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Policy Effect of Health on Economic Growth in Ghana

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Abstract
The study analyzed the policy effect of health on economic growth in Ghana from 1980 to 2014. This current study focused its discourse mainly on Health of Ghanaians in the fullness of time and its time order effect on individual income, educational attainment, demographic trends, and the nation's aggregate level of economic growth. Development is seen as a consequence of good health of countries human assets. The study employed life expectancy at birth as an indicator of health, and real per capita GDP as an indicator of economic growth. Autoregressive Distributed Lagged Model (ARDL) was employed in the study to test bounds approach to co-integration, by analytically controlling the effect of education, inflation, and accumulation of physical capital. The study revealed that economic growth is significantly predicted by health in the short-run. This implies that improvement in health status of the population will result in an increase in an economy's level of output through labor augmentation. The study recommended that the government and the Ministry of Health in their capacities should enact and implement developmental policies in order to shape and develop the health sector so as to strengthen the healthcare system.
Keywords: Health, Economic Growth, Inflation, GDP, Healthcare and Health Status

1.0 Introduction

A nation's wealth is measured by the health status of its citizens (World Bank, 2005). This is in true confirmation of the popular adage which affirms that "Health is Wealth." According to World Bank (2005), five percent of economic growth differentials between developed and developing nations are attributed to ill-health and low life expectancy. The world's central framework for reducing poverty is expressed in UN's eighth Millennium development Goals. Three of these eight goals pertain to health comprises of reducing child mortality, improving maternal health and combating HIV/AIDS, malaria, and other diseases. These potentially huge improvements in health are extremely important goals in themselves, and they serve as the instrument for achieving economic growth and reducing poverty. In other words, health is a fundamental driver for economic growth and development. Together with education, they are the most important sectors where public development attention should be focused in order to ensure greater human development.

Public health concerns itself with the protection and improvement of the health of entire populations through community- wide actions primary by governmental agencies. Every good healthcare systems aim to prevent human disease, injury, and disability, protect people from environmental health hazard and promote behaviors that lead to good physical and mental health as well as the assured availability of high-quality services (World Health Organization, 2001). Developed countries spend a high proportion of their Gross Domestic product (GDP) on Public healthcare because they believe that the health of the citizens serve as a major driver for economic activities and development while a heavy burden of disease as a result of poor healthcare spending tend to experience a multiplicity of severe impediments to economic development.

Improvement in healthcare is actually very instrumental in development and nation building. In perusing several developmental kinds of literature, it was underscored that improvement in healthcare systems in a country fosters economic growth and poverty reduction, through labor efficiency. That is, a better healthcare does not have to wait for an improved economy, measures to reduce the burden of disease and increase life expectancy will in themselves contribute to creating healthier and richer economies.

Interestingly, a special adviser to the United Nation Secretary, Jeffrey Sache, in his report commissioned by the World Health Organization made a Milestone link between Macroeconomics and health. He postulated that paying attention to the health of a given population was not merely of a selfless value but also in the interest of national and global economic development. The Commission's report noted that modest investment in health could save about 8 million lives per year resulting in an estimated 330 million disability- adjusted life years (DALYs) saved and about $200 billion in direct economic benefits per year by 2010 (World Health Organization, 2001).

Conversely, improvement in people's health condition can also be attributed to economic growth. Thus,

higher levels of developments bring about improved medical knowledge and technologies that reduce mortality rate among the population resulting in increasing their life expectancy at a birth. In fact, Improvements in health conditions leads to an increase in life expectancy, and decrease in infant mortality, which in effect add to economic performance (Issa and Ouattara, 2005). Deductively, the study perceived a two–way relationship between health and development. In effect, economic development and health may be thought of and perceived as complementary demand goods.

