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Public Health Financing, Quality of Life and Economic Growth in Sub-Saharan Africa Countries: Evidence from VAR-Based Panel Granger Causality Approach

By

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Abstract

Lots of diverse range of socioeconomic conditions, health disparities, and varying degrees of non-access to healthcare services bedevilled sub-Saharan African countries' economies. On this note, the study investigates the causal relationship among public health financing, quality of life, and economic growth in SSA countries. The study utilizes panel data spanning from 2000 to 2023, sourced from the World Bank Development Indicators. VAR-based panel Granger causality approach was employed as estimation technique. The results of co-integration confirm the existence of a long-term relationship among the variables employed. Further results from panel VAR Granger causality using stacked (common coefficient) and Dumitrescu-Hurlin (individual coefficient) indicates that the null hypothesis that GDP does not Granger cause quality of life is rejected only in the Dumitrescu-Hurlin test (3.410), indicating that economic growth improves quality of life in the long run for individual countries, as well as quality of life Granger causes GDP, meaning that in the reverse side quality of life improvement have a significant positive impact on economic growth, both in the short and long runs. Unidirectional relationship exits from GDP to public health expenditure at Dumitrescu-Hurlin test (5.348). This implies that economic growth leads to higher public health spending in the long run. While no feedback from public health expenditure to GDP. That is, PuH does not Granger caused GDP, indicating that increased in public health expenditure do not directly cause short-term or long-term changes in GDP. Based on these findings, the study recommends that successive governments in the region should allocate more resources to public health so as to increase revenue and societal demands for better healthcare and economic expansion. Long-term improvements in health infrastructure, including enhanced access to healthcare services, preventive health programs, and disease management strategies, should be emphasized to improve labour productivity over time.

Keywords: *Public health financing, Quality of life, Economic growth, SSA, VAR-Based Panel Granger Causality*

(I) INTRODUCTION

Sub-Saharan Africa, a region consisting of 48 countries, had faces numerous challenges related to diverse range of socioeconomic conditions, health disparities, and varying degrees of non-access to healthcare services (McMaughan, *et al*., 2020). Therefore, understanding the intricate relationship among public health financing, quality of life, and economic growth in sub-Saharan Africa is essential for devising effective policies and interventions to improve the well-being of its population through quality of life sustainability.

Under this perspective, the quality of life in sub-Saharan Africa can be influenced by a range of factors including healthcare access, education, income inequality, poverty, food security, sanitation, infrastructure, gender inequality, political stability, and cultural influences (World Bank, 2020). Evidently, the region faces challenges such as high disease burdens, limited access to quality education, income inequality, and food insecurity. However, issues like inadequate infrastructure, political instability, and gender disparities have historically posed challenges to quality of life in the region. It can be said that the link between economic growth and quality of life is intricate and multifaceted. While

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economic growth is characterized by increased income, improved healthcare access, better education, reduced poverty, enhanced infrastructure, and more, can significantly enhance overall quality of life. It can lead to higher standards of living, improved health outcomes, better educational opportunities, access to basic services, and greater cultural and social enrichment.

In a related development, the relationship between public health and economic growth is said to be mutually reinforcing and thus bidirectional (Jamison *et al*., 2013). Public health measures, such as disease prevention and healthcare access, can promote economic growth by creating a healthier, more productive workforce and reducing healthcare costs. Conversely, economic growth can improve public health by providing resources for healthcare infrastructure, increasing access to healthcare, and reducing poverty and health inequities (Bloom *et al*., 2004). However, making comprehensive policies that can strengthen the interdependence of health and economic factors which can result in the overall well-being of a society is considered to be in the interest of the government of any economy (Jamison *et al*., 2013). Adequate public health financing is essential for improving healthcare access and quality of life. A better quality of life, in turn, can contribute to economic growth by creating a healthier and more productive workforce. Economic growth can increase government revenue, allowing for greater public health financing. Effective governance and policies play a crucial role in optimizing this interplay. Ultimately, these elements can be interdependent and work together to enhance the well-being and prosperity of a society.

Moreover, the motivation for conducting this study on the relationship among public health finance, quality of life, and economic growth in Sub-Saharan African (SSA) countries stems from the urgent need to address persistent healthcare challenges and foster sustainable development in the region. Previous research has highlighted the significant impact of health expenditure on health outcomes and economic growth (Arthur & Oaikhenan, 2017; Aboubacar & Xu, 2017). However, the complex interplay between public health finance, quality of life, and economic growth in SSA countries remains understudied, despite the region facing various healthcare disparities and resource constraints.

Given the above, this study raised research question in related to the problem identified as given thus; what is causal relationship among public health financing, quality of life and economic growth in SSA countries? And thereafter, follow the objective of investigating the causal relationship among public health financing, quality of life and economic growth in the SSA countries. Hence, the justification of the study is based on the need for addressing healthcare challenges and promoting the well-being of population as well as fostering economic growth in the region which seems not to be addressed by researchers till date. The study utilised panel data of selected twenty (20) countries spanning from 2000 to 2023, and sourced from World Bank, World development indicator. These countries represent all regions based on data availability. The countries selected are Nigeria, Mali, Ghana, Senegal, Ivory Coast, Tanzania, Uganda, Rwanda, Kenya, Ethiopia, South Africa, Botswana, Namibia, Zambia, Zimbabwe, Angola, Cameron, Chad, Gabon and Congo.

(II) LITERATURE REVIEW AND THEORETICAL UNDERPINNING

Conceptual Literature of Public Health Financing, Quality of Life and Economic Growth

Public Health Financing is a multifaceted concept that encompasses the mobilization, allocation, and strategic utilization of resources to support public health initiatives aimed at safeguarding and enhancing the health of a population (Karamagi *et al*., 2023). At its core, this process involves the collection of funds through various mechanisms, their distribution, and the judicious deployment of these resources to implement programs and interventions that address public health priorities. One of the primary sources of funding for public health initiatives is taxation, where governments collect revenue through income taxes, value-added taxes (VAT), and levies on specific goods like tobacco (Wright *et al*., 2017). Additionally, external aid from international organizations, donor agencies, and non-governmental organizations (NGOs) often supplements domestic funding, providing crucial support for health programs, especially in resource-constrained settings. Once resources are generated, the allocation process becomes pivotal. Governments engage in budgeting exercises to prioritize public health activities, determining funding levels for different programs and ensuring the efficient use of resources. Grants and subsidies are also commonly employed to provide financial support to public health organizations, healthcare facilities, and communities (Wright *et al*., 2017). Further, Expenditure on health services constitutes a significant portion of public health financing. This includes investments in primary healthcare services, disease control programs, and initiatives addressing specific health challenges. Infrastructure development, such as the construction and maintenance of healthcare facilities, and investments in the health workforce, including training and recruitment, are integral components of resource allocation.

