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Effects of Capital and Current Health Expenditure on Economic Growth in Sub-Saharan Africa

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Abstract

Improving the health outcomes in Africa is challenged by insufficient investment both from the private and public sectors. Most governments of African countries find it difficult to allocate at least 15% of their yearly budget to the health sector as recommended by the World Bank. The relationship between health spending and growth in the economy of Sub-Saharan Africa was investigated. The data was collected for 46 countries and estimated through the GMM procedure. In the short run, a percentage change in CHE GDP is related to (11.4% and 24.28%) rise in economic growth at a 1% significance level for the difference GMM-1 and GMM-2 steps results. Similarly, a percentage rise in CAH GDP is accompanied by a 123.2% rise in short-term economic growth. In the short run, a percentage change in CHE_GDP and LCHE PC is accompanied by a rise in economic growth at a 5% significance level according to the system GMM-1 and GMM-2 step results. The difference GMM-1 and GMM-2 steps result suggests that a percentage change in capital health spending is related to a (1.97% and 0.71%) rise in LGDP PC in the long run at a 10% and 5% level of significance. Higher spending on health will drive economic growth in both the short and long term. The government should be incentivized to invest more in these projects.

Keywords: GDP Per Capita, Economic Growth, General Method of Moments (GMM), Public Spending.

1. Introduction

Economic growth in Sub-Saharan Africa is influenced by various factors, and healthcare expenditure is a critical determinant. In any economy, spending on healthcare as well as the impact of spending on the performance of the economy are vital elements to look out for. Boosting GDP is not achievable when healthcare spending is poor (Raghupathi & Raghupathi 2020). Current and capital expenditures are the two primary forms of government spending, according to Ogboru (2010). Purchases of goods and services, salaries, subsidies, and current grants and wages, particularly to productive industries, are all included. Capital expenditures are essentially investments in the acquisition of land and the production of fixed assets, buildings, and intangible assets that are projected to boost the economy's long-term productivity. Both capital and current health expenditures have been employed to improve health outcomes and boost economic

productivity. However, the region's economic growth, measured by Gross Domestic Product (GDP) has not realized the desired impact.

According to Wagner's theory of government expenditure, a functional relationship exists between government activity growth and economic growth, with the governmental sector growing faster than the economy. In 2016, the global health budget was US$7.6 trillion, which grew to US$7.8 trillion in 2017. WHO reported that for the first time in five years, global health spending increased slower than GDP in 2016 (World Health Organization, 2020). As more investment is required to keep up with the needs of preserving the population's excellent health, compared to the economy, the health sector has not stopped developing. Global expenditure from 2000- 2017 raised in real terms by 3.9 % per year, while the economy grew annually by 3.0 %. The specific objective of this study is to examine the effects of capital and current health expenditures on economic growth in Sub-Saharan Africa, exploring why these investments have failed to yield the expected growth outcomes in Sub- Saharan Africa from 2000 to 2019 using panel data analysis.

2. Literature Review

2.1 Conceptual review

2.1.1 Health Expenditure

Health expenditure consists of all expenditures or outlays for medical care, prevention, promotion, rehabilitation, community health activities, health administration and regulation and capital formation with the predominant objective of improving health. Health expenditures include expenditures on health functions such as medical education and training, and research and development. Health expenditure can result in better provision of health opportunities, which can strengthen human capital and improve productivity, thereby contributing to economic performance. It is therefore important to assess the phenomenon of healthcare spending in a country. Healthy people are assets to a country; therefore, a good medical care system is required. Healthier people are more productive. Healthy people are required to improve a nation's growth.

WHO (2013) stated that the importance of health as a key aspect of development and economic wellbeing of individuals and nations is increasingly being recognized in the world. This can be seen from a series of reforms taken by African countries to increase investments in health in order to meet the Millennium Development Goals (MDGs) of combating diseases, reduce child mortality and improving maternal health. African leaders have expressed this trust through actions such as the 2001 Abuja Declaration on an increase in government funding for health by allocating 15% of the government budget to the health sector, the 2006 Addis Ababa Declaration on community health in the African Region and the 2008 Ouagadougou Declaration on primary health care and health systems in Africa. Current expenditure is the sum of expenditures on all health goods and services, except for health capital. Recurrent expenditures are payments for consumptions that are incurred yearly, which are non-refundable. They include wages and salaries, purchases of goods and services, and current grants and subsidies, especially in the productive sectors like the health sector. (World Bank,2022). Capital Health Expenditures is total public health expenditure minus recurrent spending from

government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds (WHO, 2021).

