Human Capital Development: A Pathway to Achieving Demographic Dividend in Nigeria

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Abstract
The rise in the youth population growth in developing economies, as it relates to demographic dividend and economic growth, is a crucial discourse for researchers and policy makers. Presently, Nigeria is in the second stage of the demographic transition theory. Human capital development can fast track the attainment of demographic transition and subsequently demographic dividend. Right investment in human capital via education requires thorough understanding of the manpower need for a growing economy like Nigeria. This paper examined the unique correlation between human capital development and demographic dividend proxied by youth population growth in Nigeria. The Autoregressive Distributed Lag (ARDL) is employed for the analysis of this paper which spanned from 1981 to 2022. The findings suggest that human capital development is a major channel through which the demographic dividend is derived in the long run. It underscores the critical role of right investment in education and skills development for unlocking the productive potential of the youth in Nigeria. Equally crucial is the need to optimally utilize the human capital after developing them. The policy implication is that in order to achieve demographic dividend, Nigeria would require right investment in human capital which will consequently reduce fertility and mortality thereby, leading to a more sustainable youth population.

Keywords: Human capital development; Demographic dividend; Youth population Growth; Economic growth; Sustainable developmental goals (SDGs)

JEL Classifications: E24, J20, J13, O40, Q01

Introduction
Recently improvement in human capital development has led to a dramatic decrease in mortality and fertility rates across the globe. This is supported by the United Nations (UN) (2015) sustainable developmental goals (SDGs) 3:2:1 and 3:1:1 which are aimed at drastically reducing infant-child and maternal mortality

by 2030. This implies that there is a shift in the age structure due to the changes in the demographic dynamics of the population. Sub-Saharan Africa (SSA) is not left out of this age structure shift, creating a larger youth cohort. Specifically, in Nigeria, the improvement in human capital development cut across the health and educational sectors, leading to a rise in academic level, life expectancy, family planning and female labour participation. This aligned with SDGs 3:7:1 and 8:6:1which are committed to broadening the number of women that are availed with family planning techniques. Also, SDGs 4:1:1 and 4:3:1 are consigned to equal educational enabling environment at all tiers of education. Meanwhile, this led credence to the studies of Igboanugo and Saibu (2021) as well as Igboanugo and Nwakeze (2023), which stated that a surge in infant-child and maternal mortality will lead to a lower life expectancy. More so, a rise in female education will not only facilitate family planning and employability but also enhance their contribution to the GDP per capita.

Statistical evidence from the World Development Indicator (WDI, 2024) has shown that, over the last six decades, the Nigerian population has grown from 44.9 million in 1960 to 229.15 million in 2024 with a growth rate of 2.39%. Incidentally, 70% of this population consists of young population within 0-24 years, 42% is between the age bracket of 0-14 while the rest is between 15-24 years. This is in line with the findings of Nwakeze (2013) as well as Kotshy and Bloom (2023), who ascertained that Nigeria is currently experiencing a youth bulge. Having a larger number of youths in the entirety of the population is viewed as being profitable to the Nigerian economy due to their contribution to economic growth and innovations, especially when they are not in NEET (Not in education, employment and training). Those in NEET can be a hindrance to the vista of opportunities to be created by large youth cohort in attaining the demographic dividend (DD). Hence, efforts should be made to drastically reduce the NEET population by ensuring that those who are educated are empowered and employed-3Es. It is now more crucial than ever to reduce the youth population in NEET by encouraging and incentivising voluntarism and community service.

According to Olasehinde et al. (2024) as well as Dimbuene and Matondo (2024) demographic dividend is an economic benefit that can be profitable to an economy contingent on a larger number of working-age entirety to a smaller non-working-age population. Albeit, having a higher cohort of the youth population is not an end itself but a pathway to the end. Admissibly, there is a need for an enabling environment to be availed to the youths for DD, SDGs and Africa's

Agenda 2063 to be actualised. For the nation to transform this youth population into DD, there is need for adequate policies to be made in human capital development and job creation. This led credence to the study of Igboanugo and Dauda (2019), which revealed that human capital investment will not only improve youths' health and educational stands but enhanced productivity and economic growth to an expanded quality of life. This is in line with SDGs 16:6:1 which is aimed at good governance and adequate government expenditure on human capital development.

