

Human Capital Development and Labour Market Outcomes in Nigeria, 1980-2025

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Abstract

The research investigated the relationship between human capital development and labour market outcomes in Nigeria during the period 1980-2025. Public education and public health expenditures; gross school enrolment and human capital index served as explanatory variables, whilst the dependent variables were labour force participation rate and unemployment rate. Auto Regressive Distributed Lag (ARDL) was used to analyze the data. The findings revealed that the relationship between labour force participation rate and public education and gross school enrolment was positive and significant at long-run level, whereas the relationship between public health and the former was significant and negative. The relationship between human capital index and labour force participation was not significant. The analysis further revealed that the short run impact of public education and public health expenditure was positive and significant as well as significant and negative, respectively. No significant effect was detected from gross school enrolment and human capital index on the dependent variable. The study concludes that human capital development plays a significant role on labour market outcomes in Nigeria, the extent of which depends on the specific indicators of human capital development. The study recommends that government should improve the efficiency of its spending in both education and health; enhance school to workplace transition programmes through skill development training and work experience programmes; augment the contribution of human capital through job creation policies that promote industrialization, enhance private sector participation and entrepreneurship.

Keywords: Human capital development, labour market outcomes, labour force participation rate, public education expenditure, unemployment rate, Nigeria

Introduction

Human capital (often captured by educational and health outcomes) has generally been treated as a vital input for productivity, employability and positive labour market outcomes, especially participation in and unemployment from the labour force. The reasoning is clear enough. More educated and healthy people can carry greater labour capacity, work less interruption from ill health, and be engaged in longer and more productive lives than less educated and healthier people who are able to be employed due to more apt skills and attributes and a higher ability to adapt to changing labour markets. Hence, progress in human capital development is likely to support higher labour participation and reduce unemployment due to the improvement in the productivity of labour and employability (World Bank, 2020). This linkage is critical to Nigeria given the large and fast-growing workforce population, one of the largest in Africa and human capital is a major driver of whether such labour supply translate into positive labour market outcomes (World Bank, 2024).

The period from the early 1980s witnessed a pattern of recurrent macro-economic instability, driven by commodity price fluctuations, budgetary constraints, and shifts in economic policies

that hampered the government's capacity for sustained spending on social services (Egbulonu, Dim & Agba, 2018). A key pivot was the Structural Adjustment Programme (SAP) which started in 1986 and was linked to reforms and the austerity measures often in practice in public finances which tended to sacrifice spending on the social sector (World Bank, 2023). In subsequent decades, Nigeria's education and health sectors continued to grow and were subject to increasing demand and supply while funding and quality remained enduring constraints amid continuous population growth which has always strained service provision infrastructure, human resources and overall social spending.

At the country level, Nigeria adopted big policy reforms in education to expand access, particularly in the foundation stage. The Compulsory, Free Universal Basic Education Act (2004) as an institutional milestone guaranteed free and compulsory education for all children between 6 and 15 years of age (Federal Republic of Nigeria, 2004). Nevertheless, financing has been an ever-present challenge for education despite these policy reforms. Current World Bank human capital statistics revealed government expenditure in Nigeria was about 0.35 per cent of its GDP in 2022 and 16.6 per cent of government expenditures whereas global public finance for education should be over 4-5 per cent of GDP and more than 15 per cent of the public budget (World Bank, 2022).

The education case parallels what happened in the health sector: increased attention policy-wise and institutional reforms occurred, while financing challenges continued. Nigeria is party to continental commitment such as the Abuja Declaration of 2001 (World Health Organization [WHO], 2011), advocating for 15 per cent of national annual budget to health expenditure. The National Health Act of 2014 provides the framework for important health sector financing institutions, such as the Basic Health Care Provision Fund (Federal Republic of Nigeria, 2014). The National Health Insurance Authority (2025) asserts that the Basic Health Care Provision Fund was created according to section 11 of the National Health Act (2014) to assist the country's basic minimum package of healthcare and health financing strengthening for primary health care delivery.

Nevertheless, actual expenditures remain far from meeting country needs; current health expenditure in Nigeria was about 4.3% of its GDP in 2022 (World Bank, 2022). These patterns in education and health investments are important because the labor market outcomes in Nigeria continue to indicate both high labor supply participation and persistent unemployment. In other words, despite the increasing access to education and health services over time, the Nigerian labor market is unable to absorb the fast growing labor force into productive jobs (Aniemeke & Mgbomene, 2025). In the second quarter of 2023 and second quarter of 2024, Nigeria's labor force participation rate was high at 80.4% and 79.5% respectively. This large share of working-age population being engaged in the labor market, is mainly attributed to need for income and prevalence of informal employment (NBS, 2024).

