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Determinant of Healthcare Investments in Sub-Saharan Africa

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Abstract

This study examines the determinants of healthcare investment in Sub-Saharan Africa from 1999 to 2017 involving 35 SSA countries. The econometrics methods used in the study involves the fixed effect and random effect models, and the generalized method of moments (GMM-SYS). The results of the static model showed that GDP per capita, population and inflation positively affect investment in Sub-Saharan Africa, while debt service as a share of GDP negatively impacts healthcare investment in SSA. On the other hand, the GMM results showed that GDP per capita, population, growth, inflation, and debt service as a share of GDP have a negative relationship with healthcare investment, while infant mortality rate has a positive influence on healthcare investment in SSA. The study recommends that for SSA to improve the health sector and reduce incidences of malaria, HIV, tuberculosis, diarrhoea, and other diseases, it is important for both the governments and private investors to raise the level of healthcare investments to pay for better healthcare services, build more hospitals, clinics, and other healthcare facilities; and better finance research and development in the health sector.

Keywords: *healthcare investment, per capita, population, debt service and infant mortality rate.*

1. Introduction

Improving the health and longevity of individuals is an end in itself, and it is obviously a key indicator of economic development. However, improved health is also a means to achieving other development goals. For example, a better health of the labour force improves labour efficiency and productivity, and thus increased output. In other words, healthcare investments do not only improve the health of the populace but also serve as an important source of poverty reduction and economic growth. The burden of disease and health failure in most Sub-Sahara African (SSA) countries stands as a stark barrier to economic growth and development. Hence, there is an urgent need to address the challenges of the health sector in these countries by charting the course of an all-round, all-including effort both by the private and public sectors.

One way to improve the health status and the health sector in general is to increase healthcare investments (both private and public). Thus, several efforts

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and policies have been made by the governments of the various SSA countries to channel more funds, resources, and investments into the health sector. The most remarkable and significant of these efforts was the Abuja Declaration of April 2001. Heads of state in Africa met from 26-27 April 2001 at a pedal summit in Abuja, Nigeria, to address the exceptional challenges of HIV/AIDS, tuberculosis, and other related infectious diseases. At this meeting, the governments committed to allocating at least 15% of their total annual government budgets to the health sector. Various African governments agreed to allocate a substantial part of their resources to the health sector. They also called upon donor countries to meet their commitment of devoting 0.7% of their gross national product (GNP) as official development assistance, and cancel African external debt to allow increased investment in the social sector. This is the most important decision African leaders have taken towards healthcare investments and financing.

However, after nineteen years of the Declaration, most SSA governments have failed to commit the target of 15% of total budget to the health sector. Also, they have failed to allocate a significant portion of their resources and GDP to the improvement of the health sector. This implies that instead of channelling more resources to the health sector as per the Abuja Declaration, they have done to the contrary by allocating less of their GDP to the health sector.

For example, Table 1 shows that the average public health expenditure as a percentage of GDP in the pre-declaration period (1995-2000) in Sub-Saharan Africa was 6.01%. In 2001, before the Declaration, public health expenditure as a percentage GDP stood at 5.79%. Hence, it has the same value with the average of the 2007-2011 post-declaration periods. However, as can be clearly seen in Table 1, all the averages in the post-declaration period are lower than those of the pre-declaration period.

Table 1: Average Public Health Expenditure (% of GDP) in SSA

Period	Pre-Declaration	Declaration	Post-Declaration		
Year	1995-2000	2001-2005	2002-2006	2007-2011	2012-2016
SSA	6.01	5.79	5.78	5.79	5.58

Source: Author's computations from WDI, 2017

The apparent poor investment in healthcare in the region despite its healthcare needs and challenges served as the major motivation for this study. Therefore, this study seeks to examine the determinants of healthcare investment in SSA in the period of 1999 to 2017 for 35 SSA countries.

2. Literature Review

Several empirical literatures shed light on the determinants of healthcare investment in SSA. The first is that of Imoughele and Mohammed (2013), which empirically examines the determinants of public health expenditure in Nigeria. Using error correction techniques and time series data from 1986 to 2010 to evaluate factors that influence public health expenditure in Nigeria, their results show that the demand for health in Nigeria is price inelastic. It also shows that that total population of those aged 14 years and below, and the health expenditure share in the gross domestic product (proxy for government developmental policy on health) are the major determinants of health expenditure in Nigeria; while gross domestic product per capital, unemployment rate, population per physician, consumer price index, and political instability are insignificant. To this end, they recommended that the Nigerian government should put in place adequate spending on health at all levels (primary, secondary, and tertiary institutions), and increase its budgetary allocation to the health sector to the prescribed 15% of its annual budgetary allocation. To them, this will make the government health expenditure have a robust effect on Nigerians' health status, and meet WHO's recommended budgetary allocation to the sector.

