

Governments' Expenditure on Health and Its Impact on the Wellbeing of the Citizens: An Empirical Evidence of Ghana

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Abstract

The study aimed to assess the impact of the government's expenditure on health on the wellbeing of the citizens in Ghana. However, the study adopted the human development index as the dependent variable to measure the wellbeing of the citizens. The independent variable used in the study is the government's domestic expenditure on health. The study used secondary data available at World Development Indicators and the United Nations Human Development Index from 2000 to 2018. In order to achieve the study's objective, some regression analytical methods were used for the analysis; they are ordinary least square (OLS), fully modified least square (FMOLS) and generalized linear model (GLM) as a robust check method. In conclusion, the study found a positive and statistically significant relationship between the government's expenditure on health and human development; thus, the wellbeing of Ghanaians. In addition, the birth rate of Ghana has a positive relationship with human development, as was revealed in the study. The study recommends that the government should prioritize the health of the citizens in order to ensure healthy populace and workforce to be able to contribute to the economic activities of the country

Keywords: Government expenditure on health; human development index; birth rate; generalized linear model; fully modified ordinary least square; ordinary least square

1. Introduction

The essential development aspect of every human being is healthcare. Moreover, it is emphatic that the expenditure on health care significantly improves and enhances human capital development in every economy or country as it helps in producing healthy labour which literally translates into economic gains (Siddiqui Afridi & Haq, 1995). The quantum of health expenditure by governments ultimately determines the quality of human capital development through education in sophisticated skills acquisition to efficiently and productively contribute to the economic gains of the country (Muhammed & Faheem, 2007).

Most importantly, governments are urged to increase their expenditure on healthcare as the funding of healthcare has a spiral effect, which usually subsidizes the cost of healthcare in that economy. This ultimately reduces the brunt on the poor who cannot afford healthcare through the government's intervention of the provision of subsidies. Most kinds of literature are of the view that in order to assume a healthy economy, then healthcare expenditure must be higher in unity (Gerdtham, 1991; Hitiris & Posnett, 1992; Bloomqvist & Carter, 1997; Bac & Le-pen, 2000). Moreover, it has been established that there is a significant and robust relationship between health expenditure and the wellbeing or health status of a country. On the contrary, Blomqvist and Carter (1997), as well as Bac and Le-pen, 2007 opined that mortality and morbidity rates have a negative correlation with socio-economic status. A study conducted to unravel the relationship public health expenditure and income inequality concluded that the reluctance by governments to increase funding on health leave the poor overburdened with healthcare cost as the cut of health expenditure frequently abolish or reduce subsidies (Kawachi & Kennedy, 2007). The increment of governments' health expenditure is beneficial to the entire economy, which significantly promotes healthy, quality and proper healthcare services (Gupta & Mitra, 2004; Toor & Butt, 2005; Kawachi & Kennedy, 2007). A section of studies posits that governments' expenditure on healthcare services in Africa is mostly beneficial to the affluent as there are usually pro-rich policies attached

(Norman, 1985; Castro-Leal et al., 2008). In a cross country study where health expenditure per capita was specified as a linear function of income per capita in a supply-model (Moore et al., 1992), their result confirmed that healthcare is a “necessity good” in the short run (with elasticity below unity) and in the long run a “luxury good.”

Since 1970, governments’ expenditure on health in Ghana has been inconsistent. For instance, in 1995, total health expenditure was about 3% of the GDP of the country while in 1996 up to 2004 the value declined below 3% of the Gross domestic product of the country. However, the actual expenditure on health in 2008 was 3.2% of gross domestic product (GDP), which can be described as inadequate for a country that has a more significant number of its population considered as inferior, also burgeon aging population (World Development Indicators, 2010). Nonetheless, the annual average population growth rate of Ghana has been about 3% since 2008, but considerably governments’ expenditure on health woefully mismatches that. A more extensive section of the Ghanaian population is disadvantaged of quality and proper healthcare services, most notably people living in rural and urban poor communities (Ghana Statistical Services, 2012). Even though there have been some investments in the health sector to curtail the problem of healthcare services in Ghana, those investments are not enough to meet the healthcare needs of the broader population. Moreover, countries with a healthy workforce or population enjoy higher economic growth because the healthy workforce contributes enormously to the economic activities of the country, which in the short and long run produces higher productivity of goods and services (Anyanwu & Erhijakor, 2004; Gyimah-Brempong and Wilson, 2004). A prior study by Michael Kofi Boachie et al. (2014) buttress this assertion as they concluded in their study that governments’ expenditure on health in Ghana consistently and positively relate to the economic growth and development of the country by improving the lives of the citizens.

