the study investigates the shock and long-run implications of government financing on education and health on output and employment in Nigeria using a vector error correction model (VECM). The results show that the forecasting error shocks from government expenditure on health and education affect output more than employment along the 10-horizon period. Evidence from the long-run output model showed that government expenditure on education and human capital index is statistically significant, while government expenditure on health is not statistically significant. Government expenditure on education and the human capital index has a positive relationship with output. For the long-run employment model, government expenditure on health and education is statistically significant; while investment in human capital is not significant with employment. Government expenditure on education has a negative relationship with employment, while a positive relationship exists between government expenditure on health and employment. The result implies that human capital indicators in terms of quantity and quality do not contribute positively and significantly to employment growth in Nigeria. The study recommends the need to encourage self-reliance through entrepreneurship training to bolster employment opportunities in the long run.

Contribution/Originality: This study contributes to the existing literature by examining the long-run effects and shock implications of output and employment, which has been neglected in most studies.

1. INTRODUCTION

One of the most important factors to promote output and employment recognized in the literature is adequate human capital investment (Olopade, Okodua, Oladosun, & Asaleye, 2019; Popoola, Alege, Gershon, & Asaleye, 2019). Although this has been neglected for a long period, Schultz stressed the importance of human capital theory in 1960, but not much was attached to it as a function of economic growth. However, since the emergence of the discovery by Schultz, several researchers have emerged to substantiate and contribute to the importance and development of human capital, not only as a factor of production but as a unique factor that coordinates and

harnesses all other factors of production for increased productivity and economic growth, respectively. Efficient and effective human resources can be determined by the quality and quantity of active, educated, and healthy youth entering the labor market (Asaleye, Alege, Lawal, Popoola, & Ogundipe, 2020; Edeme & Nkalu, 2019). The importance of health care services and education in human capital development has necessitated increased public expenditure in both developed and developing economies. The public sector plays a crucial role in providing health care and educational services needed for human capital growth as both play important roles in the improvement of people's productive capacity.

Many scholars have examined the importance of social spending on human capital development. However, there is a disconnect in many studies on its impact, especially regarding employment. Others have tried to estimate the causal relationship between government spending on education and health care and economic growth in Nigeria and other developing nations. Iheoma (2014) examined how government spending affects human capital development in Nigeria. Kairo, Okeke, & Aondo (2017), Jude, Houeninvo, & Sossou (2015) and Iheoma (2014) all examined the effect of social spending on human capital in sub-Saharan Africa. The authors emphasized the importance of government spending on human capital through expenditure on education and healthcare services. It was also argued that the effects of government expenditure corroborate the improvement of welfare in the economy. Scholars such as Obansa, Abubakar, & Akanegbu (2013); Pablo & Enrique (2011) and Olaniyan, Onisanwa, & Oyinlola (2013) examined the importance of public spending on health care services in Nigeria. According to these authors, "health is wealth", and healthy, skilled labor enhances the productivity of the nation and therefore increases GDP.

On the importance of public financing on education, Adamu (2012); Chude & Chude (2013) and Omojimite (2011) posited a positive relationship between government spending and educational development. According to the authors, it was recommended that the government in Nigeria should increase its budgetary allocation to align with the United Nations' 26% of annual budgets for education, enhancing educational development and human capital. Abhijeet (2010) encouraged the Indian government to increase its monetary allocation to education to aid the country's growth. Similar studies by Emanuele, Guin-Siu, & Mello (2003) and Jude et al. (2015) examined the importance of public expenditures on health and education in selected African countries. The consensus on the implications of expenditure on human capital is that it would increase aggregate output in the long run. However, Nigeria has increased the number of universities in the country in recent times with the private sector's involvement in the educational sector. Consequently, government expenditure on education has discouraged investment through the public sector (Asaleye, Maimako, Inegbedion, Lawal & Ogundipe, 2021; Obadiaru, Oloyede, Omankhanlen, & Asaleye, 2018). For example, between 1970 and 2018, Nigeria's contribution to education was less than 26% of Gross Domestic Product (GDP) (Asaleye, Ogunjobi, & Ezenwoke, 2021), which is also below the UNESCO minimum level of 26%.

