

HEALTHCARE AND EDUCATION SPENDING: COMPLIMENTS OR SUBSTITUTES IN ECONOMIC GROWTH?

KEHINDE AJAOTIAMIYU

Department Of Social Science Education

University Of Jos, Jos, Nigeria

Ajaous@yahoo.com. Ajaot@unijos.edu.ng

08039797929

Abstract

This Study (1981-2020) Modeled The Human Capital-economic Growth Nexus Using Contemporary Data Evidence. In Pursuit Of Addressing A Pivotal Inquiry Regarding The Interplay Of Education And The Healthcare Sector In The Economic Growth Context Of Nigeria, The Study Employed A Set Of Variables Encompassing Real Gdp, Gross Capital Formation, Population Growth, Government Expenditure On Healthcare, Government Expenditure On Education, And Their Interaction. The study Further Checked For Variable Stability Using The Augmented Dickey-fuller (adf) And Found That Only Capital Formation Remained Stable At Its Level. Cointegration Analysis From The Ardl Bounds Test Revealed That One Model Showed A Long-run Relationship While The Other Did Not. Though It Was Discovered That, In The Short Term, The Impact Contribution Of Both Health And Education Expenditure May Not Be Obvious, In The Long Run, They Make A Significant Contribution To Economic Growth. In The Long Term, Investment, Healthcare And Education Spending Significantly Contribute To Economic Growth. It was Found Out That Concurrent Investment In Healthcare And Education Is Vital, Aligning With The Importance Of Knowledge And Technology In Economic Growth Theory. Continuous Investment In Both Areas Also Helps Offset The Impact Of Population Growth. This Supports The Idea That Educated, Healthy Individuals Contribute To Economic Growth, Echoing Prior Research Of Lustig (2006) And Schultz (2002). As A Result, This study Advocates For More Government Investment In Both Education And Healthcare.

Introduction

Human Development Is The Process Of Making People's Lives Better, Giving Them More Options, And Strengthening Their Capacity To Live Meaningful Lives. It Includes Social, Political, And Cultural Aspects In Addition To Economic Progress That Raise People's Standard Of Living Both Individually And Collectively. The United Nations Development Programme (undp) And Its Human Development Reports, Which Highlight The Need To Go Beyond Economic Measures Like Gdp To Gauge Progress, Are Credited For Bringing The Concept Of Human Development To Wider Attention (alkire And Foster, 2011; Undp, 2010). Human Capital Encompasses An Individual's Competitive Knowledge, Abilities, And Inherent Traits That Enable The Advancement Of Their Personal, Social, And Economic Well-being. Human Capital Development Should Be Viewed As A Crucial And Essential Component Of Economic Growth In Order To Attain Good Economic Growth In Nigeria. A Significant Obstacle Confronting The International Community And Nigeria In General Is The Attainment Of Sustainable Development. The Attainment Of The Three Pillars Of Sustainable Development Is Contingent Upon The Inclusion Of Human Capital Development As A Fundamental Component (oecd, 2001).

Moreover, According To Todaro And Smith (2012), The Key Components Of Human Capital Development Are Health And Education Which Need To Be Given Utmost Concern If Adequate Growth And Development Are To Take Place In Society. The Essence Being That An Educated

Individual Remains An Asset To The Development Of Any Nation, Especially If That Individual Is Sound And Healthy. The Literature (collin And Weil, 2018; Lustig, 2006; Schultz, 2002) Has Unanimously Agreed, That Investing In Human Capital Is Far More Productive, Cost Effective Than Investing In Physical Capital; And That An Educated Individual In Good Health Is An Asset To Industrial And Economic Growth. This By Implications Positions The Education And Health Sectors (a Major Components Of Human Capital) To Be A Crucial Conduit Of Economic Growth And Development. It Is Said That Health Is Tantamount To Improved Well-being, While Education Is Crucial For A More Rewarding And Fulfilling Life; Thus, Both Are Better Combined To Promote Increased Human Capital (todaro And Smith, 2012). Health And Education Command A Dual Advantage As They Are Both Input And Output In The Production Growth Of Economy; Implying That, Just As Health Is A Prerequisite For Increased Productivity, Success In Education Requires Sound Health, Too.