Secondly, the concept is the quality of life (QoL) which refers to a multidimensional and subjective measure that encompasses various factors reflecting an individual's overall well-being and satisfaction with different aspects of life (Post, M. 2014). It extends beyond mere economic indicators and includes social, environmental, and psychological dimensions. Quality of Life is a central consideration in discussions about public policy, healthcare, and social development, as it provides a holistic perspective on the welfare of individuals and communities (Arhin *et al.* 2023). One key aspect of quality of life is subjective well-being, which involves an individual's assessment of their life satisfaction and happiness. This subjective element recognizes that individuals are the best judges of their well-being, and their experiences and

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perceptions play a crucial role in evaluating the quality of their lives. Quality of life is often measured through a combination of objective and subjective indicators. Objective indicators may include economic factors like income and employment, health status, education, and environmental conditions. Subjective indicators involve self-reported measures of life satisfaction, happiness, and perceptions of one's overall life circumstances. In the healthcare context, quality of Life assessments are frequently used to evaluate the impact of diseases, disabilities, or medical interventions on an individual's well-being (Haraldstad *et al*., 2019). Further, the concept of quality of life has gained prominence in public policy discussions, with governments and organizations incorporating QoL indicators into their decision-making processes (Cárcaba *et al*., 2019). Policies that aim to enhance education, healthcare, social services, and environmental sustainability often have the goal of improving the overall quality of life for citizens.

The third concept of the study is on economic growth that constitutes the sustained expansion of a nation's capacity to produce goods and services over time, reflecting an increase in the overall output of the economy. This phenomenon is regarded as a cornerstone of economic development and is intrinsically linked to improvements in living standards, poverty reduction, and overall societal well-being. Recent research by Acemoglu, Akcigit, & Kerr (2019) underscores the significance of innovation, reallocation, and entrepreneurship in driving economic growth, highlighting the role of dynamic factors in shaping long-term prosperity. Key components contributing to economic growth include labour productivity, capital accumulation, and technological progress. Labour productivity, reflects the efficiency with which labour inputs are utilized in production processes, while capital accumulation involves the accumulation of physical and human capital, fostering the economy's capacity to generate output (Jones, 2016). Technological progress, as elucidated by Aghion & Howitt (2017), emerges as a critical driver of economic growth, facilitating advancements in productivity and innovation across various sectors. Measurement of economic growth typically relies on indicators such as Gross Domestic Product (GDP) and Gross National Income (GNI) per capita, providing insights into the total value of goods and services produced within an economy and average income levels, respectively (World Bank, 2021). These metrics serve as essential tools for policymakers and economists in assessing the performance and trajectory of economies over time. Sustainable economic growth necessitates careful policy management to address accompanying challenges and ensure inclusive and equitable development.

Theoretical Underpinning

The study used three theories for the study which includes the Beveridge Model theory of public health financing, health capital theory put forward by Grossman (1972) and Solow growth model of economic growth, developed by Solow (1956). The theories are discussed thus;

The Beveridge Model developed in 1948, named after the architect of the British welfare state, Sir William Beveridge, is a theory of public health financing that revolves around the concept of a nationalized and tax-funded healthcare system. This model is characterized by government ownership of healthcare facilities and the direct provision of health services to the entire population. The model is based on several assumptions which include (i) the government assumes the primary responsibility for funding and providing healthcare services to the entire population. (ii) the model assumes that every citizen has the right to equal and universal access to healthcare services without financial barriers. Likewise, the primary assumption is that healthcare services will be financed through general taxation, ensuring a collective contribution from the population. (iii) the model also assumes that the government will offer comprehensive healthcare coverage, including preventive, curative, and rehabilitative services.

One of the core tenets is the principle of equal access to healthcare services for all citizens, promoting social equity. The model advocates for government ownership and control of healthcare facilities to ensure a unified and coordinated approach to service delivery. There is an emphasis on preventive healthcare measures to improve overall population health and reduce the burden on the healthcare system. The financing mechanism relies on general taxation to fund healthcare services, and to distribute the financial burden across the entire population.

Although the Beveridge model has its usefulness, however, critics argued that the model may face challenges in terms of resource allocation and efficiency, leading to potential shortages and waiting times for certain services. It also argued that the centralized nature of the model may lead to bureaucratic inefficiencies, potentially hindering innovation and responsiveness to local healthcare needs. Also, the model may limit individual choice in healthcare providers, as the government often owns and operates the majority of healthcare facilities. Some critics argue that heavy reliance on taxation may burden the economy and limit individuals' financial autonomy.

The Beveridge Model is highly relevant to public health financing, quality of life, and economic growth. Its emphasis on tax-funded financing ensures a stable and consistent source of funding for healthcare, reducing the financial burden on individuals and promoting equitable access to services. This approach contributes to financial sustainability, offering a comprehensive and inclusive approach to public health financing.

In terms of quality of life, the Beveridge Model's focus on preventive measures positively impacts overall well-being. By providing universal access to healthcare services, it addresses health issues proactively, particularly by reducing the incidence of preventable illnesses. This aligns with the model's commitment to improving the quality of life for the population. Regarding economic growth, the model's

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relevance lies in ensuring universal access to healthcare, which is crucial for maintaining a healthy and productive workforce as well as promoting equal access to healthcare services. Above all, the Beveridge Model supports economic growth by contributing to a robust and resilient population. The emphasis on wellness and prevention further aligns with enhancing economic productivity by reducing absenteeism and improving overall workforce health.

While the second theory is health capital theory proposed by Grossman (1972). It is a foundational framework for understanding how individuals make decisions about their health. This theory extends the principles of human capital theory specifically to the realm of health. Thus, the theory is built upon several key assumptions. It assumes that individuals are rational decision-makers who seek to maximize their utility, considering both short-term and long-term implications of health-related decisions. Health is conceptualized as a form of human capital, and individuals actively invest time and resources to increase their health capital. The theory introduces a production function for health, incorporating elements such as time, goods and services, and genetics. It assumes that individuals have access to information and knowledge about their health, and health capital is viewed as dynamic, and subject to change over time. The theory acknowledges individual heterogeneity in health-related decisions and outcomes and considers various factors, including personal characteristics, socio-economic factors, and environmental conditions, as determinants of health outcomes.