Recent studies concerning human capital and economy have advanced but are limited to output and the agricultural sector (Aremu et al., 2020; Aremu et al., 2018). For example, Edeme & Nkalu (2019) investigated the nexus among education, agriculture and rural development, health, water resources, energy, housing, and environment protection using generated data from 20 states from 2007 to 2017. They employed the OLS method to process the data. The study revealed that education, health and water resources in advancing human development is higher than energy, housing and environmental protection expenditure. Omodero (2019) also examined the impact of government spending on human development in Nigeria from 2003 to 2017 using multiple linear regression models. The study revealed that government capital expenditure and inflation does not have any significant effect on human capital, while recurrent government expenditure has a strong and significant positive impact on human capital. Likewise, Subair (2019) investigated government expenditure on Nigeria's economic growth using the Johansen cointegration technique and showed that government expenditure has the potential to influence the Nigerian economic growth positively.

A related study by Akinsokeji & Akinlo (2019) examined the relationship between human capital and economic growth in Nigeria between 1986 and 2015. Secondary and time series data was used, and OLS and cointegration techniques were employed to process the data. The study found a long-run relationship between human capital and economic growth. Also, the study revealed that trade openness and physical capital negatively impact economic growth, while manufacturing and interest rate have a positive and significant impact on economic growth. Therefore, they called for the restructuring of the education system to enable the workforce to contribute meaningfully to economic growth. Okafor, Ogbonna, & Okeke (2017) examined the long-run relationship between government expenditure in education and health and capital development in Nigeria. They employed a VAR model for a multivariate analysis of expenditure to determine the long-run relationship among the variables and to test the significant effect of humans on education and health expenditure. The result revealed that human capital is significant in the current year but insignificant in the previous year.

Consequently, Jude et al. (2015) used traditional cross-sectional and dynamic panel techniques to analyze data from a sample of nine African countries between 1996 and 2010. They found out that public expenditure on education and health had a negative impact on economic growth. Their investigation also revealed that education and health spending are complementary to growth. The importance of human capital development on economic growth cannot be ignored; Uchechi (2014) employed the augmented Solow human capital growth model to investigate the impact of human capital development on national output level in Nigeria from 1999 to 2014. The study implored government and policy makers to prioritize human capital development and stated that efforts should be made to build and develop human capital through adequate educational funding across all levels since this is the only way of attaining sustainable economic growth and development.

In emerging economies, most governments allocate significant resources to improve education and health services with the underpinned objective of promoting output, employment, and aggregate welfare (Ogundipe, Ogunniyi, Olagunju, & Asaleye, 2019; Popoola, Asaleye, & Eluyela, 2018). Given the importance of human capital formation to promote output and employment in developed economies, it is important to consider whether the government's education and health spending affect employment and output in Nigeria. The increase in the rate of unemployment is one major macroeconomic problem facing Nigerian's economy (Arisukwu, Olaosebikan, Asaleye, & Asamu, 2019; Asaleye, Lawal, Popoola, Alege, & Oyetade, 2019a) coupled with the mismanagement of resources, especially through government expenditure (Oladipo, Iyoha, Fakile, Asaleye, & Eluyela, 2019a; Oladipo, Iyoha, Fakile, Asaleye, & Eluyela, 2019b). Hence, this study aims to investigate the effect of government expenditure on human capital and its implications on output and employment in Nigeria. Studies have documented that government expenditure on human capital can cause shock and long-run effects (Fashina, Asaleye, Ogunjobi, & Lawal, 2018; Popoola et al., 2019). Against this background, this study examines the shock effects of government health and education expenditure on output and employment in Nigeria. Likewise, the long-run impact of the government's health and education expenditure on output and employment was also investigated.

This study is outlined as follows: Section 1 presents the Introduction, Section 2 discusses the Materials and Method, Section 3 presents the results, and Section 4 concludes.

2. MATERIALS AND METHOD

2.1. Theoretical Framework and Empirical Models

2.1.1. Theoretical Framework

The theoretical framework is built on the new growth model by Lucas (1988). This model stressed the importance of education in a growth process, thereby using a "subjective" concept of knowledge. Human capital is used as an alternative (or complementary) to technology in the production function in this model. There is less emphasis on health in this model, but Lucas defined the general strategic knowledge management (SKM) embodied in human capital as an individual's set of physical, intellectual and technical capabilities.