However, The Annual Federal Government Expenditure To The Education Sector In Nigeria Is Negligible When It Comes To Percentages; Data Over Time Indicates That The Percentages Do Not Align With The 26.0% Suggestion Made By The United Nations Educational, Scientific, And Cultural Organization (unesco, 2011). It Was Found That The Percentages Were 8.6%, 9.04%, 9.26%, 6.65%, 6.2%, 5.94%, 5.86%, 5.13%, And 5.14%, Respectively, From 2013 To 2021. As Can Be Observed, Despite Failing To Fulfill Unesco's Target Of 26.0%, This Insignificant Spending Only Improves Marginally In Terms Of Growth From 2013 And 2014, At 0.36%, Before Plummeting Dramatically. Nigerian Education Spending, Thus, Fell 0.18% From 2017 To 2018, 0.09% From 2018 To 2019, And 0.72% From 2019 To 2020. No Wonder Nigeria Has Been Classified As A Poor Country That Has Never Made Significant Investments In The Development Of Its Human Capital, Leaving Its Citizens—who Should Be At The Core Of Economic Growth—at Risk.

Moreover, Nigeria Allocated \$71 To Healthcare In 2019, A 7.39% Increase Over The Previous Year. Healthcare Spending In 2018 Was \$67 Billion, A 9.94% Reduction From The Previous Year. Similarly, Nigeria's Healthcare Expenditure In 2017 Was \$74, A 6.91% Decrease From The Previous Year. Going Back To 2016, Nigeria Allocated \$79 To Healthcare, A Considerable Decrease Of 18.84% From 2015. Consequently, The Trend Analysis Above Demonstrates A Shifting Pattern In Government Support Of Education In Nigeria. While The Percentage Rise In Education Spending In 2021 Is Minor, It Does Suggest A Favourable Change From Recent Years' Declines. The Decrease In Education Investment From 2019 To 2020 (0.72%) And From 2018 To 2019 (0.09%) Is Worrying, Indicating A Shift In The Importance Placed On Education.

Furthermore, Over The Last Five Years, A Shifting Pattern In Government Funding For Health In Nigeria Has Been Noted. While Healthcare Spending Increased Somewhat In 2019, It Followed A Series Of Losses In Previous Years, Showing A Challenge To Sustain Steady Support For The Healthcare Sector. The Decrease In Healthcare Spending From 2018 To 2019 (9.94%) And From 2017 To 2018 (6.91%) Is Equally Worrisome, Indicating A Shift In Healthcare Priority. Even With The Minor Rise In 2019, Nigeria's Per Capita Healthcare Spending Remains Low In Comparison To Worldwide Standards. the Implication Is That Government Is Having A Challenge In Maintaining A Robust Healthcare System And A Well-functioning Education Sector, Which Could Have Repercussions On Human Capital Development And Overall Economic Progress In Nigeria. though These Drops Can Be Attributable To A Variety Of Issues, Including Economic Constraints, Conflicting Demands For Limited Resources, And Insufficient Long-term Planning; But The Implication Could Be That There Is Potential Challenge In Maintaining A Robust Healthcare System And A Well-functioning Education Sector, Which Could Have Repercussions On Human Capital Development And Overall Economic Progress In Nigeria; Hence, It Is Imperative To Empirically Find Out.

Nonetheless, Past Research Has Demonstrated That Investment In Human Capital Is Positively Associated To A Nation's Economic Growth And Development (ojo And Ojo, 2022; Nura

And Mustapha, 2015; Dauda, 2010; Delowokan, 2012; Olaniyi And Adam 2002). It Has Also Been Suggested That Human Capital Development Raises The Income Of The Poor In A Country, Hence Increasing The Income Gap Between The Rich And The Poor, Which Is, Of Course, A Global Macroeconomic Goal. In A Nutshell, Human Capital Development Promotes Justice And Poverty Reduction While Also Assisting In The Efficient Allocation And Use Of Scale Resources. It Has Also Been Said That Human Capital Development Is Inextricably Linked To Concerns Of Education, Economic Growth, And Development. Human Capital, Which Embodies Excellent Health, Education, Knowledge, Skills, Attitudes, Expertise, And Technological Know-how (abioudun And Osagie, 2018; Ojo And Ojapinwa, 2018; Babalola, 2003; Lustig, 2006; Schultz, 2002), Is Significantly Responsible For Economic Growth And Development. yet, For An Average Individual's Human Capital To Play A Substantial Role In Driving Overall Economic Growth, Considerable Investments In Their Health And Education Are Imperative.

