Fiscal space for health in Sub-Saharan African countries: an efficiency approach

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Fiscal space for health in Sub-Saharan African countries: an efficiency approach

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Abstract

The study argues that potential savings from efficiency could be effective alternative to increasing health system financing in SSA. Health system efficiency estimates were derived from the Data Envelopment Analysis and Stochastic Frontier Analysis and used to compute potential gains from efficiency. Data was sourced from the World Bank's *world development indicators* for 45 SSA countries in 2011. The results reveal that average potential saving in health expenditure from improved efficiency was 0.10% and 0.75% of GDP per capita in the DEA and SFA models, respectively. The results also showed that a 1% increase in efficiency of health expenditure reduced infant mortality rate by 0.91% compared to 0.40% reduction in infant mortality if health expenditure increased by 1%. The results imply that in the face of significant economic challenges and burden on government budget, improving health expenditure efficiency to create some fiscal space will be an important step.

Keywords: Fiscal space for health, health expenditure, DEA, SFA

JEL classification: H5, I1

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1. Introduction

Health financing remains a major constraint to effective health service delivery worldwide, notably in developing countries which experience significant gabs between population health demands and financing. In sub-Saharan Africa (SSA) in particular, the lack of sufficient resources committed to the health sector has limited improvements in population health conditions, instigating several efforts by global and local non-governmental actors to improve investments in the health sector. Such efforts include the Abuja Declaration of 2001, which required governments to allocate a minimum of 15% of annual national budgets to the health sector. Fourteen years after the declaration, few countries (Rwanda, Malawi, Madagascar, Liberia, Togo and Zambia)[1] have achieved the target. Many other countries are still far from achieving the target.

An emerging concept directed towards increased and sustainable resource commitment to the health sector is Fiscal Space for Health (FSH). The concept seeks to identify opportunities for governments to raise additional funds for the health sector without jeopardizing the financial position of the government [1-2]. The idea is to find ways of increasing health resources while not compromising sustainability. This concept is particularly important for resource-constrained regions such as SSA. In countries of such regions, placing extra burden on government budgetary allocations may result in major macroeconomic challenges.

A widely recognized approach to achieving FSH is by improving efficiency and reducing wastages in the use of resources in the health sector. Health systems with low efficiency tend to waste significant amount of resources that could hitherto have been saved and re-invested into the sector. In that case, resources committed to the health sector would have ‘increased’ without any extra strain on the national budget.

While this approach has been documented in the theoretical literature on FSH, empirical applications have generally been limited. Available studies have either discussed the

[1] These countries had health spending as percent of total government expenditure above 15%, using 2011 data from the world development indicators

opportunities for efficiency gains in the health sector [3] or provided some quantitative evidence of efficiency gains for individual countries at various levels of the health system [1, 4]. Belay and Tandon [5] provided evidence from Napal to show that improvement in health system efficiency is by far the best option for realizing additional fiscal space for health. They suggested interventions in provider payments, drug procurement mechanisms and hospital and district grant allocations as effective ways to improve efficiency, hence increase fiscal space for the health sector.

Empirical evidence from Ghana also suggests that while there are prospects for fiscal space in the health sector, this may only be achieved through significant improvement in revenue collection and major efficiency gains [6]. Powell-Jackson [2] noted that attempts to use improved conceptual understanding to conduct rigorous empirical work is still at its infancy. The purpose of the current study was, therefore, to estimate available FSH through potential efficiency gains (savings on health expenditure from improved efficiency) at the national level and compare this across SSA countries.

2. Concepts of fiscal space for health

Fiscal space for health is considered to be a relatively novel concept in the health economics literature. This has attracted significant attention from policy makers and international organizations in the bid to improve health sector resources. Heller [7] provided a general definition of fiscal space as the "capacity of government to provide additional budgetary resources for a desired purpose without any prejudice to the sustainability of its financial position". In its application to the health sector, fiscal space for health has been defined as the "ability of government to increase spending for the health sector without jeopardizing government's long term solvency or crowding-out expenditure in other sectors needed to achieve other development objectives" [8-9].

There are five broad areas identified in the literature as the potential sources of fiscal space in the health sector [8-9]. These are (i) conducive macroeconomic conditions including improving government revenue and economic growth (ii) making health a priority in government budgets

(iii) increasing specific resources (such as taxes) to the health sector (iv) Health grants and foreign aid, and (v) increasing efficiency of existing government health outlay. It should be noted that with the exception of the last two options, the other sources of FSH are mostly outside the direct control of the health sector and are linked to general macroeconomic policies.