The advantage of Lucas's new growth model over the standard growth model is that it adopts both physical capital and human capital in the production process, with non-decreasing and constant marginal productivity. The individual uses his time and part of the SKM to educate himself. Lucas's model is as follows:

$$Le = \mu hN \quad (1)$$

In Equation 1, it is assumed that people devote their non-leisure time to education or learning activities. In return, this allocation of time affects the productivity level, and the human capital (h) contribution increases. N represents the total number of workers assumed to be identical and possess the same skills (h); μ is the fraction of their non-leisure time devoted to current production, where the surplus given as 1-μ will be allocated for human capital accumulation.

Given that the production function is the total of capital (k) plus effective work, Equation 1 is modified to give Equation 2:

$$Y = F(k, Le) \quad (2)$$

Lucas emphasizes two effects of human capital. First is the internal effect, which refers to individuals who have acquired skills. The second is the external effect, and these individuals contribute to improving the productivity of others.

In the production process, the external effect may not be considered during the decision to allocate time by the producers. According to Lucas (1988), this externality denotes the average working hours and not the aggregate human capital contribution; hence equation one can be rewritten as:

$$Le = \mu haN \quad (3)$$

In Equation 3, 'ha' is the externality, and it represents the average, not the aggregate, human capital contribution. At equilibrium, the average SKM level 'ha' becomes 'h' since all the individuals are identical. The production of technology is given as:

$$Y_t = N_t C_t + K_t \quad (4^1)$$

$$= AK_t \beta [\mu_t h_t N_t] 1 - \beta ha_t \Upsilon \quad (4^2)$$

In Equation 4^1 and 4^2, C_t is per capita consumption, and A is the technology level (assumed to be constant). In Equation 4, human capital's accumulated input with non-decreasing returns is substituted as a labor input. Lucas demonstrated this to account for dependence on per capita income. Lucas further stressed that human capital growth is not dependent on the initial human capital, which is expressed below in Equation 5.

$$h_t / h_t = gh = \Phi (1 - \mu_t) \quad (5)$$

Note: Achieving exogenous growth while accounting for externality leads to non-diminishing returns to human capital accumulation.

In Equation 5, h_t represents a household with an endless lifetime. This assumption helps to avoid the stick of human capital not being constant over time. Given Equation 4, it can be deduced that the engine of sustainable growth is the effective and efficient accumulation of human capital.

The empirical models can be deduced from the theoretical framework. The government expenditure on humans is divided between health (HEH) and education (EDU) expenditure. The Human Capital Index (HCI) is used to represent human capital development, GDP represents economic growth, and EMP represents employment. Some

scholars have also stressed the importance of education and health in promoting sustainable development (Asaleye, Maimako, Lawal, Inegbedion & Popoola, 2021; Lall & Kramer-Mbula, 2005; Lange & Topel, 2006; Salazar-Xirinachs, Nubler, & Kozul-Wright, 2014; Sturm, 1993).

2.2. Empirical Models

Two models were estimated in this study. The first model was used to investigate the shock impacts of government education and health expenditures on output and employment using the vector error correction model (VECM). At the same time, the second model was used to investigate the long-run effects. Before the VECM, the series' statistical properties were tested for stationarity using the augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests. The presence of cointegrating vectors was tested using Johansen cointegration.

The study detected the existence of at least two cointegrating equations among the series, so the VECM was estimated for this study. Let's assume that the variable in the system is given as follows in Equation 6:

$$X_t = \left(GDP, HCI, HEH, EDU, EMP\right) \tag{6}$$

Since all the five variables are stationary at the order I, the first differenced form is shown as follows in Equation 7:

$$\Delta X_t = A_1 \Delta X_{t-1} + \mu_t \tag{7}$$

Alternatively, it can be expressed as follows in Equations 8 to 12:

$$\Delta GDP_t = \alpha_{11}\Delta GDP_{t-1} + \alpha_{12}\Delta HCI_{t-1} + \alpha_{13}\Delta HEH_{t-1} + \alpha_{14}\Delta EDU_{t-1} + \alpha_{15}\Delta EMP_{t-1} + \mu_{1t} \tag{8}$$

$$\Delta HCI_t = \alpha_{21}\Delta GDP_{t-1} + \alpha_{22}\Delta HCI_{t-1} + \alpha_{23}\Delta HEH_{t-1} + \alpha_{24}\Delta EDU_{t-1} + \alpha_{25}\Delta EMP_{t-1} + \mu_{2t} \tag{9}$$