The study’s objectives are to assess how the government of Ghana’s contribution to the health sector has been impacting the wellbeing of the citizens. Moreover, the study intends to ascertain the causal relationship between health expenditure and human development with the inclusion of birth and death rates as well as the government’s effectiveness in providing public goods and services with the formulation and implementation of quality and sound policies.

The organization of the study can be found as; section 1 introduces the study, section 2 reports the study’s data and methodology, section 3 presents the empirical results and findings discussion and lastly, section 4 concludes the study.

2. Data and Methodology

2.1 Data

The study aims to examine the impact of the government’s expenditure on the wellbeing of its citizens, thus Ghanaians. However, the study makes use of data available at the World Bank’s data repository, in particular, World Development Indicators and the United Nations Human Development Index database from the period of 2000 to 2018. The study’s dependent variable is the Human Development Index, which is chosen as a measure for the wellbeing of the citizens of Ghana. Moreover, the independent variable for the study is the government’s total health expenditure. The relationship between the government’s expenditure on health and human development cannot be isolated without taking into account the effect other factors could influence their relationship. Therefore, some variables are considered as control variables to account for the possible factors that could influence the relationship between the government’s expenditure on health and human development, thus the government’s effectiveness, death rate and birth rate. Details of the variables can be found in table 1 below.

Table 1 Variables description

Variable Name	Variable Description
lnBirthrate	Birth rate, crude (per 1,000 people)
lndeathrate	The death rate, crude (per 1,000 people)
lnhealthexp	Domestic general government health expenditure per capita (current US\$)
hdi	Human development index: composite measure of life expectancy at birth, education and per capita income indicators
goveff	Government effectiveness: the extent to which the government formulates and implements sound policies to provide public goods to the citizens. Measures on Score thus +2.5 signals strong and -2.5 signals weak

Note: Birth rate, Death rate and Health expenditure are in their natural logarithm hence lnbirthrate, lndeathrate and lnhealthexp

2.2 Methodology

As the study is a time-series approach, the methodology used for the findings is time-series methodologies. However, some diagnostic tests and regression analyses were executed in order to ensure that significant results are produced. Therefore, the unit root test for the group of the variables was conducted as well as the cointegration test in order to ensure stationarity among the variables. Basically, a unit root test is performed to find out whether there is any evidence of unit root in the variables or whether the variables are stationary hence free from the unit root at a significance level of 1%, 5%, or 10%. Subsequently, the correlation matrix is computed to find out whether there is a problem of collinearity or multicollinearity. The rule of thumb stipulates that no independent variable should be highly correlated with the dependent variable with a coefficient of $-/+0.80$; otherwise, there will be a problem of collinearity. Also, two independent variables should not have coefficients of $-/+0.70$ with the dependent variables; otherwise, there will be a problem of multicollinearity.

Most importantly, after all of these diagnostic tests performed and it is evidenced that the variables are free from multicollinearity, collinearity, unit root and are cointegrated, then the regression analysis becomes necessary. Notwithstanding that, two-time series regression methods are chosen, thus ordinary least square and fully modified ordinary least square. Moreover, the generalized linear model is also used for robust check to affirm the results of the study. Lastly, the study intends to find the level of causality or the causal relationship between the dependent variable and the independent variables.

3. Empirical findings and discussions

3.1 Descriptive statistics

Table 2 below displays the descriptive statistics of the study's variables and from the table, it can be reported that government's expenditure on health for the sample period of 2000 to 2018 grew at annual rate of 3% as the maximum and minimum growth rate stood at 3.9% and 3.3% respectively with the sample period (2000 – 2018). To account for the performance of government in ensuring a better life for its citizens, the study can report that the human development index for the citizens of Ghana has been fairly good as the average Score of 0.546 annually between 2000 and 2018 which somewhat above average Score against the highest score of 1. Relatively, the government's effectiveness to formulate and implement sound policies that could efficiently and effectively provide public goods to the citizens fairly weak as the Average Score for the sample period annually stood at -0.113 within the range of -2.5 and +2.5. The birth rate of Ghana within the sample period stood at an average rate of 3.5% annually, while the death rate was comparatively below the birth rate, thus 2.23% annually.

Table 2 Descriptive statistics

	Inhealthexp	Indeathrate	Inbirthrate	hdi	goveff
Mean	3.000	2.232	3.503	0.546	-0.113
Median	3.353	2.232	3.512	0.554	-0.179
Maximum	3.929	2.370	3.568	0.592	0.160
Minimum	1.547	2.078	3.418	0.483	-0.281
Std. Dev.	0.796	0.098	0.043	0.038	0.123

3.2 Unit root test

By examining the variables to check for unit root, a group unit root tests were performed. The results of the test can be found in table 3; from the table, it can be reported at both level and first difference, none of the variables had unit root. Therefore, the study rejects the null hypothesis of unit root that there is an evidence of unit root in the variables to accept the alternate hypothesis that the variables are stationary. Perhaps, at 1% and 5% significance level, the study confirms that there is no evidence of unit root in the variables.