The current study leverages on the last source of FSH and provides empirical evidence to show that reducing wastages that exist in government health spending could create additional resources that can be re-invested into the health sector. This is particularly important because as posited by Powell-Jackson et al. [2], actors of the health sector have direct control on efficiency in the use of health resources. Improving efficiency of health expenditure is also important because most SSA countries face macroeconomic challenges that limit the extent to which budgetary allocations to the health sector can be increased. Moreover, grants and foreign aid to the health sector have reached significantly high levels with little room for increases, coupled with the reduction in aid from developed countries due to the current global financial challenges.

3. Methods

3.1 Empirical Analysis

The empirical analysis was performed in two stages. The efficiency of health expenditure was estimated in the first stage using both the Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) models. In the second stage, these efficiency scores were used to compute potential gains from efficiency for each country included in the analysis. The potential efficiency gain showed how much could be saved in terms of per-capita health expenditure at maximum efficiency. This was used to represent available FSH from increased efficiency.

The DEA model

The methodology adopted in the study follows Fare et al. [10] and Alexander et al. [11] using non-parametric linear programming techniques. The analysis starts with an optimization problem which determines the available population health outcome of other health systems. A 'best practice' frontier based on a piece-wise linear envelopment of the health expenditure - health outcome data for the sample countries, was used to solve the optimization problem.

Efficiency in the production of population health is measured relative to such a frontier for each country. The health systems of countries that operate on (and determine) the frontier are termed efficient (with efficiency score of 1.00), while countries operating off the frontier are considered inefficient (with efficiency scores less than 1.00). Inefficiency in this case should be understood to mean that better population health outcomes could have been attained from the observed health expenditure, were performance similar to that of 'best practice' countries.

To better understand the procedures described above, let S^t be the technology that transforms health sector expenditure into population health outcomes. This technology can be modelled by the output possibility set

$$P^t(x^t) = \left\{ y^t : (x^t, y^t) \in S^t \right\} t = 1, ..., T \quad (1)$$

where $P^t(x^t)$ denotes the collection of population health output vectors that consume no more that the bundle of resources indicated by the resource vector x^t, during period t.

The best practice frontier can be empirically estimated as the upper bound of the output possibility set, $P^t(x^t)$. The output possibility set, $P^t(x^t)$, can be estimated empirically by assuming that the sample set is made up of observations on $j=1,...J$ countries' health systems, each using $n=1,...N$ resources, x^t_{jn}, during period t, to generate $m=1,...,M$ population health outcomes, y^t_{jm}, in period t. Accordingly, $P^t(x^t)$ is estimated from the observed set of health expenditures, and population health outcomes for all the countries of the sample.

The empirical construction of the piece-wise linear envelopment of the input possibility set is given by

$$
\begin{aligned}
&P^t(x^t) = \{ y^t : x_n^t \leq \sum_{j=1}^{J} z_j x_{jn}^t, n = 1,\dots, N \\
&\sum_{j=1}^{J} z_j y_{jm}^t \geq y_m^t, m = 1,\dots, M \\
&\sum_{j=1}^{J} z_j = 1 \\
&z_j \geq 0, j = 1,\dots, J \}
\end{aligned} \tag{2}
$$

where z_j is a variable indicating the weighting of each of the health systems.

The output-based efficiency score for each country's health system for period t can be derived as

$$
F_o^t(x_j^t, y_i^t) = \max\{\theta \text{ such that } \theta y^t \in P^t(x^t)\} \text{ where } F_o^t(x_j^t, y_i^t) \geq 1. \tag{3}
$$

This suggests that a county's health outcomes vector, y^t, will be located on the efficiency frontier when equation (3) has a value of one. However, if equation (3) produces a value less than one, the health system must be classified as inefficient relative to best-observed practice. This measure can be computed for country j as the solution to the linear programming problem

$$
F_o^t(x_j^t, y_i^t) = \max \theta \tag{4}
$$

with θ, z such that

$$
\begin{aligned}
&\sum_{j=1}^{J} z_j y_{jm}^t \geq \theta y_{jm}^t, m = 1,\dots, M, \\
&\sum_{j=1}^{J} z_j x_{jn}^t \leq x_{jn}^t, n = 1,\dots, N, \\
&\sum_{j=1}^{J} z_j = 1, \\
&z_j \geq 0, j =,\dots, J,
\end{aligned} \tag{5}
$$

where the restrictions on the weighting variables, z_j, imply a variable returns to scale assumption in regard to the underlying technology of health production.