Consequently Upon The Foregoing, It Is The Hope Of This Paper To Further Re-examine The Impact Of Human Capital Development On Economic Growth In Nigeria; To Empirically Ascertain The Distinct And Individual Contribution Of Each Education And Health Development On Nigerian Economy; And To Ascertain The Influence Of Combined And Joint Impact Of Health And Education On Economic Growth In Nigeria. Hence, This Study Contributes To The Bodyof Knowledge By Precisely Answering The Following Questions:

What Is The Relationship Between Government Spending On Education And The Overall Economic Growth Of Nigeria? How Does The Connection Between Healthcare Expenditures And Economic Growth Manifest In The Context Of Nigeria? How Do Health And Education Interact To Influence Economic Growth In Nigeria? Can The Interaction Between Health And Education Spending On Economic Growth Be Characterized As Complementary, Substitutive, Or Neutral? What Are The Long-term Implications Of Human Capital Development For Economic Growth In Nigeria?

Related Literature

In The Literature, Education And Health Are Agreed To Be The Conduits Of Economic Growth All Over The World In Their Different Capacities; Nevertheless, Their Joint Contribution As To Whether They Have A Neutral, Complementary, Or Substitute Contribution On Economic Growth Has Not Been Investigated. All Of The Studies Reviewed Had Varying Conclusions And Findings. In Nigeria, For Example, Ojo And Ojo (2022) Investigated The Relationship Between Health Expenditure, Education, And Economic Growth Between 1981 And 2019 Using Principle Component Analysis (pca) To Create Variable Indices And Error Correction Model As Estimating Methodologies. According To The Report, Both Education And Health Contribute Considerably To Economic Growth. The Study By Nura And Mustapha (2015) Is Similar. Dauda (2010) Examined The Relationship Between Education Investment And Economic Growth In Nigeria Using Annual Time Series Data From 1977 To 2011, And Discovered That Education Capital Had A Considerable Impact On Economic Growth. This Is Also Consistent With Adelowokan's (2012) Findings.

However, Akinbode Et Al (2019) Discovered, Using Ardl Estimating Approaches, That Whereas Health Spending Has A Beneficial Impact On Economic Growth, Education Has A Negative Impact. Furthermore, Ojewumi And Oladimeji (2016) Discovered That Recurrent Expenditure Had A Negative Impact On Academic Advancement In Nigeria When They Explored The Impact Of Government Finance On Education Growth. Ojo And Ojapinwa (2018) Found No Substantial Link Between Education Spending And The Success Of Nigeria's Medium And High-tech Businesses. Although Abioudun And Osagie (2018) Revealed That Recurring Education Spending Considerably Boosted Economic Development, Capital Spending Did Not.

Furthermore, Wong Sing Yun (2021) Used The Vector Error Correction Model (vecm) To Examine The Relationship Between Education Expenditure, Health Care Expenditure, And

Economic Growth In Malaysia From 1980 To 2012, And Discovered A Long-term Positive And Robust Association Between Public Education Investment And Healthcare Spending On Economic Growth In Malaysia. According To Jei (2019), Government Expenditure On Health And Education Has A Positive And Significant Impact On Economic Growth In Both China And Korea. Eggoh Et Al. (2015) Used Dynamic Panel Methodologies To Find That Public Expenditures On Education And Health Hurt Economic Growth In Numerous African Countries.

From The Foregoing, The Reviewed Studies Present Conflicting Conclusions. While Some Studies In Nigeria, Such As Those By Ojo And Ojo (2022), Nura And Mustapha (2015), Dauda (2010), And Adelowokan (2012), Report Positive Associations Between Education, Health, And Economic Growth, Others, Like Akinbode Et Al. (2019), Ojewumi And Oladimeji (2016), Ojo And Ojapinwa (2018), And Abioudun And Osagie (2018), Provide Contradictory Findings, Indicating A Lack Of Consensus In The Literature. The Preceding Literature Acknowledges The Individual Contributions Of Education And Health To Economic Growth But Highlights A Gap In Jointly Understanding Whether These Factors Have A Neutral, Complementary, Or Substitute Contribution. Invariably, No Study Discussed In The Review Explores The Combined Impact Of Education And Health On Economic Growth. This Study Will Invariably Fills In The Gaps.