Chaabouni and Abednnadher (2010) examine the determinants of health expenditures in Tunisia during the period 1961-2008, using the autoregressive distributed lag (ARDL) approach by Pesaran et al. (2001). The results of the bounds test show that there is a stable long-run relationship between per capita health expenditure, GDP, population ageing, medical density, and environmental quality. Their findings show that on the one hand there are short-and long-run results that reveal that healthcare is a necessity, and not a luxury good. On the other hand, the results of the causality test show that there is a bi-directional causal flow from health expenditures to income, both in the short- and long-run. They recommended that policies aiming at encouraging health expenses are required to build a healthier and productive society to support Tunisia's economic growth and development. In addition, they recommended that the Ministry of Health should minimize the gap of inequality distribution of healthcare among people considering the spread of emerging chronic diseases, and assure the quality and performance of public health supply. Moreover, external cooperation of the WHO was also required to make an exchange of expertise and healthcare information.

Das and Martin (2010) quantitatively examine the determinants of aggregate healthcare expenditure using a co-integration procedure in the USA. The results indicate that per capita income contributes significantly to the explanation of healthcare expenditure. The findings also show that age of the population, number of practicing doctors, and the ratio of public health expenditure to total healthcare expenditure do not seem to have any big impact on aggregate healthcare expenditure in the US. The conclusions drawn from the results is that health expenditure policy should be coupled not necessarily with an increase in the supply of physicians or policies that promote competition, but with long-run policies that promote human capital. They also find that a mixture of public-private funding does not contribute significantly to the explanation of healthcare expenditure in the US.

Folahan and Awe (2014) assessed healthcare determinants in Nigeria in a study that covers a period of 34 years (i.e., between 1976 and 2010). Cointegration and error correction model was used to estimate a model that expressed health expenditure as a function of the number of physicians, number of nurses, number of hospitals, reported cases of malaria, HIV/AIDS, tuberculosis, population, and GDP. The result showed that the number of physicians, nurses, and of hospitals have a long-run positive relationship with health expenditure in Nigeria. Their effects are also significant, showing that they are important determinants of health expenditure in Nigeria. However, cases of various diseases such as malaria, HIV/AIDS, and tuberculosis did not have a significant long-run relationship with health expenditure. This shows that the bulk of health expenditure in Nigeria goes to the payment of salaries, while little is left for the maintenance and development of health facilities. Their findings also show that expenditure on diseases in Nigeria do not appears to be commensurate with the cases of diseases. They recommended that the government should improve capital expenditure in the area to improve healthcare provision in Nigeria.

Gerdtham and Johnson (1998) carried out an investigation on the determinants of health expenditure in the OECD countries. They used international health expenditure and the latest OECD data to investigate the determinants of aggregate health expenditure. Their findings show that the use of primary care 'gatekeepers' seems to result in lower health expenditure, and also that the way of remunerating physicians in the ambulatory care sector appears to influence health expenditure. They also found that capitation systems tend to lead to lower expenditure than fee-for-service systems.

Faisal and Ulrich (2011) described the macroeconomic determinants of healthcare spending in a broad context using time series data from Pakistan on economic, demographic, social, and political variables. The data-span—from 1972-2006—was analysed using cointegration and error correction approaches. AH variables were found to be first difference stationarity, confirming the presence of one cointegrating vector. This proved the existence of a long-run relationship between public healthcare expenditures and the other variables used in the model. The income elasticity of public healthcare expenditures was estimated at 0.23. Urbanization and unemployment were the variables that had a negative effect on healthcare expenditures, with elasticity values of -1.29 and -0.32, respectively; implying that it is costly to provide healthcare to residents of remote rural areas of Pakistan.

Boachie (2014) examined the determinants of public healthcare expenditure in Ghana using annual time series data from 1970 to 2008. They explored the stationarity and cointegration properties between public healthcare expenditure, and environmental and socioeconomic indicators using ERS optimal point unit root test, and Engle-Granger cointegration tests. They also examined the long-run impacts of real GDP, $C0_2$ emissions, crude birth rate, life expectancy, inflation, and urbanization on public healthcare expenditure in Ghana. The FMOLS technique was applied to estimate the long-run multipliers of public health expenditure model. The results of their findings show that public health expenditure in Ghana is positively affected by real GDP and policies that aim to improve the well-being of the population as measured by life expectancy and crude birth rates. The study finds a strong evidence that healthcare is a necessity in Ghana. They concluded that these variables need more and critical attention to achieve improved healthcare.

