



HEALTHCARE FINANCING AND HUMAN DEVELOPMENT IN WEST AFRICA

ABSTRACT

This study examines the effect of healthcare financing on human development in West African countries from 2000 to 2022. The objective is to assess the roles of public, private, and external health expenditures alongside GDP per capita and institutional quality in shaping human development. Using Panel ARDL methodology of pooled mean group, mean group, dynamic fixed effect and Hausman test. Findings indicates that in the long run, private health expenditure significantly improves human development by 5%, while public and external health expenditures though improving it by 2% and 1% are insignificant. Also, Institutional quality and GDP per capita show no significant long-term effects on human development. Short-run results reveal limited and inconsistent effects of health expenditures, and institutional quality, while only GDP per capita significantly impacts human development in the short run, with error correction terms of 8.97% for human development, suggesting slow adjustment to equilibrium. The study recommends enhancing public spending efficiency, incentivizing private healthcare investment, strategically leveraging external funding for capacity building and Institutional reforms to improve governance, transparency, and resource allocation. The conclusion emphasizes that sustainable development in West Africa requires integrating health investments with broader socio-economic and governance reforms to ensure impactful and equitable outcomes.

Keywords: *Healthcare Financing, Human Development, Sustainable Development Goals, Pooled Mean Group, and Dynamic Fixed Effect.*

JEL CLASSIFICATION: I10, I15, I30, C33.

1. Introduction

Healthcare financing is a vital component of a country's healthcare system, influencing access to quality medical services, reducing mortality rates, and enhancing workforce productivity, all of which contribute to human development, as health is a precondition for carryout economic activities. Adequate healthcare investment is essential for achieving Sustainable Development Goals (SDGs), particularly SDG 3, which emphasizes improved well-being. However, the effectiveness of healthcare financing depends not only on the level of funding but also on how resources are mobilized and allocated.

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Understanding the relative effect of public, private, and external health expenditures on human development is crucial for shaping effective health policies in West Africa. (World Health Organization [WHO], 2015).

Despite global advancements in healthcare investment, millions in West Africa remain without access to basic medical services, raising concerns about the effectiveness of healthcare financing in fostering human development. In 2021, global healthcare spending reached \$9.8 trillion, yet many West African nations allocate less than 5% of their Gross Domestic Product (GDP) and 10% of their budget to healthcare, juxtaposed with developed nations which spend above 10% of their GDP, this is far below the 15% budget target set by the Abuja Declaration in 2001. This persistent underfunding, coupled with heavy reliance on out-of-pocket payments and external aid, poses significant challenges to achieving sustainable human development in the region. (WHO, 2020a; WHO 2015, Logarajan et al 2022; WHO Global Health Expenditure Database, [WHOGHED] 2023; World Bank Development Indicators [WDI], 2023)

Human development progress worldwide has shown a positive trend over the years, with significant improvements in the three dimensions which are health, education and living standard. The Human Development Index (HDI) which is used to gauge human development has risen globally from 0.645 in 2000 to 0.739 in 2022, reflecting an overall advancement in human development, with high HDI nations including the United States and most European countries, while Sub-Saharan Africa continues to demonstrate low HDI scores despite an increase from 0.429 to 0.549 during the same period except for countries like Mauritius, Seychelles, and Botswana that have made notable progress and West African countries generally exhibiting low scores except for Ghana and Cape Verde (UNDP, 2023; Human Development Report, [HDR] (2023/2024).

The interplay between healthcare financing and human development is elucidated through various theories, including the WHO's six building blocks, Bruce and Phelan's fundamental cause theory attributing health inequities to socioeconomic status, Newhouse's health expenditure outcome theory highlighting the crucial role of healthcare spending in influencing health outcomes, and Grossman's model conceptualizing health as a durable asset requiring ongoing investment in healthcare inputs to enhance outputs. (WHO, 2007;2010; Grossman 1972; Phelan, et al., 2010; El Haj et al., 2013; Newhouse, 1977).

Existing studies such as Radmehr and Adebayo (2022), Salami and Tijani (2021), Onofrei et al (2021), Ullah et al (2021), Chireshe and Ocran (2020), Mohanty and Behera (2020) have established connections between healthcare financing and life expectancy in various regions which is one of the dimensions of human development, but neglected the effect on overall human development which is a broader measure that

encompasses life expectancy, education and living standards. Lescano et al. (2022) and also Sadeghpour et al. (2022) established link between government health spending and human development but not within the scope of Africa, more so, existing studies did not look at all the different financing sources of health care financing such as public, private and external sources, also existing studies did not carry out cross sectional dependency test which is a basis for adoption of methodology and none of the existing studies used pooled mean group, mean group and dynamic fixed effect method for analysis.

This study intends to fill this gap by investigating the effect of public, private and external health care financing on human development within the context of West Africa for the period 2000 to 2022. The remainder of this paper is structured as follows: Section 2 reviews the theoretical and empirical literature on healthcare financing and human development. Section 3 outlines the methodology, including data sources, model specification, and econometric techniques. Section 4 presents the empirical findings and discusses their implications. Finally, Section 5 concludes the study and offers policy recommendations.