Theoretical Consideration

The Theoretical Framework For This Study Is Based On The Human Capital Theory. As Proposed By Gary Becker (1964), It Emphasizes The Importance Of Investment In Human Capital, Such As Education, Health, And Skills, In Driving Economic Growth. According To This Theory, Individuals Who Acquire And Develop Human Capital Through Education And Health Investments Become More Productive, Leading To Increased Economic Output And Improved Living Standards (see, Becker, 1964). Briefly, The Basic Form Of The Human Capital Theory Production Function Can Be Represented As:

$$Y = A * F(h, K, L) \dots\dots\dots 1$$

Where:

Y Represents The Output Or Economic Growth,

A Represents Total Factor Productivity (tfp) Or The Level Of Technology,

H Represents Human Capital, Which Includes Education And Health,

K Represents Physical Capital,

L Represents Labor,

F() Represents The Functional Relationship Between The Inputs.

In The Context Of This Study, However, The Specific Form Of The Human Capital Theory Production Function Can Be Expressed As:

$$Y = A * F(e, H, K, L) \dots\dots\dots 2$$

Where:

E Represents Investment In Education,

H Represents Investment In Health,

K Represents Physical Capital Formation,

L Represents Labor,

F() Represents The Functional Relationship Between The Inputs.

This Production Function Implies That Investment In Education (e) And Health (h) Contribute To The Accumulation Of Human Capital, Which Enhances Labor Productivity And Overall Economic Output. Additionally, Physical Capital Formation (k) And Labor (l) Also Contribute To Economic Growth

Nonetheless, The Human Capital Theory Is Extremely A Good Theoretical Candidate For The Present Study, Because It Looks Into The Relationship Between Education, Health, And Economic Progress. According To This Theory, Investments In Education And Health Contribute

Considerably To The Development Of Human Capital, Resulting In Higher Productivity And Economic Growth.

Model Specifications, Methodology And Data Sources

Model Specifications And Methodology

This Study Adopts And Modifies The Model Of Osoba And Tella (2017) Who Examined An Interactive Effect Of Human Capital Variables And Economic Growth In Nigeria. Thus, Osoba And Tella (2017) Estimated The Following Model:

$$\text{Rrgdp} = \alpha_0 + \alpha_1 \ln \text{ph} + \alpha_2 \ln \text{ed} + \alpha_3 \ln \text{he} + \alpha_4 \ln (\text{ed} * \text{he}) + \alpha_5 \dots \dots \dots 3$$

Where, Ph Is Physical Capital, Ed Is Education, He Is Health And Rgdp Is Real Gross Domestic Product.

Therefore, The Present Study Modifies The Stated Model By Estimating Two Classes Of Models (the Model I And Model Ii) As Follows:

Model I

$$\text{Rgdp} = F(\text{gcf}, \text{ehc}, \text{hhc}, \text{pgr}) \dots \dots \dots 4$$

$$\ln \text{rgdp}_t = \alpha_0 + \alpha_1 \ln \text{gcf}_t + \alpha_2 \ln \text{ehc}_t + \alpha_3 \ln \text{hhc}_t + \alpha_4 \ln \text{pgr}_t + U_{1t} \dots \dots \dots 5$$

Model Ii (interactive Effects Of Education Human Capital And Health Human Capital)

$$\text{Rgdp} = F(\text{gcf}, \text{ehc}, \text{hhc}, \text{pgr}, \text{ehc} * \text{hhc}) \dots \dots \dots 6$$

$$\ln \text{rgdp}_t = \alpha_5 + \alpha_6 \ln \text{gcf}_t + \alpha_7 \ln \text{ehc}_t + \alpha_8 \ln \text{hhc}_t + \alpha_9 \ln \text{pgr}_t + \alpha_{10} (\text{ehc}_t * \text{hhc}_t) + U_{3t} \dots \dots \dots 7$$

Where,

Rgdp = Real Gross Domestic Product; Gcf = Gross Capital Formation; Ehc = Education Human Capital Expenditure; Pgr = Population Growth Rate; Ehc * Hhc = Interaction Of Education Human Capital And Health Human Capital

Apriori Expectations

$\text{Gcf} > 0$; $\text{Ehc} > 0$; $\text{Hhc} > 0$; $\text{Pgr} < \text{or} > 0$; $\text{Ehc} * \text{Hhc} < \text{or} > 0$

This Implies That There Is An Expected Positive Relationship Between Gross Capital Expenditure And Real Gdp; Traditionally, There Is Also An Expected Positive Relationship Between Expenditure On Education And Output As Proxy By Real Gdp; There Is An Expected Positive Relationship Between Health Expenditure And Economic Growth; The Relationship Between Population Growth Rate And Economic Growth Could Be Negative Or Positive Depending On The Prevailing Situations; Interactive Terms Could Also Assumes Either Positive Or Negative Depending On Whether They Are Substitute Or Complement In Their Joint Contributions

