International Journal of Economics, Business and Management Research

Vol. 10, No.09; 2026

ISSN: 2456-7760

Is Fiscal Policy a Lever for the Household Consumption Expenditure–Health Outcomes Nexus? Evidence From Sub-Saharan African Countries

Joseph Abuga Orayo[1], Simeo Okelo[2], CPA Dennis Nyamasege[3]

[1,2]Department of Business Administration, School of Business and Economics, Kisii University, P.O. Box 408 – 40200 Kisii, Kenya

[3]Department of Accounting and Finance, School of Business and Economics, Kisii University, P.O. Box 408 – 40200 Kisii, Kenya

doi.org/10.51505/IJEBMR.2026.10904 URL: https://doi.org/10.51505/IJEBMR.2026.10904

Received: Aug 05, 2026 Accepted: Aug 25, 2026 Online Published: Sep 02, 2026

Abstract

Health outcomes reflect households' capacity to secure health-enhancing goods and services, but the effectiveness of such expenditure may depend on the fiscal environment within which households operate. This study examined whether fiscal policy serves as a lever in the relationship between household consumption expenditure and health outcomes in 27 Sub-Saharan African countries from 2000 to 2024. Life expectancy at birth and under-five mortality were used as indicators of health outcomes, while tax revenue and government expenditure represented fiscal policy. The study employed secondary panel data obtained from the World Bank's World Development Indicators and Worldwide Governance Indicators databases. Fixed-effects regression models with robust standard errors were estimated, incorporating interaction terms to determine whether fiscal policy conditioned the household consumption expenditure–health outcomes relationship. The results showed that household consumption expenditure had no statistically significant relationship with life expectancy, while its positive relationship with under-five mortality was weakly significant at the 10% level. The interactions of household consumption expenditure with tax revenue and government expenditure were statistically insignificant, indicating that neither fiscal measure significantly moderated the relationship between household consumption expenditure and the two health outcomes. Although the estimated models were jointly significant, fiscal policy did not operate as a statistically significant lever in the household consumption expenditure–health outcomes nexus during the study period. The study concludes that improvements in household consumption capacity and the availability of fiscal resources may be insufficient to enhance population health unless supported by effective revenue utilization, stronger public service delivery, and sustained investment in accessible healthcare systems.

Keywords: household consumption expenditure; health outcomes; fiscal policy; tax revenue; government expenditure; Sub-Saharan Africa

Vol. 10, No.09; 2026

ISSN: 2456-7760

1. Introduction

Health outcomes remain important indicators of human development because they reflect not only the performance of healthcare systems but also the broader socioeconomic conditions under which populations live. Improvements in population health contribute to productivity, educational attainment, labour participation and socioeconomic welfare, thereby reinforcing the relationship between health and sustainable development. Marmot and Allen (2020) observe that health outcomes are shaped by social and economic conditions extending beyond access to medical care. The World Health Organization (WHO, 2023) similarly identifies life expectancy and under-five mortality as important indicators for assessing population health and disparities in health-system performance. These indicators are particularly relevant in developing economies, where economic vulnerability and unequal access to essential services continue to influence population well-being.

Despite improvements in global health over recent decades, considerable disparities remain between Sub-Saharan Africa (SSA) and other regions. Average life expectancy in SSA remains substantially below the global average, while under-five mortality continues to be disproportionately concentrated in the region (WHO, 2023). The World Bank (2024) further reports substantial variation in health outcomes among SSA countries despite improvements in economic performance and household welfare indicators. Such disparities indicate that economic progress does not necessarily translate uniformly into better health and raise important questions about the mechanisms through which household economic resources contribute to population health.

Household consumption expenditure provides an important perspective for understanding these mechanisms because it reflects how available economic resources are translated into actual living standards. Unlike income, which represents the resources potentially available to households, consumption expenditure captures actual spending on goods and services that directly or indirectly contribute to welfare. Osakede (2021) argues that consumption can provide a particularly useful measure of household welfare in economies characterized by informal employment and irregular income flows. It may therefore provide a more stable representation of material well-being than income alone in many SSA economies.

The relationship between household consumption expenditure and health outcomes can be understood from the health-capital perspective, which views health as an asset that can be maintained or improved through investment in health-enhancing goods and services. Within this perspective, household resources facilitate expenditure on healthcare, nutrition, housing, sanitation, education, transportation and other inputs that contribute to healthier living conditions. Marmot and Allen (2020) demonstrate that differences in material and socioeconomic circumstances contribute to health inequalities, reinforcing the importance of households' capacity to access the resources necessary for healthy living. Evidence presented by Husain et al. (2021) also associates stronger household consumption capacity with improved access to healthcare and health-seeking behaviour.

Vol. 10, No.09; 2026

ISSN: 2456-7760

Empirical evidence nevertheless indicates that improvements in household economic resources do not automatically produce proportionate improvements in health outcomes. The capacity of household consumption expenditure to generate better health depends partly on the availability, affordability and quality of health-enhancing goods and services. This is particularly important in SSA, where out-of-pocket payments remain a major component of health financing and public service provision varies substantially across countries. Tapsoba et al. (2023) associate limited domestic health financing and dependence on household payments with constraints on healthcare utilisation in developing economies. The WHO and World Bank (2021) similarly document persistent deficiencies in financial protection that expose households to considerable economic burdens when seeking healthcare.

The institutional and financing environment consequently determines how effectively household resources are translated into health outcomes. Wagstaff and Neelsen (2020) identify substantial cross-country inequalities in health-service coverage and financial protection, illustrating that household economic resources alone cannot guarantee equitable access to healthcare. Cashin et al. (2024) similarly emphasise that improvements in household resources may not translate proportionately into greater healthcare affordability where treatment costs remain high and financial-protection mechanisms are weak. Under such conditions, household consumption expenditure must be understood within the broader fiscal environment that determines whether private resources are complemented by accessible publicly financed services.