The health capital theory is characterized by several key tenets. It conceptualizes health as a form of human capital, emphasizing that individuals actively invest in their health to increase their overall stock of human capital. These investments take the form of various health-related activities, and health is produced through a production function that involves inputs such as time, goods and services, and genetics. The theory considers a lifecycle perspective, recognizing that health-related decisions and outcomes evolve over an individual's lifetime. Health capital is dynamic and subject to change, reflecting on-going processes of health production and investment. The theory also acknowledges that various factors, including personal characteristics and socio-economic factors, influence health outcomes. Individual heterogeneity is recognized, with an understanding that people differ in their health endowments and responses to health investments.

The Grossman Health Capital Theory, while influential, faces several criticisms. Critics argued that its assumptions, such as rational decision-making, oversimplify the complexities of health-related choices, neglecting psychological and social factors. The theory may not adequately consider broader social determinants of health, discounting externalities and downplaying the impact of socioeconomic and environmental factors. The static nature of health capital and the equation of health with medical care consumption are also criticized, as they may oversimplify the dynamic and multifaceted nature of health. Additionally, the theory's treatment of time and discounting, along with the difficulty in measuring health capital, pose challenges. It may not comprehensively explain health inequalities and might overemphasize individual agency, potentially neglecting societal influences. Lastly, some argue that the theory's overreliance on an economic framework might not capture the holistic nature of health and well-being, disregarding non-economic motivations.

The Grossman health capital theory is relevant to this study towards impactful contributions of public health financing and quality of life on economic growth. Public health financing, according to the theory, acts as a societal investment in health capital. Adequate funding supports preventive measures, healthcare infrastructure, and interventions that contribute to improved population health. This, in turn, enhances overall well-being, aligning with the economic principle of investing in human capital for long-term productivity. The theory underscores that a healthier population, facilitated by public health financing, positively impacts workforce productivity, crucial for economic growth. Additionally, public health measures address externalities related to health, contributing to societal well-being and stability. In summary, the theory supports the idea that public health financing is integral to fostering a healthier, more productive society, ultimately influencing both quality of life and economic growth positively.

The Solow growth model, developed by Solow (1956), is a cornerstone of economic growth theory. It posits that long-term economic growth is primarily driven by capital accumulation, labour force growth, and technological progress. The model assumes constant returns to scale and diminishing returns to individual inputs, with technological progress being the key factor for sustained growth. One of its core tenets is the concept of steady-state equilibrium, where an economy grows at a constant rate when the effects of capital and labour inputs balance out (Mankiw, 1992; Barro & Sala-i-Martin, 2004).

Critics of the Solow Growth Model argue that it overly simplifies the complexities of economic growth by focusing mainly on physical capital and technology, while neglecting other significant factors such as human capital, institutional quality, and public health. Furthermore, the assumption of exogenous technological progress is seen as unrealistic, as it does not explain the origins and drivers of innovation within the economy.

Despite these criticisms, the Solow Growth Model remains relevant for understanding the relationship between public health financing, quality of life, and economic growth. Public health financing can be viewed as an investment in human capital, improving the health and productivity of the labour force. Enhanced public health leads to a higher quality of life, which can result in greater economic output and growth. In the context of the Solow Model, this improvement in human capital can shift the steady-state equilibrium to a higher level, reflecting sustained economic growth. Therefore, while the Solow Growth Model has limitations, its framework can still provide valuable insights into how investments in public health and quality of life contribute to economic growth.

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Empirical Evidences

In a comparative study between the Central African states (CEMAC) and selected African countries, Piabuo & Tieguhong (2017) examined the relationship between health expenditure and economic growth from 1995 to 2015. The study used data on health expenditure per capita, household consumption per capita, life expectancy, labour force, and trade openness. As tools of data analysis, the study employed the panel Granger causality test, panel co-integration test, and panel regression models (POLS, FMOLS, DOLS). The result of the study revealed that health expenditure and labour force have a positive and significant effect on economic growth in both regions. However, trade positively impacts growth in the CEMAC region while the contrary is the case in the selected African region. In both regions, an increase in the life expectancy at birth significantly reduced economic growth. Moreover, the result showed that there is a bidirectional causal relationship between health expenditure and economic growth for both regions.

Aboubacar and Xu (2017) conducted a study involving a panel of 36 countries to explore the relationship between healthcare expenditure and economic growth in Sub-Saharan Africa. The study utilized data spanning from 1995 to 2014, including variables such as health expenditure per capita (PPP), GDP per capita growth rate, net official development assistance, foreign direct investment, gross domestic savings, and labour force. Both dynamic and static panel regression models were employed for analysis. The results revealed a significant positive association between health expenditure and economic growth. Additionally, while the impact of official development assistance on economic growth was deemed insignificant, foreign direct investment, population, and gross domestic savings were found to exert positive effects on economic growth within the region.

In Nigeria, Ogunjimi and Adebayo (2019) examined the causal relationship between health expenditure, health outcomes and economic growth spanning 1981 from 2017. Variables on life expectancy, infant mortality rate, maternal mortality rate, health expenditure, and real GDP were employed to perform the TYDL Granger causality test. The result of the analysis revealed a unidirectional causality running from health expenditure to infant mortality while there is no causality between real GDP and infant mortality. Also, there is a unidirectional causal relationship running from health expenditure and real GDP to life expectancy and maternal mortality and a unidirectional causal relationship running from real GDP to health expenditure respectively.

Zaidi and Saidi (2018) investigated the relationship between health expenditure, environmental pollution, and economic growth in countries across Sub-Saharan Africa. The study utilized data spanning from 1990 to 2015, incorporating variables such as GDP per capita, CO2 emissions, nitrous oxide emissions, and health expenditure. Analytical tools employed included a panel Auto-regressive Distributed Lag (ARDL) model and panel Vector Error Correction Model (VECM)-based Granger causality test. The findings indicated that economic growth positively influenced health expenditure, while environmental pollution variables negatively impacted health expenditure in the long run. Furthermore, the causality analysis revealed that health expenditure Granger caused GDP per capita, whereas a bidirectional causality existed between CO2 emissions and GDP per capita, as well as between health expenditure and CO2 emissions, respectively.