Moreover, The Present Study Adopts The Autoregressive Distributed Lag (ardl) Model As Its Methodological Framework Being A Dynamic Technique That Can Capture Both Dynamic And Static Effect(s) Of Regressors On Dependent Variables. It Equally Is Capable Of Featuring Short-run And Long-run Dynamics Of Models. Inquisitive Readers Should Check The Appendix For Ardl Model Specification. Ardl Was Proposed By Shin, Yu, And Greenwood-nimmo (2014), And Has Since Then Being Embraced By Social Scientists (see, Tiarniyu, Et Al, 2022; Adekunle Et Al, 2018; Adedokun, 2022; Adekunle Et Al, 2019)

Variables And Data Sources

This Study Focuses On The Nigerian Economy From 1981 To 2020. It Uses Real Gdp As A Measure Of Economic Growth, Gross Capital Formation For Physical Assets, Education Expenditure, Health Expenditure, And Population Growth Rate For Human Capital. Data Sources Include The Central Bank Of Nigeria (cbn, 2021) For Real Gdp, Population Growth Rate, Education, And Health Expenditure, And The World Development Indicator (wdi, 2021) For Gross Capital Formation.

Empirical Analysis

Summary Of Descriptive Statistics

Table 4.1 Summarizes Key Statistics For Five Variables In The Study: Real Gross Domestic Product, Gross Capital Formation, Education Expenditure, Health Expenditure (in Natural Log), And Population Growth Rate. *lehc* And *lhhc* Have Similar High Means, While *pgr* Has The Lowest Mean. The Median Shows Similar Patterns. *pgr* Has The Lowest Minimum And *lhhc* Has The Highest Maximum Among The Variables. *lhhc* Is The Most Volatile (high Standard Deviation), While *pgr* Is The Least Volatile. All Five Variables Follow A Strong Normal Distribution According To The Jarque-Bera Test.

Table 1: Descriptive Statistics Summary

variable	Obs	Mean	Median	Max.	Min.	Std.Dev	Jarque-B
GDP	40	8.698637	8.921369	11.87903	4.975569	2.388418	3.585238[0.166523]
GCF	40	3.454731	3.480585	4.492909	2.701623	0.511336	1.497097[0.473053]
EHC	40	10.47677	11.05936	14.29397	5.977112	2.760523	3.043374[0.218343]
HHC	40	10.42412	10.19846	15.30394	5.411200	3.698461	3.868007[0.144568]
GR	40	2.581854	2.586026	2.709830	2.488792	0.066053	2.504152[0.285911]

Note: The Probability Values Are Classified In The Block Brackets
Computed By The Author, 2023

Analysis Of The Trend

Following Figure 1 And 2 Below, And The Growth Rate Table In The Appendix; The Growth Rate Of Real Gdp Fluctuates Over The Years. It Experiences Both Positive And Negative Growth Rates. Notably, The Growth Rates Are Generally Positive In The Earlier Years, With Some Fluctuations, Indicating Economic Expansion. However, There Are Periods Of Economic Downturns Where The Growth Rates Turn Negative, Such As In 2020. For The Education Expenditure (*ehc*) Growth; The Growth Rate Of Education Expenditure Also Fluctuates Over Time. It Experiences Both Positive And Negative Growth Rates, Indicating Variations In Government Spending On Education. There Are Periods Of Rapid Growth (e.g., 1993) Followed By Periods Of Decline (e.g., 2003). The Growth Rates Are Generally Positive In Recent Years. Moreover, The Growth Rate Of Health Expenditure Exhibits Significant Fluctuations, With Both Positive And Negative Growth Rates. There Are Instances Of Substantial Growth (e.g., 2002) Followed By Periods Of Decline (e.g., 2003). The Growth Rates Exhibit High Variability Across The Years. This Variability Could Be Attributed To Various Factors, Including Low Investment In Both Health And Education Sectors.