Unemployment is the other side of Nigeria's labor market; it's been a recurrent aspect of the Nigerian economy and fluctuates tremendously during the study period reflecting limitations in job creation, economic growth and labor demand (Mgbomene, 2025). The Nigerian economy's unemployment rates changed from about 5.4% in 1980 to 8.4% in 2017, moderating to about 3.1% in 2025, signifying dynamic trends. Broader measures of human capital remain poor. In 2020, Nigeria's Human Capital Index was 0.36 indicating that a child born in Nigeria will be expected to attain only about 36 percent of her/his future productivity when she or he is completed her/his education and with good health. The co-existence of high labor force

participation, persistent unemployment, and relatively low human capital performance implies that it is appropriate to investigate whether increased public investment on education and health, better school enrollment, improved human capital outcome led to better labor market outcome.

Given the renewed efforts of the Nigerian government towards achieving long-run development through human capital development, the study sets to investigate the effects of human capital proxies which includes the public education expenditure, public health expenditure, gross school enrolment rate, and human capital index on the labor market outcomes in Nigeria proxied by the labour force participation and the unemployment rate.

Statement of the Problem

The paradox in Nigeria's development story remains its huge, engaged workforce; nevertheless, labour market outcomes has been a lot to desire not been strong human capital as the foundation to its outcomes. With a labour force participation rate (LFPR) of 79.5 per cent in the second quarter of 2024 (Q2 2024), Nigeria's workforce has one of the highest in the sub-Saharan Africa region. (NBS, 2024) It is imperative to note that high labour participation rate has not translated into good employment and decent work, especially when the Nigerian labour market is informal and characterized by largely vulnerable employment. Nigeria has, over time, not been able to create enough jobs to match the growth of its labour force which often results in cyclical periods of joblessness. The presence of persistently high labour participation rate alongside unemployment points to a central argument of whether Nigeria human capital have had enough human and finance capital strengthen to generate sustainable decent work outcomes for her citizens, especially on labour force participation rate and unemployment rate.

One major concern arises from the seeming dichotomy between policy commitments to investments in human capital and the reality of investment levels. The global frameworks call for large public investments in both health and education; for instance, common benchmark public expenditure levels are 4-6 per cent of GDP and 15-20 per cent of overall government spending on education (United Nations, 2019), and 15 per cent of the budget on health as enshrined in the Abuja Declaration (World Health Organization, 2011). In contrast, actual 2022 government spending on education in Nigeria was equivalent to about 0.35 per cent of Nigeria's GDP and constituted about 4.3 per cent of government total spending; the 2022 health expenditure amounted to about 4.3 per cent of Nigeria's GDP (World Bank, 2022). Similarly, Nigeria's Human Capital Index was valued at about 0.36 in 2020 (World Bank, 2020), which signifies low levels of education and health and skills that increase worker productivity and employability. This implies that the growth in investments in human capital was perhaps not large enough to spur higher labour force participation without leading to an increase in unemployment, an issue for empirical investigation.

Besides, the available empirical studies on Nigeria are mostly related to the human capital development in its capacity as a determinant of economic growth with less focus on its implications for labour market outcomes directly. For instance, Olaniyan and Okemakinde (2008), Maku et al (2019) and Onum (2025) have predominantly discussed education and health in relation to the economic growth of the country without clearly investigating their impact on the labour market outcomes such as labour force participation and employment. Furthermore, in Nigeria, there are very few studies that consider the implications of human capital development on the labour market outcomes, including Akinbobola and Saibu (2021), Osei-Gyebi and Ajayi

(2025), but they are largely constrained in the period covered, narrow measures of human capital, or emphasis on specific labour market indicators.

Based on these arguments, there is a knowledge gap in explaining the long run dynamics between human capital development and labour market performance in Nigeria. Thus, this study intends to bridge this gap by providing answers to these critical research questions: what is the relationship between public education expenditure, public health expenditure, gross school enrolment rate and human capital index on labour market outcomes in Nigeria. This study empirically investigates this relationship over the period 1980-2025.

Conceptual Review

Hanueshek & Woessmann (2020) conceptualized human capital development as the stock of the abilities, skills, knowledge, health, and attributes of an individual to increase their productivity and their contribution to long run economic growth. However, the Organisation for Economic Co-operation and Development (OECD, 2001) gave definition to human capital in terms of knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. Human capital development can be discussed with reference to public education spending, public health spending, school enrolment rate, human capital index. Public expenditure on education is government expenditure on educational facilities, staff wages, administration and maintenance.

The increase of spending on public education results in the increased gross enrolment rate of school. Public education expenditure refers to the amount of government resources allocated to the provision of educational services for the generality of the population (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). The increase in the public expenditure for the provision of public healthcare infrastructure, staffing etc. and that public expenditure for the provision of educational services is vital for building of human capital. WHO (2021) Health expenditure is defined as all spending on the provision of health services, family planning activities, nutrition activities, and emergency aid designated for health'. It is believed that increase in education facilities results in increase in gross school enrolment rate; hence the term is significant for human capital development (World Bank, 2020). As, healthy individuals can learn effectively and hence participate in job market as efficiently as productive workers, it indicates that an healthy and educated person can generate a larger output than uneducated and unhealthy person (World Bank, 2020).