Dhrifi (2019) analysed the impact of healthcare expenditures on child mortality rates using data from 93 developed and developing countries from 1995 to 2012. The key variables in the study are child mortality rate, per capita GDP, health expenditure, poverty rate, access to clean water, life expectancy at birth, female literacy, urbanization, and CO2 emissions. The study adopted the simultaneous-equation model and the findings show that health expenditure has a positive effect on reducing child mortality only for upper-middle-income and high-income countries, whereas for low-income and lower-middle-income countries, health spending does not have a significant impact on child health status. It is also found that at lower development levels, public health spending has a greater effect on mortality rates than private expenditure, while at high development levels, private health expenditure has a positive impact on child mortality.

Raghupathi and Raghupathi (2020) examined the relationship between healthcare expenditure and economic performance in the US from 2003 to 2014. The study used data on multifactor productivity, labour productivity index, per capita GDP, per capita personal income, average weekly hours worked, average hours spent purchasing goods and services, and the healthcare expenditure indicators on hospitals, home health agencies, prescription drugs, nursing facilities, and personal healthcare respectively. The study employed visual analytics and a regression model and their study revealed that healthcare expenditure positively impacts the economic indicators of income, GDP, and labour productivity but negatively impacts multi-factor productivity.

Ayadi and Lawanson (2020) explored the consequences of the evolving patterns of healthcare financing on health outcomes in Sub-Saharan Africa. The research utilized data on life expectancy, infant mortality, and under-5 mortality as health indicators, while healthcare financing from various sources including public expenditures, private (out-of-pocket) expenditures, insurance, and external funding (donor) sources served as dependent variables. The study focused on panels consisting of 30 countries from the years 1995 to 2014. Employing the dynamic panel regression model, the findings unveiled that health insurance was associated with an increase in life expectancy and a decrease in under-five mortality. Results also indicate that, government expenditure on health was found to enhance life expectancy, particularly when interacting with an institutional variable. Moreover, an uptick in the share of external funding was linked to an increase in life expectancy and a reduction in both infant and under-five mortality rates. However, out-of-pocket expenditure exhibited no significant effect on any of the dependent variables.

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Odhiambo (2021) investigated the causal relationship between health expenditure and economic growth across sub-Saharan African nations. Utilizing data encompassing real per capita GDP, public health expenditure, private health expenditure, and life expectancy at birth from 2008 to 2017, the study employed the panel Error Correction Model (ECM)-based Granger-causality test as its analytical approach. The findings indicated a one-way causal relationship between health expenditure to economic growth in low-income countries, while no causal link was observed in middle-income nations. However, when considering private health expenditure, a short-term causal relationship from economic growth to health expenditure was evident in middle-income countries, contrasting with the absence of such causality in low-income countries.

In Nigeria, Osakede (2021) analyzed the relationship between public health spending and health outcomes from 1980 to 2017. Data on public spending on health outcomes, quality of governance, and three measures of health outcomes which are life expectancy at birth, infant mortality rate per 1,000 live births, and maternal mortality rates per 100,000 live births. The study employed the two-stage least square regression model and the result revealed that public health spending had no significant effect on health outcomes except when interacted with governance quality. The interaction of government health spending with governance effectiveness as well as that for control of corruption improved health by inducing a fall in maternal deaths, whereas government health expenditure interacted with the rule of law and raised maternal mortality. Public health spending interacted with regulatory quality and improved life expectancy while for political stability with public health spending induced a fall in life expectancy, and poor maternal and infant health. Political stability and the control of corruption had a direct influence on maternal health.

Using a panel of 41 SSA countries, Akinbode *et al*. (2021) investigated the effect of health outcomes on economic growth from 2000 to 2018. The study used data on GDP per capita, life expectancy, gross secondary school enrolment, gross fixed capital formation, health expenditure, labour force, trade openness, foreign direct investment, and corruption perceptions index. The static (POLS and FE) and the dynamic panel regression models were employed as the econometric tools of analysis. The analysis revealed that life expectancy at birth, trade openness, and foreign direct investments have a significant positive impact on economic growth. It is also revealed that an increase in the labour force resulted in to decline in economic growth. However, the impact of health expenditure on economic growth is mixed, positive in the dynamic model but negative in the static model.

Gaies (2022) examined the impact of health expenditure on income growth in a panel of 60 OECD countries from 2000 to 2017. The study used variables on real per capita GDP, health expenditure indicators, gross capital formation per GDP, population growth, primary and secondary school enrollment, trade, and inflation rate. The study perused dynamic linear and threshold panel data models as tools of analysis and the results revealed that while public and private domestic health expenditures increase income growth, external inflows of health expenditure do not. In addition, with their interactions with the health expenditures indicators, the result showed that human and physical capital indicators positively drive economic growth in the sample countries thus indicating complementarity rather than substitutability between investments in health, physical and human capital.

Arhin *et al.* (2023) investigated the impacts of healthcare financing policy instruments on the efficiency of health systems across Sub-Saharan African (SSA) nations. Utilizing data spanning from 2000 to 2019 from 46 selected SSA countries, the study employed two-stage and one-stage stochastic frontier analysis (SFA), along with Tobit regression techniques, to evaluate the influence of healthcare financing policy variables on health system efficiency. The findings indicated that healthcare financing arrangements involving prepayment, social health insurance, as well as mixed- and externally-funded healthcare systems, were associated with significant enhancements in health system efficiency.

(III) Methodology

Model Specifications

The study follows and adopted Gaies (2022) theory of public health financing and quality of life towards fostering economic growth. However, the theoretical framework for the study is anchored on endogenous growth theory developed by Kenneth Arrow (1962), Hirofumi Uzawa (1965), Miguel Sidrauski (1967) and later by Paul Romer (1986), Robert Lucas (1988), Sergio Rebelo (1991) and Ortigueira and Santos (1997). The endogenous growth theory, in contrast to exogenous growth theory, posits that economic growth is driven by factors that are determined within the economic system itself, including investments in human capital, innovation, and technological progress. The modification of model as given in the equation specified thus:

$$Y = f(HE, K, Pop, School, Trade, Inf) \qquad (1)$$

Where Y is real per capita GDP, HE represents the public health expenditure, K is the capital, Pop is the population, School is the primary school enrolment rate, Trade is the openness to capture globalization, and Inf is the inflation rate respectively. However, the model for this study is specified as:

$$GDP = f(PuH, QoL, PuE, K, ErT) \qquad (2)$$

$$\ln GDP_{it} = \beta_0 + \beta_1 PuH_{it} + \beta_2 QoL_{it} + \beta_3 PuH_{it} + \beta_4 \ln K_{it} + \beta_5 ErT_{it} \qquad (3)$$