Table 3 Group unit root tests

Group unit root test: Summary			
Series: Inhealthexp, Indeathrate, Inbirthrate, hdi, goveff			
LEVEL FORM	Statistic	Prob.**	Sig.
Null: Unit root (assumes common unit root process)			
Levin, Lin & Chu t*	-3.376	0.000	***
Null: Unit root (assumes individual unit root process)			
ADF - Fisher Chi-square	29.530	0.001	***
PP - Fisher Chi-square	30.609	0.001	***
FIRST DIFFERENCE	Statistic	Prob.**	Sig.
Null: Unit root (assumes common unit root process)			
Levin, Lin & Chu t*	-2.961	0.002	**
Null: Unit root (assumes individual unit root process)			
ADF - Fisher Chi-square	25.052	0.005	**
PP - Fisher Chi-square	42.986	0.000	***

Note: *** indicates 1% significance level, ** indicates 5% significance level. Unit root tests; Levin et al. (2002), Im et al. (2003), Maddala and Wu (1999).

3.3 Correlation matrix

In the account of the correlation matrix, the study found that the government's health expenditure has a positive correlation with human development at a 1% significance level. On the other hand, death rate, birth rate and government's effectiveness have a negative correlation with human development or the wellbeing of Ghanaians at 1% and 5% significance level. In addition, government effectiveness has a positive correlation with death rate and birth rate. However, laying emphasis on collinearity, the study did not find any problem of collinearity and multicollinearity.

Table 4 Correlation matrix

Correlation	hdi	lnhealthexp	lndeathrate	lnbirthrate	goveff
Probability					
hdi	1				
lnhealthexp	0.704***	1			
lndeathrate	-0.674***	-0.612***	1		
lnbirthrate	-0.620***	-0.714***	0.791***	1	
goveff	-0.425*	-0.355	0.468**	0.392*	1

Note: *** indicate 1% significance level, ** indicates 5% significance level, * indicates 10% significance level

3.4 Cointegration test

By finding out whether there is evidence of the cointegration of the variables helps to check for the long run relationship or equilibrium of the dependent and the independent variables. Table 5 exhibits the cointegration test performed in the study. In the table, it can be witnessed that from none to at most 4 in both trace statistics and Max-eigen statistics the variables were cointegrated hence the study rejects the null hypothesis of cointegration and confirms that there is a long run relationship between the variables at 1% and 5% significance level.

Table 5 Cointegration test

Unrestricted Cointegration Rank Test (Trace)					
Hypothesized		Trace		0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	Sig.
None *	0.997	215.483	69.819	0.000	***
At most 1 *	0.959	116.006	47.856	0.000	***
At most 2 *	0.880	61.600	29.797	0.000	***
At most 3 *	0.665	25.534	15.495	0.001	***
At most 4 *	0.335	6.936	3.841	0.008	**
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)					
Hypothesized		Max-Eigen		0.050	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	
None *	0.997	99.477	33.877	0.000	***
At most 1 *	0.959	54.405	27.584	0.000	***
At most 2 *	0.880	36.066	21.132	0.000	***
At most 3 *	0.665	18.598	14.265	0.010	**
At most 4 *	0.335	6.936	3.841	0.008	**

* denotes rejection of the hypothesis at the 0.05 level

Note: *** indicate 1% significance level, ** indicates 5% significance level

3.5 Regression results

In order to understand the dynamics that the government's expenditure has on the wellbeing of its citizens, the study employed three regression analysis methods to conclude on the relationship or impact firmly. However, the results from the analysis can be found in table 6. From the table, it can be reported that health expenditure by the government could positively improve the wellbeing of its citizens by 0.001% and 0.010%, respectively. At the 5% significance level, the study confirmed a positive relationship between the government's expenditure on health and human development in Ghana. This result clearly postulates that the effort of the government to

prioritize the health of its citizens could significantly improve the wellbeing of them. Nonetheless, a healthy nation is a wealthy nation, which literally means that a nation that promotes good health on the part of its citizens ensures high productivity and high life expectancy. In spite of this, healthy people will produce enough goods and services to translate into economic gains for prosperity and further development. With regards to the government’s effectiveness to formulate and implement excellent and sound policies that could positively and significantly affect the life or wellbeing of its citizens, it evidently proved so. In table 6, it is evidenced that across all the study’s regression analysis, the government’s effectiveness showed a positive and statistically significant relationship in a consistent manner at 5% significance level. To account for the other control variables, thus birth and death rate in the country, as it is exhibited in table 6; the birth rate has a positive and statistically significant relationship with human development in Ghana. At a 5% significance level, a percentage increase in birth rate will lead to an increase in human development in Ghana. Contrary to this, the death rate showed a negative effect on human development in Ghana as the result of the study can report a negative relationship between the two.