The SFA model

A simple cross sectional SFA model was used in the analysis [12]. The model basically generates stochastic error and inefficiency term based on the residuals obtained from an estimated production function expressed as follows:

$$\begin{aligned} y_i &= \alpha + x_i^{'}\beta + \varepsilon_i \\ \varepsilon_i &= v_i - u_i \\ v_i &\sim N(0, \delta_v^2) \\ u_i &\sim f \end{aligned} \qquad i = 1,..,N \qquad (6)$$

where y_i represents the logarithm of output of the *ith* DMU, x_i is a vector of inputs and β is the vector of technology parameters. The error term ε_i is composed of a sum of normally distributed disturbance (v_i) which accounts for measurement and specification error and a one-sided disturbance (u_i) which measures inefficiency. Both v_i and u_i are assumed to be independent of each other and *i.i.d* across observations. An exponential assumption $[u_i \sim \varepsilon(\delta_u)]$ proposed by Meensen and VanBroeck [13], was made about the distribution of the inefficiency term[2].

3.2 Computing efficiency gain

The potential expenditure savings computed in the current study follows Hernandez de Cos and Moral-Benito [14]. The starting point is to estimate the following equation that relates health outcomes (h_i) to per capita expenditure (exp_i) and efficiency (eff_i):

$$h_i = \beta_1 eff_i + \beta_2 \exp_i + \gamma x_i^{'} + u_i \qquad (7)$$

where x is a vector of other variables that influence population health and u_i is the error term. Given the estimated parameters for efficiency and expenditure ($\hat{\beta}_1$ and $\hat{\beta}_2$), respectively, the actual per capita health expenditure (*exp**) required to achieve the current health status (at maximum efficiency) can be computed for the *ith* country as follows;

[2] for further details on SFA models, see 12. Belotti F, Daidone S, Ilardi G, Atella V: **Stochastic frontier analysis using Stata.** *Center for Economic and International Studies Tor Vergata Research Paper Series* 2012, **10:**1-48.

$$\exp_i^* = \exp_i + \frac{\hat{\beta}_1}{\hat{\beta}_2}\left(eff_i - eff_{\max}\right) \tag{8}$$

The potential health expenditure savings (S^*) for the *ith* country can be expressed as a percentage of the country's per capita gross domestic product (GDPpc) as follows;

$$S^* = \frac{\exp_i - \exp_i^*}{GDP_{pci}} \times 100 \tag{9}$$

where GDP_{pci} is per capita GDP for the *ith* country.

The potential savings in per capita health expenditure shows the fiscal space for health available for the *ith* country if efficiency were improved.

3.3 Data and data source

Table 1 below gives a detailed description of the variables used in the analysis and their sources.

Table 1: Variable description and data source

Variables	Description
Infant mortality rate (IMR)	Main health outcome variable measured as infant deaths per 1000 live births
Per capita health expenditure (HEpc)	Health expenditure per capita measured in constant 2005 international dollars
Real GDP per capita (RGDPpc)	Real GDP per capita measured in constant 2005 international dollars
DPT Immunization (Imm)	Percentage of children ages 12-23 months who received DPT immunization before 12 months
Sanitation	Percentage of population using an improved sanitation facility
HIV prevalence rate (HIV)	Estimated number of adults aged 15-49 years with HIV infection expressed as percent of total population in that age group
Urbanization	Annual urban population growth rate.
Population aged 14 years and below (Pop1)	Population age group below or equal to 14 years expressed as percentage of total population

Population 15-64 years (Pop2)	Population age group between 15 and 64 years expressed as percentage of total population
Population 65 years and above (Pop3)	Population age group above 65 years expressed as percentage of total population
Education	Average years of schooling

Source: Author's compilation
Note: All data were sourced from The World Bank's *World Development Indicators*

Data for the study was obtained from the World Bank's World Development Indicators (WDI). The data were collected across 45 countries in SSA[3] for the year 2011[15]

4. Results

4.1 Descriptive statistics

Table 2 presents descriptive statistics of the variables included in the model. The mean values, standard deviations, minimum and maximum values are presented. On average, annual urban population growth rate was about 3.6%. Mean per capita GDP was about US$3630.5 with maximum and minimum values of US$349.0 and US$26142.0, respectively. On average, the countries included in the analysis spent US$225.4 per capita on health with minimum and maximum values of about US$17.0 and US$1642.7, respectively. Average infant mortality rate was about 63.2 per 1000 live births.