Where GDP is the real GDP to proxy economic growth, PuH is the public health expenditure, QoL is the Quality of Life, PuE is the public education expenditure, K is the capital, and ErT tertiary education enrolment rate. In equation (3), public health expenditure (PuH) is a crucial component of the equation, highlighting the causal relationship among public health financing, quality of life, and economic growth. The VAR-Based Granger causality equation 4 - 6 is given thus;

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$$PuH_t = \gamma_{11} + \sum_{i=1}^{k} \beta_{11,i}\, PuH_{t-i} + \sum_{i=1}^{k} \beta_{12,i}\, QoL_{t-i} + \sum_{i=1}^{k} \beta_{13,i}\, GDP_{t-i} + \varepsilon_{1t} \quad (4)$$

$$QoL_t = \gamma_{21} + \sum_{i=1}^{k} \beta_{21,i}\, PuH_{t-i} + \sum_{i=1}^{k} \beta_{22,i}\, QoL_{t-i} + \sum_{i=1}^{k} \beta_{23,i}\, GDP_{t-i} + \varepsilon_{2t} \quad (5)$$

$$GDP_t = \gamma_{31} + \sum_{i=1}^{k} \beta_{31,i}\, PuH_{t-i} + \sum_{i=1}^{k} \beta_{32,i}\, QoL_{t-i} + \sum_{i=1}^{k} \beta_{33,i}\, GDP_{t-i} + \varepsilon_{3t} \quad (6)$$

The study employed the block exogeneity test in the panel VAR model. Equation (4) - (6) depicts the generalised panel VAR representation of the system of public health financing (PuH), quality of life (QoL), and changes in real GDP as a proxy for economic growth. After testing for the optimal lag (k), the model in Equation (4) - (6) is estimated and the block exogeneity Wald test will be used to test for the significance of the lags of the selected variable (cause variable) in the equation of the variable of interest (response variable). An insignificant test implies not granger causality but otherwise.

Estimation Techniques

Panel Unit Root Test

Panel unit root tests are pivotal tools in econometric analysis, especially when dealing with time series data from multiple cross-sectional units. These tests serve the fundamental purpose of determining whether the variables under consideration exhibit unit root properties, indicating non-stationarity. Widely employed panel unit root test is the Levin, Lin, and Chu (LLC) test. Notably, the LLC test adjusts for cross-sectional dependence, acknowledging the potential interdependencies across units. Another prominent approach is the Im, Pesaran, and Shin (IPS) test, which considers both individual unit root hypotheses and a common unit root hypothesis. This method is particularly robust in handling cross-sectional dependence and allows for the heterogeneity of unit root characteristics.

Interpreting the results of panel unit root tests is crucial for drawing meaningful conclusions. If the null hypothesis of a unit root is rejected, it indicates that the variable is stationary across the cross-sectional units. On the other hand, failure to reject the null hypothesis suggests that the variable is non-stationary.

Co-integration Test

Panel co-integration tests serve as crucial tools in the realm of econometrics, especially when dealing with time series data across multiple cross-sectional units. The primary objective of these tests is to ascertain whether a stable long-term relationship exists among the variables under consideration across all units. This concept of co-integration is fundamental in understanding how economic variables move together over time, providing a nuanced perspective beyond short-term fluctuations. The widely utilized method is Pedroni's Panel Co-integration Test. Developed by Adrian Pedroni, this test extends traditional cointegration tests to the panel data context. It includes both individual unit-specific cointegration tests and group cointegration tests, offering a comprehensive assessment. The Pedroni test involves estimating the following equation:

$$\Delta y_{it} = \alpha_i + \beta_i t + \sum_{j=1}^{k} \delta_{ij}\, y_{j,t-1} + \sum_{j=1}^{k} \gamma_{ij}\, \Delta y_{j,t-1} + \varepsilon_{it} \#(3.7)$$

In Equation (7), Δy_{it} is the first difference of the dependent variable for individual i at time t, t is the time trend, $y_{j,t-1}$ is the lagged level of the dependent variable for individual j at time $t-1$, $\Delta y_{j,t-1}$ is the lagged first-difference of the dependent variable for individual j at time $t-1$, and ε_{it} is the error term. The null hypothesis posits the absence of cointegration, and rejection implies the presence of a stable long-term relationship among the variables.

Panel VAR-Based Granger Causality Test

The concept of Panel Granger causality test extends the traditional Granger causality analysis to panel data scenarios, where observations span multiple entities (cross-sections) and time periods (panels) (Dumitrescu & Hurlin, 2012). This test is fundamental for examining causal relationships between variables within a panel dataset while considering potential interdependencies and heterogeneity across entities using Dumitrescu-Hurlin (DH) Panel Granger causality test. Unlike standard Granger causality tests, the DH test addresses issues of cross-sectional dependence and heterogeneity inherent in panel data by estimating panel vector autoregression (PVAR) models and conducting a Wald-type test to assess Granger causality between variables while controlling for such dependencies.

The DH Panel Granger causality test follows several key steps. Initially, a PVAR model is estimated to capture the dynamic relationships between the variables of interest across entities and time periods. Subsequently, the estimation of the residual's covariance matrix is crucial to account for cross-sectional dependence among entities. The DH test statistic is then computed based on the estimated PVAR model coefficients and the residuals covariance matrix. Critical values for the DH test statistic are determined through simulations or asymptotic distributions, facilitating hypothesis testing to ascertain the significance of Granger causality between variables.

Advantages of Panel Granger causality tests include the ability to account for cross-sectional dependence, handle heterogeneity across entities, and efficiently utilize data from multiple sources. By considering such complexities inherent in panel data. However, this test enhances the robustness and reliability of causal inference compared to traditional time series or cross-sectional analyses alone.

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Cross Sectional Dependence Test

In panel data analysis, testing for cross-sectional dependence is crucial, especially when the data covers multiple countries over time. Given the likelihood of regional spill overs, policy diffusion, and shared external shocks, it is important to assess whether the cross-sectional units (countries) are interdependent. To this end, the Pesaran (2004) CD test was employed to detect the presence of cross-sectional dependence among the variables. The CD test evaluates whether the residuals across panel units are correlated. A significant test statistic indicates that the assumption of cross-sectional independence is violated; implying that shocks affecting one country may also influence others in the panel.