2.1.2 Life Expectancy and Population growth rate

According to the United Nations Development Programme, (UNDP, 2023). Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life (UNDP, 2023)**.** Higher health expenditure mostly leads to a better access to medical care, improved disease prevention, and higher quality of life. This decreases mortality rates and increase life expectancy by addressing health issues more effectively. On the other hand, Population Growth Rate is the annual increase(decrease) in population, expressed as a percentage of the total population accounting for births, deaths and migration. Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. Increased health spending lowers infant and maternal mortality, leading to higher survival rates.

2.1.3 Economic Growth

The growth of an economy can be defined as the rise in the worth of the goods and services produced by an economy over time. Such growth is measured as the percentage of rise in real total GDP. It can also be simply defined as a rise in the sum of goods and services formed per head of the population compared from one period of time to another. Increasing the worth and magnitude of the factors of production which consist of Land, Labor, Capital and Entrepreneurship will improve the growth of an economy (Loizides & Vamvoukas, 2005). The Keynesian school of thought in Macroeconomics suggests that government spending speeds up economic growth. Kurt (2015) posited that the health level of the people and the level of economic growth and development are mutually interrelated. When there is economic growth and development, health conditions are better and hence a healthier population. Thus, the amount of labor available will be on the increase as there will be lesser loss to death or ill-health.

Ogboru (2010) detailed that the best general method to quantity the growth of economy is real Gross Domestic Product (GDP), and is defined as the entire value of goods and services formed in an economy and real GDP because of the adjustment to remove effects of inflation. GDP can be quantified either by the amount of what is procured in the economy using the expenditure method or by returns received on what is formed using the income method or the value-added approach. The expenditure method characterizes total demand (the demand for all goods and services in an economy) and can be separated into imports and exports, investment, and government spending. What is formed in the economy can be separated into services, durable goods, structures, inventories and nondurable goods. GDP sums only final output of goods and services, not the production of intermediate goods or the value of labor in the chain of production to avoid double counting (adding the value of output to the GDP more than once).

2.2 **Theoretical Framework**

2.2.1. **Keynesian Theory of Government Expenditure**

The fractional dynamics of national income are described by the generalization of economic growth models connected with the Keynesian model. The classic dynamic model of growth supports the theoretical understanding of the association between growth and spending. In this model, Keynes acknowledges that household income is a key predictor of spending; if people had more money, they would buy more goods and services, raising aggregate demand. Increased government spending, meanwhile, improves aggregate demand and consumption. These connections constitute an important part of the overall macro model.

In the standard dynamic Keynesian model with continuous time,

$$E(t) = C(t) + I(t) + G(t) \quad (1.3.1)$$

Where,

$Y(t)$ is a national income; $G(t)$ is the government expenditure; $C(t)$ captures the consumption expenditure; $I(t)$ describes the investment expenditure. All the variables describe the dynamics of the expenditure parts of the economy where $E(t)$ is a total expenditure, i.e. $E(t)$ is defined as the total of all expenditures. In dynamic equilibrium;

$$Y(t) = E(t) \quad (1.3.2)$$

In equation (1.3.2), the balance equation establishes the equality of the national income to the sum of all expenditures as,

$$Y(t) = C(t) + I(t) + G(t) \quad (1.3.3)$$

In the model, it is assumed that the consumption expenditure in period t depends on the income level in the same period. The consumption expenditure $C(t)$ is regarded as an endogenous variable equal to the amount of domestic consumption of some part of the national income and final consumption is independent of income. As a result, the consumption expenditure $C(t)$ is