Globally, there has been a great effort to improve the health status of citizens among Republic States. In fact, innovation of new medicines and diagnostic techniques has improved tremendously in order to improve the health of many peoples. In addition, nutrition has improved while mortality among infants and children has reduced resulting in great improvement in life expectancy at birth in almost all countries in the last few decades (World Bank, 2004). Intuitively, the increase in health investment is expected to improve the health conditions, more especially in the developing countries such as those in Sub –Saharan Africa where mortality (maternal, infant and under – five), and prevalence of diseases such as malaria, tuberculosis, and HIV/AIDS are high (WHO, 2001, and Anyanwu & Erhijakpor, 2007).

Very importantly, Ghana has made a significant progress in economic growth in recent years culminating in her status as a lower middle –income country, although a lot more work and effort are needed to sustain this achievement. For instance, life expectancy at birth rose from 56 years in 1990 to 61 years in 2012 following the decline in infant and under – five mortality (World Bank, 2014). These improvements in economic growth and health conditions are likely to continue within the subsequent decades, all other things being equal.

Despite the fact that it is common to regard improvements in health conditions as the product of economic growth, similarly, it is possible to attribute the economic progress to the improved health condition. It is against this background that the study examines the effect of health, as a component of human capital, on economic growth using time series data on Ghana. In perusing several kinds of literatures and Journal publications studies on healthcare and economic growth from eminent writers like; Adu Frimpong, et. al., 2017; Adu et al, 2013; and Adams & Opoku, 2015, none of these writers has investigated into the topic: effect of health on economic growth. As a result, this current study tends to fill the gap by examining the effects of health on economic growth in Ghana.

2.0 Conceptual Framework

The study is guided by Mankiw et al. (1992), Knowles and Owen (1997) and Blom et al. (2004). These authors' works theorized that growth in output emerges from input combination and technology. In the present study inputs are reproducible physical capital (K), labor (L), human capital (H), and technological progress (A). The Human capital (H) is decomposed into health (h) and education (i.e. formal schooling and other forms of training (s). Then the aggregate Cobb-Douglas production function is therefore transformed as given below:

$$Y = AK^{\alpha}L^{\beta}e^{\varphi h + \lambda s\theta t} \quad \ldots\ldots (1)$$

According to Grossman (2000), Bloom et al (2004), and Adu Frimpong (2016), the stocks of health and knowledge or education determine the time spent on market and non–market activities. Thus the worker's ability to earn is dependent on his/her level of health status, and knowledge or education. Every worker, therefore, supplies labor (i.e. man hours) and some form of human capital (i.e. health, knowledge, experience, and skills). With this understanding, human capital (1) can be rewritten as:

$$y = AK^{\alpha}e^{\varphi h + \lambda s\theta t} \quad \ldots\ldots (2)$$

Equation (2) shows the per capital/worker production function. Taking logs of equation (2) yields

$$lny = lnA + \alpha lnk + \varphi h + \lambda s + \theta_t \quad \ldots\ldots (3)$$

As indicated earlier, "A" is a measure of technological advancement in the economy, which explained output growth that is not accounted for by changes in physical capital and/or labor (i.e. a number of workers). This is usually referred to as the Solow residual, similar to Mankiw (1972) theoretical analysis of technology which evolves through the economy. That is to say, that the level and changes in technological advancement is dependent on such economic variables as international trade, foreign direct investment, and macroeconomic stability. Theoretically, international trade (X), foreign direct investment (FDI) and macroeconomic stability (i.e. inflation (IFL) influence the level of Technology. Following the variables, the empirical health – growth models could be stated as:

$$lny = \beta 0 + \alpha lnk_t + \varphi h_t + \lambda s_t + \beta 1 lnX_t + \beta 2 lnFDI_t + \beta 3 lnIFL_t + \theta_t \quad \ldots\ldots (4)$$

Where the variable is as defined before and the parameters to the parameters to be estimated areφ, λ, 1, 2, 3 and 0 is the constant term. The error term is captured by and is assumed to be normally distributed with zero mean and constant variance while t represents time.