2. Literature Review and Theoretical Framework

2.1 Conceptual Clarification

Concept of Healthcare Financing

Healthcare financing encompasses the strategies employed to generate, allocate, and utilize funds for healthcare services within a health system, as defined by the World Health Organization (WHO) (2023b). This framework includes public funding through government budgets, private funding via out-of-pocket payments, private corporations and insurance, and external funding from global institutions aimed at supporting healthcare in low to moderate income regions. Effective health financing mobilizes and allocates resources to cater to the healthcare needs of populations, ensuring equitable access to necessary services. Key components include the significance of public and private funding mechanisms, the impact of external aid, and the development of innovative financing strategies. Ultimately, successful healthcare financing requires efficient resource management, transparency, and accountability to achieve optimal health outcomes. Healthcare financing refers to the methods and proposed action used to fund healthcare services to ensure accessibility, affordability and quality for the populace (National Health Systems Resource Centre [NHSRC] (2018).

This study defines healthcare financing as the collective financial contributions from public, private, and external sectors aimed at supporting healthcare services, including the provision of facilities, disease treatment, and the efficient management of resources to achieve health-related objectives and promote well-being.

Concept of Human Development

Human Development which is measured by Human Development Index (HDI) serves as a tool for measuring human progress and expanding individuals' choices, with its primary goals being a long and healthy life, access to education, and a decent standard of living (Nafziger, 2006). This index evaluates development across three key dimensions: life expectancy at birth as a measure of longevity; educational achievement, assessed through the average years of schooling for adults and the expected years of schooling for children; and living standards, represented by real per capita GDP adjusted for each country's purchasing power (Todaro & Smith, 2015). Developed by Lord Meghnad Desai and Nobel laureate Amartya Sen, the HDI was first introduced in the inaugural Human Development Report by the United Nations Development Programme (UNDP) in 1990. It is a composite indicator that captures achievements in these three fundamental dimensions of human development: health, education, and living standards (Jhingan, 2011).

The Human Development Index (HDI) can be conceptualized as a multifaceted metric aimed at assessing and enhancing human advancement through the expansion of opportunities and the elevation of life quality. It encompasses three essential dimensions: Health and Longevity, which underscores the importance of a long and healthy life; Education and Knowledge, highlighting educational attainment as a catalyst for empowerment; and Living Standards and Economic Prosperity, which reflects the capacity to attain a satisfactory standard of living essential for alleviating poverty and inequality.

2.2 Theoretical Framework

This study is anchored on the Health system theory, particularly the framework established by WHO, it is deemed essential for a comprehensive examination of healthcare financing and human development outcomes in West Africa. It posits that key elements such as healthcare financing, governance, workforce, service delivery, information systems, and access to medicines are crucial for enhancing healthcare infrastructure and overall wellbeing. Optimal governance promotes efficient resource allocation, thereby addressing challenges like corruption and mismanagement, which are prevalent in the West African region. Sustainable healthcare

financing necessitates diverse funding sources to alleviate the financial burden on impoverished populations while ensuring equitable access to quality services. (WHO 2007;2010).

Furthermore, the Donabedian model, established in 1966, is essential to healthcare system theory, focusing on structure (resources), process (care administration), and outcomes (patient health), where adequate financing is crucial for enhancing care delivery and overall health metrics such as life expectancy and mortality rates, which leads to overall wellbeing and enhancing human development as noted by El Haj, Lamrini, and Rais (2013). Ultimately, strategic investment in health systems through effective financing and governance can significantly improve overall human development outcomes in West Africa

2.3 Empirical Literature

This section reviewed fact-based studies on the subject matter from panel-based studies to country specific studies.

Lescano et al. (2022) applied panel pooled ordinary least square to a sample of 57 developed and developing countries to examine the effect of central and sub-national government health expenditure on human development index for the period 2000 to 2018 and found out that government health expenditure positively impacts human development index and its components. The study did not disaggregate healthcare spending into different sources to show its relative effect on human development and did not carry out cross sectional dependency test which is a basis for the type of methodology to adopt, this study would carry out cross sectional dependency test and disaggregate healthcare spending into different sources to show its relative effect on human development in other to inform proper policy on which financing mechanism are most effective.

Sadeghpour et al. (2022) investigated the influence of health system financing on the human development index in Iran for the period 2001 to 2018, utilizing the Engle-Granger and Johansen-Joselius methodologies. The results indicate a long-term relationship among the human development index, government health expenditures, the private sector's proportion of gross domestic product, health insurance, and gross domestic product per capita. Furthermore, the analysis reveals the presence of two cumulative vectors, which substantiate the positive impact of variations in government health expenditures, health insurance, and the private sector's share of GDP on the human development index, alongside a negative connection between per capita GDP and the human development index. This research focuses on Iran and did not differentiate health financing into distinct sources; in contrast, the current study is centered on West African countries, with health financing categorized into various sources.

Aydan et al. (2022), examined the influence of healthcare and social spending, as well as the economic freedom index, on well-being measured by better life index of 34 Organization of Economic Cooperation for Development (OECD) countries for the period 2013-2017. Two distinct models were computed to analyze the impact of social expenditure, health expenditure and economic freedom index on better life index through a panel random effect model. The results of the study demonstrate that both public and private social expenditures exhibit a positive and statistically significant association with the better life index at a significance level of 1%. Public health expenditure also shows a positive and statistically significant relationship with the better life index at a significance level of 1%, while the effects of private health expenditure are statistically significant at a level of 10%. Furthermore, the economic freedom index is found to have a positive and statistically significant effect on the better life index in both models. The study is based on OECD countries, measured human development with better life index, and did not carry out cross sectional dependency test which is a basis for the type of methodology to adopt, this study would carry out cross sectional dependency test and will use HDI to capture human development and the scope of this study is West African countries.