Source of Data

The study utilised panel data of selected twenty (20) countries spanning from 2000 to 2023 on quarterly basis, and sourced from the World Bank Development Indicators 2023 edition. The countries in question represent all regions based on data availability. The countries selected are Nigeria, Mali, Ghana, Senegal, Ivory Coast, Tanzania, Uganda, Rwanda, Kenya, Ethiopia, South Africa, Botswana, Namibia, Zambia, Zimbabwe, Angola, Cameron, Chad, Gabon and Congo.

(IV) RESULTS AND DISCUSSIONS

4.1. Descriptive Statistics

Table 4.1: Descriptive Statistics for variables in SSA countries

Variable	Mean	Max	Min	Std. Dev.	Skew	Kurt	J-B	Prob
GDP ($ Billion)	135.4	1100	6.900	215.7	2.717	9.660	1416	0.000
PuH	7.183	20.83	0.734	3.401	0.920	3.634	72.61	0.000
PuE	16.82	30.63	5.255	5.157	-0.013	2.546	3.967	0.138
QoL	58.55	82.33	27.22	12.62	-0.423	2.272	23.87	0.000
K ($ Billion)	11.65	150	0.120	19.07	3.222	15.54	3809	0.000
ErT	8.227	28.37	0.696	5.638	1.267	4.215	1.414	0.000

Source: Author's computation 2024

Table 4.1 indicates that Real GDP has the highest mean value of $135.4 billion among the variables, while tertiary enrolment rate has the lowest mean value of 8.23%. However, the high standard deviation of 215.7 suggests significant variation in GDP across SSA countries. This is further highlighted by the maximum GDP of $1,100 billion and a minimum of $6.9 billion, demonstrating vast economic disparities within the region. The skewness value of 2.717 indicates that the distribution of GDP is positively skewed, meaning that a few countries have exceptionally high GDP values, pulling the distribution rightward. The kurtosis value of 9.660 suggests a leptokurtic distribution with heavy tails, indicating extreme values. The Jarque-Bera (J-B) statistic of 1,416, with a probability of 0.000, confirms that GDP is not normally distributed. Public health expenditure, expressed as a percentage of total government spending, has a mean value of 7.183% and a standard deviation of 3.401. The range of expenditure, from a minimum of 0.734% to a maximum of 20.83%, suggests significant differences in how SSA governments prioritize health. The skewness of 0.920 shows a moderate positive skew, meaning that while most countries allocate close to the average, some allocate much higher proportions. With a kurtosis value of 3.634, the distribution is slightly peaked compared to a normal distribution. The Jarque-Bera statistic of 72.61 (p-value = 0.000) indicates that the variable is not normally distributed.

Public education expenditure has a mean of 16.82% and a standard deviation of 5.157, with a maximum of 30.63% and a minimum of 5.255%. These statistics highlight disparities in educational investment across SSA countries, with some allocating nearly one-third of their budgets to education while others allocate far less. The skewness of -0.013 suggests that the distribution is nearly symmetrical, while the kurtosis value of 2.546 is close to normal. The Jarque-Bera test statistic of 3.967 (p-value = 0.138) suggests that public education expenditure is approximately normally distributed. The quality-of-life index, which averages 58.55 with a standard deviation of 12.62, ranges from a low of 27.22 to a high of 82.33, reflecting significant variation in living standards across SSA. The negative skewness of -0.423 indicates a slight leftward tail, meaning more countries are clustered towards higher quality-of-life values. The kurtosis value of 2.272 suggests a slightly flatter-than-normal distribution. The Jarque-Bera test statistic of 23.87 (p-value = 0.000) confirms that the quality-of-life variable is not normally distributed.

Gross capital formation, an indicator of investment in physical assets, has a mean value of $11.65 billion and a high standard deviation of $19.07 billion. The maximum value of $150 billion is substantially higher than the mean, showing that a few countries make significantly larger investments while others contribute far less, as evidenced by the minimum value of $0.120 billion. The skewness value of 3.222 indicates strong positive skewness, meaning a few countries exhibit exceptionally high investment levels. With a kurtosis of 15.54, the distribution is highly leptokurtic, showing extreme values. The Jarque-Bera test statistic of 3,809 (p-value = 0.000) strongly rejects normality. Finally, the tertiary enrolment rate has a mean value of 8.227% and a standard deviation of 5.638%, with a maximum of 28.37% and a minimum of 0.696%. The skewness value of 1.267 shows a moderate positive skew, meaning that while most countries have relatively low enrolment rates, a few have significantly

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higher participation in tertiary education. The kurtosis value of 4.215 indicates a peaked distribution, suggesting the presence of outliers. The Jarque-Bera test statistic of 151.4 (p-value = 0.000) confirms that tertiary enrolment rate does not follow a normal distribution

Correlation Analysis

Table 4.2: Pairwise correlation coefficient

Variable					
Real GDP	1				
Public Health Expenditure	0.0731				
Public Education Expenditure	-0.002	0.215	1		
Quality of Life Index	0.031	0.334	0.212	1	
Gross Capital Formation	0.920	0.061	-0.003	0.083	1
Tertiary Enrollment Rate	0.259	0.299	0.337	0.511	0.239	1

Source: Author's computation 2024.

Table 4.2 showed that the correlation between real GDP and public health expenditure is relatively weak at 0.073. This suggests that the size of a country's economy has little direct impact on the proportion of its public budget dedicated to health spending. Despite economic growth, public health expenditure may not increase proportionally, likely due to varying government priorities or the influence of external funding, such as international aid (World Bank, 2020). Also, it can be seen that the correlation between real GDP and public education expenditure is nearly zero, with a value of -0.002, implying that countries with higher GDP levels are not necessarily spending more on education as a percentage of their total expenditure. This may reflect differences in government focus, where economic growth does not always translate into increased investment in human capital (UNESCO, 2018).

In contrast, the correlation between real GDP and the quality-of-life index is also quite low at 0.031. This indicates that economic growth in SSA countries does not strongly predict improvements in the overall living standards of their populations. The weak relationship may suggest that while some countries experience growth, the benefits may not be evenly distributed, leading to limited gains in quality of life for a broad portion of the population (Stiglitz, 2012). Further, gross capital formation shows the strongest correlation with real GDP, with a value of 0.920. This near-perfect positive relationship highlights that countries with larger economies tend to invest significantly more in physical capital such as infrastructure, machinery, and buildings. Economic theory supports this finding, as greater levels of GDP are often accompanied by higher investments in capital goods, which further contribute to economic growth (Barro & Sala-i-Martin, 2004). Lastly, the tertiary enrolment rate is shown to have a moderate positive correlation of 0.259 with real GDP. This suggests that higher levels of GDP are somewhat associated with greater access to higher education. Although the relationship is not as strong as that between GDP and capital formation, it does indicate that as countries grow wealthier, they tend to expand educational opportunities, particularly in tertiary education (Todaro & Smith, 2015).