Table 2: Descriptive statistics

Variable*	Observation	Mean	Standard deviation	Minimum	Maximum
Urbanization (%)	45	3.61	1.44	-1.90	6.11
GDP per capita (US$)	45	3630.51	5676.14	349.01	26142.02
Immunization (%)	45	78.24	18.61	22.00	99.00
Sanitation (%)	45	35.45	22.40	9.60	97.10
Per-capita Health	45	225.39	322.26	16.99	1642.71

[3] The following countries were included in the study: Angola, Benin, Burkina Faso, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Demographic Republic, Congo, Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, South Africa, Sao Tome, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, The Gambia, Togo, Uganda and Zambia.

expenditure (US$)					
Infant Mortality Rate	45	63.17	25.51	11.90	119.20
Population under 14 yrs (%)	45	41.45	6.04	20.64	49.92
Population 15-64 yrs (%)	45	55.20	4.95	47.49	71.32
Population above 65 yrs (%)	45	3.35	1.23	2.16	8.04
HIV prevalence (%)	43	5.10	6.58	0.10	26.00
Education (years)	45	4.50	2.12	1.20	9.40

Source: Authors' computation

* Detailed variable definitions and units of measurement are presented in Table 1 above

4.2 Potential expenditure savings (efficiency gains)

Table 3 presents potential savings on health expenditure per capita given improvement in health expenditure efficiency. The potential expenditure savings are expressed as percentage of each country's GDP per capita. The potential expenditure savings differed across countries with some countries potentially benefiting significantly from efficiency improvements. The results from the DEA analysis show that on average, SSA countries could save per capita health expenditure of up to 0.10% and 0.08% of GDP per capita for single and multiple input specifications, respectively. A higher average is reported in the SFA model with a potential health expenditure saving of about 0.75% of per capita GDP.

The individual country analysis reveal that, as expected, countries located on the production frontier (efficiency score of 1.00) had no potential savings in health expenditure in the DEA model. These countries are relatively efficient, using their resources optimally. Examples of such countries include Cape Verde, Eritrea, and Seychelles. In both the DEA and SFA models, Democratic Republic of Congo recorded the highest potential saving in health expenditure with about 0.42% (DEA with single input), 0.39% (DEA with multiple inputs) and 3.32% (SFA) of GDP per capita respectively (Table 3). Other countries with relatively high potential saving on health expenditure using the single input DEA model include Burundi (0.29%), Liberia (0.26%), Central African Republic (0.20%) and Niger (0.19%).

In the SFA model, other countries with high potential health expenditure savings include Central African Republic (2.32%), Niger (1.76%), Burundi (1.75%) and Mali (1.58%). Countries with the lowest potential saving on health expenditure include Mauritius (0.02%), Seychelles (0.03%) and Botswana (0.05%).

Table 3: Potential savings in health expenditure

Country name	DEA Mono Input		DEA Multiple Input		SFA model	
	Efficiency score	Potential Saving	Efficiency score	Potential Saving	Efficiency score	Potential Saving
Angola	0.17	0.04	0.17	0.03	0.35	0.49
Benin	0.42	0.10	0.43	0.09	0.74	0.75
Botswana	0.65	0.01	0.65	0.01	0.81	0.05
Burkina Faso	0.33	0.12	0.76	0.04	0.56	1.36
Burundi	0.38	0.29	0.44	0.24	0.78	1.75
Cameroon	0.26	0.08	0.26	0.08	0.75	0.48
Cape Verde	1.00	0.00	1.00	0.00	0.91	0.10
Central African Rep	0.35	0.20	0.35	0.18	0.56	2.32
Chad	0.30	0.12	0.54	0.07	0.68	0.95
Comoros	0.54	0.10	0.61	0.08	0.80	0.71
Congo, D.R	0.34	0.42	0.34	0.39	0.69	3.32
Congo, Rep.	0.36	0.04	0.36	0.03	0.67	0.34
Cote d'Ivoire	0.27	0.10	0.27	0.09	0.78	0.52
Equatorial Guinea	0.14	0.01	0.18	0.01	0.11	0.13
Eritrea	1.00	0.00	1.00	0.00	0.86	1.11
Ethiopia	0.66	0.08	0.87	0.03	0.84	0.65
Gabon	0.29	0.01	0.29	0.01	0.49	0.14
Gambia, The	0.44	0.08	0.49	0.06	0.77	0.54
Ghana	0.50	0.07	0.50	0.06	0.85	0.35
Guinea	0.37	0.15	0.62	0.09	0.80	0.84
Guinea-Bissau	0.28	0.15	0.35	0.12	0.71	1.03
Kenya	0.59	0.06	0.59	0.06	0.91	0.24
Lesotho	0.27	0.10	0.27	0.09	0.54	1.06
Liberia	0.39	0.26	0.39	0.24	0.88	0.89
Madagascar	0.88	0.03	0.88	0.03	0.90	0.44
Malawi	0.53	0.13	0.53	0.12	0.80	0.97
Mali	0.28	0.15	0.37	0.12	0.55	1.58
Mauritania	0.27	0.08	0.27	0.07	0.55	0.80
Mauritius	0.99	0.00	1.00	0.00	0.92	0.02
Mozambique	0.42	0.15	1.00	0.00	0.70	1.36
Namibia	0.54	0.02	0.54	0.02	0.83	0.10
Niger	0.55	0.19	1.00	0.00	0.75	1.76
Nigeria	0.25	0.08	0.25	0.07	0.69	0.53
Rwanda	0.55	0.09	0.56	0.08	0.88	0.42
Sao Tome	0.31	0.10	0.31	0.09	0.83	0.41
Senegal	0.48	0.07	0.48	0.06	0.84	0.37
Seychelles	1.00	0.00	1.00	0.00	0.84	0.03
Sierra Leone	0.14	0.18	0.15	0.17	0.61	1.44