Nathaniel and Khan (2020) employed ARDL and Bayer Hancks cointegration to determine the effect of public health financing on quality of life in Nigeria for the period 1970 to 2014. Findings revealed that public health expenditure did not enhance quality of life in the short run, but it did enhance it in the long run. The study only examined the effect of public health financing on life expectancy which is just a component of human development and is limited in geographical context to only Nigeria, as a departure this study covers all countries in west Africa and will examine the effect of public, private and external healthcare financing on human development index which covers all the dimensions of human development.

Owumi and Eboh (2022) employed robust least squares using time series analysis for Nigeria for the period 2000 to 2017 to examine the effect of healthcare spending on life expectancy, findings revealed that government health expenditure, out of pocket health expenditure and external health expenditure all exhibit significant positive effects on life expectancy in Nigeria. The study only examined the effect of healthcare financing on life expectancy which is just a component of human development and is limited in geographical context to only Nigeria, as a departure this study covers all countries in west Africa and will examine the effect of public, private and external healthcare financing on human development index which covers all the dimensions of human development.

Radmehr and Adebayo (2022) employed panel moments quantile regression for panel data of Mediterranean countries for the period 2000 to 2018 to examine the effect of health expenditure, sanitation, CO2 emissions, and economic growth on life expectancy in Mediterranean countries and results showed that economic growth, health expenditure, and sanitation all contributed positively to life expectancy across all quantiles, while the effect of carbon emissions was negative in all quantiles. The study only focused on life expectancy dimension of HDI and the geographical scope is Mediterranean countries, this study is based on the overall human development index encompassing the three dimensions and the scope is west African countries.

Salami and Tijani (2021) employed fixed effect and two stage least squares for panel data of 45 African countries for the period 2000 to 2015 to examine the effect of health expenditure on life expectancy. Findings revealed that health expenditure had a positive effect on life expectancy in West Africa, but exhibited negative effects in Central and Southern Africa. The study is based on only life expectancy which is just a dimension of HDI, did not carry out cross sectional dependency test which is a basis for abduction of panel data methodology and did not disaggregate health spending into different sources, this study is based on the overall human development index, will carry out cross sectional dependency test and disaggregate health spending into different sources to show its relative effect.

Onofrei et al. (2021) employed panel data analysis for European union countries spanning 2000 to 2019 to examine the effect of public health expenditure on life expectancy and infant mortality rate. Findings show that public health expenditure positively impacts life expectancy and reduce infant mortality rate. The study did not carry out cross sectional dependency test, the geographical scope of the study is European union countries, healthcare spending was not disaggregated into different sources to show its relative effect and the focus was just on the health dimension of HDI. This study will address all these identified gaps within the scope of west African countries.

Ullah et al. (2021) employed Quantile Autogressive Distributed Lag (QARDL) in data for Pakistan for the period 1995Q1 to 2017Q1 to examine the effect of public health spending on life expectancy and infant mortality rate, findings revealed that public health expenditure improves life expectancy and reduce infant mortality rate. The study is based on time series analysis applicable to only Pakistan, focused on only the health dimension of HDI and did not classify healthcare spending into different sources, as a departure, this study is based on west African countries, overall human development index and classified health spending into different sources.

Chireshe and Ocran (2020) employed fixed effects panel and generalized methods of moments for a panel data of 45 Sub-Saharan African countries for the period 1995 to 2018 to examine the effect of healthcare spending on health outcomes and found out that total health expenditure per capita and public health expenditure as a percentage of GDP is connected with improvement in life expectancy and reduction in under five mortality rates, while private health expenditure decreased life expectancy and not significant in reducing mortality rates. The study did not carry out cross sectional dependency test, neglected the effect of external healthcare spending and focus on only the health dimension of HDI, as a departure this study would carry out cross sectional dependency test, assess the effect of external healthcare spending and used the overall human development index which covers the three dimensions.

Mohanty and Behera (2020) utilized panel fixed effects model for 28 states in India for the period 2005 to 2016 to examine the effect of public healthcare spending on life expectancy and infant mortality rates. Findings revealed that per capita public health expenditure positively impacts life expectancy and reduce infant mortality rates. The study only assesses the effect of public health spending, is limited in scope to only India and did not carry out cross sectional dependency test which is a basis for methodology in panel data analysis, as a departure this study is based on all countries in West Africa, healthcare spending is disaggregated into different sources and cross-sectional dependency test will be conducted.

Duba et al. (2018) employed panel data analysis for 210 countries for the period 1995 to 2014 to assess the effect of public health expenditure on male and female life expectancy and found a significant association between life expectancy for both genders and public health expenditure. The study did not carry out cross sectional dependency test, only government health spending was used to assess life expectancy, as a departure this study will carry out cross sectional dependency test and would disaggregate healthcare spending into different sources to assess its effect on human development in west African countries which is a broader measure of well-being than life expectancy.

Arthur and Oaikhenan (2017) investigated the impact of public and private health expenditure on health outcomes in 40 Sub-Saharan Africa (SSA) countries. Employing panel fixed effect method, findings revealed that public health expenditure significantly reduced infant and maternal mortality rates, but did not have significant effects on life expectancy despite having a positive coefficient, while private health expenditure demonstrated a positive and significant influence on life expectancy and a weak negative significant effect on infant and maternal mortality rates. The study neglected the effect of external healthcare spending, did not

conduct cross sectional dependency test to determine appropriate methodology and the focal point was on the health dimension of HDI, as a departure this study would address these deficiencies.

This paper build on the work of existing studies, however, it differs from others by examining the effect of healthcare spending on human development in the context of West Africa, addressing methodological short comings in the literature and accounting for the relative effect of the different sources of healthcare spending.