Cross-Sectional Dependence Test

Table 4.3*:* Cross-Sectional dependent test results

Test	Statistics	Probability
Pesaran CD	4.814	0.000***

Note: *** p < 1%, ** p < 5%, * p < 10%

Table 4.3 presents the results of the Pesaran cross-sectional dependence (CD) test to examine the presence or absence of correlation across the cross-sectional units (countries) in the panel data. The rule of thumb is that a CD statistic with a significant p-value indicates that the variable exhibits cross-sectional dependence, meaning that shocks or movements in one country are likely related to others. From the result, the test statistic with a value of 4.814 is highly significant with a very low probability, implying the rejection of the null hypothesis. It can therefore be concluded that the shocks or movements in one country are related to others across the selected sub-Saharan Africa countries.

4.4. Panel Unit Root Test

Table 4.4*:* Summary of the panel unit root test results at the level and first difference

Variable	Common unit root		Individual unit root		
	LLC	BRG	IPS	ADF	PP
$\ln(GDP_{it})$	-0.574	3.205	1.870	26.45	46.51
$\Delta\ln(GDP_{it})$	-4.157***	-4.165***	-5.694***	103.8***	518.4***
PuH_{it}	3.140	3.448	1.241	37.49	54.42*
$\Delta(PuH_{it})$	-3.377***	0.305	-6.986***	128.2***	720.1***
PuE_{it}	42.39	-5.273***	2.454	42.39	52.4*
$\Delta(PeU_{it})$	7.331	10.31	-4.227***	135.2***	531.8
QoL_{it}	17.08	9.788	12.66	16.14	21.71
$\Delta(QoL_{it})$	23.86***	14.61***	11.76***	22.18***	13.11***

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$\ln(Kap_{it})$	1.131	3.825	3.632	17.63	21.94
$\Delta\ln(Kap_{it})$	-5.956***	0.121	-7.202***	131.2***	266.9***
ErT_{it}	1.460	4.254	3.695	17.09	21.52
$\Delta(ErT_{it})$	-1.564*	-0.284	-2.902***	70.26***	385.7***

Note: *** p < 1%, ** p < 5%, * p < 10%

The panel unit root test results in Table 4.3 indicate that all the variables including real GDP, public health expenditure, public education expenditure, quality of life, and gross capital formation exhibits non-stationary at their levels. This non-stationarity suggests that these variables do not tend to return to a stable long-term equilibrium and are subject to persistent shocks over time. For instance, GDP and public health expenditure fluctuate in the short term without reverting to a specific mean, which is a typical characteristic of macroeconomic variables (Enders, 2014). However, after first differencing, these variables become stationary, meaning they follow an integrated process of order one (I(1)). The tests show that first-differenced forms of these variables such as changes in GDP, health expenditure, and investment are stable over time, indicating that their growth rates stabilize, even though the levels may not. This transformation from non-stationarity to stationarity upon differencing suggests that while the absolute levels of the variables are unpredictable and their relative changes over time are more consistent and thus more suitable for econometric analysis (Stock & Watson, 2015).

Given that all the variables are I(1), it is critical to proceed with a co-integration test. Co-integration analysis is necessary to determine whether a long-run equilibrium relationship exists among these non-stationary variables. Without this step, regression models using non-stationary variables may produce spurious results—where relationships appear significant when, in fact, they are not (Granger, 1986). By performing co-integration tests, we can avoid the problem of spuriosity and ensure that any relationships identified among GDP, public health expenditure, education expenditure, quality of life, and capital formation reflect genuine long-term economic connections.

Panel Co-integration Test

Table 4.5. Panel cointegration test results summary

Test Type	ADF	PP
Kao	-0.697	
Pedroni (Common AR)	-4.166***	-2.813***
Pedroni (Individual AR)	-3.468***	-8.286**

Note: ***p<1%; **p< 5%; *< 10%

The panel co-integration test results presented in Table 4.5 provide an overview of the long-term relationships among the variables being analysed for the group of countries in this study. The results focus on two main tests, the Kao test and the Pedroni test, each applied using both the ADF (Augmented Dickey-Fuller) and PP (Phillips-Perron) approaches. The Kao test, which is designed to test for panel co-integration by assuming homogeneity in the long-run relationship across the panel, produces a result of -0.697. However, according to this Kao test, there is no clear indication of a long-term equilibrium relationship binding the variables together. In contrast, the Pedroni test results offer more detailed insights. The Pedroni (Common AR) results, which assume a common autoregressive process across the panel, show a test statistic of -4.166 under ADF and -2.813 under Phillips-Perron. Both results are highly significant at the 1% level of significance, meaning that there is strong evidence of co-integration when assuming a common autoregressive process. This suggests that, across the panel of countries, the variables exhibit a long-term equilibrium relationship when modelled with a common adjustment process. Also, the Pedroni (Individual AR) results, which allow for individual autoregressive processes for each country in the panel, show significant results. Under ADF, the test statistic is -3.468, and under Phillips-Perron, it is -8.286, with the latter being significant at the 5% level of significance. The results suggest that even when allowing for country- specific dynamics, there is still evidence of co-integration, meaning that the variables tend to move together in the long run, although the strength of this relationship may vary across countries.