Human Capital Index (HCI) is a cross-country comparable index of human capital which captures the amount of human capital that a child born today can expect to have at age 18, subject to current risks to health and education (World Bank, 2020). HCI created by the World Bank indicates the productivity of future workers relative to a benchmark representing complete education and full health and is the main measure used in human capital development diagnostics, planning, and labour market forecasting.²¹ Human capital development is associated with the labour market as countries with high human capital development indicators tend to exhibit a more efficient labour force characterised by high participation in employment, low unemployment, and high capacity to adjust to the demands of the labour market (Onoriode et al., 2026). Labour market outcomes are operationalized in this study to be the realized result of the interaction between labour demand and labour supply within an economy as conceived by Fox and Gandhi (2021).

The indicators representing labour market outcomes consist of unemployment rate and labour force participation rate. Labour force participation rate is defined as the proportion of the working-age population that either have employment or are unemployed and seeking for employment (International Labour Organization, 2022). While, the unemployment rate is defined as the proportion of labour force that is able to work, available to work and actively seeking employment but are unable to find employment (International Labour Organization, 2023). Both of the labour market indicators mentioned are utilised as explained variable in this study.

Theoretical Framework

The present study relies on three interrelated theories: human capital theory, signalling theory of labour markets, and Structuralist theory of labour markets. All the three theories provide different perspectives on how human capital investment on health and education impact on labour market.

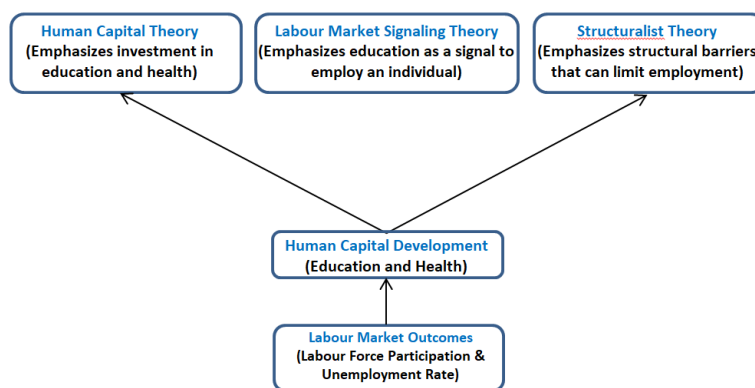


Figure 1: Theoretical Framework (Source: Researcher's Computation)

Schultz (1961) and Becker's (1964) theory of human capital, argue that investment in education and health, can raise the productivity, employability and earning capacity of an individual. This has shaped numerous national and international developmental strategies and agenda focusing on the generation of human capital as a vehicle for economic development. In the view of this perspective, public investment on health and education is seen as an investment good rather than a social good.

The labour market signaling theory that was developed by Spence (1973) could be regarded as an adjunct of the human capital theory in so far as it claims that education increases productivity, rather by signals information about worker traits such as intelligence and conscientiousness, social background or political preferences. Thus, employer uses this education credentials as a screening device in the face of asymmetric information.

The third leg of the theoretical framework is the dual labour market (Structuralist) theory advocated by Lewis (1954) in dual economy model and extended by Piore (1969, 1975) using labour market segmentation. This approach states that labour market is heterogeneous and structured rather than smooth and efficient market and is segmentally ordered and influenced by economic factors, historical and social. Given the dualistic labour market with formal-informal economy in Nigeria, one expects existence of spatial differential of infrastructure and services in the country, as well as the remnant impact of austerity measures and underfunded social sectors, which would lead to the existence of structural barriers impeding the effectiveness of human capital development, despite increased public spending on health and education. Therefore, the

failure to promote and expand jobs in the formal sector, poor school-to-work transition coupled with gender discriminations are structural constraints to labour market participation.

Empirical Review

Empirical study by Ogundari and Awokuse (2021) indicated that increased expenditure on education improves labour market outcomes, although its effectiveness depends on the quality and relevance of education to labour market needs. Similar result is obtained by Adejumo, Asongu and Adejumo (2021), which indicated that higher school enrolment in Nigeria contributes to employment generation in the short run, although sustained improvements in employment require complementary policies such as skills development, good governance and private sector expansion. Going further, the International Monetary Fund (2022) reported that educational attainment influences labour market outcomes in Nigeria significantly.

Following this trend, Zummo and Hamza (2025) showed that the level of education spending increases the level of labour participation, but it reduces when there is no sufficient labour market reforms. On gender perspectives, Effiong, Ayodele and Obot (2025) and Ugwuoti (2025) provide evidence that the level of education expenditure leads to an improvement in women's level of participation in the labour market due to increased participation in educational activities and the reductions of inequalities in the labour market. Likewise, Esara, Udo and Udegbole (2025) and Emmanuel (2025) provide indirectly evidence of the impact of education investment on labour market participation. Their studies are on the level of educational spending impacts on enrollment in schools and human capital development. Several studies focused on the impact of public health expenditure on labour market outcomes with various econometric models.