3. Methodology

This section specifies the model of the study, the data sources, the sample of countries, and the estimation procedures involved in carrying out the analysis.

3.1 Nature and Sources of Data

Secondary panel data was used for the analysis covering the period from 2000 to 2022. The data on West African Countries was obtained from WHO Global Health Expenditure Data Base (WHOGHED), World Governance Indicators (WGI) and United Nations Development Program (UNDP). Data on GDP per capita, domestic general government health expenditure per capita, domestic private health expenditure per capita, external health expenditure per capita was sourced from WHO GHED, data on human development index was sourced from UNDP and data on institutional quality was sourced from WGI.

3.2 Panel Sample

The panel sample consists of 16 countries in the West Africa sub-region comprising; Benin republic, Burkina Faso, Cape Verde, Cote-divoire, Ghana, Guinea, Gambia, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Democratic republic of Togo. These are all the countries in West Africa based on the regional scope of the study and no country was left out.

3.3 Model Specification

This study developed one model to assess the effect of healthcare financing on human development in West Africa.

The first model is specified based on the healthcare system theory, and adapting the work of Miranda-Lescano, Muinelo-Gallo and Roca-Sagales (2022). The functional and econometric model is specified in the equation below.

$$HDI_{it} = f(DGGHE_{it}, DPHE_{it}, EXHE_{it}, GDPPC_{it}, INSQ_{it}) \quad 1$$

$$HDI_{it} = \rho_0 + \rho_1 DGGHE_{it} + \rho_2 DPHE_{it} + \rho_3 EXHE_{it} + \rho_4 GDPPC_{it} + \rho_5 INSQ_{it} + \mu_i + \lambda_i + e_{it}$$

2

HDI is Human Development Index, DGGHE is Domestic General Government Health Expenditure Per Capita, DPHE is Domestic Private Health Expenditure Per Capita, EXHE is External Health Expenditure Per Capita, GDPPC is Gross Domestic Product Per Capita, INSQ is institutional quality proxied by government effectiveness, *i* signifies the selected countries (*i*=1-16), *t* signifies the time specification, φ_0 is the constant term, $\rho_1 - \rho_5$ are the coefficients of the variables, μ_i represents the country-specific effects, λ_i stands for the time-specific effects and e_t is the error term.

Apriori Expectation: $\rho_1, \rho_2, \rho_3, \rho_4, \rho_5 > 0$

3.4. Panel ARDL Estimation Procedure

The study adopted the Panel Autoregressive distributed lag (PARDL) to examine the objective of the study, within this framework there are three estimation techniques viz: pooled mean group (PMG), mean group (MG) and dynamic fixed effects (DFE) and the choice of the best estimation is based on the Hausman test.

The ARDL model is specified as follows:

$$\Delta y_{it} = \sum_{k=1}^{p-1} \lambda_{ik} \Delta y_{it-k} + \sum_{k=0}^{q-1} \delta_{ik} \Delta x_{i,t-k} + \varphi_i (y_{it} - 1 + B_i x_t) + \omega_i + \epsilon_{it}$$

In the model above $\lambda_{ik} \Delta y_{it-k}$ is the short run lag dependent variable, δ_{ik} are the short run coefficients of the independent variables, φ_i is the cointegration term coefficient, ω_i is the fixed effects term and ϵ_{it} is the idiosyncratic error term. In the PMG, the long run coefficients B_i are same across cross sections, while the short run coefficients δ_{ik} and cointegration coefficients φ_i vary across groups, in the mean group the long run, short run and cointegration coefficients vary across groups, in the dynamic fixed effects the short run, long run and cointegration coefficients are the same across groups.

Before conducting the ARDL analysis, there were some pre-estimation tests that were carried out. This includes the Descriptive Statistics Test which considers the mean, the minimum and maximum values, followed by Pairwise Correlation, after which the Cross Section Dependence Test the (CDS) was conducted to investigate whether the variables are cross-sectionally dependent or not. There after the Panel Unit Root Test using CIPS was performed on the variables to ascertain the order of stationarity, the Panel Co-integration Analysis for the

examination of long-term associations among non-stationary variables using Westerlund cointegration test which is a suitable test in the presence of cross-sectional dependence. After the pre-estimation tests, the analysis was achieved through the use of the PMG, MG, Dynamic fixed effect, and Hausman Test to determine the best technique (Pesaran & Smith, 1995; Blackburne & Frank, 2007; Bangake & Eggoh, 2012; Lee & Wang, 2015; Westerlund, 2006).

4. 0 Results and Findings

4.1 Presentation of Result

Table 1: Descriptive Statistics

	OBS	HDI	PUHE	PRHE	EHE	GDPPCUS	INSQQ
MEAN	368	0.462993	15.406	24.65985	8.347751	1070.858	-0.814822
MAX	368	0.668	209.043	78.75567	75.80813	4378.4	0.3409591
MIN	368	0.26	0.954772	3.386758	0.2638649	194.137	-1.807464
STD. DEV	368	0.0796796	25.564	15.57933	8.281578	804.4477	0.438006