$$\Delta HEH_t = \alpha_{31}\Delta GDP_{t-1} + \alpha_{32}\Delta HCI_{t-1} + \alpha_{33}\Delta HEH_{t-1} + \alpha_{34}\Delta EDU_{t-1} + \alpha_{35}\Delta EMP_{t-1} + \mu_{3t} \tag{10}$$

$$\Delta EDU_t = \alpha_{41}\Delta GDP_{t-1} + \alpha_{42}\Delta HCI_{t-1} + \alpha_{43}\Delta HEH_{t-1} + \alpha_{44}\Delta EDU_{t-1} + \alpha_{45}\Delta EMP_{t-1} + \mu_{4t} \tag{11}$$

$$\Delta EMP_t = \alpha_{51}\Delta GDP_{t-1} + \alpha_{52}\Delta HCI_{t-1} + \alpha_{53}\Delta HEH_{t-1} + \alpha_{54}\Delta EDU_{t-1} + \alpha_{55}\Delta EMP_{t-1} + \mu_{5t} \tag{12}$$

In Equations 8 to 12, the series is in first differenced form, and the long-run relationship is ignored, that is, the series are in first differenced VAR form. To estimate the VECM, we have:

$$\Delta X_t = \partial \Delta X_{t-1} + \lambda Z X_{t-1} + \varepsilon_t \tag{13}$$

Equation 13 expresses the first differenced series, and the long-run implication λZX represents the long-run relationship.

2.3. Shock Effects

Following the ordering of the variables, as stated in Asaleye et al. (2020), with sight adjustment as follows:

$$\Delta\begin{pmatrix} GDP \\ EDU \\ HEH \\ HCI \\ EMP \end{pmatrix} = \begin{pmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \end{pmatrix} + \sum_{i=1}^{n} \Delta \begin{pmatrix} \vartheta_{11} & \vartheta_{12} & \vartheta_{13} & \vartheta_{14} & \vartheta_{15} \\ \vartheta_{21} & \vartheta_{22} & \vartheta_{23} & \vartheta_{24} & \vartheta_{25} \\ \vartheta_{31} & \vartheta_{32} & \vartheta_{33} & \vartheta_{34} & \vartheta_{35} \\ \vartheta_{41} & \vartheta_{42} & \vartheta_{43} & \vartheta_{44} & \vartheta_{45} \\ \vartheta_{51} & \vartheta_{52} & \vartheta_{53} & \vartheta_{54} & \vartheta_{55} \end{pmatrix} \begin{pmatrix} GDP_{t-i} \\ EDU_{t-i} \\ HEH_{t-i} \\ HCI_{t-i} \\ EMP_{t-i} \end{pmatrix} \left[ET_{t-1}\right] \begin{pmatrix} \rho_{1t} \\ \rho_{2t} \\ \rho_{3t} \\ \rho_{4t} \\ \rho_{5t} \end{pmatrix} + \begin{pmatrix} v_{1t} \\ v_{2t} \\ v_{3t} \\ v_{4t} \\ v_{5t} \end{pmatrix} \tag{14}$$

Equation 14 shows the matrix of the VECM, Δ represents the first difference, and ET represents the error correction term; errors in the equation are assumed to be uncorrelated. The interpretation of the result can be done

either using variance decomposition or an impulse response function. The variance decomposition provides information about how each variable contributes to the other. This analysis will also help to determine how much the exogenous shocks can explain the forecast error variance for other variables. The impulse response function helps to show the response of the shock that one variable has on an impulse of another variable. This study uses the variance decomposition. The strength of the panel VECM lies in its ability to treat all variables as endogenous and interdependent, both dynamic and static (Asaleye et al., 2019b; Asaleye et al., 2019c).

2.4. Long-Run Impacts

The long-run equations for output and employment were established using the normalised procedure of Johansen cointegration. The cointegration transformation of Equation 7 is given in Equation 15 as:

$$\Delta X_t = \mathrm{M} X_{t-1} + \sum_{n=1}^{k-1} \Omega_n \Delta X_{t-1} + \varepsilon_t \qquad (15)$$

In Equation 15, $\mathrm{M} = \sum_{n=1}^{k} \Phi_n - I$, and $\Omega_n = -\sum_{a=n+1}^{k} P_a$, and normalization is done on output and employment variables to generate the long-run equations.

This study examines the effect of government expenditure and human capital development in Nigeria from 1981 to 2018. Government expenditure is proxied by health expenditure and education expenditure. Human capital development is proxied by the Human Capital Index, and other variables included in this study are growth and employment, which are proxied by real GDP and employment rate, respectively. All data were obtained from the World Bank, except HDI, which was obtained from the United Nations Development Report (UNDP).