South Africa	0.34	0.02	0.35	0.01	0.53	0.18
Sudan	0.31	0.08	0.36	0.07	0.84	0.33
Swaziland	0.21	0.04	0.21	0.03	0.35	0.53
Tanzania	0.52	0.08	0.52	0.07	0.90	0.29
Togo	0.37	0.16	0.37	0.15	0.74	1.14
Uganda	0.37	0.12	0.37	0.11	0.88	0.38
Zambia	0.47	0.08	0.47	0.08	0.83	0.47
Mean	**0.45**	**0.10**	**0.50**	**0.08**	**0.72**	**0.75**

Source: Authors' computation

Note: Potential savings on health expenditure are expressed as percent of each country' GDPpc.

4.3 Efficiency, health expenditure and health outcomes

Results in Table 4 show the relationship between efficiency, health expenditure and health outcomes. The idea was to find out if increasing health expenditure and improving efficiency in the use of this expenditure influence health outcomes differently. All models used infant mortality rate as health outcome. The efficiency variables in Models 1 and 2 are from single and multiple inputs specifications, respectively. The results show that health expenditure efficiency significantly improved infant mortality rate with elasticities of approximately -0.91 and -0.80 in models 1 and 2, respectively. This implied that a 1% increase in health expenditure efficiency would translate into a reduction in infant mortality rate by 0.91% and 0.80% in models 1 and 2, respectively. In the SFA model, a 1% increase in efficient leads to a 1.13% reduction in infant mortality rate.

On the other hand, the results also show that health expenditure per capita has negative relationship with infant mortality rate, irrespective of the model specification. The relationship was however only significant for Models 1 and 2. The estimated elasticity for per capita health expenditure in Model 1 was about -0.40 while that of Model 2 was about -0.35. This suggests that a 1% increase in per capita health expenditure would reduce infant mortality by about 0.40% and 0.35% in Models 1 and 2, respectively. A general observation show that health system efficiency has a higher impact on infant mortality compared to per capita health expenditure.

Table 3: Efficiency and population health

Variables	Model 1	Model 2	Model 3
Lnefficiency	-0.90585***	-0.79634***	-1.12666***
	(0.02897)	(0.05378)	(0.18089)
LnHCEpc	-0.40412***	-0.35480***	-0.02974
	(0.03235)	(0.06433)	(0.11278)
LnHIV	0.02701**	0.07144***	-0.01615
	(0.00995)	(0.02033)	(0.03878)
Lnpop1	-0.45065	-0.69835	1.87358
	(0.37595)	(0.77148)	(1.37981)
Lnpop2	-0.47901	-1.08397	1.66604
	(0.51000)	(1.04276)	(1.92433)
Lnpop3	-0.06578	-0.1188	-0.12061
	(0.08385)	(0.16923)	(0.32481)
Lnurbanization	0.01917	0.01976	-0.12412
	(0.04953)	(0.10009)	(0.18895)
Lnsanitation	-0.01986	-0.09845**	-0.11589
	(0.01969)	(0.03922)	(0.07504)
LnGDPpc	0.03898	0.09025*	-0.22677**
	(0.02560)	(0.05234)	(0.09962)
Lneducation	-0.02647	-0.39915***	0.01468
	(0.02536)	(0.05365)	(0.09974)
Constant	8.58203**	12.28921*	-7.45126
	(3.33183)	(6.83989)	(12.47097)