Nevertheless, the large youth population that the country is supposed to leverage on, to achieve SDGs 8:2:1 and 10:1:1 (which is targeted at achieving income equality among the youth as well as promoting savings and GDP per capita) are grossly unemployed or at best underemployed. Available statistics from WDI (2024) have shown that the Nigerian youth unemployment rate has increased over the last four decades from 14.25% in 1981 to 73.2% in 2020. This is attributed to poor sexual and reproductive health, skill mismatch, unskilled labour force, and lack of job experience among others, which inhibits the youths from acquiring available limited jobs in the labour market. Anowor et al., (2023) ascertained that the surge in youth unemployment challenges has made them vulnerable to civil disorder, and social vices. The aforementioned draws attention to the need to drastically improve human capital development in its entirety as this will facilitate the economy's prospects of reaping demographic dividend. Nevertheless, this paper implies that there is a need that relied upon the youth embodying the necessary human capital development to take in employment opportunities. Admittedly, the foregoing showcases the purported human capital development conundrum in attending demographic dividend in Nigeria, which pinpoints vitality, skills, experiences, health and education embodied by youth cohorts.

The points mentioned above highlight the research question viz; how does human capital development influence the correlation between demographic dividend and economic growth in Nigeria? Therefore, this paper seeks to examine how human capital development influences the relationship between demographic dividend and economic growth in Nigeria. The Autoregressive Distributed Lag (ARDL) is employed for the analysis which spanned from 1981 to 2022. The data is obtained from the WDI (2023), Worldwide Governance Indicator (WGI) and National Bureau of Statistics (2023). The remaining sections are structured as follows; the review of literature is in section two; the methodology is in section three; results are presented and discussed in section four, while the conclusion of the study is in the fifth section.

Literature Review

This segment of the paper comprises the theoretical and empirical reviews that are crucial to the topic. Although numerous theories explained the correlation between demographic dividend and human capital development in Nigeria, the theory that underpins this write up is the demographic transition theory (DTT) and the endogenous growth theory. The main aim of adopting these theories is based on the ability of the theories to incorporate all the target variables.

The demographic transition theory was propounded by the Office of Population Research in 1944 and designed for the League of Nations with scholars like Notestein (1945) and Thompson (1929). The DTT looked at how nations over time change with regards to their population growth (birth and death rates), which occur as a country transit from a developing to a developed economy (Nafziger, 1997). The theory was developed based on the Western European demographic history of the Industrial Revolution. However, Okpala (1990) opined that the theory was premised on the general pattern of nations transition from the era of high-level childbearing and death rates to the state of low-level birth and death rates (classification of economies of populations according to their country-specific combination of fertility and mortality rates). The model underscores the importance of demographic transition to demographic dividend and its contribution to economic growth at large. The theory is categorized into four stages.

Additionally, the first, second and third stage of the theory is characterized by more consumption and less savings as families have more children to cater for. The second stage is actually where Nigeria is at present, with about 70% culmination of young people 42% of which comprises young people below 15 years while the rest is between 15-24 years old. The nation is anticipated to be at this stage for the next 50 years (WDI, 2023). This entails that the economy has enough young labour force (demographic dividend) as the engine to drive economic growth and stability using savings and investment. Thus, appropriate policies, human capital investment and restructuring need to be in place, if not it will result in demographic catastrophe (youth unemployment).

Also, the endogenous growth theory, which was formulated in the 1980s by Romer and Lucas. The endogenous growth theory brings to spotlight the importance of human capital development in economic growth and development. The theory premised that human capital development in the form of education,

health, training, and innovation, among others are the key drivers of demographic dividends and economic growth. The implication is that demographic dividend as well as the expected increase in the per capita gross domestic product (GDP) cannot be actualized without human capital development (Anowor et al., 2023).The discussions concerning the factors that drive economic growth, such as those by Becker (1962), G. Becker (1964a), Romer (1986, 1990), Lucas (1988), Rebelo (1991), Barro (1991, 2001), Aghion and Howitt (1997), have consistently highlighted that knowledge, skills, health, and education contribute to economic productivity through labour, thereby boosting output and enhancing an economy's ability to progress and adopt modern technologies, ultimately leading to demographic dividends. It is believed that young people are crucial in acquiring human capital resources because they are better positioned to create wealth if fully involved, given their higher energy levels and more years to contribute to productive activities compared to adults. Therefore, Nigeria could achieve demographic dividends and economic growth by engaging its surplus youthful population in productive activities.

The fundamental concept of human capital for an individual or group mainly consists of skills, experience, abilities, energy, as well as the health status of the person or population involved in the production of goods and services. Numerous scholarly studies have shown that investments in human capital can enhance productivity and drive economic development (Mincer, 1996; Aleksynska & Schindler, 2011; Anowor et al., 2020; Danquah & Ouattara, 2014; Hammed et al., 2019; McDonald & Roberts, 2002; Onodugo et al., 2013). These considerations have prompted an inquiry into how investment in human capital can impact demographic dividends in Nigeria.