Fiscal policy provides a potential mechanism through which this complementarity occurs because taxation and government expenditure influence both household resources and governments' capacity to provide health-related public goods. Through revenue mobilization, governments obtain the resources required to finance healthcare, infrastructure, social protection, sanitation, education and other services with implications for population health. Government expenditure may simultaneously complement household consumption by reducing the amount households must pay directly to obtain essential services. Barroy et al. (2022) demonstrate that domestic revenue mobilization and prevailing fiscal conditions influence the fiscal space available for health financing. Goryakin et al. (2023) similarly emphasise that fiscal policy affects population health through resource mobilization and public investment in health systems and human capital.

Tax revenue and government expenditure may, however, condition the household consumption expenditure–health outcomes relationship through different channels. Taxation expands governments' revenue-generating capacity but may also reduce disposable household resources and consequently constrain consumption possibilities. Government expenditure can complement household resources by expanding access to publicly financed healthcare and other social services. Wanjala et al. (2020) suggest that appropriately designed fiscal interventions can protect vulnerable populations against economic shocks and preserve their access to essential services. Evidence presented by Boundioa and Thiombiano (2024) further indicates that sustained public and health expenditure can contribute to improved population health where fiscal resources are effectively translated into service delivery.

Vol. 10, No.09; 2026

ISSN: 2456-7760

The existence of fiscal resources does not, however, guarantee improved health outcomes because their effects depend on allocation, implementation and institutional capacity. Piatti-Fünfkirchen and Ally (2022) demonstrate that weaknesses in public financial management can constrain the conversion of government budgets into effective health services. Iheoma (2024) also identifies heterogeneous responses of health outcomes to fiscal-policy shocks across SSA, indicating that the consequences of fiscal interventions differ among countries. These findings suggest that similar levels of household consumption expenditure may generate different health outcomes depending on whether national fiscal systems complement or constrain households' capacity to transform their consumption into improved health. Further, existing studies have generated substantial evidence on household economic resources, healthcare affordability, fiscal space, public expenditure and population health. However, these factors have largely been examined through separate direct relationships. Studies such as Husain et al. (2021) focus on the relationship between household consumption capacity and healthcare access, whereas Barroy et al. (2022) principally examine the expansion of fiscal space for health. Wagstaff and Neelsen (2020), on the other hand, concentrate on inequalities in universal health coverage and financial protection. Although these studies provide important insights, they give limited attention to whether fiscal policy changes the strength or direction of the relationship between household consumption expenditure and population health.

Recent fiscal-health studies have also demonstrated that government financing and public expenditure can influence population health, but they have not sufficiently established whether these fiscal conditions modify the health effects associated with household consumption expenditure. Boundioa and Thiombiano (2024) examine the relationship between public expenditure and health outcomes, while Iheoma (2024) investigates the responses of health outcomes to fiscal-policy shocks. Nevertheless, limited empirical evidence exists on the interaction between household consumption expenditure and distinct fiscal-policy components. The gap is particularly evident in SSA, where countries exhibit considerable differences in household welfare, revenue mobilization, public expenditure, financial protection and health-system performance. The present study addresses this gap by conceptualizing and determining whether fiscal policy is a potential lever through which the relationship between household consumption expenditure and health outcomes may be conditioned. The conceptual framework presented in Figure 1 illustrates the hypothesized relationships.