Samadi and Rad (2013) surveyed the determinants of health expenditures in the Economic Cooperation Organization (ECO) countries. They used panel data econometrics methods for the purpose of their research. For a long-term analysis, they used Pesaran cross-sectional dependency test, followed by panel unit root tests to show, first, whether the variables were stationary or not. Upon confirmation of no stationary variables, they used Westerlund panel cointegration test to see whether long-term relationships exist between the variables. At the end, they estimated the model with continuous-updated fully modified (CUP-FM) estimator. Also, for short-term analysis they used the fixed effects (FE) estimator to estimate the model. Their findings show that there is a long-term relationship between health expenditures per capita and GDP per capita, the proportion of population below 15 and above 65 years old, the number of physicians, and urbanisation. Likewise, all the variables had short term relationships with health expenditures, except for the proportion of population above 65 years old. The author's recommended that health is a necessary good in ECO countries, and that governments must pay due attention to equal distribution of health services in all regions of the country.

Table 2 presents a regional health expenditure as a percentage of GDP from 1999 to 2017. The table shows that throughout the considered period, Europe and Central Asia consistently channelled the highest percentage of their GDP to the health sector, followed by Latin America and Caribbean. On the hand, SSA's public health expenditure as a share of GDP is consistently higher than those of South Asia, and Middle East and North Africa.

Table 2: Regional Public Health Expenditure (% of GDP)

Year	Sub-Saharan Africa	Latin America & Caribbean	Europe & Central Asia	South Asia	Middle East & North Africa
1998	6.14	6.29	8.10	4.24	4.26
1999	6.07	6.29	8.23	4.21	4.25
2000	6.13	6.30	8.19	4.41	4.60
2001	6.14	6.31	8.18	4.70	4.84
2002	6.06	6.51	8.28	4.71	4.83
2003	5.52	6.35	8.23	4.61	4.91
2004	5.79	6.49	8.43	4.96	5.24
2005	5.38	6.19	8.67	4.99	5.49
2006	5.99	6.44	8.87	4.81	5.28
2007	6.04	6.38	8.84	4.62	5.30
2008	5.86	6.81	8.91	433	5.03
2009	5.66	6.77	8.81	4.23	4.92
2010	5.62	6.88	8.71	4.29	5.01
2011	5.59	6.90	8.97	4.19	5.16
2012	6.15	7.55	9.81	5.30	6.13
2013	5.79	7.18	9.56	5.03	6.09
2014	5.81	7.05	9.43	4.86	5.93
2015	5.60	7.02	9.46	5.04	6.27
2016	5.65	7.16	9.51	5.15	6.28
2017	5.47	7.31	9.50	5.32	6.36

Source: Author's Compilation from WDI, 2017

However, while public health expenditure (as a percentage of GDP) is increasing in other regions, it is declining in SSA. This again proves the growing neglect of the health sector by governments of countries in the region. Consequently, this raises a concern on factors that determine the amount SSA governments spend, as a share of their GDP, in the health sector as healthcare investment.

The OECD considers that healthcare expenditure must be carefully planned, regardless of who is paying or providing health services (OECD, EuroStat & WHO, 2011). Also, the OECD (2006) argued that healthcare investment is primarily determined by demographic and non-demographic factors. The demographic factors include mortality rate, literacy rate, and the state of health of the population. The non-demographic drivers of healthcare investment include some the following: GDP growth, inflation administrative cost, poverty rate that influences the demand for healthcare, and interest rate that affects the cost of private healthcare investment.

3. Methodology

3.1Analytical Techniques

The methodology of this study used the fixed effect, random effect static model, and the dynamic model (GMM) to investigate the individual impact of each determinant of healthcare investment in SSA. In the model specification, total health expenditure as a percentage of GDP is used as a proxy of healthcare investment.