The neoclassical growth model of Solow (1956) and Swan (1956) indicates that, without technological progress, diminishing returns would eventually halt economic growth. Aghion and Howitt (1992, 1997) argue that technological progress, while initially displacing workers, provides opportunities for enrichment through productivity growth, leading to the creation of new jobs. Therefore, demographic dividends in Nigeria can be enhanced if young Nigerians with adequate human capital can be efficiently employed as new jobs are created.

The pro-Schumpeterian endogenous growth models, as theorized by Segerstrom et al. (1990), Aghion and Howitt (1992), Caballero and Hammour (1996), and Bartelsman et al. (2004), emphasize the positive impact of human capital in exploiting knowledge in new ways, leading to demographic dividends and

economic growth. Schultz (1999) demonstrates that health and education are not only valuable in themselves but are also components of human capital development that drive demographic and economic dividends in the future. Thus, the aggregate investment in education, health, on-the-job training, and other areas that enhance the productivity and value of young workers in the labor market is referred to as an investment in human capital (Becker, 1964a; Schultz, 1961). Soares (2014) further suggests that spending on education and health positively impacts productivity, thereby improving human capital.

The endogenous growth models of Romer (1986, 1990), Lucas (1988), Rebelo (1991), and Barro (1991, 2001) propose that an economy can grow continuously as long as it continues to advance technologically through improved human capital development from investments in education, health, research and development (R&D), on-the-job training, among others. More-educated, skilled, and healthier young workers are likely to yield higher dividends than their less-educated, less-skilled, and weaker counterparts in a labor market where wages reflect the marginal productivity of workers. Several scholars have studied human capital development, demographic dividend and economic growth. This includes but is not limited to the following.

Employing the Das Gupta decomposition technique Choo and Gee (2024), examined the influence of age and education on Singapore's demographic dividend spanning from 1970 to 2020 and found that educational influence on demographic dividend is more outstanding compared to the age influence. This implies that the educated and trained labour force contributed more to the growth of the GDP per capita of the economy rather than the age cohort of the population. This led credence to the importance of human capital development as the pathway to achieving demographic dividend. In the same vein, Dimbuene and Matondo (2024), studied the SSA demographic dividend by mitigating social inequality, analysing the available enabling environment and found that DD cannot be actualized without good governance, education and health. The implication is that for SSA countries to which Nigeria belongs, to reap DD, there is a need for a good leader that has the well-being of the citizens in mind and is determined to improve human capital development as well as make policies that favours human capital investment and youth employability.

Utilizing content analysis and meta-analysis of data, Firmansyah (2023) analyzed the Indonesian Demographic dividend: age structure, education and economic

growth and revealed that having an abundant labour-force cohort cannot drive economic growth but educated, trained and skilled labour is the engine that drives demographic dividend and economic growth in the future. In line with the aforementioned, in scrutinizing the Turkish demographic structure, human capital and economic growth between 1990 and 2020, Bawazir and Nor (2023) employed autoregressive distributed lag (ARDL). The study found that variation in the share of the working-age entirety contributes to economic growth both in the short and long. On the other hand, there is a positive bond between economic growth and human capital development. Employing National Transfer Accounts (NFA) Oosthuizen (2024), analyzed South African's education and waning demographic dividend and discovered that higher level of educational attainment will not only improve the labour-force skills and productivity but will also spill over to demographic dividend. Using fixed effect and time effect on a panel data of 159 countries spanning from 1950-2015, Kotschy et al. (2020) reassessed the influence of age-structure and education on demographic dividend and found that both variables work-hand-hand for demographic dividend to occur. This implies that both age-structure and education are necessary prerequisite for the attainment of demographic dividend. Similarly, Zhou et al. (2023) examined the influence of the Chinese demographic and education dividend on economic growth for the period 2002 to 2020 using System - Generalized Method of Moments (Sys-GMM). The study found that for demographic dividend to occur, larger population, labour-force and improved education are the necessary conditions. This implies that demographic dividend cannot be fully actualized in the absence of any of the aforementioned. Also, in Mexico and Spain, Renteria et al. (2016) spanning from 1970 to 2015 employing National Transfer Accounts (NTA), evaluated the consequence of education on the demographic dividend. The study revealed that educational contributes more to demographic dividend than age-effect. More so, both age-structure and education contribute immensely to the attainment of demographic dividend. Finally in Nigeria, Young (2019) using Multivariate VAR between 1970 – 2017 examined the impact of education on demographic dividend and found that education does not only facilitate waning fertility and surge in productivity but also enhanced demographic dividend.