Empirical results have revealed that an investment in health can help the workforce to become more efficient and less absent. For instance, based on the cross country empirical estimates Tchouassi and Oseni (2020) showed a negative relationship between public health spending and vulnerability in the labour market. Similar results obtained by Adepoju, Tamba and Olayinka (2020) showed that increased spending on health promotes labour productivity and reduces time spent on disease.

Similarly, Igbiniedion and Olele (2024) found that maternal mortality rate declines as both public health spending and private health expenditure rise leading to low labour participation rate. Eze and Ogunleye (2021) concluded that limited public health spending leads to increased informal labour market employment. Mensah and Okonjo (2021) observed that increased health expenditure leads to the reduction in the rate of absenteeism and increased the level of job quality in sub-Saharan Africa. Meanwhile, the results by Adejumo and Gaye (2022), Kossi and Osei (2022), Omotosho and Danjuma (2023) and Abubakar and Sulaiman (2023) all report positive impacts of public health spending on employment and labor productivity using varying econometric techniques. From a Nigerian point of view, Aninwagu and Momodu (2025) revealed a positive and significant relationship between healthcare expenditure and the female labour force participation rate, whilst Ogu et al. (2026) showed that increased health spending from the government leads to better outcomes in terms of labour participation. Another study by Onoghware and Olele (2024) found positive effects of government education and health expenditure on growth of the Nigerian economy.

Furthermore, enhanced educational enrollment leads to improved labour force participation, however the impact is highly dependent on the quality of education and labour market opportunities. Numerous international studies conducted by Lopez and Bentaouet-Kattan (2019),

Al-Samarrai and Cerdan-Infantes (2021), and Wei and Zhang (2022) found that increased enrolment is not sufficient for improving labour market performance unless it is complemented with a change in curricula and better linkage between education and industry. Nigeria's experiences support the same findings. Okolie et al. (2021) observed that stronger collaboration between higher education institutions and industry enhances the employability of graduates by improving the relevance of academic programmes to labour market needs.

Likewise, Ogunyemi and Okeke (2020) noted that low level of practical skills in Nigerian graduates has created a gap in labour readiness despite increase in school enrolment. On the other hand, Yaro and Tchamyou (2021), Danladi and Saka (2022), Amaefule et al. (2025), and Mashenene, Bwana, and Tumaini (2025) reported that the rise in school enrollment significantly boosts labor force participation and labor productivity, particularly in regions where enrollment expansion has been coupled with skill enhancement. Similarly, Khan et al. (2021) and Silva and Gomez (2023) have found increased enrolment has positive effect on employment outcomes but a prerequisite is greater integration with the labour market and enhanced employment growth. In addition, human capital index has been gaining importance as a broader index in measurement of the quality of human capital in the existing literature and several studies have analyzed its impact on labour market outcomes at global and Nigeria. Lopez and Lutz (2020) revealed that an improvement in human capital index greatly stimulates formal employment and reduces working poverty.

Correspondingly, Abdulkarim and Mwansa (2021) found that the human capital index in countries with strong investment in education and health yields strong effects on labor productivity and labor force participation whereas Nigeria falls short in investment for human development and education and health services. At the national level, Anowor and Ukpere (2025) demonstrated that improvement in the quality of education and healthcare significantly enhances labour productivity and employment outcomes in Nigeria. Okoli, Okaforocha, Osang and Nwokoye (2024) found that government expenditure on education and higher educational attainment reduces unemployment significantly in Nigeria in both short and long run. Furthermore, Eze and Adewale (2023) revealed that improvement in the index of human capital leads to enhancement of quality of employment and labor productivity. Moreover, Adebayo (2025) concluded that improvement in index of Nigeria's human capital significantly explain a greater share of labor productivity growth.

In the literature that was reviewed there were several research gaps observed. Most studies that were carried out in Nigeria conceptualized human capital as a monolithic factor often measured using solely education expenditure or school enrolment as a proxy; which tends to neglect the complementary role of education expenditure in promoting the ability to absorb workers and also reduce skill mismatch or shortages, which is often a co-determined factors for a sustained workforce as posited by health education. In addition, many of the research have focused on short term studies based on cross-sectional data, or correlations between a measure of human capital and a measure of labour outcomes that fail to capture time-series dimension, policy effects, or other dynamic considerations in the context of reform or other shocks over time. Finally, while research at the regional or international level, have analyzed how schools produce graduates for a world of work and their performance on signals, to the best of the researcher's knowledge, no systematic empirical analysis have been conducted for Nigeria which examines how the gross school enrolment rates (especially for secondary and tertiary school levels) lead to better labor market performance.

Methodology

Ex-post facto research design is adopted for this study. The data on labour force participation and unemployment rate (which is the dependent variables of study) are obtained from the international labour organisation database and National bureau of statistics, Nigeria. The data on public education expenditure and public health expenditure are obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2024 Edition. The gross school enrolment rate and human capital index are obtained from World Development Indicators (World Bank, 2024).