described by the linear equation of the economic multiplier,

$$C(t) = a(t)Y(t) + b(t) \quad (1.3.4)$$

Where $a(t)$ is the multiplier factor that explains the marginal propensity to consume ($0 < a(t) < 1$), and the function $b(t) > 0$ is the autonomous consumption that is independent of income. The expression $a(t)Y(t)$ defines consumption that is independent of income. In the static model, the investment expenditure and government expenditure are considered as exogenous variables. As noted by Volgina, Golodnaya, Odiako, and Shuman (2014) in the dynamic Keynesian model, the investment expenditure $I(t)$ is treated as endogenous and it is assumed to depend on the level of income. The investment expenditure $I(t)$ is determined by the rate of change of the national income and it is the private sector expenditure. This assumption is described by the equation of the economic accelerator,

$$I(t) = u(t)Y^{(1)}(t) \quad (1.3.5)$$

where $u(t)$ is the rate of acceleration, which characterizes the level of technology and infrastructure.

$Y^{(1)}(t) = \frac{\partial Y(t)}{\partial t}$ is the first-order derivative of the income function $Y(t)$ with respect to the time variable.

Government expenditure $G(t)$ is the total government spending on infrastructure, health and education. As presented by Keynes, government spending is a critical factor driving aggregate demand. That means an increase in spending would increase demand. Also, Keynes argued that government spending was necessary to maintain full employment. On this note, many economies follow Keynes's Law aiming to automatically increase the economy in accordance with the growth of government expenditure through the multiplier effect (Lingxiao, Peculea and Xu, 2016). In the model, government expenditure $G(t)$, the propensity to consume $a(t)$, the rateof acceleration $u(t)$, and the autonomous consumption $b(t)$ are exogenous variables that are specified as external to the model and characterize the functioning and development of the economy (Tarasov & Tarasova, 2019). These variables, as functions of time, are assumed to be given. The purpose of the dynamic model is to explain the behavior of the national income as measured by Gross Domestic Product (GDP) relative to the aggregate expenditure. For this, it is necessary to find the national income $Y(t)$, as a function of time t. Substituting the multiplier Equation (1.3.4) and the accelerator Equation (1.3.5) into the balance Equation (1.3.3)yields equation (1.3.6):

$$Y(t) = a(t)Y(t) + b(t) + u(t)Y^{(1)}(t) + G(t) \qquad (1.3.6)$$

Overall, it should be emphasized that while both Keynes and Wagner's Laws describe the long-run association between government spending and growth of the economy, Keynes classified public spending as an external component that results in the growth of the economy rather than an internal phenomenon (Lingxiao, Peculea, and Xu, 2016). Devarajan, Swaroop, and Zou (2006), have utilized this idea and conducted a systematic assessment of the link between the mix of public expenditures and economic development. This study, which is based on this theory, specifies the link between the variables of interest in the following sub-section.

2.3 Empirical Review

Okoye, et al. (2019) investigated the relationship between capital government expenditure and economic growth in Nigeria using the Auto-regressive distributed lag (ARDL) to see how much government spending influences output growth. The research is based on data collected between 1981 and 2017. The study found that lagged current expenditure had a considerable short-run negative influence on economic growth. It also showed that lagging capital investment had a considerable beneficial impact on growth. However, there is no evidence of a long-run influence of government spending on economic growth within the scope of this study. This suggests a pattern of government spending in Nigeria that is unsustainable.

According to Ogunleye (2014), health is a type of human capital and a vital aspect in the economic growth process. As a result, health production is a key factor in determining health outcomes. Between 1995 and 2014, Aboubacar and Xu (2017) looked at the relationship between health-care spending and economic growth in Sub-Saharan Africa. The results were estimated using the system's General Method of Moments (GMM) approach. The results show that there is a positive and statistically significant association

between the two variables, indicating that health spending has a major impact on the region's economic growth.

Kuhn and Prettner (2016) investigated the implications of a labour-intensive healthcare industry in the context of an R&D-driven growth model with overlapping generation. Health care increases longevity and labor participation/productivity. Even if the provision of health care diverts labor from productive activities, it may still fuel R&D and economic growth if the additional wealth that comes with expanding longevity translates into a more capital/machine intensive final goods production and, thereby, raises the return to developing new machines. Mild conditions under which an expansion of health care beyond the growth-maximizing level is Pareto-improving was examined.