3.1.1 Fixed Effects Mode

The fixed effects model arises from the assumption that the omitted effects, c_i, in the general model:

$$y_{it} = x'_{it}\beta + C_i + \varepsilon_{it} \qquad (1)$$

are correlated with the included variables. In a general form,

$$E[C_i \,|X_i\,] = h(X_i) \qquad (2)$$

Because the conditional mean is the same in every period, we can write the model as:

$$\begin{aligned} y_{it} &= x'_{it}\beta + h(X_i) + \varepsilon_{it} + [c_i - h(X_i)] \\ &= x'_{it}\beta + \alpha_i + \varepsilon_{it} + [c_i - h(X_i)] \qquad (3) \end{aligned}$$

By construction, the bracketed term is uncorrelated with X_i, so we may absorb it in the disturbance, and write the model as:

$$y_{it} = x'_{it}\beta + \alpha_i + \varepsilon_{it} \qquad (4)$$

A further assumption (usually unstated) is that $\text{Var}[c_i \,|X]$ is constant. With this assumption, equation (4) becomes a classical linear regression model. For the sake of emphasis, it is equation (2) that signifies the 'fixed effects' model, not that any variable is 'fixed' in this context, and random elsewhere. The fixed effects formulation implies that differences across groups can be captured in differences in the constant term. Each α_i is treated as an unknown parameter to be estimated.

3.1.2 Random Effects Model

The fixed effects model allows unobserved individual effects to be correlated with the included variables. We then modelled the differences between units strictly as parametric shifts of the regression function. Consider, then, a reformulation of the model:

$$y_{it} = x'_{it}\beta + (\alpha + \mu_i \qquad (5)$$

Where there are K regressors. The component μ_i is the random heterogeneity specific to the ith observation and is constant through time.

3.1.3 Dynamic Panel Data Estimator (GMM SYS Estimator)

The dynamic panel data estimator has been advanced as an effective method of addressing the problems of endogeneity and orthogonality between error terms and regressors (Adamu et al., 2016). The dynamic panel data estimator used in this paper is equivalent to the generalized method of moments system (GMM SYS) technique, and hence possesses the properties of consistency and asymptotic efficiency (Arellano & Bond, 1991). Arellano and Bond's (ibid.) model, which has strict exogenous variables (K-l independent variables), is an autoregressive specification of the form:

$$y_{it} = ay_{i(t-i)} + \beta x^* + \eta_i + V_{it} = \delta' x_{it}\eta_i + v_{it} \qquad (6)$$

Where $X_{it} = (y_{i(t-i)}X_{it}$*')' is $k \times 1$, and the v_{it} are not serially correlated. Suppose initially that the x^* are all correlated with η_i. In this context the form of the optimal matrix of instruments depends on whether the X_{it}* are predetermined or strictly exogenous variables.

If the X_{it}* are predetermined, in the sense that $E(X_{it}{}^*v_{is}) \neq 0$ for $s < t$ and zero otherwise, then only x_{it}*,...,$X_i(s.1)$are valid instruments in the differenced equation for period s so that the optimal Z; is a $(T-2) \times (T-2)[(k-1)(T+1) + (T-2)]/2$ matrix of the form Z = diag($y_n, \dots, y_{is}X_i1$*'...$x_i{}^*{}_{*(s+i)}), s = 1, \dots, T-2)$. On the other hand, if the x_{it}* are strictly exogenous, i.e., $E(x_{it}v_{is})$ for all t, s, then all the $x^{*'}s$ are valid instruments for all the equations; and Z_i takes the form Z = diag(y_i1 ..., $y_{is}X_i1$*... X_{iT}*'), (s = 1,...,$T-2$). Clearly, x_{it}* may also include a combination of both predetermined and strictly exogenous variables. In either case, the form of the GMM estimator of the $k \times 1$ coefficient vector δ is:

$$\delta = (X'ZA_NZ'\bar{X})^{-1}X'ZA_NZ'\bar{Z}'\bar{y} \qquad (7)$$

Where $\bar{X}$ is a stacked $(T-2)N \times k$ matrix of observations on X_{it}, and y and Z are for the appropriate choice of Z_i. Alternative choices of A_N will produce one-step or two-step estimators.