Source: Authors' computation
Note: *** significant at 1%; ** significant at 5%; * significant at 10%. Model 1 and 2 have efficiency variables from DEA specification with mono (single) and multiple inputs, respectively. Model 3 has efficiency variable from the SFA model

5. Discussions

In general the findings of the study suggest the presence of some level of FSH across countries in SSA. Such FSH can be derived by improving efficiency of health expenditure.

The individual country analysis suggest that SSA countries have some potential fiscal space for health (or potential savings on health expenditure). This conforms with the findings of Hernandez de Cos and Moral-Benito [14] who found that potential efficiency gains in the health sector and the savings in health expenditure, thereof, are high. Similar conclusions were also drawn by Belay and Tandon [5] in the case of Nepal and Okwero et al. [1] in the case of Uganda. The findings suggest that a good alternative to increasing health expenditure could be by improving efficiency in health care system management. For countries where resources are available for investment in the health sector, the two (increased health spending and improved efficiency) could be complementary. Otherwise, the former could follow the latter for better results. The results also suggest that the magnitude of efficiency savings vary with the efficiency model estimated. Estimates from the SFA model was significantly higher than those from the DEA models. In the DEA models it was also observed that the results from the single input specification was higher than that of the multiple input specification. However, the rank (in terms of performance) of the individual countries was consistent across the models.

The results from the regression analysis showed a generally significant relationship between health expenditure efficiency, health expenditure and health outcomes in SSA. The relationship was higher for the efficiency variable relative to the health expenditure variable. This suggests that improving efficiency could actually have higher effect on health outcomes than simply increasing health expenditure. This supports the argument that governments should go beyond increasing health expenditure to ensuring that these resources are used efficiently. Similarly, debates about health spending need not focus too much on just raising spending but actually improving the efficiency of the spending. Increasing health expenditure is considered as a necessary condition to health outcome improvement while improving efficiency becomes a sufficient condition.

In many developing countries, such as SSA, the evidence of a high and significant impact of health system efficiency on health outcomes is critical. This is because most of these countries face unlimited social and economic challenges with very limited resources. This problem of scarcity cripples progress and development of many sectors of the economy, including the health sector. Cutting wastes by improving efficiency and savings (in economic terms) should become an essential public sector strategy. Such improvements create fiscal space that provides avenue for governments to raise additional resources for the health sector.

This evidence calls for cogent attempts by governments to improve efficiency in the health sector. The introduction of appropriate policies, effective monitoring and evaluation and sufficient remuneration for health sector workers could play important roles in improving health system efficiency. Novignon [16] provided evidence to show that reduced corruption, quality public sector institutions and access to health care are significant factors in reducing health system inefficiencies.

6. Conclusion

The purpose of the study was to examine potential fiscal space for health through efficiency gains in health expenditure. Using data from 45 SSA countries in 2011, the DEA and SFA models were employed to estimate health expenditure efficiency. Efficiency gains were therefore computed as potential savings in health expenditure from improved efficiency. The relationship between health expenditure efficiency, health expenditure and health outcomes was also estimated.

The results showed potential saving in health expenditure in SSA. This indicates potential fiscal space for health that could be explored if health system management was improved. The estimates for savings in health expenditure was sensitive to the model used. The results also indicated a strong relationship between health expenditure efficiency and health outcomes in SSA. A similar relationship was also found for health expenditure and health outcomes even though the magnitude of impact was higher for health expenditure efficiency.

In general, the results confirm the need for governments in the region to increase both heath expenditure and efficiency in the use of this expenditure. Improving efficiency of health expenditure is particularly important in the sense that most countries face daunting economic challenges, hence available fiscal space for health in government budgets are very limited. The potential savings from improved health expenditure efficiency, therefore, provide an effective alternative that can be explored.

A limitation of the study lies in its inability to complement the results from aggregated data with micro level data. While health production functions in the current study were based on health spending and other health sector related variables as inputs, there are important factors beyond the control of the health sector but cannot be observed at the aggregate level [17]. Complementing such aggregate analysis with micro level analysis could be beneficial for policy.

Competing interest

Authors declare they have no competing interest

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