Author’s computation using STATA version 15

The mean of HDI is 0.463 indicating relatively low development, the mean is within the minimum and maximum values, with a standard deviation of 0.079 implying moderate variation in human development in West Africa. The mean of public health expenditure is 15.4 billion USD per capita which falls within the range of minimum and maximum values, and it has a significant variation (standard deviation 25.6) indicating wide disparities across west Africa. Private health expenditure has a mean of 24.7 billion USD per capita which is higher than public health expenditure and smaller variation compared to PUHE. External health expenditure has a mean of 8.35 USD per capita, with a wide range, suggesting dependence on external funding in some countries in West Africa. GDPPCUS (Per Capita GDP) has a mean of 1,070.86 USD, with a wide range from 194.14 to 4,378.40 and standard deviation, showing significant economic disparities across West Africa. INSQQ (Institutional Quality Index) has a mean of -0.815 which is negative implying low-average institutional

quality across most observations, but a slight variation of 0.4388006 showing similarity in institutional quality across west Africa. Table 2: Correlation Matrix for Model HDI

	HDI	PUHE	PRHE	EHE	GDPPCUS	INSQQ
HDI	1.000					
PUHE	0.6794	1.000				
PRHE	0.5897	0.4527	1.000			
EHE	0.1764	0.1528	0.2755	1.000		
GDPPCUS	0.8178	0.8226	0.6967	0.1343	1.000	
INSQQ	0.4321	0.5714	0.0030	0.0127	0.5168	1.000

Author’s computation using STATA version 15

PUHE (Public Health Expenditure) has a strong positive correlation ($r=0.679$), suggesting that increased public health spending is associated with higher human development. PRHE (Private Health Expenditure) has a moderate positive correlation ($r=0.590$), indicating a similar but weaker relationship compared to PUHE. EHE (External Health Expenditure) has a weak positive correlation ($r=0.176$), implying limited association between external funding and HDI. GDPPCUS (Per Capita GDP) has a very strong positive correlation ($r=0.818$), underscoring the significant role of income distribution in improving HDI. INSQQ (Institutional Quality) has a moderate positive correlation ($r=0.432$), suggesting institutional quality also influences HDI.

Table 3: Variance Inflation Factors

Variable	VIF	1/VIF
lnGDPPCUS	4.90	0.203975
lnPUHE	4.34	0.230517
lnPRHE	2.83	0.353722
lnEHE	1.15	0.406913
INSQQ	2.47	0.873168
Mean VIF	3.13	

Author’s computation using STATA version 15

A VIF value above 10 is often considered problematic, but a value above 5 can indicate moderate multicollinearity that might warrant attention, from the table above all the variables have a VIF less than 10 and mean VIF of all the variables is 3.13.

Table 4: CDS Test (Cross Sectional Dependence Test)

Variables	CD-Test	P-Value	Corr.	Abs (corr)
lnHDI	49.66	0.000	0.945	0.945
lnPUHE	32.85	0.000	0.625	0.691
lnPRHE	33.23	0.000	0.632	0.638
lnEHE	26.32	0.000	0.501	0.677
lnGDPPCUS	45.59	0.000	0.868	0.868
INSQQ	-0.87	0.385	-0.017	0.359

Author’s computation using STATA version 15

From the cross-sectional dependency test result in table 4 above, lnHDI, lnPUHE, lnEHE and lnGDPPCUS have high positive values with P-values=0.000, so we reject the null hypothesis of no cross-sectional dependence at 1% significance level. However, institutional quality proxied by government effectiveness with P-value of 0.385 fails to reject the null hypothesis of no cross-section dependence. Based on this, the use of second-generation unit root test will be incorporated since almost all the variables were cross sectionally dependent.

Table 5: Pesaran CIPS Unit Root Test in the Presence of CDS

Variables	Levels(t)	1%				5%				Remarks
		1%	5%	10%	1 st	1%	5%	10%		
lnHDI	-2.318	-2.38	-2.2	-2.11	-3.683	-2.38	-2.2	-2.11	1(0)	
lnPUHE	-2.470	-2.38	-2.2	-2.11	-5.053	-2.38	-2.2	-2.11	1(0)	
lnPRHE	-2.068	-2.38	-2.2	-2.11	-4.227	-2.38	-2.2	-2.11	1(1)	
lnEHE	-2.961	-2.38	-2.2	-2.11	-5.168	-2.38	-2.2	-2.11	1(0)	
lnGDPPCUS	-2.369	-2.38	-2.2	-2.11	-4.016	-2.38	-2.2	-2.11	1(0)	
INSQQ	-2.085	-2.38	-2.2	-2.11	-4.707	-2.38	-2.2	-2.11	1(1)	

Author’s computation using STATA version 15

The Pesaran CIPS unit root test indicated that lnHDI, lnPUHE, lnEHE, and lnGDPPCUS were stationary at levels, while lnPRHE and INSQQ was stationary at first difference. This suggests that there is mixed order of integration and Pesaran and Smith (1995) recommended ARDL model to estimate relationship of mixed orders.

Table 6: Westerlund Cointegration Result

Model	Variance ratio stat.	P-Value
lnHDI Model	2.6840	0.0036

Author’s computation using STATA version 15

Table 6 established the cointegration test by using Westerlund (2006) which is suitable in the presence of cross-sectional dependence. Judging from the P-Values, it is glaring that there is cointegration in the model, thus there is long run relationship between the dependent variable and the independent variables in the model. Based on this result, this study proceeded to establish the ARDL PMG, MG and DFE long run and Short run coefficients.