Fig 1: Trend Between Growth And Education Expenditure

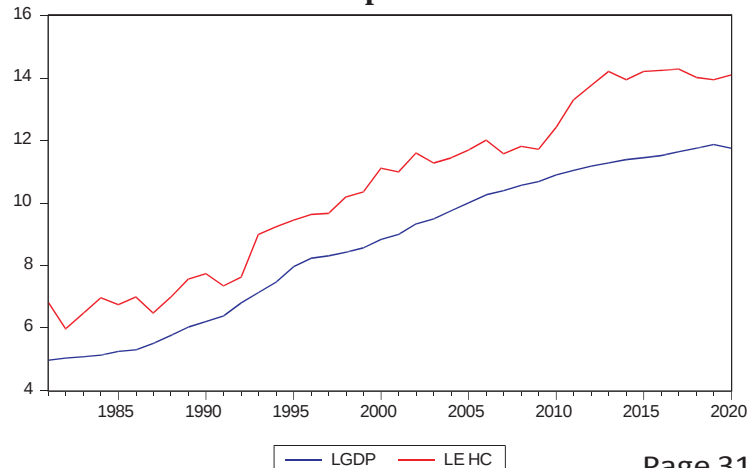


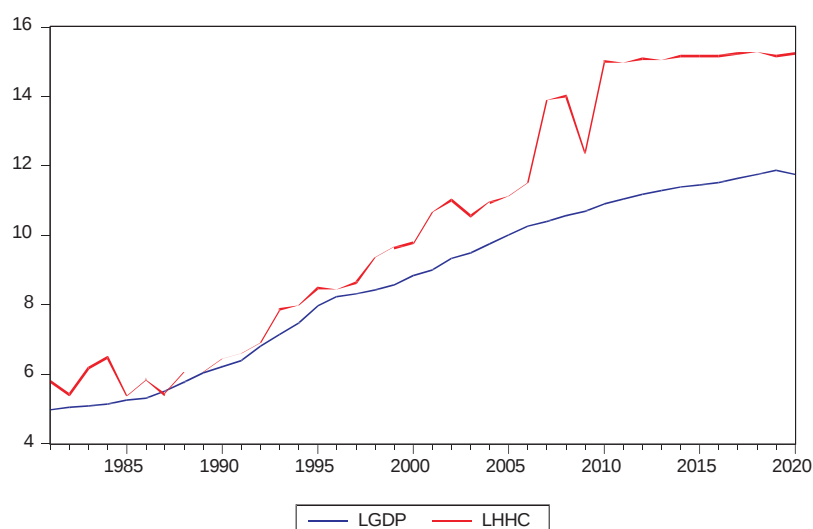
Fig 2: Trend Between Growth And Health Expenditure**Stationarity Test Results**

Table 2 Displays Adf Unit Root Test Results. Gross Capital Formation Is $I(0)$, While The Other Five Variables (including Natural Logs Of Real Gdp, Education Human Capital Expenditure, Population Growth Rate, And An Interactive Variable) Are $I(1)$ After First Differencing. We'll Use The Bounds Test To Assess Cointegration Between $I(0)$ And $I(1)$ Series, With Results Coming Soon.

Table 2: Result Of Unit Root Test (adf)‡

Variables	Level	First Difference	Remarks
LGDP	-4.211868 ^B	-8.827*** ^A	$I(1)$
LEHC	-4.212 ^B	-2.627*** ^C	$I(1)$
LGCF	-1.950** ^C		$I(0)$
LHHC	-4.212 ^B	-2.627*** ^C	$I(1)$
PGR	-4.219 ^B	-2.629*** ^C	$I(1)$
LEHC* LHHC	-4.212 ^B	-2.627*** ^C	$I(1)$

***, **, * Indicate The Rejection Of The Null Hypothesis Of A Unit Root At 1%, 5% And 10%, Respectively; A Represents Model With Constant; B Represents Model With Constant And Trend; While C Represent Model With None. ‡see The Appendix For Full Details On The Adf Unit Root Test

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Cointegration Test Results

Table 4.3 Presents The Results Of The Bounds Cointegration Test In Regard To The Six Series Used During The Inquiry. The Bounds Cointegration Test Findings For Model 2 Confirm The Existence Of A Long Run Relationship Between The Variables Of Interest, As The Relevant F-stat Is Bigger Than The Upper Critical Value Bound At All Significant Levels. As A Result, Both Short And Long Term Models For Model 2 Will Be Estimated. However, For The Model 1, All The Variables Are Not Cointegrated, Thus, Only Short-run Estimation Will Be Considered.