Vol. 10, No.09; 2026

ISSN: 2456-7760

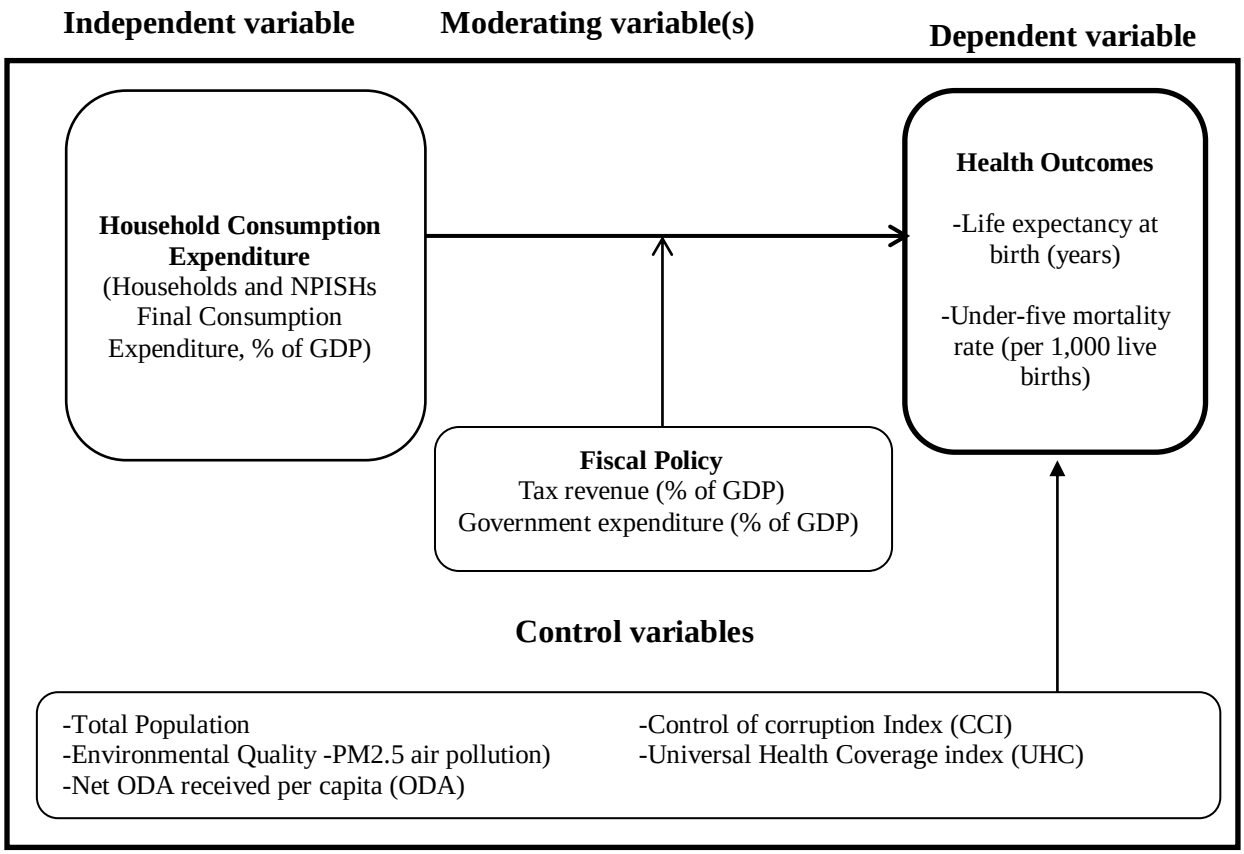

Figure 1: Conceptual Framework
Source: Researcher (2026)

2. Method

2.1 Research Design

The study was guided by the positivist research philosophy and adopted a longitudinal non-experimental panel research design. The design was appropriate because the study relied on observed macroeconomic, fiscal and health data without manipulating the explanatory variables. Combining cross-sectional and time-series dimensions made it possible to examine changes within countries over time while accounting for differences among countries. Panel-data analysis also assists in controlling for unobserved country-specific characteristics that could otherwise bias the estimated relationships (Baltagi, 2021).

2.2 Study Population and Sample

The target population consisted of the 48 countries in Sub-Saharan Africa. Eligibility for inclusion in the analytical sample was determined using the World Bank Group country income classification applicable in *FY2025/2026*, when the study sampling frame was developed and data extraction commenced. The study focused on countries classified as lower-middle-income,

Vol. 10, No.09; 2026

ISSN: 2456-7760

upper-middle-income, or high-income economies and with sufficiently complete and consistent data for the principal study variables. Low-income countries and countries with substantial gaps in the required macroeconomic, fiscal, and health indicators were excluded to enhance comparability and minimize measurement inconsistencies arising from excessive missing observations. Following the application of these criteria, the final analytical sample comprised 27 Sub-Saharan African countries: Angola, Benin, Botswana, Cabo Verde, Cameroon, Comoros, Republic of the Congo, Côte d'Ivoire, Equatorial Guinea, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Mauritania, Mauritius, Namibia, Nigeria, São Tomé and Príncipe, Senegal, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. The income classifications reflect those applicable when the sampling frame was developed; subsequent World Bank reclassification of individual countries does not alter the sampling criteria applied in this study.
The 27 countries were observed annually over the period 2000–2024, giving a maximum potential panel of 675 country-year observations (27 countries × 25 years). However, the study employed an unbalanced panel because data availability varied across countries, years, and study variables. Consequently, the effective number of observations differed across variables and regression specifications, with each available annual observation representing a country-year unit of analysis. No missing values were imputed; estimation was based on the available observations for the variables included in each model. Although the unbalanced structure may reduce statistical precision where observations are limited and may affect representativeness where missing observations are systematically concentrated in particular countries or periods, it does not inherently compromise the reliability of panel estimates. The reliability of the estimates was strengthened through appropriate panel-model selection, diagnostic testing, and the use of robust standard errors, and these considerations were taken into account when interpreting the findings.

2.3 Measures and Covariates

The study examined two health-outcome indicators: life expectancy at birth and under-five mortality. Life expectancy measured the average number of years a newborn would be expected to live under prevailing mortality conditions. Under-five mortality measured the number of deaths among children younger than five years per 1,000 live births. Both indicators were transformed into natural logarithms to reduce skewness, stabilize variance and facilitate proportional interpretation of the estimated relationships. The principal explanatory variable was household and nonprofit institutions serving households' final consumption expenditure, measured as a percentage of gross domestic product. This indicator captured the proportion of national output devoted to household consumption and was used as a macro-level measure of the actual utilization of economic resources by households. Fiscal policy was represented by tax revenue as a percentage of GDP and general government final consumption expenditure as a percentage of GDP. These indicators captured the revenue-mobilization and expenditure dimensions of fiscal policy, respectively.

The models controlled for population size, environmental quality, official development assistance, universal health coverage and control of corruption. Population was measured as the natural logarithm of the total national population. Environmental quality was represented by population-weighted exposure to PM2.5 air pollution, measured in micrograms per cubic meter.

Vol. 10, No.09; 2026

ISSN: 2456-7760

Official development assistance was measured as the natural logarithm of net ODA received per capita. Universal health coverage was measured using the UHC service coverage index, while control of corruption was measured using the corresponding Worldwide Governance Indicators estimate.

Table 1. Definition and Measurement of Study Variables

Variable	Indicator and measurement
Life expectancy	Natural logarithm of life expectancy at birth, measured in years
Under-five mortality	Natural logarithm of deaths among children under five per 1,000 live births
Household consumption expenditure	Household and NPISH final consumption expenditure as a percentage of GDP
Tax revenue	Tax revenue as a percentage of GDP
Government expenditure	General government final consumption expenditure as a percentage of GDP
Population	Natural logarithm of total population
Environmental quality	Population-weighted PM2.5 exposure in micrograms per cubic metre
Official development assistance	Natural logarithm of net ODA received per capita
Universal health coverage	UHC service coverage index
Control of corruption	Worldwide Governance Indicators estimate of control of corruption

Source: Researcher's operationalization (2026).