Table 7: ARDL Long Run and Short Run Results of PMG, MG and DFE Estimation for Model HDI

PMG Model Variables	Coefficient	Prob	MG Model Variables	Coefficient	Prob	DFE Model Variables	Coefficient	Prob
long run lnPUHE	0.034	0.132	long run lnPUHE	-0.038	0.457	long run lnPUHE	0.028	0.184
lnPRHE	0.165	0.000	lnPRHE	0.194	0.025	lnPRHE	0.052	0.051
lnEHE	0.133	0.000	lnEHE	0.048	0.241	lnEHE	0.016	0.249
lnGDPPCUS	0.253	0.000	lnGDPPCUS	-0.012	0.921	lnGDPPCUS	0.027	0.584
INSQQ	0.101	0.021	INSQQ	-0.186	0.017	INSQQ	0.239	0.509
Short run Ec	-0.036	0.037	Short run Ec	-0.252	0.000	Short run Ec	-0.089	0.000
lnPUHE	-0.007	0.823	lnPUHE	0.0004	0.920	lnPUHE	-0.002	0.375
lnPRHE	-0.008	0.102	lnPRHE	-0.006	0.491	lnPRHE	-0.000	0.991
lnEHE	-0.002	0.438	lnEHE	-0.003	0.051	lnEHE	0.000	0.912
lnGDPPCUS	0.036	0.000	lnGDPPCUS	-0.001	0.951	lnGDPPCUS	0.023	0.001
INSQQ	-0.003	0.445	INSQQ	-0.008	0.179	INSQQ	-0.000	0.966

Author’s computation using STATA version 15

Above are the estimation results for PMG, MG and DFE. In the long run the effect of public health expenditure is statistically insignificant across all models, positive in PMG and DFE, negative in MG. Private health expenditure positively and significantly impacts human development across PMG, DFE and MG. External health expenditure has a significant positive long-run effect in PMG but not in MG/DFE. GDP per capita has a strong, significant positive long-run effect in PMG but not in other models, in MG it is negative, while in DFE it is positive. Institutional quality has a significant positive significant effect in PMG but a negative one in MG and positive insignificant in DFE. Error correction terms are significant in all models, confirming adjustment to long-run equilibrium.

In the short run there is insignificant short-run effects of public health expenditure it is negative in PMG and DFE, while positive in MG, there is insignificant short-run negative effects of private health expenditure on human development in West Africa. External health expenditure was negative and insignificant in PMG and MG, while positive and insignificant in DFE. GDP per capita has significant positive short-run effects in PMG and DFE but not in MG where it is negative and insignificant. Institutional quality has no significant short-run effects, the coefficient is negative across all models.

Table 8: Hausman Test Result for Model HDI

PMG VS MG	Chi2=69.52	Prob=0.000	Decision=MG
MG VS DFE	Chi2=0.00	Prob=1.0000	Decision=DFE

Author’s computation using STATA version 15

Based on the Hausman test, the MG (Mean Group) model is preferred over the PMG model because the MG model is consistent while the PMG is not, given the significant difference. Also, The DFE (Dynamic Fixed Effects) model is preferred over the MG model because there is no significant difference between them, and DFE may offer more efficient estimates. Thus, the dynamic fixed effect model is the preferred model for analysis and discussion of findings based on Hausman Test.

4.2 Discussion of Findings

The descriptive statistics points to low human development in West Africa, also the health financing metrics and GDP per capita depicted wide disparities in economic conditions of the 16 West African nations, but the institutional quality points to similar levels of inefficiency of governments in West Africa.

The preliminary analysis shows there was no problem of multicollinearity as none of the independent variables were perfectly collinear with each other and this was also confirmed by the variance inflation factor which was less than 10 for all the independent variables. The study adopted panel econometric techniques starting with cross sectional dependency test which revealed the presence of cross section dependence in human development index, public health expenditure, private health expenditure, external health expenditure, GDP per capita implying that common factors determine these variables in these West African countries, while institutional quality was cross sectionally independent.

Based on the cross-sectional dependency test, second generation unit root test was employed for human development index, public health expenditure, private health expenditure, external health expenditure, and GDP per capita. While first generation was applied for institutional quality. The unit root test results depicted varying levels of stationarity (I(0) and I(1)) and none of the variables were I(2), justifying the use of panel ARDL for analysis. The Westerlund cointegration test revealed long run relationship in the HDI model. The study proceeded to estimate the panel ARDL models which are the pooled mean group, mean group and dynamic fixed effect, the Hausman test revealed dynamic fixed effect as the most appropriate estimation technique for the analysis of HDI model.

The DFE model for HDI revealed that in the long run only private health expenditure significantly determines human development in West Africa, suggesting that increasing private health spending could have a positive impact on human development, while other variables such as public health expenditure, external health expenditure, GDP per capita, and institutional quality were insignificant, this is in contrast to Leascano et al. (2022) who found out that public health expenditure had a positive significant effect on human development index in a panel of 57 developed and developing countries this could be due to the fact that the geographical scope of the study consist of developed nations that spends hugely on healthcare, while this study is on West African countries that government spend less on healthcare. Also, it is in contrast with Sadeghpour et al. (2022) which findings revealed significant effect of government spending on HDI, though the study is on only Iran, while this study is on the entire west African countries. The error correction term indicates that 8.97% of the deviation from the long run is corrected in each period, this confirms the presence of a stable long run relationship, in the short run public health expenditure, private health expenditure, external health expenditure and GDP per capita positively impact HDI but only GDP per capita was significant, while institutional quality was negative and insignificant. The findings reveal stark disparities in healthcare financing and economic conditions across West African countries, reflecting the uneven development and resource allocation in the

region. While private health expenditure positively impacts human development in the long run, public and external expenditures appear ineffective, indicating inefficiencies in the public health sector and potential mismanagement or suboptimal use of external funding. The long-run significance of private health expenditure suggests that individuals and private entities are more efficient in allocating resources for health-related needs, potentially due to better accountability and targeted spending compared to public systems. The insignificance of GDP per capita in determining human development suggests that economic growth alone does not translate directly into improved social outcomes. The inefficiency of institutions, as evident by institutional quality, further underscores governance issues that impede effective resource mobilization and allocation. The slow pace of adjustment (8.97%) indicates structural challenges in aligning short-term dynamics with long-term goals. This reflects systemic inefficiencies, policy lags, and possible inertia in implementing impactful health and development strategies.