From the forgoing, it has been ascertained that human capital development is an important tool in attaining demographic dividend in Nigeria. However, from the reviewed literature, there is no conclusive empirical evidence on the key drivers of demographic dividend. Remarkably, studies that evaluated the human capital and demographic dividend nexus are limited in the Nigerian context. This study stands out by filling the gap in existing literature both empirically and methodologically,

by focusing on the contribution of human capital development to the impact of demographic dividend on economic growth in Nigeria.

Research Methodology

According to the nature of this study, a linear regression using the Autoregressive Distributed Lag (ARDL) model is employed in analyzing the relationship between human capital development and demographic dividend in Nigeria. The estimation technique helps to evaluate the short-run and long-run impact. The data employed were culled from secondary sources obtained from the Statistical Bulletin of the National Bureau of Statistics and WDI. The data spanned from 1981 to 2022 (41 years).

The augmented demographic transition theory, which explores the broader economic implications of demographic changes over time, is used as the framework for the empirical analysis in this study. The theory is based on theoretical and empirical outcomes developed in Williamson (2001) and Bloom et al (2003) where demographic dividend is considered as the economic growth potential that arises from shifts in a country's population structure which favours the working-age population relative to the dependent population. This model, however, demonstrates that such a shift in population's structure can lead to a period of accelerated economic growth, provided that the increased labour supply is effectively utilized. Demographic dividend is delivered through four mechanisms: (1) change in labour supply; (2) job availability; (3) investment growth through savings, (4) and human capital development.

Consider an economy with a labour force segregated into youth working-age population $YP_w(t)$ and adult working age population $DP_w(t)$. Also, consider that there is human capital development of $H(t)$. The labour supply function is therefore demonstrated as:

$$L(t) = H(t)\left\{\lambda_Y YP_w(t) + \lambda_D DP_w(t)\right\} \qquad (1)$$

The modified or augmented Cobb-Douglas production function (based on the demographic dividend functions) with working-age population groups, human capital, and youth unemployment becomes:

$$Y(t) = A(t)K(t)^{\alpha}\left\{H(t)\left[\lambda_Y YP_w(t) + \lambda_D DP_w(t)\right]\right\}^{1-\alpha} \qquad (2)$$

Therefore, the growth in per capita output with working-age population structure and human capital is now given as:

$$\frac{\dot{y}(t)}{y(t)} = \frac{\dot{A}(t)}{A(t)} + \alpha\frac{\dot{K}(t)}{K(t)} + (1-\alpha)\left(\frac{\dot{H}(t)}{H(t)} + \left[\frac{\dot{YP}_w(t)}{YP_w(t)} + \frac{\dot{DP}_w(t)}{DP_w(t)} - \frac{\dot{P}(t)}{P(t)}\right] + \frac{\dot{\lambda}_{\gamma+D}(t)}{\lambda_{\gamma+D}(t)}\right) \quad (3)$$

Equation (3) is the augmented demographic transition model that shows that demographic dividend can be derived via changes in the labour supply function in several mechanisms, including: Demographic dividend $\frac{\dot{YP}_w(t)}{YP_w(t)} + \frac{\dot{DP}_w(t)}{DP_w(t)} - \frac{\dot{P}(t)}{P(t)}$, which is the growth of the working-age population relative to the total population. Here, a faster-growing working-age population relative to the total population enhances the growth rate of per capita output. This leads to a demographic dividend. Human capital development: $\frac{\dot{H}(t)}{H(t)}$ which increases growth and then, total labour force participation rate $\frac{\dot{\lambda}_{Y+D}(t)}{\lambda_{Y+D}(t)}$. In a simplified form, Equation (2.4.4) demonstrates that growth in RGDP can be expressed as:

$$\Delta RGDP_t = \Delta A_t + \theta\Delta K_t + \vartheta\Delta H_t + \pi\Delta YP_t + \lambda LPR_t - \varphi U_t \quad (4)$$

This shows that in the augmented demographic transition model:

1. Demographic dividend through increased youth labour supply (ΔYP)directly increases growth in per capita output.
2. Improvement in human capital (ΔH)through education further bolsters economic growth.