Asiedu, Agyemang and Frempong (2020) examined the effect of health expenditure on economic growth in Ghana and Rwanda (1995-2018) using the Autoregressive Distributed Lag (ARDL) model and found a long-run positive relationship between capital health spending and economic growth. Due to strong governance, the short-run impact was also significant bin Rwanda.

Wu et al. (2021) applied the quantile-on-quantile approach to investigate the influence of the quantiles of healthcare on the quantiles of the economy's growth for pooling forty countries in the Asian region. As the quantile of healthcare expenditure increases in the countries, the impact of healthcare expenditure on the economy's growth does not guarantee an increase. The positive and negative effects of healthcare expenditure on developing the economic relationship will repeatedly occur when the quantiles of the economy's growth increase in the countries. One implication is that the governments should account for problems such as corruption, bureaucracy, underinvestment, and inefficiency in health-related resource utilization

Ogunleye and Olayemi (2022) examined how current health expenditure affects economic growth across 20 sub-Saharan countries using the Generalized Method of Moments (GMM) and found a positive association with economic growth though it was statistically insignificant.

3. Methodology

The General Method of Moments (GMM) estimation technique was used and the data covered the period 2000-2019 for forty-six countries in sub-Saharan Africa and the data was derived from the ministry of health and World Bank Database.

3.1 Model specification

In this study and in line with the specific objective of examining the effects of capital and current health expenditure on economic growth in Sub-Saharan Africa, one main regression model was specified and estimated. The model in its functional form is given as;

$Y_i = f(X_i)$; Y_t= vector of dependent variables while Y_t= vector of independent variables

More specifically, the model in its functional form is given as;

GDP_PC = f (CAH, CHE, GE, LEB, PGR)

However, the model is specified in empirical form as;

$\ln GDP_{it} = \beta_0 + \beta_1 \ln CAH_{it} + \beta_2 \ln CHE_{it} + \beta_3 \ln GE_{it} + \beta_4 \ln PGR_{it} + \beta_5 \ln LEB_{it} + \varepsilon_{1it}$

"α_s" represent the coefficients of the regression equation, "α_0"is the constant and **"**ε_{1it}**"**is the error term where; GDP is Gross domestic product capturing economic growth, CAH is capital expenditure on health, CHE is current expenditure on health, LEB is the life expectancy at birth and (PGR).is the population growth rate.

H0: There is no significant relationship between health expenditure and economic growth in Sub- Saharan Africa

4. Results and Discussion

Table 1: Short-Run differenced & system (GMM-1 & GMM-2) Dynamic Panel Data Estimation

LGDP_PC	Diff GMM_1	Diff GMM_2	Sys GMM_1	Sys GMM_2
LGDP_PC	0.880821 (9.77)***	0.102634(1.8)*	0.9390674(24.51)***	0.949265(15.79)***
LCHE_PC	-0.00994 (1.07)	0.114031(3.19)***	0.0000657(0.31)	0.063877(2.1)**
CAH_GDP	0.0051271(1.99)**	1.232401(2.63)**	-0.0004719(-0.03)	0.005322(0.51)
CHE_GDP	0.114031(3.19)***	0.242854(2.01)***	0.0070565(2.17)*	0.002064(0.25)
LGE	0.065221(0.065)	1.210781(0.38)	0.0139169(0.47)	-0.06661(-1.24)
PGR	0.000387(0.10)	0.000387(0.1)	0.008859(0.61)	0.001359(0.21)
Hansen Prob	0.346	0.254	0.415	0.129
Sargan test	25.06	2.97	25.33	18.47
Sargan Prob	0.093	1.000	0.088	0.297
Hansen test	26.39	18.16	17.59	22.44

AR (1) test	-2.68	-1.42	-1.66	-1.46
AR (1) P-value	0.007	0.007	0.096	0.144
AR (2) test	-1.32	-1.16	-0.82	-0.97
AR (2) P-value	0.185	0.248	0.411	0.331
No. of Instruments	21	21	23	22
No. of Observations	222	222	241	243

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's Computation

Short-Run Effect of Capital and Current Health Expenditure

The *table 1* shows the effect of capital health expenditure and current health expenditure on economic growth using the generalised methods of moments. The result contains two difference equation and two system equation.