3.0 Model Estimation

The empirical estimation, this study makes use of the autoregressive distributed lag model (ARDL) approach to cointegration due to Pesaran et. Al (2001). In the empirical estimation, this study makes use of the autoregressive

distributed lag model (ARDL) approach to perform co-integration analysis due to Pesaran et al. (2001). The ARDL model or the bounds test approach to cointegration is applicable irrespective of the order of integration of the underlying variable. However, the absence of I (2) variable should be guaranteed so as to avoid spurious results. It is therefore important to test for unit root in each series before using the ARDL cointegration methodology. In this spirit, we employed the Dickey – Fuller GLS de – trending unit root test to examine the time – series properties of the data

Further, the study acknowledges the possibility of the bidirectional relationship between economic growth and improvement in human capital. This usually creates an endogeneity or simultaneity problem in empirical estimations. It is for this reason that the study uses the ARDL procedure, which is able to correct simultaneity issues by allowing for an unrestricted number of lags for the criterion variables and explanatory variables. Another reason for the use of ARDL estimator stems from its efficiency in studies using finite or small samples (Pesaranet, 2001). Thus, in determining the long – run relationship between economic growth and other variables the study use the ARDL bounds test approach to cointegration. We first estimate equation (4) using an ARDL specification of the form.

$$\Delta y_t = \gamma_0 + \sum_{i=1}^{r} \gamma_1 \Delta y_{t-i} + \sum_{i=1}^{r} \gamma_2 \Delta h_{t-i} + \sum_{i=1}^{r} \gamma_3 \Delta s_{t-i} + \sum_{i=1}^{r} \gamma_4 \Delta k_{t-i} + \sum_{i=1}^{r} \gamma_5 \Delta FDI_{t-i} + \sum_{i=1}^{r} \gamma_6 \Delta X_{t-i} + \sum_{i=1}^{r} \gamma_7 \Delta IFL_{t-i} + \beta_1 y_{t-i} + \beta_2 h_{t-1} + \beta_3 s_{t-1} + \beta_4 k_{t-1} + \beta_5 FDI_{t-1} + \beta_4 X_{t-1} + \beta_5 IFL_{t-1} + \mu_t \quad \ldots\ldots\ldots(5)$$

Where the meaning of variables are the same as previously defined 0 is the drift component, and put is the error term. The next step in the ARDL bounds test procedure is to test for a long – run relationship among the variables using W– statistics after which an error correction model is estimated to determine the short run dynamics or multipliers in the model and the speed of adjustment towards equilibrium.

4.0 Empirical Result and Discussion

4.1 Results from Unit root test

The aim for the unit root test was to ensure the absence of variables that are integrated of order two I(2). This was to avoid spurious ARDL regression. In this regard, the variables considered in the study were found to be a mixture of stationary, I(0) and none- stationary I(I) series. More specifically education was stationary after first differencing while life expectancy at birth and log of inflation were stationary at all levels. This study began by inspecting the stationary properties of the series using the Augmented – Dicker – Fuller (ADF) test procedure. The ADF test is used to determine the order of integration of each series in the model. The orders of integration is established by determining whether the series is stationary or not – stationary

If the series is however found to be not – stationary, then the series is differenced and the resultant differenced series is then tested to determine whether is stationary or not – stationary this sequence is repeated until all series are stationary. No variable was integrated of order two. All the series were stationary. Table 1 reports a summary of unit root tests.

Table 1: Results of the ADF Unit Root Test

Tables 1: Results of the UDF Unit Root Test

Method	Statistic	Prob.**
ADF – Fisher Chi-Square	44.1465	.0000
ADF – Choi Z-stat	-4.12521	.0000

*** Probabilities for Fisher tests are computed using an asymptotic Chi- square distribution. All other tests assume asymptotic normality.*

Hypothesis Testing of Unit Root

Ho: All variables have Unit Root or are not – stationary

H_1: Variables are stationary

The ADF test tests the null hypothesis that the variables have the unit root or are nonstationary as against the alternative hypothesis that the variable are stationary. Once the absence of I (2) variables is established, the next step is to find the existence of the co-integrating relationship between economic growth and the other variable in equation (4) There is ample evidence to suggest that there exists a long-run relationship between economic growth and variables presented in equation (4). The results from the bounds test approach to

cointegration are presented in Table 2.