Focusing on the influence of human capital development as a mediating factor in determining the effect of demographic dividend on economic growth. The model adapts the work of Bairoliya and Miller (2021) and seeks to demonstrate that the interaction of human capital development with youth population growth can influence the pattern of the effect of demographic dividend on economic growth in Nigeria. The model is specified as:

$$GDPPC = f(YP, HCD, YP * HCD, DI, TO, IQ, GCE) \quad (5)$$

Where GDPPC is gross domestic product per capita (a proxy for economic growth), YP represents youth population (a proxy for demographic dividend), HCD represents human capital development, DI is a domestic investment, TO is trade openness, IQ represents institutional quality and GCE is government capital expenditure. In econometric form:

$$GDPPC_t = \psi_1 + \psi_2 YP_t + \psi_3 HCD_t + \psi_4 (YP * HCD)_t + \psi_5 DI_t + \psi_6 TO_t + \psi_7 IQ_t + \psi_8 GCE_t + \mu_{1t} \quad (6)$$

Where the coefficient of the interaction term ψ_4 indicates the impact of demographic dividend with quality human capital development on economic growth. It is expected that the coefficient will be positive to show that human capital development tends to transform demographic dividend into a more productive base that contributes positively to economic growth. In the model, the impact of the youth population growth on economic growth when human capital development is taken into cognizance is computed as:

$$\frac{\delta GDPPC}{\delta YP} = \psi_2 + \psi_4 HCD \quad (7)$$

The coefficient shows that an increase in youth population is likely to exert a positive effect on economic growth for an economy with a higher level of human capital development.

Presentation and Analysis of Results

In this section, the summary of the variables used in the study is presented in the form of descriptive statistics, and the results are presented in Table 1. Note that these statistics show the first and higher moment conditions of the dataset and seek to explain the behaviour of the data. The average annual growth in GDP per capita for the period is 0.77%, which is low and shows that overall, the real income of individuals has experienced low levels of growth in Nigeria over the years. The maximum GDP per capita growth rate is high at 12.28% while the minimum growth rate is -13.13 which is also very low. This shows the wide swings that per capita income in Nigeria has experienced in the last 4 decades. The standard deviation for the variable at 4.58 is however better than the average growth rate. Along with the low skewness at -0.47, these scores indicate that growth in per capita income has remained close to the mean value over the years.

The probability score for the J-B statistic also indicates that per capita GDP growth is normally distributed over the period of the study. This shows that the annual growth rate for the years was generally dispersed from the mean value. Indeed, there are large outliers in the GDP growth rates reported in particular periods within the sample.

Table 1: Descriptive Statistics

Variable	Mean	Max.	Min.	Std. Dev.	Skew.	Kurt.	J-B	Prob.
GDPPC	0.77	12.28	-13.13	4.58	-0.47	4.47	5.20	0.07
YP_24(%)	37.98	40.04	35.78	1.32	-0.17	2.01	1.88	0.39
YP_34(%)	64.96	66.98	61.77	1.77	-0.73	2.12	4.94	0.08
DI	-0.10	40.39	-30.17	13.24	0.07	4.13	2.20	0.33
HCD	33.26	54.84	21.27	9.31	0.53	1.92	3.94	0.14
GCE	24.85	158.83	-51.91	41.33	0.69	4.06	5.19	0.07
TO	29.55	58.92	7.36	12.33	0.11	2.40	0.69	0.71
IQ1	6.80	10.50	3.75	1.62	-0.04	2.78	0.09	0.95
IQ2	1.57	2.00	1.00	0.34	-0.10	2.06	1.59	0.45

Source: Author's computation, 2023

The youth population is considered in terms of the population of individuals between ages 15 and 24 (YP_24) and those between ages 15 and 34 (YP_34). This is to delineate the relevant age structure within the youth age in the country and provide a more nuanced evaluation of their implications for the delivery of demographic dividends. The average share of youth aged 24 is 37.98%, while that of youth aged 34 years is 64.96%. This shows that a very large proportion of the population in Nigeria is within the youth category. The standard deviation values and skewness of both variables indicate that the reported average proportions for the population group are similar and steady over the years. Both population groups are also normally distributed (based on the p-values of the J-B statistics which are greater than 0.05).

The average growth rate of domestic investment (measured as gross fixed capital formation) is negative at -0.1%, suggesting that capital accumulation has been weak in the country over the years. The negative average growth in domestic investment is due to the wide swings in the growth rate over the period as characterised by the large maximum and minimum values as well as the high standard deviations. Average human capital (in the form of secondary school enrolment) is 33.26%, with a maximum rate of just over 50% over the period. Average growth in government capital expenditure (GCE) is 24.85 percent over the period, with a standard deviation of 41.33 which is larger than the mean value. Average trade openness is 29.55% over the period of the study, although the

maximum value shows that trade openness was as high as 58.9% in some years. In terms of institutional quality, the average score for political stability (IQ1) is 6.8 out of a maximum score of 12.0. This means that political stability has been relatively high in Nigeria over the period. On the other hand, the average score for control of corruption (IQ2) is quite low at 1.57 compared to the globe range maximum of 6.0 (0-6.0).