3.2 Model Specification

Based on the foregoing, the model for this study is presented below considering the following panel model:

$$HI_{it} = \beta_1 GDPC_{it} + \beta_2 IMR_{it} + \beta_3 POGR_{it} - \beta_4 IFN_{it} + \beta_5 DSEG_{it} + \mu_{it} \qquad (8)$$

In this model, *I* indicates cross sections and t indicates time period. For making an estimable regression, we used the logarithm form for the model. To make the model brief, we used 'LN' instead of log:

$$LNHI_{it} = \beta_1 LNGDPC_{it} + \beta_2 LNIMR_{it} + \beta_3 LNPOGR_{it} + \beta_4 LNINF_{it} + \beta_5 LNDSEG_{it} + \mu_{it} \qquad (9)$$

Where:

$LNHI_{it}$= the logarithm of healthcare expenditures as a share of GDP (used as a proxy for healthcare investment);
$LNGDPC_{it}$= the logarithm of per capita gross domestic product;
$LNIMR_{it}$= the logarithm of infant mortality rate per 1000 live birth;
$LNPOGR_{it=}$ the logarithm of population between 15 and 65 years of age;
$LNINF_{it=}$ the logarithm of inflation;
$LNDSEG_{it}$= the logarithm of total debt service as a percentage of GDP; and
μ_{it}= the stochastic error term.

Based on existing literature, it is assumed in this study that *GDPC* has a positive relationship with *HI*; *IMR* has a positive relationship with *HI*; *POPR* also has a positive relationship with *HI*; *INTR* has a negative relationship with *HI*; *INIR* has a negative relationship with *HI*; and *GD* has a negative relationship with *HI*; based on the assumption that government debt reduces available resources, which in turn limits general investments.

4. Results

The study presents the econometric results obtained by using the fixed effects model, the random effect model, and the dynamic panel data (or the GMM SYS estimator). We should note that one star (*) indicates that an estimated regression coefficient is significantly different from zero at a 10% confidence level; two stars (**) show that a regression coefficient is significantly different from zero at a 5% confidence level; and three stars (***) signify that a regression coefficient is significantly different from zero at a 1% confidence level. The total absence of a star indicates that a regression coefficient is not significantly different from 0, even at a 10% level. Table 3 presents results of the static models (fixed and random effect models).

The static model results, which involve the results of the fixed effect model and the random effect model in both the fixed effect model and the random effect model, shows that GDP per capita (GDPC) has a negative effect on healthcare investment. Its coefficient is significant at a 10% confidence level in both models.

Table 3: Static Models Results - Dependent Variable (HI)

	Fixed Effect Model			Random Effect Model		
Variable	*Coefficient*	*t-ratio*	*p-value*	*Coefficient*	*t-ratio*	*p-value*
C	6.536993	14.23	0.0000	7.225044	15.68	0.0000
GDPC	-0.000112	-1.67	0.0962	-0.000101	-1.86	0.0634
IMR	0.037147	2.10	0.0366	-0.004564	-0.38	0.7034
POGR	0.240454	2.95	0.0033	0.224022	2.77	0.0057
INF	0.000527	2.05	0.0411	0.000589	2.32	0.0206
DSEG	-0.024827	-4.29	0.0000	-0.030634	-10.84	0.0000
R^2	0.809016			0.173750		
Adjusted R^2	0.791082			0.167481		
F-statistic	45.11010			27.71589		
D-W stat	0.492502			0.451230		

Source: Author's computation using EVIEWs 7.0

On the other hand, while infant mortality rate (per 1000 live births) has a positive effect on healthcare investment in the fixed effect model, healthcare investment is negatively affected by infant mortality rate (IMR) in the random effect model. The coefficient of IMR is significant as it passes the significant test at a 5% level in both models. Population growth has a positive effect on healthcare investment in both the fixed and the random effect models. Its coefficient is highly significant in both models, easily passing the significance test at a 1% level of significance. In contradiction to *a priori* expectation, inflation affects healthcare investment positively in SSA, and its coefficient is significant at a 5% level in both models. As expected, total debt service (as a percentage of GDP) in the two models has a negative effect on healthcare investment in SSA. It has a coefficient that is highly significant since it easily passes the significance test at a 1% level of significance in both the fixed and random effect models.

Table 4 presents the dynamic model results. As expected, the one period lagged value of healthcare investment (*HI*) has a positive and highly significant effect on the current healthcare investment. Similar to the static model, GDP per capita (GDPC) has a negative effect on healthcare investment. Its coefficient is not significant as it fails to pass the significance test even at a 10% confidence level. As in the fixed effect model, infant mortality rate (per 1000 live births) has a positive effect on healthcare investment in SSA. The coefficient of IMR is not significant as it does not pass the significance test at all levels of significance. Population growth has a negative effect on healthcare investment in the region. This contradicts both the *a priori* expectation and the static model's results. Its coefficient is also insignificant at all levels of significance. In line with *a priori* expectation, inflation affects healthcare investment negatively in SSA, and its coefficient is highly significant as it passes the significance test at a 1% level. Finally, as expected, total debt service (as a percentage of GDP) has a negative effect on healthcare investment in SSA. It has a coefficient that is highly significant since it easily passes the significance test at a 1% level of significance.