Environmental quality was proxied by population-weighted exposure to PM2.5 air pollution because PM2.5 provides a more direct measure of population exposure to environmental conditions that can affect health outcomes. Fine particulate matter penetrates deep into the respiratory system and is associated with respiratory and cardiovascular morbidity and premature mortality. This makes PM2.5 particularly relevant to the study's health outcomes (life expectancy and under-five mortality) compared with broader environmental-pressure indicators such as CO_2 emissions, which primarily capture greenhouse-gas emissions and their contribution to climate change rather than direct population exposure to harmful ambient air pollutants. Accordingly, PM2.5 was considered a more proximate environmental-health indicator for the present analysis.
Household consumption expenditure was measured using household and NPISH final consumption expenditure as a percentage of GDP. The indicator captures the value of goods and services consumed by households and nonprofit institutions serving households relative to the size of the economy and therefore provides a standardized macroeconomic measure of realized household consumption across countries. Its use as a percentage of GDP enhances comparability across economies of different sizes and is consistent with the study's country-level analytical

Vol. 10, No.09; 2026

ISSN: 2456-7760

framework. The measure was therefore preferred because the study examines aggregate household consumption expenditure rather than individual- or household-level consumption behaviour.

2.4 Data Sources and Collection Procedure

The study relied exclusively on secondary country-level data. Annual data for the study variables were obtained primarily from the World Bank's World Development Indicators and Worldwide Governance Indicators databases. These sources were selected because they provide internationally standardized indicators that support comparisons across countries and over time. A structured secondary data collection schedule was used to extract and record annual observations for every country. The data were cross-checked for consistency, organized according to country and year, and combined into a panel dataset. The resulting dataset was cleaned, coded and transformed before analysis. Missing observations were retained as missing rather than being artificially imputed, which explains the differences in the numbers of observations across variables and regression models.

2.5 Econometric Model Specification

The study employed panel-data regression analysis to estimate the relationship between household consumption expenditure and health outcomes and to assess the moderating role of fiscal policy. The analysis proceeded by first estimating the baseline relationship between household consumption expenditure and each health-outcome indicator while controlling for the specified covariates. The baseline model was specified as:

$$HO_{it} = \alpha_0 + \beta_1 HCE_{it} + \beta_2 POP_{it} + \beta_3 ENQ_{it} + \beta_4 ODA_{it} + \beta_5 UHC_{it} + \beta_6 CCI_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

……..……...(1)

Where:HO_{it}: Health outcomes (proxied by Life expectancy at birth and under five mortality) HCE_{it}: Household consumption expenditure per capita; POP_{it}: Population Growth; ENQ_{it}: Environmental Quality; ODA_{it}: Official Development Assistance; UHC_{it}: Universal Health Coverage; CCI_{it}: Control of Corruption Index; μ_i: Country-specific effect; λ_t: Time specific effect; ϵ_{it}: Error term; α_0 is the intercept or constant; β_{1-6} is regression coefficients; ε_{it} is a random error term that accounts for unexplained variations. Proceed to estimate the model to determine whether fiscal policy significantly predicts health outcomes, controlling for purchasing power. The second step model was specified as:

$$HO_{it} = \alpha_0 + \beta_1 HCE_{it} + \beta_2 FP_{jit} + \beta_3 POP_{it} + \beta_4 ENQ_{it} + \beta_5 ODA_{it} + \beta_6 UHC_{it} + \beta_7 CCI_{it} +$$

$$\mu_i + \lambda_t + \epsilon_{1it}$$

……..…….(2)

Where: FE_{jit}: Fiscal policy components j=1,2 where 1= Tax revenue, 2=Government spending.

If this relationship is not significant (i.e., β_2 is not statistically significant), moderation is still

possible, but the evidence for direct influence of the moderator on the outcome is weak. If significant, proceed to Step 3. In the third step, estimate the model with both main effects and the interaction term to test whether fiscal policy moderates the relationship between purchasing power and health outcomes.

$$HO_{it} = \alpha_0 + \beta_1 HCE_{it} + \beta_2 FP_{jit} + \beta_3 (HCE * FP_j)_{it} + \beta_4 POP_{it} + \beta_5 ENQ_{it} + \beta_6 ODA_{it} + \beta_7 UHC_{it} + \beta_8 CCI_{it} + \mu_i + \mu_i + \lambda_t + \epsilon_{1it}$$

…………………………………….…………………………………………….(3)

The study introduces an interaction term between household consumption expenditure and fiscal policy $(HCE * FP_j)$. Note that separate models were estimated for the two fiscal-policy indicators and the two health outcomes. The interaction coefficient, β_3, measured whether the relationship between household consumption expenditure and the respective health outcome varied with fiscal policy. A statistically significant interaction coefficient was treated as evidence of moderation.

The continuous explanatory and moderating variables were mean-centred before constructing the interaction terms. Mean-centring reduced non-essential multicollinearity between the interaction terms and their constituent variables and allowed the main-effect coefficient of household consumption expenditure to be interpreted at the average level of the respective fiscal-policy indicator. Where an interaction was statistically significant, conditional marginal effects were estimated at the 25^{th}, 50^{th} and 75^{th} percentiles of the moderator to establish how the relationship changed across different fiscal conditions.

2.6 Statistical Analysis and Diagnostic Tests

Data analysis was conducted using Stata version 16. Descriptive statistics, including means, standard deviations, minimum values and maximum values, were used to summarize the distributions of the study variables. Pearson correlation coefficients were examined to establish preliminary relationships among the variables. Variance inflation factors were subsequently calculated to assess multicollinearity, with a value exceeding 10 treated as evidence of serious multicollinearity.

Fixed-effects and random-effects panel regression models were estimated. The fixed-effects estimator controlled for unobserved country characteristics that remained constant over time and could be correlated with the explanatory variables. The random-effects estimator assumed that country-specific effects were uncorrelated with the regressors. The Hausman specification test

Vol. 10, No.09; 2026

ISSN: 2456-7760

was applied to determine the appropriate estimator. Rejection of its null hypothesis supported the fixed-effects model, whereas failure to reject the null hypothesis supported the random-effects model.