Table 2: Unit Root Test for Variables

Variable	**ADF Test**		**KPSS**		**Order of Integration**
	Levels	*First Difference*	*Levels*	*First Difference*	
GDPPC	-1.158	-4.094**	0.654**	0.283	I(1)
YP	-0.546	-4.311**	0.808**	0.135	I(1)
DI	-2.186	-5.290**	0.560*	0.288	I(1)
HCD	-1.574	-5.539**	0.728**	0.096	I(1)
GCE	-0.419	-6.166**	0.764**	0.082	I(1)
TO	-3.390*	-8.502**	0.281	0.211	I(0)
IQ1	-2.089	-4.959**	0.616*	0.334	I(1)
IQ2	-3.501*	-3.637*	0.321*	0.385	I(0)

*Note: * and ** indicate signifies at 5 and 1 percent levels respectively; 95% critical values are reported in parentheses below each test value.*
Source: Author's computation, 2023

The KPSS unit root test is also reported in the third and fourth columns in Table 2. The test results provide improved robustness of the unit root outcomes (Ighodaro & Adegboye, 2020). The null hypothesis of the KPSS test is the absence of unit root (or presence of stationarity). This means that a significant KPSS coefficient implies non-stationarity and vice versa. The result reveals that only TO did not have insignificant coefficients in levels. This means that all the other variables are stationary only after the first differences, while TO is stationary in levels.

The KPSS test for the variables TO and IQ shows that the test statistics failed at the 5% level in both the levels and the first differences. This shows that both variables are stationary at levels and integrated of order zero. Again, these results show that there is a mixed stationarity status among the variables in the study. The unit root tests therefore imply that an ARDL approach to cointegration for the dynamic analysis should be employed in the empirical analysis. Essentially, it is appropriate to use cointegration analysis to estimate the relationships between the variables.

From the unit root tests, it is seen that the integration status of the variables is mixed (some variables are I(1) while others are I(0)). Thus, all variables in the model are not integrated in the same order, which implies that the normal cointegration test may not generate adequate estimates.

Table 3: Result of the Interaction of Education with Demographic dividend

Variable	*Dependent variable = per capita GDP*		
	Coeff.	**t-Stat.**	**Prob.**
Short run			
ΔHCD	-0.001	-0.041	0.969
ΔHCD(-1)	0.018	2.048	0.071
ΔHCD(-2)	0.074	7.091	0.000
ΔYP*HCD	0.081	1.044	0.324
ΔYP*HCD(-1)	-0.050	-0.559	0.590
ΔYP*HCD(-2)	-0.775	-7.012	0.000
ΔLDI	0.568	8.154	0.000
ΔLDI(-1)	-0.092	-2.520	0.033
ΔLDI(-2)	0.197	5.831	0.000
ΔTO	0.002	2.982	0.015
ΔTO(-1)	0.006	6.505	0.000
ΔTO(-2)	0.004	5.354	0.001
ΔLGCE	-0.091	-5.778	0.000
ΔLGCE(-1)	-0.063	-4.637	0.001
ΔLGCE(-2)	-0.111	-7.027	0.000
ECM_{t-1}	-0.678	-7.471	0.000
Long run			
YP	-0.040	-4.708	0.001
HCD	0.058	2.674	0.025
YP*HCD	0.604	3.998	0.003
LDI	1.178	3.017	0.015
TO	-0.008	-1.821	0.102
LGCE	-0.022	-0.254	0.805
Constant	-1.582	-0.428	0.679
Adj. R-aq.	0.712		

Source: Author's computation, 2023

The result of the estimated model is presented in Table 3 The goodness of fit statistics of the model is impressive, with the adjusted R-squared value at 0.712. This shows that the estimated model explains over 71% of the systematic variations in GDP per capita. The estimated short-run estimates reported in the upper panel of the result revealed that the coefficients of the current and first lag of HCD fail the significance test at the 5% level, while that of the second lag is highly significant at the 1% level. This shows that human capital development has

a significant delayed positive impact on economic growth in the short run. The coefficient of the interaction between the youth population and human capital development index is only significant after the second lag, which also shows that the short-run effect of the human capital-embodied youth population on economic growth is also delayed.