Estimation of Short-Run differenced GMM-1 and GMM-2 Dynamic Panel Data

For the difference GMM-1 step results in the short run, it is evident that a percentage change in capital health expenditure is accompanied by a 0.5% rise in economic growth at a 5% level of significance, everything being equal. Hence, capital health expenditure as a percentage of GDP (CAH_GDP) exhibits a direct relationship with GDP_PC. In the same short run, a percentage increase in current health expenditure as a percentage of GDP (CHE_GDP) is accompanied by an 11.4% rise in economic growth at a 5% significance level, everything being equal. This result shows that current health expenditure (CHE_GDP) and GDP_PC have a direct relationship, which indicates that a 1% change in current health expenditure (CHE_GDP) results in a less than 1% change in real gross domestic product (GDP_PC). The result also shows that the probability value of AR (1) is 0.007, which is significant as expected, while the probability value of AR (2) is 0.185. It shows that the AR of order 2 is not significant, which means that there is no second-order serial correlation and this implies that the lag of the dependent variables used as instruments is not endogenous. The probability of the Hansen (0.346) is not significant and indicates that the instruments are good. In summary, an increase in current and capital government spending on health will improve economic growth in Sub-Saharan Africa in the short run. This finding supports Jamison (2006), who argued

that in economic crises, health investments are keys to economic recovery. Equally, WHO (2017) has documented that health expenditures contribute to poverty reduction in Sub-Saharan Africa.

For the difference GMM-2-step result, in the short run, it is evident that a percentage change in capital health expenditure CHE_GDP is accompanied by a 24.2854% rise in LGDP_PC at all levels of significance, everything being equal. Hence, current health expenditure on economic growth exhibits a direct relationship. In the same short run, a percentage increase in capital health expenditure (CAH_GDP) is accompanied by a 123.24% rise in economic growth at a 5% level of significance, everything being equal. Hence, capital health expenditure and economic growth (CHE_GDP) have a direct relationship. Also, in the short run, a percentage change in current expenditure per capita is accompanied by 11.4031% rise in economic growth, everything being equal. The result also shows that the probability value of AR (1) is 0.007, which is significant as expected, while the probability value of AR (2) is 0.248. It shows that the AR of order 2 is not significant, which means that there is no second-order serial correlation and this implies that the lag of the dependent variables used as instruments is not endogenous. The probability of the Hansen (0.245) is not significant and it indicates that the instruments are good. In summary, an increase in current and capital government spending on health and current expenditure per capita will improve growth in the economy of Sub-Saharan Africa in short term. This result support OECD (2019) and World Bank (2014), that documented that countries that invest more in healthcare tend to experience **sustained economic growth**, especially when health expenditure is effectively allocated to improve overall population health.

Estimation of Short-Run system GMM-1 and GMM-2 Dynamic Panel Data

The system GMM-1-step result shows that a percentage change in current health expenditure CHE_GDP is accompanied by a 0.70565% rise in the growth of the economy in the short term at a 10% level of significance, everything being equal. The result also shows that the probability value of AR (1) is 0.096, which is significant as expected, while the probability value of AR (2) is 0.411. It shows that the AR of order 2 is not significant, which means that there is no second order serial correlation. The probability of the Hansen (0.415) is not significant, which indicates that the instrument set is good. In summary, an increase in current government spending on health will improve economic growth in Sub-Saharan Africa in the short run. This result supports OECD (2019) that when governments increase health spending, they can improve public health outcomes, reduce the burden of disease, and enhance the workforce's productivity, which directly stimulates economic growth.