5. Conclusion and Recommendations

5.1 Conclusion

The study provides critical insights into the dynamics of healthcare financing and its impact on human development in West Africa from 2000 to 2022. The key conclusions are as follows: Private health expenditure is a significant driver of human development in the long run, highlighting the efficiency of private sector investments in health. This underscores the need to foster an environment that encourages private sector participation through supportive policies and incentives. Public health expenditure does not significantly influence human development in the long run. This reflects inefficiencies in the allocation and utilization of public funds, necessitating reforms to improve the effectiveness of government spending on healthcare. External health expenditure was also insignificant, this points to the importance of using external funds strategically to build local capacity and reduce dependence on external sources. The insignificance of GDP per capita in determining human development suggests that economic growth does not automatically translate into better well-being. This emphasizes the need for targeted investments in health and social services to complement economic growth. The inefficiency and ineffectiveness of institutional quality in driving health and development outcomes highlight governance challenges in West Africa. Strengthening institutional frameworks is crucial to enhance accountability, transparency, and resource efficiency. The slow error correction rates (8.97%) indicate structural challenges in addressing long-term goals. This points to the need for sustained and consistent policy efforts to achieve meaningful progress. The cross-sectional dependency among variables such as health expenditure, GDP per capita, and human development suggests that West African nations share

common challenges. This provides an opportunity for regional collaboration to address systemic issues collectively. The study concludes that healthcare financing in West Africa needs a strategic overhaul to maximize its impact on human development. Reforms should focus on enhancing the efficiency of public spending, incentivizing private sector participation, leveraging external funds effectively, and addressing institutional weaknesses. A multidimensional approach that integrates health, governance, and economic growth is essential to drive sustainable development in the region.

5.2 Recommendations

The following recommendations based on findings are proffered for West African countries in order to ensure that healthcare financing impacts human development in the region.

- I. **Policy Reorientation Towards Efficiency in Public Spending:** Governments in West Africa should focus on improving the efficiency and targeting of public health expenditure. This includes strengthening healthcare delivery systems, reducing corruption, and ensuring that public funds are directed toward priority areas that yield the greatest impact on health outcomes and human development.
- II. **Enhancing the Role of Private Sector:** The findings emphasize the importance of incentivizing private healthcare investment. Policymakers could introduce tax incentives, subsidies, or public-private partnerships to amplify the role of the private sector in delivering healthcare services.
- III. **Rethinking External Health Financing:** Governments should work towards diversifying funding sources and leveraging external funds more strategically for capacity building and long-term development.
- IV. **Institutional Reforms:** The inefficiency of institutions calls for urgent reforms to improve governance, transparency, and accountability. Strengthening institutional quality is critical to ensure that economic growth and healthcare investments translate into tangible improvements in human development.
- V. **Holistic Development Beyond Economic Growth:** The insignificance of GDP per capita suggests that focusing solely on economic growth is insufficient. Policymakers must adopt a multidimensional approach that integrates healthcare, education, social welfare, and infrastructure development to drive comprehensive human development.
- VI. **Regional Cooperation:** The cross-sectional dependency among most variables highlights shared challenges and opportunities across West African countries. Regional cooperation in healthcare policy, funding mechanisms, and knowledge sharing could help address common problems more effectively.

References

- Aydan, S., Donar, B., and Arikan, C. (2022). Impacts of Economic Freedom, Health, and Social Expenditures on Well-Being Measured by the Better Life Index in OECD Countries. *Social Work in Public Health* 37(5):435–47. <http://dx.doi:10.1080/19371918.2021.2018083>
- Arthur, E, and Oaikhenan, H.E. (2017). The Effects of Health Expenditure on Health Outcomes in Sub-Saharan Africa (SSA) *African Development Review* 29(3):524–36. <http://dx.doi.org/10.1111/1467-8268.12287>
- Bangake, C., and Eggoh, J. C. (2012). Pooled Mean Group Estimation on International Capital Mobility in African Countries. *Research in Economics* 66(1):7–17. <http://dx.doi.org/10.1016/j.rie.2011.06.001>
- Blackburne, E. F., and Frank, M.W. (2007). Estimation of Nonstationary Heterogeneous Panels. *The Stata Journal: Promoting Communications on Statistics and Stata* 7(2):197–208.
- Chireshe, J., and Ocran, M., K. (2020). Health Care Expenditure and Health Outcomes in sub-Saharan African Countries. *African Development Review* 32(3):349–61. <http://dx.doi:10.1111/1467-8268.12444>
- Duba, J., Berry, J., Fang, A., and Baughn, M. (2018). The Effects of Health Care Expenditures as a Percentage of GDP on Life Expectancies. *Research in Applied Economics* 10(2):50- 65. <http://dx.doi.org/10.5296/rae.v10i2.12654>
- El-Haj, H. I., Lamrini, M, and Rais, N. (2013). Quality of Care Between Donabedian Model and ISO9001V2008 *International Journal for Quality Research* 7(1):17–30.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(2), 223-255.
- Jhingan, M.L. (2011). *The Economics of Development and Planning* 40th Edition. Vrinda Publications.
- Lee, Y., and Wang, K. (2015). Dynamic Heterogeneous Panel Analysis of the Correlation between Stock Prices and Exchange Rates. *Economic Research-Ekonomska Istraživanja* 28(1):749–72. <http://dx.doi:10.1080/1331677X.2015.1084889>
- Logarajan, R., D., Nor, N., M., Sirag, A., Said, R., and Ibrahim., S. (2022). The Impact of Public, Private, and Out-of-Pocket Health Expenditures on Under-Five Mortality in Malaysia. *Healthcare* 10(3):589-604. <http://dx.doi:10.3390/healthcare10030589>
- Miranda-Lescano, R., Muinelo-Gallo, L., and Roca-Sagales, O. (2022). Human Development and Decentralization: The Importance of Public Health Expenditure. *Annals of Public and Cooperative Economics* 94(1),191–219.
- Mohanty R., K. and Behera D.,K. (2020). How Effective is Public Health Expenditure in Improving Health Outcomes? An Empirical Investigation from Indian States. National Institute of Public Finance and Policy New Delhi Working Paper No.300.
- Nafziger, W.E. (2006). *Economics Development* 4th Edition. Cambridge University Press.