Table 4: Dynamic Model Results - Dependent Variable (HI)

Variable	Coefficient	T- Value	p-value	Significance
HI(-l)	0.763322	27 30898	0.0000	***
C	1.768790	5.145389	0.0000	***
GDPC	-2.01E-05	-0.512369	0.6086	
IMR	0.005290	0.413147	0.6796	
POGR	-0.015268	-0.263793	0.7920	
INF	-0.002814	-3.988268	0.0021	***
DSEG	-0.005101	-2.191017	0.0288	**
R2	0.914659			
Adjusted R2	0.908863			
J-Stat	1.97E-21			
D-W stat	2.059145			

Source: Author's computation using EVIEWS 7.0

The coefficient of determination (R^2) of 0.92 indicates that the explanatory variables account for about 92% of the total systematic variations in the dependent variable (*HI*). The remaining 8% is captured by the stochastic error term. After adjusting for the degree of freedom, the adjusted R^2 shows that the explanatory variables were still able to account for about 91% of the total systematic variations in the dependent variable. The Durbin-Watson statistic of 2.059 signifies the absence of a seria1 correlation in the dynamic model.

4. Implication and Discussion of Findings

From all models employed in this study, we can draw out some implications of our findings. Against expectations, the findings show that GDP per capita has a negative influence on healthcare investment in SSA. This implies that as the economy of the region grows, fewer resources are channelled to the health sector as healthcare investment. In accordance with expectation, infant mortality rate (*IMR*) has a positive relationship with healthcare investment. This implies that as the death rate of infants per 1000 live births increases, both public and private investors are propelled to invest in the health sector. Higher infant mortality rate shows that the health sector requires better health facilities, and thus greater healthcare investments.

The GMM results show that population growth is negatively related to healthcare investment in SSA. This implies that as population growth increases, both private and public investments in the health sector decline. One possible reason for this is that governments in SSA may find that other sectors of the economy—such as education, transportation, power, and agricultural sectors—require greater allocation of resources as the growth rate of the population increases.

Inflation negatively affects healthcare investment in the GMM model. This implies that as the prices of medical and non-medical products rise, fewer funds will be channelled to the health sector. In other words, as the costs of goods and services (medical and non-medical) increases, private investors and government in SSA are discouraged from investing in the health sector. Also, from the demand side, higher inflation rate reduces peoples' purchasing power, thus reducing their ability to purchase health products and services. The total debt service (as a percentage of GDP) has a negative impact on healthcare investment, implying that the higher the debt service as a share of GDP, the lower the resources that go into the health sector as investment. Total debt and debt service payments discourage both domestic and foreign direct investments, and consequently inhibit private healthcare investments. Debt service payments by a government reduce available government resources, thereby adversely impacting public healthcare investments.

5. Conclusion and Policy Implications

Healthcare investment can be influenced by the extent and degree of diseases such as malaria, HIV/AIDS, tuberculosis, polio, diarrhoea, and so on. More so, the determinant of healthcare investment can be classified into demographic and non-demographic factors. Some of the demographic determinants include: infant mortality rate, maternal mortality, life expectancy, death rate, age brackets of the population, and fertility rates. Non-demographic determinants include income level of the populace, government expenditure, government revenue, GDP growth rate, and national debt.

This study examined the determinants of healthcare investment in SSA from 1999 to 2017 involving 35 countries. The econometrics methods used in the study involved fixed effect and random effect models, and the generalized method of moments (GMM-SYS). The results of the static models showed that GDP per capita, population, and inflation positively affect healthcare investment, while debt service as a share of GDP negatively impacts healthcare investments in SSA. On the other hand, the GMM results showed that GDP per capita, population growth, inflation, and debt service as a share of GDP have a negative relationship with healthcare investments, while infant mortality rate has a positive influence on healthcare investments in SSA.

The determinant of healthcare investment is key to the development of the health sector in SSA countries. The region has one of the highest prevalence of HIV/AIDS, malaria, diarrhoea, and tuberculosis. To improve the health sector and reduce the incidences of these and other diseases, it is important for both the governments and private investors in the region to raise the level of healthcare investments to pay for better healthcare services; build more hospitals, clinics and other healthcare facilities; and better finance R & D activities in the health sector.

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