The system GMM-2-step in table 1 shows that CHE_PC has a positive and significant relationship with LGDP_PC at the 5% level of significance, which implies that a percentage increase in current health per capita (LCHE_PC) in the short run is accompanied by a 6.38% rise in real gross product at the 5% level of expenditure, everything being equal. The result also shows that the probability value of AR (1) is 0.144, which is insignificant, while the probability value of AR (2) is 0.331. It shows that the AR of order 2 is not significant, which means that there is no second order serial

correlation. The probability of the Hansen (0.129) is not significant, which indicates that the instrument set is good. In summary, the increase in current expenditure per capita will increase economic growth in the long run. This finding support Mourougane, **et al (2016),** in their work, found that government spending on human capital (e.g., education and health) is linked to higher long-term growth. The finding equally supports IMF (2022) that public investment, particularly in education, healthcare, and infrastructure, plays a crucial role in boosting the potential output of an economy, as such spending can enhance human capital and improve the economic environment, fostering long-term growth.

Table 2: Long-Run differenced & system (GMM-1 & GMM-2) Dynamic Panel Data Estimation

LGDP_PC	Diff GMM_1	Diff GMM_2	Sys GMM_1	Sys GMM_2
LCHE_PC	-0.0446437(-1.29)	0.5001967(1.91)***		
CAH_GDP	0.0197648(1.82)*	0.0071757(1.93)**	-0.0077447(-0.03)	0.1048993(0.53)
CHE_GDP	0.0219994(1.65)*	-0.0413459(-2.09)**	0.1158081(2.18)	0.0406719 (3.64)***
LGE	0.4093573(1.67)*	0.2918282(1.83)*	0.2283985(0.51)	-1.312874(-0.61)
PGR	0.4093573(1.19)	0.0007203(0.05)	0.1453895(0.60)	0.0267943(0.18)

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's Computation

Long-Run effect of capital and current health expenditure on economic growth

This section shows the long-run effect of capital and current health expenditure on economic growth using the Generalised Methods of Moments (GMM). It presents results of one-step and two-step difference and system dynamic panel data estimation

Long-Run difference GMM-1 and GMM-2 Dynamic Panel Data Estimation

Table 2 presents the result of the one-step long-run difference GMM panel data estimate. From the result, CAH_GDP, CHE_GDP and LGE are found to be positive significant at 10% level. The result of the difference GMM-1 step, in the long run, indicates that a percentage change in capital health expenditure is accompanied by a 1.97648% rise in

LGDP_PC at the 10% level of significance, everything being equal. Hence, capital health expenditure on LGDP_PC exhibits a direct relationship, indicating that a 1% change in capital health expenditure results in more than a 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one percent change in government spending has a larger positive effect on the LGDP_PC in the long run (1.97648%) than in the short run (0.5%). Also, in the long run, the result of the difference GMM-1 step indicates that a percentage change in current health expenditure is accompanied by a 2.19994 % rise in LGDP_PC at the 10% level of significance, everything being equal. Hence, current health expenditure on LGDP_PC exhibits a direct relationship, indicating that a 1% change in current health expenditure results in more than a 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one percent change in the current health expenditure has a lesser positive effect on the LGDP_PC in the long run (2.19994%) than in the short run (11.4%). Furthermore, in the long run, a percentage change in government expenditure is accompanied by a 40.93573% rise in LGDP_PC at the 10% level of significance, everything being equal. Hence, government expenditure on LGDP_PC exhibits a direct relationship, indicating that a 1% change in government expenditure results in more than a 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one percent change in government spending has a larger positive effect on the LGDP_PC in the long run. In summary, an increase in government expenditure on health will improve economic growth in Sub-Saharan Africa in the long run. This finding support Bedir,(2016) and IMF (2016)**,** who reported that health spending, has a statistically significant positive effect on economic growth.

Table 2 presents the result of the two-step long-run differenced GMM panel data estimate. From the results, CHE_GDP, CAH_GDP, and LCHE_PC were found to be significant at a 5 per cent level of significance, while LGE was found to be significant at a 10 per cent level of significance. In the long run, the result of the difference GMM-2 step indicates that a percentage change in current health expenditure is accompaied by a 4.1 percent rise in LGDP_PC at a 5 percent level of significance, everything being equal. Hence, current health expenditure on economic growth exhibits an indirect relationship, indicating that a 1% change in public health expenditure results in a more than 1% change in Real Gross Domestic Products (LGDP_PC). Moreover, a one percent change in the current health expenditure on health has a more positive outcome on the LGDP_PC in the long-run period (4.13459%). Similarly, in the long run, a percentage change in capital health expenditure is accompanied by a 0.71757% rise in LGDP_PC at a 5% level of significance, everything being equal. Hence, capital health expenditure and economic growth exhibit a direct relationship, indicating that a 1% change in capital health expenditure results in a less than 1% change in Real Gross Domestic Products (LGDP_PC).