The coefficients of domestic investment and trade openness are both mainly positive, indicating that investment and external trade significantly improve economic growth in the short run. The coefficients of the current and lags of government expenditure are all however negative, indicating that government expenditure exerts negative short-run effects on economic growth in Nigeria. The coefficient of the error correction term is significant and negative, showing that any deviations of growth from its equilibrium will be restored in the long run. The ECM term also has the expected sign and significance level which show that deviations from long-run stability will always be restored over time.

The main consideration of the estimates in Table 3 is on the long-run results which show the stable coefficients among the variables. The coefficient of the youth population in the long run estimates is negative and shows that the youth population essentially exerts negative effects on economic growth in the long run in Nigeria. The coefficient of human capital development is positive and also significant at the 5% level. This shows that human capital development directly promotes economic growth in the long run. The coefficient of the interaction term between the youth population and human capital development is significant at the 5% level. This shows that the effect of an embodied youth population (via educational development) on economic growth is positive. This also indicates that human capital development has an indirect effect on economic growth via the improvement of the contribution of human capital. Thus, in the long run, although the youth population alone will deliver growth-inhibiting effects in Nigeria, the youth population that possesses deeper human capital delivers significant positive effects on the economy. From the results, the impact of the youth population on economic growth when human capital is taken into cognizance is (-0.04 + 0.604) = 0.60. This shows that with the human capital development of the youth, the long-run effect of a 1% increase in the youth population is an increase in real income growth by 0.6% points. These results reveal that human capital development is a major channel through which the positive outcome of the youth population on economic growth can be derived. This is the main manifestation of the demographic dividend in Nigeria.

Conclusion and Policy Recommendation

The significant positive relationship between human capital development and the contribution of the youth population to economic growth also establishes that right investment in education and skills are key to ensuring that the youths are productive in the economy. Right investment in human capital via education requires thorough understanding of the manpower need for a growing economy like Nigeria. Human capital development therefore possesses transformative power in terms of enhancing the contribution of the demographic dividend to economic growth. Ineffective or sub-optimal utilization of developed human capital, out-migration (Japa-syndrome) of skilled labour will adversely affect the prospects of Nigeria reaping or optimizing demographic dividend. It is important to note that under-utilized or redundant "developed human capital" would be "net burden" instead of expected "net asset" to the society. Therefore, efforts should be made to drastically reduce the NEET population. One way of ensuring this is by effective implementation of the 6334 system of education.

Reference

Aghion, P., & Howitt, P. (1997). *Endogenous growth theory*. MIT press. https://mitpress.mit.edu/books/endogenous-growth-theory

Aleksynska, M., & Schindler, M. (2011). Labor market institutions in advanced and developing countries: A New Panel Database. *IMF Working Paper* No. 11/ 154. International Monetary Fund.

Anowor, O. F., Ichoku, H. E., Onodugo, V. A., & McMillan, D. (2020). Nexus between healthcare financing and output per capita: Analysis of countries in ECOWAS sub-region. *Cogent Economics & Finance*, 8(1), 1832729. https://doi.org/10.1080/23322039.2020. 1832729

Anowor, O. F., Ichoku, H. E., Onodugo, V. A., Ochinanwata, C., & Uzomba, P. C. (2023). Does investment in education and health impact youth employment outcomes? Evidence from Sub-Saharan Africa. *Cogent Economics & Finance*, *11*(1), 2160128.

Bartelsman, E., Haltiwanger, J., & Scarpetta, S. (2004). Microeconomic evidence of creative destruction in industrial and developing countries. Mimeo, University of Maryland.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, 106(2), 407–*443*. https://doi.org/10.2307/2937943

Barro, R. J. (2001). Human Capital and Growth. *The American Economic Review*, 91(2), 12–17. https://doi. org/10.1257/aer.91.2.12

Bawazir, A. A., & Nor, S. M. (2023). Demographic structure, human capital, and economic growth: Evidence from Turkey. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rew*, 8(7), 23.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70(5), 9–49. https://doi.org/10.1086/258724

Becker, G. (1964a). Human capital. Colombia University Press for the National Bureau of Economic Research.

Bloom, D. E., Canning, D., & Sevilla, J. (2003). *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*. New York: RAND Corporation.

Caballero, R., & Hammour, M. (1996). On the timing and efficiency of creative destruction. *Quarterly Journal of Economics*, 111(3), 805–852. https://doi.org/10.2307/2946673

Choo, E. & Gee, C. (2024). Age and education effects in Singapore's demographic dividend 1970–2020. *The Journal of the Economics of Ageing*, 27.1000482.