The autoregressive distributed lag (ARDL) modelling technique is used in this study to estimate the relationship between human capital development and labor market outcomes in Nigeria. The pre-estimation analysis involves the conducting of a unit root test using the Augmented Dickey Fuller (ADF) test and the Phillips-Perron (PP) test on the variables to confirm their order of integration. This is followed by the conduct of the ARDL bounds test for cointegration to test whether there is a long-run equilibrium relationship among variables in the models. When cointegration is established, the long-run coefficients and the related error correction model (ECM) were estimated to examine the long-run equilibrium and short-run adjustment.

Model Specification

The model specification this study adopts is similar in structure to the econometric model in Iyobhebhe and Abiodun (2025). In their work on determinants of public education expenditure and labour force participation in Nigeria, Iyobhebhe and Abiodun (2025) employed a multivariate time series framework to analyze the effect of public secondary education expenditure on labour force participation using the former as the independent variable and labor force participation as the dependent variable. Gross enrolment rates and literacy rate were also introduced as explanatory variables. This study seeks to capture the more complete human capital framework by introducing health and education components to extend the specification in Iyobhebhe and Abiodun (2025). It also goes further to expand the dimensions of labour market outcomes to reflect at least two aspects as follows:

$$\text{LFPR} = f(\text{EDUX}, \text{HEAX}, \text{ENROL}, \text{HCI}) \quad (1)$$

$$\text{UNEP} = f(\text{EDUX}, \text{HEAX}, \text{ENROL}, \text{HCI}) \quad (2)$$

Where:

LFPR = Labour force participation rate

UNEP = Unemployment rate

EDUX = Government expenditure on education

HEAX = Government expenditure on health

ENROL = Gross secondary school enrolment rate

HCI = Human capital development index

The expanded econometric form of the two models is specified as:

$$\text{LFPR}_t = \alpha_0 + \alpha_1 \text{EDUX}_t + \alpha_2 \text{HEAX}_t + \alpha_3 \text{ENROL}_t + \alpha_4 \text{HCI}_t + U_{1t} \quad (3)$$

$$\text{UNEP}_t = \beta_0 + \beta_1 \text{EDUX}_t + \beta_2 \text{HEAX}_t + \beta_3 \text{ENROL}_t + \beta_4 \text{HCI}_t + U_{2t} \quad (4)$$

Where:

α_0 and β_0 = Constant terms for both models

$\alpha_1 - \alpha_4$ = Coefficients representing the marginal effects of each explanatory variable in model one

$\beta_1 - \beta_4$ = Coefficients representing the marginal effects of each explanatory variable in model two

U_t = Error terms

A-priori Expectation

The predicted relationship between these variables and participation and unemployment is generally expected to be positive for the variables and the estimated model as regards to participation and negative regarding unemployment as per theoretical framework and as discussed on theoretical and empirical literatures as we explained that an increase in investment in public expenditure on both health and education, school enrolment rate and the human capital index improve workers' productivity and employability in to the labor market. The signs of variables used in the estimated model are therefore expected to be:

For the Labour Force Participation Model:

$\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0$

For the Unemployment Model:

$\beta_1 < 0, \beta_2 < 0, \beta_3 < 0, \beta_4 < 0$

Results and Discussion

This sub-section analyses the data using econometric procedures enumerated in the previous chapter. The test for stationarity, cointegration are carried out before estimation the parameters of the model.

Table 1: Summary of the Unit Root Test

Variables	ADF test stat. at Level		ADF test stat. at 1st difference		Decision
	ADF at Level	p-value	ADF at 1st diff.	p-value	
LFPR	-6.3104	0.0000	-7.7458	0.0000	I(0)
UNEP	-2.8312	0.0619	-8.0505	0.0000	I(1)
EDUX	-2.4905	0.1251	-5.4487	0.0000	I(1)
HEAX	-2.0532	0.2640	-10.9386	0.0000	I(1)
ENROL	-1.7830	0.3838	-7.7626	0.0000	I(1)
HCI	-4.6812	0.0005	-8.9948	0.0000	I(0)

Source: Extracted from Eviews Output

Table 1 presents the results of the Augmented Dickey-Fuller (ADF) unit root test used to examine the stationarity properties of the variables. The results show that labour force participation rate (LFPR) and human capital index (HCI) are both stationary at level. This indicates that LFPR and HCI do not require differencing and are said to be integrated of order zero, I(0). In contrast, the unemployment rate (UNEP), government expenditure on education (EDUX), government expenditure on health (HEAX) and gross secondary school enrolment rate

(ENROL) are integrated of order one, $I(1)$, implying that the variables are stationary after first differencing.

Therefore, the unit root results reveal a mixed order of integration among the variables. LFPR and HCI are stationary at level $[I(0)]$, whereas UNEP, EDUX, HEAX, and ENROL become stationary only after first differencing $[I(1)]$. Since none of the variables is integrated of order two $[I(2)]$, the mixed integration order justifies the use of the Autoregressive Distributed Lag (ARDL) modelling approach.