In addition, a one-percent change in capital health expenditure on health has a larger positive effect on the LGDP_PC in the short run (123.2401%) than in the long run (0.71757%). Also, in the long run, a percentage change in current health expenditure per capita is accompanied by a 50.01967% rise in LGDP_PC at a 5% level of significance, everything being equal. Hence, current health expenditure per capita on economic growth exhibits a direct relationship, indicating that a 1% change in capital health expenditure

results in more than a 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one percent change in the current health expenditure per capita has a lesser positive effect on the LGDP_PC in the short run (11.4031%) than in the long run (50.01967%). Lastly, in the long run, a percentage change in government expenditure is accompanied by a 29.18282% rise in LGDP_PC at the 10% level of significance, everything being equal. Hence, government expenditure on economic growth exhibits a direct relationship, indicating that a 1% change in capital health expenditure results in more than a 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one percent change in the government expenditure has a larger positive effect on the LGDP_PC in the long run (29.18282%). In summary, an increase in government expenditure on health will improve growth in the economy of Sub-Saharan Africa in the long term. This finding supports I welunmor et al *(2014)* who found that increased spending on healthcare, specifically targeting major health crises like HIV/AIDS, led to improved long-term economic outcomes in African nations. This finding equally supports *IMF* (2014) that highlighted those health investments in Sub-Saharan Africa could contribute to long-term economic sustainability.

Long-Run system GMM-1 and GMM-2 Dynamic Panel Data Estimation

Table 2 presents the result of the one-step long-run system GMM panel data estimate. From the result, CHE_GDP, LPRHE_PC, LGE and PGR are found to have a positive insignificant while CAH_GDP is negative insignificant in the long run. Therefore, these variables do not have an effect on LGDP_PC in the long run. Table 2 also presents the result of the two-step long-run system GMM panel data estimate. As a result, CHE_GDP was found to have a positive and significant effect on LGDP_PC at all levels of significance. The result of the system's GMM-2 step, in the long run, indicates that a percentage change in current health expenditure is accompanied by a 4.06719% rise in gross domestic product at 1% level of significance, everything being equal. Hence, current health expenditure on economic growth exhibits a direct relationship, indicating that a 1% change in current health expenditure results in a more than 1% change in Real Gross Domestic Products (LGDP_PC). In addition, a one-percent change in the current government spending on health has a larger positive effect on the LGDP_PC in the long run.

The short run analysis of effect of capital and current health expenditure on economy growth shows that both capital and current health expenditure have a positive effect on economic growth in Sub-Sahara African countries. This finding is consistent with those of Okoye, et al. (2019) and Ejem and Ogbonna (2019) while the long run analysis of effect of capital and current health expenditure on economy growth shows that current health expenditure has a positive effect on economic growth. However, Iheanacho (2016) documented a negative and significant long run effect of capital expenditure on economic growth in Nigeria, while recurrent expenditure is the major driver of economic growth. In Cameroon, Mandiefe and Tieguhong (2015) show that investments in public health contributed to Cameroon economic growth only in the long run, from 1988 to 2013, indicating that public health investments boost economic growth in the long-run through efficient allocation of resources.

5. Conclusion and Recommendation

The short run analysis of effect of capital and current health expenditure on economy growth shows that both capital and current health expenditure have a positive effect on economic growth in sub-Sahara Africa countries. To summarize, the results show that an upsurge in current and capital government health spending will improve economic growth in Sub-Saharan Africa in the short term. An increase in current expenditure per capita will increase the growth of the economy in the long term. The short-term analysis of the effects of capital and current health expenditure on economic growth shows that both capital and current health expenditure have an increasing effect on economic growth in sub-Saharan Africa. The government is therefore encouraged to invest more in capital and current projects like research and development so as to improve on already existing technologies, which will in turn, enhance the well-being of the population in sub-Saharan Africa.

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