Table 1. Unit root test results.

Series	Augmented Dickey–Fuller			Phillips–Perron		
	At level	First DF	I(D)	At level	First DF	I(D)
GDP	0.663	-5.329	I(1)	0.663	-5.326	I(1)
HCI	-1.157	-3.601	I(1)	-1.157	-3.539	I(1)
HEH	-0.665	-7.243	I(1)	-I.781	-16.55	I(1)
EDU	-1.556	-5.486	I(1)	-1.412	-7.742	I(1)
EMP	-1.438	-4.4159	I(1)	-1.581	-4.438	I(1)

3. RESULTS

Table 1 presents the unit root test results, which was carried out using the augmented Dickey–Fuller and Phillips–Perron tests. The 5% significance level was adopted in this study, and the results indicate that the series was not stationary at level but were all stationary at first difference. All the series are integrated of the same order, order one.

Table 2 presents the cointegration results, and the evidence shows that the trace statistics indicate three cointegrating equations, while the maximum eigenvalue shows that there are two cointegration equations. This study uses the result of the maximum eigenvalue. According to Popoola et al. (2019), the maximum eigenvalue is more suitable for small data.

Based on this, two equations are generated in this study. The first equation expresses the output behavior, and the second equation shows the employment equation. The cointegration outcome validates the use of the vector error correction model in this study, which is more suitable for the non-stationary series with the presence of cointegrating vectors in this study instead of vector autoregression, which is suitable for series that are integrated of order zero.

Table 2. Cointegration test results.

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None*	0.929	146.451	34.806	0.000
At most 1	0.564	61.762	28.588	0.008
At most 2	0.457	35.228	22.299	0.049
At most 3	0.306	15.692	15.892	0.189
At most 4	0.117	4.002	9.165	0.411

Note: Trace test: three cointegrating equations at the 5% level.
* represents the rejection of the hypothesis at the 5% level.
** MacKinnon, Haug, & Michelis (1999) p-values.

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None*	0.929	84.689	34.806	0.000
At most 1	0.563	76.535	28.588	0.009
At most 2	0.457	49.536	22.299	0.046
At most 3	0.306	11.689	15.892	0.205
At most 4	0.117	4.002	9.164	0.412

Note: Max-eigenvalue test: two cointegrating equations at the 5% level.
* denotes rejection of the hypothesis at the 5% level.
** MacKinnon et al. (1999) p-values.

Table 3. Shock of government on health.

Period	SE	GDP	EDU	HEH	HCI	EMP
1	8.042	0.726	86.365	12.908	0.000	0.000
2	13.083	47.926	43.256	8.614	0.197	0.007
3	17.216	31.492	26.847	22.076	0.117	19.467
4	23.553	18.861	45.876	24.083	0.066	11.113
5	35.186	8.505	71.077	14.928	0.052	5.435
6	42.393	6.375	75.283	13.904	0.618	3.821
7	55.164	4.975	76.774	14.402	1.546	2.302
8	68.808	4.527	80.039	11.131	2.675	1.627
9	78.215	5.425	77.077	10.254	3.895	3.348
10	94.641	4.886	78.717	8.164	4.622	3.611

Note: SE represents standard error, GDP is the Gross Domestic Product, EDU is government expenditure on education, HEH is government expenditure on health, and EMP is employment.

Table 4. Shock of government on education.

Period	SE	GDP	EDU	HEH	HCI	EMP
1	14.776	1.729	98.271	0.000	0.000	0.000
2	19.747	30.825	58.651	6.061	0.451	4.0126
3	23.998	20.872	42.112	18.188	0.697	18.131
4	29.248	26.014	34.438	22.851	0.478	16.219
5	42.067	12.909	61.708	17.111	0.231	8.0406
6	54.995	8.067	72.102	14.395	0.637	4.797
7	71.053	5.433	74.901	14.991	1.767	2.908
8	85.917	6.426	74.237	13.891	3.411	2.036
9	102.016	5.532	72.771	14.423	4.444	2.829
10	127.572	3.538	77.534	11.686	4.918	2.322

Tables 3 and 4 present the VECM results. Variance decomposition was used for the interpretation. The emphasis of the shocks of government expenditure on health and education is on output and employment.