Panel unit-root tests were conducted to examine the stationarity properties of the variables. Where variables exhibited different orders of integration, panel cointegration tests were used to determine whether they shared a stable long-run relationship. The models were also assessed for serial correlation, heteroskedasticity and cross-sectional dependence. Where diagnostic tests indicated violations of the conventional error assumptions, cluster-robust standard errors were applied to obtain reliable statistical inference.

The statistical significance of individual regression coefficients was evaluated using two-tailed tests. The joint significance of the explanatory variables in the fixed-effects models was evaluated using the F-test, while the Wald chi-square test was used for the random-effects models. The null hypothesis of no moderating effect was rejected when the coefficient of the relevant interaction term was statistically significant. All hypotheses were evaluated at the 5% significance level.

2.7 Ethical Considerations

Ethical approval for the study was obtained from the Kisii University Institutional Scientific and Ethics Review Committee under Protocol No. *KSU/ISERC/0090/07/26*, effective from 1st July 2026. Authorization to conduct the research was subsequently granted by the National Commission for Science, Technology and Innovation under Research Licence No. *NACOSTI/P/26/4193083*, issued on 18th July 2026. The study relied exclusively on publicly available country-level secondary data and did not involve direct interaction with human participants or the collection of personally identifiable information.

3. Results

3.1 Descriptive Statistics

Table 2 presents the descriptive statistics for the variables included in the analysis. The number of observations varied because of differences in country-year data availability. Life expectancy, expressed in logarithmic form, recorded a mean of 4.09 and a standard deviation of 0.12, indicating relatively limited variation across countries and over time. By comparison, the logarithm of under-five mortality had a mean of 4.12 and a standard deviation of 0.63, demonstrating considerably greater variation in child mortality.

Household consumption expenditure averaged 63.38% of GDP, with a standard deviation of 18.84. It ranged from 13.98% to 119.41% of GDP, indicating substantial differences in the proportion of national output devoted to household consumption. Tax revenue averaged 17.30% of GDP and ranged from 3.40% to 40.22%, while government expenditure averaged 16.39% of GDP and ranged from 2.05% to 46.26%. These distributions demonstrate marked differences in

Vol. 10, No.09; 2026

ISSN: 2456-7760

household consumption patterns, domestic revenue mobilization and public expenditure across the sampled countries.

Table 2. Descriptive Statistics of the Study Variables, 2000–2024

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
Life expectancy at birth (log)	648	4.09	0.12	3.77	4.35
Under-five mortality rate (log)	648	4.12	0.63	2.45	5.31
Household consumption expenditure (% of GDP)	544	63.38	18.84	13.98	119.41
Tax revenue (% of GDP)	380	17.30	7.86	3.40	40.22
Government expenditure (% of GDP)	544	16.39	7.67	2.05	46.26
Total population (log)	675	15.54	1.86	11.30	19.27
PM2.5 air-pollution exposure	567	32.28	16.72	8.50	85.10
Net ODA per capita (log)	640	3.86	1.03	−0.99	6.54
UHC service coverage index	648	45.67	14.70	13.00	81.00
Control of corruption index	621	−0.45	0.69	−1.65	1.70

Source: Researcher's computation based on secondary panel data (2000–2024).

The control variables also exhibited meaningful variation. PM2.5 exposure ranged from 8.50 to 85.10 micrograms per cubic metre, while the UHC service coverage index ranged from 13 to 81. The control of corruption index recorded a negative mean of −0.45 and ranged from −1.65 to 1.70, reflecting substantial differences in institutional quality. The observed variation supported the inclusion of demographic, environmental, health-system and institutional conditions in the regression models.

3.2 Correlation Results

Household consumption expenditure had a weak negative correlation with life expectancy ($r=-0.1349$, $p<0.05$) and a weak positive but statistically insignificant correlation with under-five mortality ($r=0.0482$, $p>0.05$). These preliminary results indicated that higher household consumption expenditure was not consistently associated with improved health outcomes at the bivariate level. On the other hand, tax revenue was negatively correlated with life expectancy ($r=-0.2633$, $p<0.05$) and under-five mortality ($r=-0.1133$, $p<0.05$). Government expenditure had a weak and statistically insignificant correlation with life expectancy ($r=-0.0225$, $p>0.05$) but a significant negative correlation with under-five mortality ($r=-0.2793$, $p<0.05$). The mixed directions showed that the fiscal-policy variables did not have uniform bivariate relationships with the two health outcomes.

Vol. 10, No.09; 2026

ISSN: 2456-7760

Among the control variables, UHC service coverage was positively correlated with life expectancy ($r=0.4936$, $p<0.05$) and negatively correlated with under-five mortality ($r=-0.7729$, $p<0.05$). Control of corruption was also positively associated with life expectancy ($r=0.3673$, $p<0.05$) and negatively associated with under-five mortality ($r=-0.6099$, $p<0.05$). The highest correlation among the explanatory variables was between tax revenue and government expenditure ($r=0.7484$, $p<0.05$). Although relatively high, this coefficient remained below the conventional threshold of 0.80 for serious multicollinearity.

3.3 Diagnostic and Model-Selection Results

The Fisher-type augmented Dickey–Fuller tests were applied to assess the stationarity properties of the panel variables. The results indicated that household consumption expenditure and tax revenue were stationary at level, I(0), whereas government expenditure became stationary after first differencing, I(1). The health-outcome and control variables similarly exhibited a combination of I(0) and I(1) processes. Given these mixed orders of integration, cointegration testing was undertaken to establish whether a stable long-run relationship existed among the variables before estimating the models in levels.