Table 2: Bounds Test for Cointegration

Test Statistic	Value	k
F-statistic For Model 1	5.876806	4
F-statistic For Model 2	1.351047	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
1%	3.74	5.06

Table 2 presents the results of the ARDL bounds test for cointegration, which was conducted to determine whether a long-run equilibrium relationship exists between the dependent variables and the explanatory variables. In Model 1 (where LFPR is the dependent variable), the F-statistic generated (5.8768) is greater than the 5% upper bound critical value of 4.01, thus we are able to reject the null hypothesis of no cointegration. The findings suggest that labour force participation has a stable long run relationship with its explanatory variables.

In Model 2 (where UNEP is the dependent variable), the F-statistic generated (1.3510) is less than the 5% lower bound critical value of 2.86, therefore we accept the null hypothesis of no cointegration. This means that over our time period there is no evidence that the relationship between UNEP and public education expenditure, public health expenditure, gross school enrolment rate, and the Human Capital Index has remained stable, and there is no stable long-run relationship between these variables. Therefore, we are able to include and estimate long-run coefficients for the LFPR model, whereas we have to take into account the shorter-run ARDL equation for the UNEP model because we do not have evidence of cointegration for the model.

Table 3: Summary of the Short Run and Long Run ARDL Estimates For Model 1 (LFPR)

Short Run Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LFPR(-1))	0.543989	0.369929	1.470521	0.1556
D(LFPR(-2))	0.309437	0.361423	0.856163	0.4011
D(LFPR(-3))	-1.239957	0.325466	-3.809788	0.0010
D(EDUX)	0.093276	0.230141	0.405299	0.6892
D(EDUX(-1))	-0.462409	0.159722	-2.895076	0.0084
D(EDUX(-2))	0.426216	0.084605	5.037704	0.0000

D(EDUX(-3))	-0.182991	0.108633	-1.684482	0.1062
D(HEAX)	-0.006811	0.257621	-0.026440	0.9791
D(HEAX(-1))	0.247144	0.172572	1.432115	0.1662
D(ENROL)	-0.129949	0.332915	-0.390338	0.7000
D(ENROL(-1))	-1.138448	0.284153	-4.006456	0.0006
D(HCI)	62.109947	17.343268	3.581214	0.0017
D(HCI(-1))	-7.516984	8.850136	-0.849364	0.4048
D(HCI(-2))	-13.064483	9.135760	-1.430038	0.1668
CointEq(-1)	-0.315575	0.023268	-13.562618	0.0005

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDUX	0.421857	0.177213	2.380516	0.0264
HEAX	-0.431142	0.177551	-2.428269	0.0238
ENROL	0.977717	0.399277	2.448718	0.0228
HCI	-0.815647	0.900705	-0.905565	0.3750
C	-0.188047	1.766223	-0.106468	0.9162

Summary of the ARDL estimates (Short run & Long run) is provided in Table 3. In short run, past values of labor force participation also shape the current labour force participation. Although the effects of the coefficients of lagged differences of LFPR mixed but only the third lags D (LFPR(-3)) is positive and significant (-1.2399, p -value = 0.0010) . It seems that it take three periods for labour force to adjust to shocks in LFPR, which indicates it may contain some cyclical movement.

In short run the first lags of expenditure in education has a negative impact and statistically significant (-0.4624, p -value = 0.0084) , however, second lag has a positive impact and highly significant (0.4262, p -value = 0.0000) . This pattern indicate that increased educational investment may at first lead to decreased level of labor force participation (may be because children will stay in school for more time) and later positive effects on labor force participation as more benefits from educational investments start showing effects, whereas, the third lag is negative and insignificantly impacted.

No effect was found in short run from government expenditure on health. All the coefficients of health spending were found statistically insignificant for current and lagged values. The impact of gross secondary school enrolment is interestingly shown to be a negative one. For example in short run, while current value of ENROL is negative but insignificantly affected, the coefficient on the first lags of ENROL is found to be negative and highly significant (-1.1384, p -value = 0.0006).

This analysis reveals a significant short-run, positive, and immediate impact of human capital index (HCI) on the labour force participation. HCI has a significant coefficient (62.1099, p -value = 0.0017) in current period, signifying that any improvements in human capital via health and education will result in enhanced likelihood of joining in the labour market. On the other hand, CointEq (-1) the error correction term is found negative and highly significant (-0.3156, p = 0.0005), implying existence of a long run equilibrium. It shows that about 31.6% of any

disequilibrium between labour force participation and HCI will be adjusted within one year time period; in other words, the system takes less time to be adjusted to long-run equilibrium.

In terms of the long-run results, government expenditure on education (EDUX) positively affects the labour force participation and the coefficients are statistically significant (0.4219, p -value = 0.0264). Gross secondary school enrollment has a significant positive influence (0.9777, p -value = 0.0228) on labour force participation. However, government expenditure on health (HEAX) has a negative and statistically significant impact on the labour force participation (-0.4311 , p -value = 0.0238). It means that an increment of government spending on health sector does not necessarily result in the increment of well-being that boost participation on labour force.