Estimates of VAR-Based Panel Granger Causality Test

Table 4.7: *The VAR-based, stacked (common coefficients) and the Dumitrescu-Hurlin (individual coefficients) panel Granger causality test result*

Null Hypothesis	VAR-Based	Stacked	D-H
QoL does not granger cause PuH	6.614**	3.245**	8.238***
PuH does not granger cause QoL	1.257	0.915	5.215***
GDP does not granger cause PuH	2.052	0.953	5.348***
PuH does not granger cause GDP	0.190	0.291	2.312
GDP does not granger cause QoL	2.414	1.497	3.410*
QoL does not granger cause GDP	18.13***	9.311***	2.940***

Note: * p < 10%, ** p < 5%, *** p < 1%

Table 4.7 presents the results of the Granger causality test. The table exhibits three types of tests: the VAR-based (pooled panel approach), the stacked panel approach (common coefficients for all panel members), and the Dumitrescu-

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Hurlin (D-H) test (which accounts for individual coefficients). Details of the relationship are stated in thus. The null hypothesis that QoL does not Granger cause PuH is rejected across all three tests, with significant results: 6.614 in the VAR-based test, 3.245 in the stacked panel, and 8.238 in the Dumitrescu-Hurlin test. In contrast, the null hypothesis that PuH does not Granger cause QoL is only rejected in the Dumitrescu-Hurlin test (5.215). For the relationship between GDP and public health expenditure, the null hypothesis that GDP does not Granger cause PuH is rejected only in the Dumitrescu-Hurlin test (5.348). On the other hand, the null hypothesis that PuH does not Granger cause GDP is not rejected in any of the tests. For the causal relationship between GDP and quality of life, the null hypothesis that GDP does not Granger cause QoL is rejected only in the Dumitrescu-Hurlin test (3.410). The reverse causal relationship, where QoL Granger causes GDP, is strongly supported in all three tests: 18.13 in the VAR-based, 9.311 in the stacked, and 2.940 in the Dumitrescu-Hurlin test.

Discussion of Findings

The Causal Relationship Between Economic Growth and Quality of Life (QoL)

For the causal relationship between GDP and quality of life, the null hypothesis that GDP does not Granger cause QoL is rejected only in the Dumitrescu-Hurlin test (3.410), indicating that economic growth improves the quality of life in the long run for individual countries. As economies expand, improvements in income, employment, and access to social services (such as healthcare and education) can lead to better living standards. This aligns with the modernization theory, which suggests that economic development brings about improvements in social indicators like health, education, and overall well-being. The reverse causal relationship, where QoL Granger causes GDP, is strongly supported in all three tests: 18.13 in the VAR-based, 9.311 in the stacked, and 2.940 in the Dumitrescu-Hurlin test. This shows that improvements in quality of life have a significant positive impact on economic growth, both in the short and long run. Better living standards, improved health, and access to education likely lead to a more productive workforce and greater economic output over time. This finding supports the human capital theory, which emphasizes the role of a healthy and educated population in driving economic growth. Empirical studies like Ogundari and Awokuse (2018) support this result, showing that improvements in health and education, key components of quality of life, exhibits positive effects on economic growth in SSA.

The Causal Relationship Between Economic Growth and Public Health Expenditure (PuH)

For the relationship between GDP and public health expenditure, the null hypothesis that GDP does not Granger cause PuH is rejected only in the Dumitrescu-Hurlin test (5.348). This implies that for individual countries, economic growth leads to higher public health spending in the long run. As economies grow, governments may allocate more resources to public health, possibly due to increased revenue and societal demands for better healthcare. This finding supports Keynesian economic theory, which suggests that increased government spending, particularly in areas like healthcare, becomes more feasible with economic expansion. Empirical literature, such as the findings of Odhiambo (2021), also points to a relationship between GDP and public health expenditure, especially in countries with sustained economic growth. On the other hand, the null hypothesis that PuH does not Granger cause GDP is not rejected in any of the tests, indicating that increases in public health expenditure do not directly cause short-term or long-term changes in GDP. This may suggest inefficiencies in the way health expenditures are allocated or long gestation periods before the positive effects of improved health outcomes translate into economic growth. It contrasts with the findings of Aboubacar and Xu (2017), who reported a significant positive relationship between health expenditure and economic growth in SSA, indicating that the causal relationship could be more nuanced depending on the efficiency and targeting of healthcare spending.

The causal relationship between Quality of Life (QoL) and Public Health Expenditure (PuH)

The null hypothesis that QoL does not Granger cause PuH is rejected across all three tests, with significant results: 6.614 in the VAR-based test, 3.245 in the stacked panel, and 8.238 in the Dumitrescu-Hurlin test. This result implies that improvements in the quality of life, such as better living standards, health, and well-being, lead to an increase in public health expenditure. Governments may respond to rising demand for better healthcare services as living standards improve. This aligns with Wagner's Law, which states that as economies grow and societies develop, government spending on social services like healthcare tends to increase to meet the higher demand for quality services. In contrast, the null hypothesis that PuH does not Granger cause QoL is only rejected in the Dumitrescu-Hurlin test (5.215), meaning that when accounting for individual country dynamics, public health expenditure does Granger cause quality of life improvements in the long run. This suggests that, while there may not be immediate effects in the pooled panel (VAR-based) or common-coefficient approach (stacked), higher public health spending contributes to better living conditions over time. This aligns with the human capital theory, which emphasizes the importance of healthcare in improving workforce productivity and overall well-being. Empirical studies such as Boachie *et al*. (2018), found that public health spending improves life expectancy and reduces mortality in the long-run relationship.

(V) Concluding Remarks and Policy Recommendations

The study x-rayed the causal relationship among public health financing, quality of life, and economic growth in Sub-Saharan African (SSA) countries, while they concludes that public health expenditure exhibits an insignificant effect on economic growth (GDP) in the short run but a significant positive effect in the long run in SSA countries. This implies that short-term increases in healthcare spending do not immediately translate into economic growth. However, in the long run, sustained investment in healthcare infrastructure and

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services improves labour productivity and reduces disease burdens which in turn boost GDP in the region. The study also concluded that quality of life has a negative effect on GDP in the short run but a significant positive effect in the long run in SSA. The implication of this result is that initial improvements in living standards may temporarily slow down economic growth, possibly due to shifts in consumption and labour preferences. However, over time, a better quality of life, including improved health and education, leads to a more productive workforce and higher economic growth in the region. Based on the foregoing concluding remarks, the study therefore recommends that successive governments in SSA countries should prioritize sustained investments in public health, even if short-term economic returns are minimal. Long-term health infrastructure improvements, such as access to healthcare services, preventive health programs, and disease management, should be emphasized to enhance labour productivity over time. However, efficient allocation of health resources will further ensure that the workforce remains healthy and productive, thereafter, fostering sustained economic growth. Again, policymakers should invest in initiatives that improve the overall quality of life, such as better housing, healthcare access, and social security, even if there is an initial economic cost. These investments will pay off in the long term by fostering a more productive, educated, and healthy population, which in turn supports economic growth. Finally, government should also continue to invest in education, with a focus on both access and quality. This implies that enhancing in primary, secondary, and tertiary education systems will foster long-term human capital development, which is crucial for sustained economic growth in SSA countries.

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