The Kao residual-based panel cointegration test was employed to determine whether the variables shared a common long-run equilibrium relationship within the panel framework. The test provided evidence of cointegration in both health-outcome models. For life expectancy, the modified Dickey–Fuller ($p = 0.0127$), augmented Dickey–Fuller ($p = 0.0243$), and unadjusted modified Dickey–Fuller ($p = 0.0119$) statistics rejected the null hypothesis of no cointegration at the 5% significance level. All five Kao statistics were statistically significant for under-five mortality. The evidence of cointegration therefore supported estimation of the relationships in levels despite the mixed stationarity properties of the variables. Variance inflation factors ranged from 1.19 to 4.26, with a mean of 2.84. Household consumption expenditure recorded a VIF of 1.97, government expenditure 3.80, and tax revenue 4.26. All VIF values were below 10 and tolerance values exceeded 0.10, indicating that multicollinearity was not sufficiently severe to undermine the stability of the regression estimates.

The Wooldridge tests detected first-order serial correlation in both the life-expectancy ($F = 111.812$, $p < 0.05$) and under-five mortality ($F = 31.380$, $p < 0.05$) models. The modified Wald tests similarly indicated groupwise heteroskedasticity in both models at the 5% significance level. In contrast, the Pesaran cross-sectional dependence tests were statistically insignificant for life expectancy ($CD = 0.317$, $p = 0.7515$) and under-five mortality ($CD = -0.221$, $p = 0.8251$). Accordingly, the null hypothesis of cross-sectional independence was not rejected, indicating no statistically detectable residual cross-sectional dependence across the sampled countries. Given the presence of serial correlation and heteroskedasticity, robust standard errors were employed to strengthen statistical inference by accounting for these violations of the conventional error assumptions.

Vol. 10, No.09; 2026

ISSN: 2456-7760

Table 3. Summary of Diagnostic and Model-Selection Tests

Diagnostic test	Life expectancy model	Under-five mortality model	Decision
Wooldridge autocorrelation test	F=111.812, p<0.05	F=31.380, p<0.05	Serial correlation present
Modified Wald heteroskedasticity test	$\chi2$=7,248.67, p<0.05	$\chi2$=13,587.76, p<0.05	Heteroskedasticity present
Pesaran cross-sectional dependence test	CD=0.317, p=0.7515	CD=−0.221, p=0.8251	No statistically detectable cross-sectional dependence
Hausman specification test	$\chi2$=103.64, p<0.05	$\chi2$=103.17, p<0.05	Fixed effects selected

Source: Researcher's computation based on secondary panel data (2000–2024).

The Hausman specification tests rejected the null hypothesis that the random-effects estimator was consistent in both the life-expectancy ($\chi^2 = 103.64, p < 0.05$) and under-five mortality ($\chi^2 = 103.17, p < 0.05$) models. The results therefore supported the fixed-effects estimator, which controls for unobserved time-invariant country-specific heterogeneity that may be correlated with the explanatory variables. Fixed-effects estimation with robust standard errors was consequently adopted for the final analysis.

3.4 Household Consumption Expenditure and Health Outcomes

The baseline models examined the relationship between household consumption expenditure and each health outcome before the fiscal-policy variables and interaction terms were introduced. Household consumption expenditure had a negative but statistically insignificant relationship with life expectancy ($\beta=-0.0001727, t=-0.35, p>0.10$). Because life expectancy was expressed in logarithmic form, a one-percentage-point increase in household consumption expenditure as a share of GDP was associated with an approximate 0.017% reduction in life expectancy, holding the control variables constant. However, this relationship was statistically indistinguishable from zero.

Household consumption expenditure had a positive coefficient in the under-five mortality model ($\beta=0.0022784, t=1.70$). The relationship was weakly significant at the 10% level but did not meet the study's 5% significance threshold. A one-percentage-point increase in household consumption expenditure was associated with an approximate 0.23% increase in under-five mortality, holding the other variables constant. Nevertheless, the evidence was insufficient to establish a statistically significant relationship at the specified level.

3.5 Moderating Effects

From the findings in Table 4, all four moderation models were jointly statistically significant. The tax-revenue models recorded $F=7.97, p=0.0000832$ for life expectancy and $F=25.93$,

Vol. 10, No.09; 2026

ISSN: 2456-7760

p=0.0000 for under-five mortality. The government-expenditure models recorded *F=7.61, p=0.0000482* for life expectancy and *F=75.50, p=0.0000* for under-five mortality.

3.5.1 Moderating Effect of Tax Revenue

Table 4 presents the final interaction models for tax revenue and government expenditure. In the life-expectancy model, the interaction between household consumption expenditure and tax revenue was positive but statistically insignificant (*β=0.0000641, t=0.78, p>0.10*). The coefficient indicated that the relationship between household consumption expenditure and life expectancy became marginally more positive as tax revenue increased, but the change in the slope was not statistically distinguishable from zero. The within R^2 increased from 0.6939 after the inclusion of tax revenue to 0.7013 following the addition of the interaction term. Although the interaction model explained approximately 70.1% of the within-country variation in life expectancy, the increase in explanatory power was modest and was not supported by a statistically significant interaction coefficient.

In the under-five mortality model, the interaction between household consumption expenditure and tax revenue was negative but statistically insignificant (*β=−0.0001839, t=−1.10, p>0.10*). The negative coefficient suggested that the association between consumption expenditure and child mortality weakened as tax revenue increased. However, the interaction was not statistically significant, indicating that the effect of consumption expenditure on under-five mortality did not differ systematically across levels of tax revenue.

3.6.1 Moderating Effect of Government Expenditure

The interaction between household consumption expenditure and government expenditure was positive but statistically insignificant in the life-expectancy model (*β=0.0000257, t=0.81, p>0.10*). Government expenditure therefore did not significantly change the relationship between household consumption expenditure and longevity. The within R^2 increased only slightly from 0.6537 in the model containing the main effect of government expenditure to 0.6562 after the interaction term was introduced. The interaction coefficient was also positive and statistically insignificant in the under-five mortality model (*β=0.00000686, t=0.07, p>0.10*). Its magnitude was effectively zero, indicating that the relationship between household consumption expenditure and under-five mortality remained practically unchanged across different levels of government expenditure. The within R^2 remained approximately 0.8336 before and after the interaction was introduced, providing further evidence that the interaction added negligible explanatory power.