Human capital index in the long run estimation is negatively related to labour force participation and not statistically significant. It means that once controlling education expenditure and gross school enrollment level the effect of human capital on the labour force participation disappears.

Table 4: Short Run Estimates for Model 2 (Unemployment Model)

Short Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEP(-1)	0.685383	0.135226	5.068440	0.0000
EDUX	0.252948	0.118986	2.125863	0.0406
EDUX(-1)	-0.210677	0.104225	-2.021369	0.0509
HEAX	-0.280415	0.115414	-2.429634	0.0204
HEAX(-1)	0.182091	0.099316	1.833443	0.0753
HEAX(-2)	0.080035	0.050069	1.598482	0.1189
ENROL	-0.664637	1.614047	-0.411783	0.6830
HCI	0.773273	2.723119	0.283966	0.7781
C	3.299840	7.655496	0.431042	0.6691
R-squared	0.540613	Durbin-Watson stat		1.995500
Adjusted R-squared	0.435611	F-statistic		5.148566 (0.0000)

In Table 4 we give the short-run ARDL estimation results of the determinants of unemployment rate (UNEP) in Nigeria. The estimated coefficient on UNEP(-1) (lagged unemployment rate) is positive and highly significant at 0.6854 (p -value = 0.0000), showing that unemployment in Nigeria is very sticky or persistent, in the sense that past unemployment matters for the present one. Similarly, the estimated coefficient on EDUX (government spending on education) is positive and statistically significant at 0.2529 (p -value = 0.0406), in a contemporaneous sense, whereas its lag effect EDUX(-1) shows a negative coefficient of -0.2107. This reflects a sort of initially increase in unemployment with education expenditure which diminishes over time.

The government spending on health, HEAX, is negative and statistically significant in contemporaneous sense at -0.2804 (p -value = 0.0204), indicating that spending more on health sector decreases the unemployment rate in the short run. But the first lag, HEAX(-1) has a positive effect, and the second lag HEAX(-2) has positive and non-significant effect at -0.1821 and -0.1189 respectively, suggesting a weak and dispersed health expenditure effect on unemployment in the medium and long-run.

However, school enrollment, ENROL, displays negative effect with insignificant coefficient (-0.6646 , $p\text{-value} = 0.6830$), that means higher enrolment has a tendency of lowering unemployment rate, but it is not significant in short run. In the same token, the Human Capital Index, HCI has positive and non-significant coefficient of 0.7733 ($p\text{-value} = 0.7781$), signifying that human capital development has not been directly effective in solving the problem of unemployment in the short run after controlling for other explanatory variables.

Test of Hypotheses

Hypothesis One

H₀₁: There is no significant relationship between public education expenditure and labour market outcomes (labour force participation rate and unemployment rate) in Nigeria.

Public education expenditure (EDUX) has a positive and significant long-run effect on labour force participation ($\beta = 0.4219$; $p\text{-value} = 0.0264$) and a positive and significant short-run effect on unemployment ($\beta = 0.2530$; $p\text{-value} = 0.0406$).

Decision: The null hypothesis is therefore rejected, indicating that public education expenditure significantly influences labour market outcomes in Nigeria.

Hypothesis Two

H₀₂: There is no significant relationship between public health expenditure and labour market outcomes in Nigeria.

Public health expenditure (HEAX) has a significant negative long-run effect on labour force participation ($\beta = -0.4311$; $p\text{-value} = 0.0238$) and a significant negative short-run effect on unemployment ($\beta = -0.2804$; $p\text{-value} = 0.0204$).

Decision: Accordingly, the null hypothesis is rejected, implying that public health expenditure significantly affects labour market outcomes in Nigeria.

Hypothesis Three

H₀₃: Gross school enrolment rate has no significant relationship with labour market outcomes in Nigeria.

Gross school enrolment rate (ENROL) has a positive and significant long-run effect on labour force participation ($\beta = 0.9777$; $p\text{-value} = 0.0228$), but its effect on unemployment is statistically insignificant ($\beta = -0.6646$; $p\text{-value} = 0.6830$).

Decision: The null hypothesis is partially rejected. This implies that gross school enrolment rate has a significant positive effect on labour force participation in the long run but does not significantly influence unemployment in the short run.

Hypothesis Four

H₀₄: Human Capital Index has no significant effect on labour market outcomes in Nigeria.

The Human Capital Index (HCI) has no significant effect on labour force participation ($\beta = -0.8156$; $p\text{-value} = 0.3750$) or unemployment ($\beta = 0.7733$; $p\text{-value} = 0.7781$).

Decision: The null hypothesis is accepted. Therefore, human capital index does not have a statistically significant effect on either labour force participation or unemployment during the study period.

Diagnostic Tests

Coefficient of Determination (R^2): Model 1 had an R-squared of 0.7599, which means about 75.99 per cent of the variation in the labour force participation rate can be accounted for by human capital development variables which represent good fitness. The Model 2 (Unemployment Rate) had an R-squared of 0.5406 meaning about 54.06 per cent of the variation in the unemployment rate can be accounted for by the independent variables, this represented a moderate fitness.