Table 3: Cointegration bound test result

	Model 1	Model 2
F-stat	1.283106	16.93314
Critical Values		
Significance levels	Lower (I0) Bound	Upper (I1) Bound
10%	3.03	4.06
5%	3.47	4.57
2.5%	3.89	5.07
1%	4.4	5.72

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Short-run Regression Results For Model 2 And 1

The Table 4 Bellow Summarizes The Key Findings:

- **Both** Models (models 2 And 1) Reveal That The Prior Value, Particularly The First Lag Of The Natural Log Of Real Gross Domestic Product, Is Positively Linked To Its Current Value. The Autocorrelation Coefficients (0.474571 And 1.126023) Are Highly Significant At A 1% Level. However, In Model 1, The Second Lag Has A Negative Connection, Suggesting That Given Present Growth Rates, Output Growth Would Increase The Next Period, While It Would Plummet The Following Time. This Suggests A Degree Of Uncertainty And Variability In The Economy's Growth Trajectory, Indicative Of Economic Instability.
- **Domestic** Investment (gross Capital Formation) Surprisingly Has A Negative Impact On Economic Growth In Both Model 1 And Model 2, Indicating A Recessionary Effect. The Negative Impact Of Domestic Investment On The Economy Could Be Due To Low Government Savings And A Lack Of Focus On Productive Investments Like Human Capital.
- **Government** Spending On Education Affects Economic Growth Positively In Model 2 With Lags, But Negatively In Model 1 With Lags.
- **The** Overall Impact Of Education Spending Varies Between The Models, With Model 2 Showing Positive Effects When Combined With Health Spending.
- **Government** Spending On Health Initially Has A Negative Effect On Output Growth In Both Models But Becomes Significant After Lags.
- **Population** Growth Negatively Impacts Output Growth In The Short Run, With A 9.6% Reduction. Even With Health And Education Spending, It Still Reduces Growth But Only By 7.5%, Implying That Investing In Both Can Counteract Population Growth's Impact.

Table 4: Short-run Regression Results For Model 2 And 1

Dependent	Variable		LGDP	
	Model 2		Model 1	
LGDP(-1)	0.474571*** (0.088661)		1.126023*** (0.131678)	
LGDP(-2)			-0.328369*** (0.091860)	
	-0.523113***		-0.559857*** (0.201637)	
	(0.093589)			
LGCF				
LGCF(-1)	-0.394453 (0.245648)			
LEHC	0.082118 (0.056641)		-0.018363 (0.033025)	
LEHC(-1)	0.228908*** (0.071499)		-0.087483** (0.043839)	
LEHC(-2)	-0.002171 (0.057141)		0.066252 (0.039672)	
LEHC(-3)	-0.179838*** (0.046571)		-0.152225*** (0.058436)	
LHHC	-0.011081 (0.072254)		-0.056502* (0.032656)	
LHHC(-1)	0.309085*** (0.096039)			
LHHC(-2)	-0.162267* (0.081503)			
LHHC(-3)	-0.187984** (0.083730)			
LHHC(-4)	0.228348*** (0.056661)			
PG	-7.485090*** (2.204612)		-9.609495*** (1.989176)	
PG(-1)	23.22194*** (5.708280)		30.92674*** (6.436119)	
PG(-2)	-24.29651*** (5.143782)		-42.40305*** (10.65132)	
PG(-3)	8.830515*** (1.730231)		27.44638*** (8.150772)	
PG(-4)			-8.606692*** (2.836147)	
HHC_LEHC	-0.005783 (0.006287)			
HC_LEHC(-1)	-0.035395*** (0.009833)			
HC_LEHC(-2)	0.010855 (0.007069)			
HC_LEHC(-3)	0.011851* (0.006226)			
LHHC_LEHC(-4)	-0.015563*** (0.004184)			
C	4.044229* (2.023344)		10.31028*** (3.262367)	
Adj. R ²	0.999613		0.999015	
F-stat	4109.586 [0.0000]		2536.696 [0.0000]	
Ramsey RESET	2.033719 [0.1793]		18.37607 [0.0004]	
linearity test				
Jarque-Bera	1.462499 [0.481307]		0.539956 [0.763396]	
normality test				
Breusch-Godfrey	7.777693 [0.0078]		0.040895 [0.9600]	
serial correlation				
LM test				
Breusch-Pagan	1.594089 [0.1937]		0.528445 [0.8887]	
Godfrey				
heteroscedasticity				
test				