Danquah, M., & Ouattara, B. (2014). Productivity growth, human capital and distance to frontier in Sub-Saharan Africa. *Journal of Economic Development*, 39(4), 4–24. https://doi.org/10.35866/caujed.2014.39.4.002

Dimbuene, Z. T., & Matondo, S. M. (2024). Demographic Dividend in Sub-Saharan Africa–Toward Mitigating Social Inequality? A Critical Analysis of the Enabling Environment.

Firmansyah, D. (2023). Demographic Dividend: Age Structure, Education and Economic Growth. *Jurnal Ekonomi, Manajemen dan Akuntansi*,1(3), 181-188.

Hammed, O. M., Agboola, H. Y., & Kafilah, L. G. (2019). Endogenous specification of foreign capital inflows, human capital development and economic growth: A study of pool mean group. *International Journal of Social Economics*. https://doi.org/10.1108/IJSE-04- 2018-0168

Igboanugo, I. N., & Dauda, R. O. (2019). Education, Health Expenditure and the Quality of Life in Nigeria. *Academic Journal of Economic Studies*. 5(4), 94-102.

Igboanugo, I.N. & Saibu, O.M. (2021). Infant-Child Mortality and Maternal Employment in Nigeria. *Ovidius Universiy Annals, Economic Sciences Series.* XXI (1),119-126.

Igboanugo, I.N. & Nwakeze, N. M. (2023). Nutrition, Maternal Mortality, And Quality of Life in Nigeria. *American International Journal of Business Management (AIJBM),* 6(9),54-64.

Lucas, R. (1988). On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7

McDonald, S., & Roberts, J. (2002). Growth and multiple forms of human capital in an augmented Solow model: A panel data investigation. *Economics Letters*, 74(2), 271–276. https://doi.org/10.1016/S0165-1765(01)00539-0

Mincer, J. (1996). Economic development, growth of human capital, and the dynamics of the wage structure. *Journal of Economic Growth*, 1(1), 29–48. https://doi.org/10.1007/BF00163341

Olasehinde N., O. Olaniyan, A. Soyibo, A. Lawanson, R. Dauda, O. Odufuwa, O. Awodumi, T. Olalude, O. Adonri and A. Dasogot, (2024). Demographic Dividend in Nigeria: Evidencefrom Country and Sub-Country Application of National Transfer Accounts (NTA) Approach, *Health Policy Training and Research Programme (HPTRP*) Working Paper 2024-1, University of Ibadan, Nigeria.

Onodugo, V. A., Obi, K. O., Anowor, O. F., Nwonye, N. G., & Ofoegbu, G. N. (2017). Does public spending affect unemployment in an emerging market? Risk Governance & Control: Financial Markets & Institutions, 7(1), 32–40. http://dx.doi.org/10.22495/rgcv7i1art

Oosthuizen, M. (2024). Education and South Africa's waning demographic dividend. *The Journal of the Economics of Aging*, 27, 1004824.

Rebelo, S. T. (1991). Long-run policy analysis and long-run growth. Journal of Political Economy, 99(3), 500–521. https://doi.org/10.1086/261764

Renteria, E., Souto, G., Mejia-Guevera, I., & Patrot, C. (2016). The Effect of Education on the Demographic Dividend. *Population and Development Review*, 42(4),651- 671.

Romer, P. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(5), 1002–1037. https://doi.org/10.1086/261420

Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5), 71–102. https://doi.org/10.1086/261725

Schultz, T. W. (1961). Education and economic growth. In N. Henry (Ed.), *Social forces influencing American education* (pp. 1–12). University of Chicago Press.

Schultz, T. W. (1999). Health and school investment in Africa. *Journal of Economic Growth*, 13(1), 67–88. https://doi.org/10.1257/jep.13.3.67

Segerstrom, P., Anant, T. C., & Dinopoulos, E. (1990). A schumpeterian model of the product life cycle. American Economic Review, 80, 1077–1091.

Soares, R. R. (2014). Gary Becker's contributions in health economics. In IZA Discussion Paper No. 8586. The Institute for the Study of Labor.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65–94. https://doi.org/10.2307/ 1884513

Swan, T. W. (1956). Economic growth and capital accumulation. Economic Record, 32(2), 334–361. https://doi.org/10.1111/j.1475-4932.1956.tb00434.x

United Nations (2015). Transforming Our World, The 2030 Agenda for Sustainable Development. Resolution Adopted by the General Assembly on 25 September 2015, 42809, 1-13.

Williamson, J. G. (2001). Demographic change, economic growth, and inequality. *American Economic Review*, *91*(4), 869-873.

Zhou, J., Deng, J., Li, L., & Wang, S. (2023). The Demographic Dividend or the Education Dividend? Evidence from China's Economic Growth. *Sustainability*, *15*(9), 7309.