The variance decomposition of government expenditure on health is presented in Table 3. In period 1, the forecasting error shock of government expenditure on health (HEH) shows a 0.726329% variation in GDP, while there is no employment variation. In periods 2 to 10, the forecasting error shock of HEH shows 47.9%, 31.5%, 18.9%, 8.51%, 6.37%, 4.97%, 4.53%, 5.43 and 4.89% variations, respectively, in GDP. While from periods 2 to 10, the forecasting error shock of HEH shows 0.007%, 19.5%, 11.1%, 5.44%, 3.82%, 2.30%, 1.63%, 3.35% and 3.61% variations, respectively, in employment. The overall conclusion is that the forecasting error shock of government

expenditure on health affects output and employment in Nigeria. These findings are in line with the study of Fashina et al. (2018).

Table 4 presents the variance decomposition of government expenditure on education. In period 1, the forecasting error shock of government expenditure on education (EDU) shows a 1.73% variation in GDP, while there is no employment variation. In periods 2 to 10, the forecasting error shock of EDU shows 30.8%, 20.9%, 26%, 12.9%, 8.07%, 5.43%, 6.43%, 5.53% and 3.54% variations, respectively, in GDP, while from periods 2 to 10, the forecasting error shock of EDU shows 4.01%, 18.1%, 16.2%, 8.04%, 4.8%, 2.91%, 2.04, 2.83 and 2.32% variations, respectively, in employment. Likewise, the conclusion is that the forecasting error shock of government expenditure on health affects output and employment in Nigeria. These findings are in line with Popoola et al. (2019).

Table 5. Long-run results for output and employment.

Output Equation				
GDP	**EMP**	**EDU**	**HCI**	**HEH**
1	0	-0.003998*	-4.028441*	-0.026440
		(0.00071)	(0.35618)	(0.20603)
		[-5.63098]	[11.3101]	[0.12833]
Employment Equation				
GDP	**EMP**	**EDU**	**HCI**	**HEH**
0	1	0.840569*	0.000417	-2.774720*
		(0.34960)	(0.00042)	(0.53617)
		[2.404374]	[0.99286]	[-5.17508]

Note: () = standard error; [] = t-statistics.
* shows significance at the benchmark of 5%

Table 5 presents the long-run results for output and employment. For the output model, government expenditure on education and human capital index are statistically significant, while government expenditure on health is not statistically significant. Government expenditure and human capital index have a positive relationship with the output. For the employment model, government expenditure on health and education are statistically significant. The human capital index is not statistically significant. Government expenditure on education has a negative relationship with employment, while government expenditure on health has a positive relationship with employment.

4. CONCLUSION

Many empirical and theoretical investigations have shown that investment in human capital is vital for increasing productivity. However, research on the effects of human capital on employment is relatively limited, particularly in emerging nations. Most governments in developing economies devote substantial resources to improving education and health services, with the predominant goal of increasing output, employment, and overall welfare.

The findings from the study indicate that shocks from government expenditure on health and education affect output more than employment. Likewise, government expenditure on education and human capital index is statistically significant in the long-run. Although, government expenditure on health is not statistically significant. Government expenditure on education and the human capital index has a positive relationship with the output. For the long-run employment model, government expenditure on health and education is statistically significant. However, investment in human capital is not statistically significant with employment. Government expenditure on education has a negative relationship with employment, while there is a positive relationship between government expenditure on health and employment.

The empirical findings have some implications. One is that the total outcome has a negative relationship with employment, and the insignificant effect of the human capital index on employment is worrisome; this implies that

human capital indicators in terms of quantity and quality do not have a positive and significant contribution to employment generation in Nigeria. There is a need to increase government expenditure on education and training to meet the demand of the economy and encourage self-reliance through entrepreneurship training to support employment opportunities in the long run. However, government expenditure on education and the human capital index has a positive relationship with aggregate output. However, increasing government expenditure on education and health may be a necessary but not a sufficient condition to positively and significantly bolster employment in the long-run. To enhance the quality of health, policymakers need to incentivise physicians to reduce brain drain because many physicians in Nigeria seek the slightest opportunity to exit the country owing mainly to relatively low remunerations compared with what they can earn in more advanced countries. For further studies in this area, more quality indicators of human capital formation (not used in this study due to data constraints) may be incorporated upon the availability of more data on aggregate levels in Nigeria. These variables include, but are not limited to job training, school drop-out rates, students' enrolments, and test scores in examinations.

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