Note: Model 2 Is The Model With Interactive Terms While Model 1 Represents Model Without Interactive Terms. The Asterisks ***, **, And * Indicate The Levels Of Statistical Significance For Coefficients At 1%, 5%, And 10%, Respectively. Meanwhile, The Numbers Enclosed In Parentheses Denote Standard Errors, And Those Enclosed In Square Brackets Represent Probability Values. Computed By The Author, 2023

Long-run Regression Results For Model 2

From Table 5 Below, The Following Key Observations Are Important:

- **Long-term** Predictors Of Economic Growth Are Domestic Investment, Health, And Education Financing, Especially When Funded Simultaneously; This Is Seen In Their Respective Percentage Contributions (1.7%, 0.24%, 0.33%, And 0.06%), Which Are All Statistically Significant At The 1% Level; Aligning With The Emphasis On Technology And Knowledge In New Growth Theory.
- **Domestic** Investment (gross Capital Formation) Surprisingly Has A Negative Impact On Economic Growth, Indicating A Recessionary Effect, And Suggestive Of Factors Identified Above
- **In** The Long Term, Population Growth Has A Minor And Inconsequential Influence On Economic Growth, Provided Proper Investments Are Made To Enhance Human Capital.
- **The** Negative Sign In The Interactive Terms Of Health And Education Spending Suggests They Are Complementary Goods That Are Better Pursued Together For Increased Output Growth.

Table 5: Result Of Long Run Estimation

	Dependent Variable	LGDP
	-1.746319***	
LGCF	(0.319023)	
	0.245546***	
LEHC	(0.081133)	
	0.335158***	
LHHC	(0.110261)	
PG	0.515497(0.710674)	
	-0.064775***	
LHHC_LEHC	(0.007043)	
C	7.697006***(3.308813)	
	0.358912***	
@TREND	(0.039731)	

The Asterisks ***, **, And * Indicate The Levels Of Statistical Significance For Coefficients At 1%, 5%, And 10%, Respectively. Meanwhile, The Numbers Enclosed In Parentheses Denote Standard Errors, And Those Enclosed In Square Brackets Represent Probability Values. Computed By The Author, 2023

Conclusions And Policy Recommendation

This Study (1981-2020) Analyzed The Link Between Human Capital (education And Healthcare) And Economic Growth In Nigeria. Variables Representing Economic Growth, Investment Environment, And Human Capital Development Were Employed. The Trend Analysis Conducted

Shows That Nigerian Economy Experiences Fluctuating Growth Pattern Relative To Education And Healthcare Spending. The Augmented Dickey-fuller (adf) Method Was Used To Determine The Stationarity Or Otherwise Of The Variables Used In The Study. The Ardl Approach Has Also Been Used As An Estimating Methodology. It Was Discovered That Only Gross Capital Formation Is Stationary At Level, While The Rest Variables Become Stationary After The First Differencing. The Bound Test Cointegration Findings Show That Model 2 Is Cointegrated Whereas Model 1 Is Not. Though It Was Discovered That, In The Short Term, The Impact Contribution Of Both Health And Education Expenditure May Not Be Obvious, In The Long Run, They Make A Significant Contribution To Economic Growth. Moreover, It Was Found Out That, In The Human Capital Estimated Model, The Only Significant Long-run Predictors Of Economic Growth Are Domestic Investment, Health And Education Financing, Especially When The Funding Is Done Concurrently. This Is Obvious In Their Respective Percentage Contributions (1.7%, 0.24%, 0.33%, And 0.06%), Which Are All Statistically Significant At The 1% Level. This Is Consistent With New Growth Theory Trajectory, Which Places A High Value On Technology And Knowledge Acquisition. It Was Also Discovered That Constant Investment In Both Health And Education Will Significantly Contribute To Economic Growth Over Time, And That Investing In Both Health And Education Concurrently Will Mitigate The Economic Impact Of Larger Population Increase. This Merely Confirms The Saying That "an Educated Fellow In Good Health Is An Asset To Industrial And Economic Growth," And The Study's Conclusions Are Consistent With Those Of Lustig (2006) And Schultz (2002). It Is Therefore Recommended That Nigerian Government Should Place A Greater Emphasis On Human Capital Development Investment; Thus, Investment On Education Sectors And Health Sectors Should Be Taking Place Concurrently. Thus, The Implication Of This Finding And Recommendation Is That The Sustained Investment In Human Capital, Particularly In Education And Healthcare, Have Ramifications For The Overall Economic Performance And Long-term Sustainability.

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