Vol. 10, No.09; 2026

ISSN: 2456-7760

Table 4. Estimation Results for Fixed-Effects Model(s)

Variable	Life expectancy: Tax revenue	Under-five mortality: Tax revenue	Life expectancy: Government expenditure	Under-five mortality: Government expenditure
Household consumption expenditure (centred)	−0.0007189 (−1.00)	0.0008761 (0.32)	−0.0001493 (−0.33)	0.0022958 (1.66)
Tax revenue (centred)	−0.0002741 (−0.17)	0.001569 (0.59)	—	—
Government expenditure (centred)	—	—	0.0012019 (1.07)	−0.0000881 (−0.03)
Consumption × tax revenue	0.0000641 (0.78)	−0.0001839 (−1.10)	—	—
Consumption × government expenditure	—	—	0.0000257 (0.81)	0.00000686 (0.07)
Total population (log)	0.2929222*** (4.89)	−1.040011*** (−3.84)	0.1707724** (2.58)	−1.05199*** (−6.02)
PM2.5 air-pollution exposure	−0.0006446 (−1.13)	−0.0039839* (−1.87)	−0.0004751* (−1.81)	−0.0018484 (−0.89)
Net ODA per capita (log)	0.0022438 (0.62)	−0.0297004* (−1.74)	0.0016051 (0.27)	−0.0138801 (−0.90)
UHC service coverage index	0.0025569 (1.58)	−0.0155381** (−2.37)	0.0031315* (1.97)	−0.0086464** (−2.38)
Control of corruption index	−0.0432535 (−1.21)	0.151877 (1.04)	−0.040332** (−2.06)	0.1704338** (2.13)
Constant	−0.6088879 (−0.67)	21.34666*** (5.43)	1.3065520 (1.37)	20.9982*** (8.28)
Observations	263	263	424	424
F-statistic	7.965342	25.92734	7.606804	75.50232
Probability > F	0.0000832	0.0000	0.0000482	0.0000
Within R^2	0.7013	0.815	0.6562	0.8336
Overall R^2	0.0607	0.1831	0.1108	0.2561
Country fixed effects	Yes	Yes	Yes	Yes
Robust standard errors	Yes	Yes	Yes	Yes

*Robust t-statistics are reported in parentheses. *** p<0.01; ** p<0.05; * p<0.10.*
Source: Researcher's computation based on secondary panel data (2000–2024).

Vol. 10, No.09; 2026

ISSN: 2456-7760

All four interaction coefficients were statistically insignificant. Accordingly, the null hypothesis that fiscal policy does not moderate the relationship between household consumption expenditure and health outcomes was not rejected for either tax revenue or government expenditure. Because none of the interactions was significant, conditional marginal effects and simple slopes were not estimated.

4. Discussion

The study found that household consumption expenditure had a negative but statistically insignificant relationship with life expectancy and a positive relationship with under-five mortality that did not meet the study's significance threshold. These findings indicate that changes in aggregate household consumption expenditure did not independently explain improvements in either population longevity or child survival. Although the health-capital perspective suggests that greater consumption capacity enables households to obtain healthcare, nutrition, housing and other health-enhancing goods, aggregate consumption expenditure does not reveal how household resources are allocated. Increased consumption may therefore include expenditure on goods and services with limited health benefits, while essential healthcare and adequate nutrition remain unaffordable or inaccessible to vulnerable households.

The lack of a significant relationship differs from evidence presented by Husain et al. (2021), who associated stronger household consumption capacity with improved healthcare access and health-seeking behavior. The difference may arise because access to health-enhancing goods depends on more than the total level of consumption. High out-of-pocket healthcare payments can absorb household resources without necessarily generating effective or timely care, particularly where service quality is poor. Tapsoba et al. (2023) demonstrate that limited domestic health financing increases household financial burdens and constrains healthcare utilization. Cashin et al. (2024) similarly emphasize that improvements in household resources do not automatically translate into healthcare affordability when financial-protection arrangements remain weak.

Tax revenue did not significantly moderate the relationship between household consumption expenditure and either life expectancy or under-five mortality. This finding provides limited support for the Keynesian expectation that fiscal policy can protect household welfare and influence social outcomes through taxation, redistribution and publicly financed services (Keynes, 1936). Although Barroy et al. (2022) demonstrate that domestic revenue mobilization can expand fiscal space for health, the availability of tax revenue does not guarantee that collected resources will reduce household healthcare costs or improve access to essential services. The insignificant interactions may reflect narrow tax bases, weak compliance, regressive taxation or insufficient allocation of collected revenue to healthcare and social protection.

Government expenditure also failed to moderate the relationship between household consumption expenditure and either health outcome. Keynesian fiscal theory proposes that public expenditure can support aggregate demand, stabilize household consumption and expand access

Vol. 10, No.09; 2026

ISSN: 2456-7760

to essential services, particularly where private resources are inadequate. However, the insignificant interaction coefficients indicate that aggregate government expenditure did not systematically complement household consumption in ways that improved longevity or child survival. This differs from Boundioa and Thiombiano (2024), who associate public and health expenditure with improved population health. The difference may arise because the present study measured total government consumption expenditure rather than spending specifically allocated to healthcare, nutrition, maternal and child health or social protection.