Table 2: Bounds Test Approach to Co-Integration

K	95% Level		90% level		F(W)- Statistics
	Lower bound	**Upper bound**	**Lower bound**	**Upper bound**	
6	3.8950	5.3510	3.3741	4.6364	11.0321
6	(21.8101)	(32.1030)	(18.1657)	(27.1414)	(71.7518)

Note: K is the number of regressors while W – statistic and its critical values are in parenthesis. If the statistic lies between the bounds, the test inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of the no level effect can't be rejected.

As shown in Table 2, the null hypothesis of no cointegration among the variable is rejected at 5% and 10% level. This is because the computed test statistics are above the upper bounds

Thus, there is long run relationship following the normalization of economic growth on the independent variables. The ARDL estimates were very high in health. The diagnostic test results are presents in table 3.

Table 3: Diagnostic Test Results of ARDL Estimates

Test Statistics	LM Test Statistic	F-version
A: Serial Correlation	CHSQ(1) = 3.9141 [0.246]	F(1,21) = 2.3754 [0.314]
B: Functional form	CHSQ(1) = 2.3850 [0.345]	F(1,21) = 1.0276 [0.440]
C: Normality	CHSQ(2) = 2.1828 [0.690]	Not applicable
D: Heteroscedasticiy	CHSQ(1) = 2.2414 [0.339]	F(1,29) = 2.2114 [0.354]

A: Lagrange multiplier test of residual serial correlation Ramsey's Reset test using the square of the value, C: Based on a test of skewness and kurtosis of residuals, Based on the regression of squared residuals on squared fitted values.

Once the establishment of the co-integrating relationship between economic growth and the independent variable is made the null of zero co-integrating vectors is rejected against the alternative of one cointegrating vector. Therefore, it is concluded that there are one cointegration vectors specified in the model and that there exists a long-run relationship between the variables of interest. The next step is to estimate the long – run coefficients in the ARDL models with a lag length based SBIC. The long run estimates from ARMD (1,1,0,0,0,0,0,0) Specifically is presented in Table 4

Table 4: Long –Run Estimates Based on ARDL (1,1,0,0,0,0,,0) Approach

Variable	Coefficient	Standard Error	t-statistic
H	0.0366	.0226	3.8084**
S	0.0263	0.0019	7.0261**
Lnk	0.3042	0.0629	4.8381***
lnFDI	-0.0156	0.0051	-0.6580
lnX	0.1350	0.0574	2.4764***
lnIFL	-0.0244	0.0075	-1.0043*
Intercept	1.9584	0.5952	3.0895***

****(**)* denotes significance at 1%, 5% and 10% significance level respectively.*

The four of the six dependent variables presented in the model were statistically significant in influencing long–term growth in Ghana within the study period. The coefficient of health; measured by life expectancy at birth, was 0.0366 and statistically significant at 5% level while that of education was 0.0172 and statistically different from zero at 1% level. The stock of physical capital and international trade were also statistically significant at 1% level with elasticities of 0.2133 and 0.2241 respectively. While both the elasticity coefficients of foreign direct investment (-0.0247) and inflation were negative, only inflation (-0.0335) was statistically at 10% level.

The next step in our econometric analysis is to model the short – run dynamics to capture the speed of adjustment towards equilibrium following a short dynamics in the system. The results of the error correction model (ECM) are presented in Table 5.