- Nathaniel, S., and Khan, S. (2020). Public Health Financing, Environmental Quality, and the Quality of Life in Nigeria. *Journal of Public Affairs* 20(3):1-9. <http://dx.doi.org/10.1002/pa.2103>
- National Health Systems Resource Centre (NHSRC). (2018). Health Care Financing <https://nhsrindia.org/>
- Newhouse, J. P. (1977). Medical-care expenditure: A cross-national survey. *The Journal of Human Resources*, 12(1), 115-125. <http://dx.doi.org/10.2307/145602>
- Onofrei, M., Vatamanu, A., Vintilă, G., and Cigu, E. (2021) Government Health Expenditure and Public Health Outcomes: A Comparative Study among EU Developing Countries. *International Journal of Environmental Research and Public Health* 18(20):1-13. <http://dx.doi.org/10.3390/ijerph182010725>
- Owumi, B. E., and Eboh, A. (2022). An Assessment of the Contribution of Healthcare Expenditure to Life Expectancy at Birth in Nigeria. *Journal of Public Health* 30(9):2113– 21. <https://link.springer.com/article/10.1007/s10389-021-01546-6>
- Pesaran, M. H., and Smith, R. 1995. Estimating Long-Run Relationships from Dynamic Heterogeneous Panels. *Journal of Econometrics* 68(1):79–113. [https://doi.org/10.1016/0304-4076\(94\)01644-F](https://doi.org/10.1016/0304-4076(94)01644-F)
- Phelan, J., C., Link, B., G., and Tehranifar. P. (2010). Social Conditions as Fundamental Causes of Health Inequalities: Theory, Evidence, and Policy Implications. *Journal of Health and Social Behavior* 51(1):28–40. <https://doi.org/10.1177/0022146510383498>
- Radmehr, M., and Adebayo, T. S. (2022). Does Health Expenditure Matter for Life Expectancy in Mediterranean Countries? *Environmental Science and Pollution Research* 29(40):60314– 26. <http://dx.doi.org/10.1007/s11356-022-19992-4>
- Salami, A. and Tijjani, M. (2021). Healthcare Expenditure and Life Expectancy in Africa: A Panel Study. *South Asian Journal of Social Studies and Economics* 9(4): 1–9. <https://doi.org/10.9734/sajsse/2021/v9i430246>
- Sadeghpour, K., S., Elnaz G., Saeed R., Majid M., F. (2022). Health Financing and Human Development Index (HDI) in Iran. *The Iranian Journal of Health Insurance* 4 (4):1-8.
- Todaro, M., P., and Smith, S., C. (2015) *Economic Development* 12th Edition. Pearson
- Ullah, I., Ullah, A., Ali, S., Poulouva, P., Akbar, A., Haroon Shah, M., Rehman, A., Zeeshan, M., and Afridi, F., E., A. (2021) Public Health Expenditures and Health Outcomes in Pakistan: Evidence from Quantile Autoregressive Distributed Lag Model.” *Risk Management and Healthcare Policy* Volume 14(1):3893–3909. <http://dx.doi.org/10.2147/RMHP.S316844>
- United Nations Development Programme (UNDP). (2023). <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>
- Westerlund, J. (2006). Reducing the size distortions of the panel LM Test for cointegration. *Economics Letters*, 90(3), 384-389. <https://doi.org/10.1016/j.econlet.2005.09.002>
- World Bank Development Indicator (WDI) (2023). <https://databank.worldbank.org/source/world-development-indicators>

- World Health Organization. (2023a). *World Health Statistics 2023 – Monitoring Health for the SDGs*. World Health Organization.
- World Health Organization (WHO). (2023b.). Health financing <https://www.who.int/health-topics/health-financing>.
- World Health Organization (2023). Global Health Expenditure Database
- World Health Organization. (2020a). *Global Spending on Health: Weathering the Storm*. World Health Organization.
- World Health Organization (2020b). Life expectancy and Healthy life expectancy, data by country.
- World Health Organization. 2015a. *Health in 2015: From MDGs, Millennium Development Goals to SDGs, Sustainable Development Goals*. Geneva: World Health Organization.
- World Health Organization. 2010. *Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and Their Measurement Strategies*. Geneva: World Health Organization.
- World Health Organization. 2007. *Everybody's Business -- Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action*. Geneva: World Health Organization.