Durbin–Watson Autocorrelation Test: The Durbin–Watson statistic for Model 1 is 2.1784, while that of Model 2 is 1.9955. Both values are close to the benchmark value of 2, indicating the absence of first-order serial correlation in the residuals.

Heteroskedasticity Test: The Breusch-Pagan-Godfrey test of Model 1 resulted in F-statistic 1.3311 and probability value 0.2579 whereas, F-statistic 1.7878 and probability value 0.1130 for Model 2. As both the probability values are higher than 5% level of significance, therefore, we accept the null hypothesis of homoskedasticity for both the models. Hence, there is no evidence of heteroskedasticity in both the models.

Discussion of Findings

Result indicate that public education expenditure is strongly positively and significantly long-run correlated with labor force participation confirming that sustained government investment in education raises human capital and enhance market participation. This result support the human capital theory of Becker (1964) and corroborate studies by Anowor and Ukpere (2025), Olawale and Saheed (2022), and Bashir and Ikpefan (2023) who found that increase in public investment in education strengthen market participation by enhancing the skill and productivity of workers. Education expenditure however increases unemployment in the short run due to the inability of the Nigerian economy to absorb the increasing pool of educated graduates. This is consistent with Okolie et al (2021) and Ukozor (2024) who linked unemployment among graduate to poor skill mismatch and inadequate job creation even as education expenditure increase over the period. Also, the result is in line with the assertion of Onoghware and Olele (2024) where-in they held that government education expenditure grows the Nigerian economy.

Result for public health expenditure is not uniform; it reduces unemployment significantly in short run through improved productivity of health workers while a significant negative and long run impact was obtained for labour force participation. The result for short run is consistent with Adepoju, Tamba and Olayinka (2020), Kossi and Osei (2022), Omotosho and Danjuma (2023), and Ogu et al. (2026), who found that spending on health enhances worker's productivity and thus their market participation. The long run negative relation is however contrary to other studies and might be caused by issues relating to ineffective spending and delivery in healthcare services and as pointed out by Omotosho and Danjuma (2023). However, Igbinedion and Olele (2024) found negative effect of public health spending and private health expenditure on maternal mortality. According to Igbinedion and Olele (2024), decreasing maternal mortality implies positive health outcomes and more participation of women in employment but the contrary is the case in this present study where-in health spending decreased labour participation rate in both short and long run.

Other results show that while gross school enrolment leads to a significant positive effect on long-term labor force participation, it exerts no significant influence on unemployment in the

short term. This gives support to the view that education impacts on labor market over the long run through accumulation of human capital rather than job creation. This outcome is consistent with Lopez and Bentaouet-Kattan (2019); Yaro and Tchamyou (2021); Danladi and Saka (2022) and Amaefule et al. (2025) that an increase in school enrolment strengthens labor market participation over the time, but stressed that school enrollment is not enough in itself to reduce unemployment as a substantial proportion of job growth is also required, in conjunction with labor market reforms. Human capital index has no significant effect on both the labor force participation and the unemployment of Nigeria, which is contrary to evidence by Abdulkarim and Mwansa (2021); Saidu and Bashir (2022); Eze and Adewale (2023); Adebayo (2025) who reported significant positive impact of human capital development on the labor market, particularly on employment.

The findings imply that Nigeria's overall human capital growth is not strong enough to provide immediate benefits, primarily due to poor structures of the industrial base, inadequate transport infrastructure, and low job creation which inhibit human capital realization in productive labor use. Therefore, findings suggested that education and health spending are necessary but not sufficient. It takes much more than that if they are to translate into measurable benefits for job seekers.

Conclusion

This research concludes that public education expenditure enhances labour force participation in the long-run by increasing workforce efficiency and employability. This makes labour participation higher and shows that education expenditure improves workforce participation and hence increases the employment level over time. It also goes on to imply that labour expenditure enhances unemployment in the short-run. This reflects the fact that the supply of educated labour may have increased due to high expenditure on education but the economy could not create enough job opportunities for the fresh graduates at the moment. Similarly, labour expenditure to the health sector decreases labour unemployment in the short-run while it negatively correlates with the labour force participation.

The study further concludes that human capital stock is relevant in boosting the workforce but on the other hand, gross school enrollment has no impact on labour force. However, human capital index shows no significant influence on labour force and employment in short-run or long-run.

Recommendations

Based on the findings of the study, the following recommendations were made:

- i. Priority should be accorded to TVET, STEM education, entrepreneurship development and digital literacy skills. Education-business links should also be enhanced so as to equip students with skills relevant to the labour market and reduce the unemployment rate.
- ii. The government should increase the efficiency and effectiveness of public expenditure on health to improve labour market outcomes.
- iii. Government should also enhance policies aimed at reducing the time gap between the time of graduation and the employment time for example through expanded internship, apprenticeship programmes, industrial attachment, work-study schemes, career guidance and job search assistance programmes and university-business partnership that enhance employment.

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