The study’s regression method from all indications proved significance as the r-squared on the model showed 0.99 and 0.99, respectively, which confirmed a healthy and good relationship between the dependent and the independent variables. Also, the F-statistics, LC and LR statistics all showed 1% significance. In conclusion, the study can confirm that the results from its regression are fit for inference.

Table 6 Regression results

	Main models		Robust check
	OLS	FMOLS	GLM
lnhealthexp	0.001 (3.071)**	0.010 (3.789)**	0.010 (3.071)**
lndeathrate	-0.523 (-5.250)***	-0.494 (-6.272)***	-0.523 (-5.250)***
lnbirthrate	0.458 (2.488)**	0.403 (2.736)**	0.458 (2.488)**
goveff	0.024 (2.166)**	0.025 (3.155)**	0.024 (2.166)**
constant	0.081 (0.193)	0.209 (0.613)	0.081 (0.193)
R ²	0.990	0.989	
Adjusted R ²	0.988	0.985	
F-statistics	360.266***		16.087***
Log likelihood	79.746		79.345
Lc statistics		2.331***	
LR statistics			1441.064***

Note: *** indicate 1% significance level, ** indicates 5% significance level, * indicates 10% significance level. T-statistics and Z-statistics are in parentheses. OLS means ordinary least square, FMOLS means fully modified least square and GLM means the generalized linear model

3.6 Granger causality test

Another objective of the study is to observe the causal relationship between the dependent and the independent variables; therefore, the use of granger causality became pertinent. In observance, the study found a bidirectional causal relationship between human development and birth rate, human development and death rate, birth rate and death rate as well as government effectiveness and health expenditure. These relationships mean that any change or variation of one of the variables will possibly affect the other. For instance, a change in

human development will possibly affect the birth rate, as well as a change in birth rate, which will possibly affect human development, thus vice versa. On the other hand, human development showed a unidirectional causal relationship with government effectiveness, death rate showed unidirectional causality with government effectiveness and other unidirectional causal relationships observed stem from birth rate to health expenditure and death rate to health expenditure.

Table 7 Granger causality test

Pairwise Granger Causality Tests				
Null Hypothesis:	Obs	F-Statistic	Prob.	Sig.
lndeathrate does not granger cause lnhealthexp	17	6.178	0.014	**
lnhealthexp does not granger cause lndeathrate		2.060	0.170	
lnbirthrate does not granger cause lnhealthexp	17	13.701	0.001	***
lnhealthexp does not granger cause lnbirthrate		2.748	0.104	
hdi does not granger cause lnhealthexp	17	1.488	0.265	
lnhealthexp does not granger cause hdi		1.928	0.188	
goveff does not granger cause lnhealthexp	17	11.577	0.002	**
lnhealthexp does not granger cause goveff		4.259	0.040	**
lnbirthrate does not granger cause lndeathrate	17	19.169	0.000	***
lndeathrate does not granger cause lnbirthrate		17.412	0.000	***
hdi does not granger cause lndeathrate	17	8.454	0.005	**
lndeathrate does not granger cause hdi		5.129	0.025	**
goveff does not granger cause lndeathrate	17	0.478	0.631	
lndeathrate does not granger cause goveff		3.258	0.074	*
hdi does not granger cause lnbirthrate	17	15.260	0.001	***
lnbirthrate does not granger cause hdi		3.079	0.083	*
goveff does not granger cause lnbirthrate	17	0.229	0.799	
lnbirthrate does not granger cause goveff		2.242	0.149	
goveff does not granger cause hdi	17	2.106	0.164	
hdi does not granger cause goveff		5.199	0.024	**

Note: *** indicate 1% significance level, ** indicates 5% significance level, * indicates 10% significance level

4. Conclusion

We employed secondary data from the World Bank data repository, specifically World Development Indicators and the United Nations Human Development Index from 2000 – 2018 in time series study for Ghana. The objectives of the study were to assess the impact of the government’s expenditure on health on the wellbeing of the people of Ghana; also to find out the causal relationship between the dependent and the independent variables.

The study concludes that it is pertinent for the government to prioritize the health of its citizens. Upon analyzing the study’s data, it was found out that the government’s expenditure on health significantly and positively affects the development and wellbeing of the citizens. Moreover, the birth rate of Ghana is also identified as a positive and significant factor in the human development index. Perhaps, it will be essential for the government to formulate and implement quality, sound and ethical policies that could effectively and efficiently provide public goods to the citizens to help improve their wellbeing.

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