Table 5: The Result of the Short Run Dynamics (i.e. Short run relationship)

Error Correction Model: D(LNRGDP)			
Variable	**Coefficient**	**Standard Error**	**T-value**
Constant	0.0217	0.0090	-8.0115***
Δh	1.8658	0.2168	8.0014***
Δs	0.8300	0.1211	6.0097***
Δlnk	0.0585	0.00495	-9.0263***
ΔlnFDI	-0.0010	0.00282	-7.3049***
ΔlnX	0.0840	0.04811	10.6061***
ΔlnIFL	-0.0218	0.00429	-5.0652***
ECM(-1)	-0.3747	0.00653	-9.0276***

*ecm = lny -0.0366*h -0.0263*s* -0.3042**lnk* + 0.0156**lnFDI* -0.1350**lnX* + 0.0244*

R-squared	*0.8656*	*Akaike AIC*	*80.7287*
Adj. R-squared	*0.8186*	*Schwarz SC*	*-0.909322*
F-statistic	*20.2457***	*Sum sq. resid*	*2.252912*
Mean dependent	*-0.012137*	*Log likelihood*	*82.47651*
S.E. equation	*0.0159*	*Durbin-Watson stat*	*1.937804*
S.D. dependent	0.223046		

****(**)* denotes significance at 1%, 5% and 10% significance level respectively. Δ is the lag operator.* **Source: Author's Computation.**

In the short–run, the coefficient of health was 0.0366 and statistically significant at 5% level. Though coefficient of education was positive, it was statistically significant in influencing economic growth. While the statistical significance of the elasticity coefficient of capital did not change in the short –run, its positive elasticity dropped from 0.03042 to 0.0585. Again, both the elasticity coefficient and significance of international trade also dropped. The coefficient of ECM was -0.3747 and statistically significant at 1% level. The summary statistics of the error correction model shows that 86.56% of the variations in the economic growth in the short-run are explained by the variables presented in the model. This suggests that the error correction model is well fitted to the model.

5.0 Conclusion and Recommendations

Health itself is a priority goal as well as a core driver of economic development and national income augmentation. Unfortunately, the importance of health investment has been neglected and largely underestimated by many nations. The study theorizes that health improvements affect education, labor, productivity, savings and investments, and demography in ways that can possibly offer a swank to the Gross National Income (GNP) of developing economies. This study has estimated the effect of health on economic growth in Ghana while controlling for the effects of education, physical capital accumulation, international trade, FDI, and inflation. Furthermore, the study finds that the long– term economic growth achieved in Ghana within the study period has been significantly influenced by improvement in health, physical capital accumulation, international trade, and education.

First, we find that better health improves the economic performance of the country. This follows from the positive and significant relationship between health and economic growth both in the short and long run. However, the growth effect of health was greater than education in both short and long run as shown by their magnitude. The results suggest that increasing life expectancy by a year boosts the productivity of workers and increases economic growth by 2.1% in the long– term. In addition, the long run results could be due to the effectiveness and high level of productivity among healthy workers.

Another possible reason for the long-term positive effect of health emanates from the sustained labor. That is, healthy people provide efficient labor which in effect contributes to productivity. In addition, healthy people provide educational investment, that is, they are more likely to save more funds making them available for ventures creation and investments for growth to be achieved. Surprisingly, this finding is consistent with the findings by Bloom and Canning (2003).

Again, in the short-term, the growth effect of health is positive. More specifically, improvement in Health, boost economic growth by 1.3%. The short-run results, perhaps, is due to low level of absenteeism resulting from improved health. Finally, the study finds out that the effect of inflation on growth is negative and robust in the short –run.

Policy Recommendations

The key recommendation is that developed countries should partner the DVC in term of financial aids such as grants and donor financing, especially to the countries that need help most urgently, which are concentrated in Sub – Saharan Africa. This will boost the accessibility of the world's poor nations to essential health services.

There should also be an organized system of transparency and accountability to ensure proper and efficient distribution of aids and/or choice of resource allocation. The choice on how best to improve health exists

everywhere, but such choice in poor countries is both crucial and difficult. Efforts to widen the choices to be considered for delivering health service and for encouraging health – promoting activities are therefore highly relevant.

The government should seek ways of curtailing cost, increasing efficiency and tapping additional resources. They should also improve the allocation of health resources. In addition, all the Stakeholders should do well to reconcile conflicting goals, values and interest of the various groups and individuals involved in the health sector.

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