The absence of moderation by government expenditure may also reflect differences in expenditure efficiency and institutional capacity across SSA countries. The Keynesian transmission mechanism assumes that fiscal resources are effectively channeled into productive activities and public services capable of supporting household welfare. Where public financial management is weak, increased expenditure may not generate the expected multiplier effects on service access and population health. Piatti-Fünfkirchen and Ally (2022) show that weaknesses in budget execution and resource allocation can restrict the conversion of government expenditure into effective healthcare delivery. Iheoma (2024) similarly reports heterogeneous health responses to fiscal-policy shocks across SSA, suggesting that the effects of fiscal intervention depend on national institutions and expenditure priorities. The findings therefore do not necessarily invalidate the Keynesian role of fiscal intervention but indicate that its expected welfare effects were not evident through the aggregate fiscal indicators used in the study. Fiscal policy may influence the consumption–health relationship only when taxation is sufficiently progressive and government expenditure is efficiently directed towards services that reduce households' private healthcare costs. The results draw attention to the composition, targeting and implementation of fiscal policy as possible determinants of whether public intervention strengthens the capacity of household consumption to produce improved health outcomes.

5. Conclusion and Recommendations

This study examined whether fiscal policy serves as a lever in the relationship between household consumption expenditure and health outcomes in Sub-Saharan Africa. Household consumption expenditure had no statistically significant effect on life expectancy or under-five mortality at the 5% level. Moreover, neither tax revenue nor government expenditure significantly moderated this relationship. The findings therefore suggest that variations in aggregate household consumption and fiscal conditions alone are insufficient to explain changes in population health. Their health effects appear to depend more on the composition of household expenditure, the allocation of public resources, service accessibility, and the institutional effectiveness with which fiscal resources are converted into health-enhancing services.

Governments in Sub-Saharan Africa should consequently focus on the quality and targeting of fiscal policy rather than merely expanding tax revenue or aggregate expenditure. Additional revenue should be allocated transparently to primary healthcare, maternal and child health, sanitation, nutrition, and financial protection programmes that reduce households' out-of-pocket expenditure. Consistent with the Keynesian perspective, public expenditure can complement

household consumption and improve welfare, but its effectiveness requires efficient budgeting, timely disbursement, accountable implementation, and equitable access to services.

Future research should distinguish health-specific and social-sector expenditure from aggregate government consumption and examine whether fiscal policy produces different effects across income groups, fiscal-capacity levels, and health-system structures. Household-level data could also be used to separate consumption devoted to healthcare, food, housing, and other health-enhancing goods. Such extensions would help identify the fiscal and household spending channels through which improvements in population health can be achieved more effectively.

Acknowledgments

The authors acknowledge Kisii University for providing the academic and institutional support necessary for this research. They also acknowledge the Kisii University Institutional Scientific and Ethics Review Committee and the National Commission for Science, Technology and Innovation for reviewing and authorizing the study. The authors further acknowledge the World Bank for making the World Development Indicators and Worldwide Governance Indicators datasets publicly available.

References

Baltagi, B. H. (2021). *Econometric analysis of panel data* (6th ed.). Springer.

Barroy, H., Sparkes, S., Dale, E., Mathonnat, J., & Kutzin, J. (2022). Can low- and middle-income countries increase domestic fiscal space for health: A mixed-methods approach to assess possible sources of expansion. *Health Systems & Reform, 8*(1).

Boundioa, J., & Thiombiano, N. (2024). Effect of public health expenditure on maternal mortality ratio in the West African Economic and Monetary Union. *BMC Women's Health, 24*(1), 109.

Cashin, C., Sparkes, S., & Bloom, D. (2024). Addressing purchasing power disparities in global health financing. *Health Policy and Planning, 39*(2), 134–145.

Goryakin, Y., Morgan, A., & Suhrcke, M. (2023). The role of fiscal and macroeconomic policy in health financing: An integrative review. *Health Economics, Policy and Law, 18*(1), 45–61. https://doi.org/10.1017/S1744133121000350

Husain, M. J., Datta, B. K., Kostova, D., Joseph, K. T., Asma, S., Richter, P., & Palipudi, K. (2021). The effects of household consumption and economic vulnerability on access to health services: A global analysis. *Social Science & Medicine, 281*, 114098. https://doi.org/10.1016/j.socscimed.2021.114098

Iheoma, C. G. (2024). Impact of fiscal policy shocks on health outcomes in Sub-Saharan Africa: A panel structural VAR approach. *Global Health Economics and Sustainability, 3*(1), 45–60.

Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.

Marmot, M., & Allen, J. (2020). COVID-19: Exposing and amplifying inequalities. *Journal of Epidemiology and Community Health, 74*(9), 681–682. https://doi.org/10.1136/jech-2020-214720

Vol. 10, No.09; 2026

ISSN: 2456-7760

Osakede, U. A. (2021). Public health spending and health outcome in Nigeria: The role of governance. *International Journal of Development Issues, 20*(1), 95–112.

Piatti-Fünfkirchen, M., & Ally, M. (2022). Fiscal space for health in Sub-Saharan Africa: Trends and opportunities. *Health Systems & Reform, 8*(1), e1994562. https://doi.org/10.1080/23288604.2021.1994562

Tapsoba, S. J., Hougaard, C., & Laing, S. (2023). Affordability of essential health services in Sub-Saharan Africa: A cross-country panel analysis. *African Journal of Economic Policy, 30*(1), 15–30.

Wagstaff, A., & Neelsen, S. (2020). A comprehensive assessment of universal health coverage in 111 countries: A retrospective observational study. *The Lancet Global Health, 8*(1), e39–e49. https://doi.org/10.1016/S2214-109X(19)30463-2

Wanjala, B., Murunga, J., & Kibaara, D. (2020). Fiscal space for health in Kenya: The untapped potential. *Health Systems & Reform, 6*(1), e1723769.

World Bank. (2024). *World development indicators*. https://databank.worldbank.org/source/world-development-indicators

World Health Organization, & World Bank. (2021). *Tracking universal health coverage: 2021 global monitoring report*. https://www.who.int/publications/i/item/9789240040618

World Health Organization. (2023). *World health statistics 2023: Monitoring health for the SDGs*. https://www.who.int/publications/i/item/9789240074323