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Public Expenditure and Health Status in Ghana

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Abstract
Better health status is described as an indicator of economic success or failure of nations. The availability of health care services and the physical, biological and socioeconomic environment, in which a person lives, broadly determine disease pattern, health status and therefore, the quality of life. This paper examines the relationship between public spending and health status in Ghana, using simple but conventional econometric techniques. One measure of health status [under five-mortality rate (per 1000 live births)] was used as an indicator of health status. The results revealed that the availability of physicians and health insurance are the most important determinants of health status in Ghana. Contrary to findings from earlier studies however, the analyses found income per capita to be a rather insignificant determinant of health status. The policy implications that emanate from this paper based on the results are that the health sector is interlinked with socioeconomic development and therefore, the government of Ghana must not treat the health services in isolation but in an integrated manner to achieve the broader goals of poverty reduction, human capital formation and economic development. The results support the hypothesis of increasing public investments in health, especially in the area that will attract the training and the supply of more physicians. The results also show that the national health insurance policy is a positive determinant of health status and, therefore, much education is needed to enlighten and attract Ghanaian into registering and subscribing to it. Government should also make money available for the purchase of drugs and treatment under the health insurance scheme to ensure its growth and sustenance.
Keywords: physicians per population, GDP per capita, national health insurance, health status mortality rate.

Introduction

The allocation of public expenditure to the health sector is mainly for the reason that it has positive effects on the formation of quality human capital, which can boost economic growth while promoting equity and reducing poverty. The productivity and benefit of spending on health will however depend on how funds are allocated within the health sector. In the attempt to improve social welfare of citizens, many governments chose to change the composition and direction of public expenditure. Chenery et al. (1974), Selowsky (1979) besides Musgrove (1996) viewed this option as having vital prospective in most developing countries for two major reasons. First, government expenditure constitutes a significant proportion of national income; and changes in the direction of expenditures can have an extensive effect on the real incomes of the lowest income groups consequently the poor. Second, the use of annual fiscal budget to increase the consumption of specific goods and services of the poor in the society has the capacity of transferring and redistributing income.

The indicators of healthy living, such as infant mortality rate (per 1000 live births), under-five mortality rate (per 1000) and life expectancy at birth (years) have not witnessed much significant improvement over the years.

There emerged a paradigm shift in the early 1990s in response to the growing inability of governments in developing countries to meet distributional goals with fiscal policy actions. The idea as to how to effectively redirect strategies and actions towards public spending that improve health status of nations began to assume centre-stage in international funding and assistance programmes (World Bank 1990, 1991; UNDP 1990; ADB 1992; IFAD 1992). The case had been made that the development of human capital needed to be encouraged and expanded through primary education and basic health care, largely provided publicly. In addition, that there should be a need for a well-targeted social safety nets, provided by the government, to guard the poor and vulnerable against food and other insecurities.

Like most developing countries in Africa, Ghana has made dramatic changes during its period of reform since 1983. Though one of the major focuses was the curtailing of government expenditure, expenditure in the social sectors mainly education and health has been on the increase. Figures obtained from the Ghana Health Service indicates that the proportion of total government recurrent expenditure devoted to Health ranged between 10.2 percent in 2001 and 34.2 percent in 2006. Compared with that of other developing countries of the world, it is quite huge. Similarly, the government had invested more in hiring health manpower (doctors, nurses and health workers) over the same period. For instance, in 2001, doctor to population ratio was 20,036 but in 2006, this number reduced to 14,732 (Ghana Health Service, 2007, 2010). There has also been a huge public investment in health infrastructure as indicated by hospital bed to population, which showed an improving trend of 58.9% in 2001 to 51.3% in 2006 (Ghana Health Service, 2010).

Among other socioeconomic priorities, health is one of the issues that are at the forefront of the Millennium Development Goals (MDGs), which Ghana hopes to fulfil by 2015. The Government therefore prioritised health issues within the MDGs. Among the goals of the MDGs is to reduce under-five mortality rate to two-thirds by 2015; the fifth goal is to reduce the maternal mortality ratio by three-quarters by 2015, and the sixth is to try and to reduce infection rates of HIV/AIDS, malaria, and other communicable diseases associated with hygiene and environment by 2015. All of these have been made primary health goals, which the government has sought to integrate into community level health care (Public Agenda, 6 February 2008). The main challenge in achieving the health-related MDGs, according to the ministry of health "is to increase overall coverage and to reach the poor more effectively". However, Public Agenda newspaper observed that "it appears […] that despite the policy of focusing on primary health care, most of the increased spending in the health sector in recent years has gone into other sectors to the neglect of the primary health component" (Public Agenda, 6 February 2008).
It therefore becomes important to examine the extent to which public spending may have any impact on the indicators of health status and healthy living such as morbidity and mortality within the country. Child mortality, one of the three indicators of health has therefore been adopted as the measure of health status for this research. This paper looks to examine the effectiveness of fiscal policy instrument on the lives of the citizens of Ghana.

Statement of the Problem

Despite the fact that spending on health has a positive effect on the formation of quality human capital that boosts economic growth, promotes equity, and reduces poverty, exactly how productive and beneficial such spending on health will be however depends on how funds are allocated within the health sector. Data from the Ghana Health Service shows that, since the mid-1980s, real per capita spending on health has increased on the average. However, a relatively high percentage of public spending is allocated to curative health care. Thus, there is room for improving health outcomes by changing the composition of public expenditure. Over the past decade Ghana has continued to achieve high and stable economic growth. Higher growth rate stretches the revenue space of the government that leads to increase health interventions and expenditures. With ever-increasing health expenditures comes the need to evaluate their effectiveness. Health sector expenditures are inputs that influence the health status of the country .There are questions that can only be answered by studying the relationship between health status and public expenditure in Ghana. The aim of this research therefore is to explore the relationship between health status and public expenditure in the country.

Objectives of the Study

The general objective of the research is to provide a comprehensive and reliable documentation on the relationship between public expenditure and health status in Ghana.
The specific objectives for which this study aims at achieving include the following:

- ***i*** To assess the effectiveness of public expenditure by examining the effect of per capita total and public health expenditures on health status.
- ***ii*** To examine the relative relevance of public expenditure for policy-making purposes most especially on health policy.
- ***iii*** To analyse the necessary and sufficient conditions as well as determine the directions under which public health expenditure should increase.

This study is significant and timely because there have been and continues to be numerous increases in health expenditure in Ghana but very little attention has been placed on the relationship between public spending on health and health status in the country over the years by researchers which serve as a basis for discussion and policy-focus

Theoretical Literature

Universally it is recognised that human capital formation plays a crucial role in economic growth in the long run. Health therefore is a critical component of the living standards of a society. Health is visualised as an input into and outcome of development process, integrated socioeconomic lift based (links health improvements with other sectors such as water and sanitation and nutrition) on health status improvements which depict a reflection and cause of continuing development efforts towards human welfare. Improvement in the health of a population as a whole unquestionably has a positive impact by generating social returns to individuals and communities. This explains on one hand, improved human capital better capable of participating in economic activities, improved productivity at individual level and consequently better living standards. On the other hand, better health status will result in lesser absence from work, reduce disease burden (Basta, Karyadi & Scrimshaw, 1979) which translates into low economic cost in terms of providing health services and hence better coverage and better management of the available resources.
Lichtenberg (2004) argued that more public health services could enhance the level of life expectancy. An

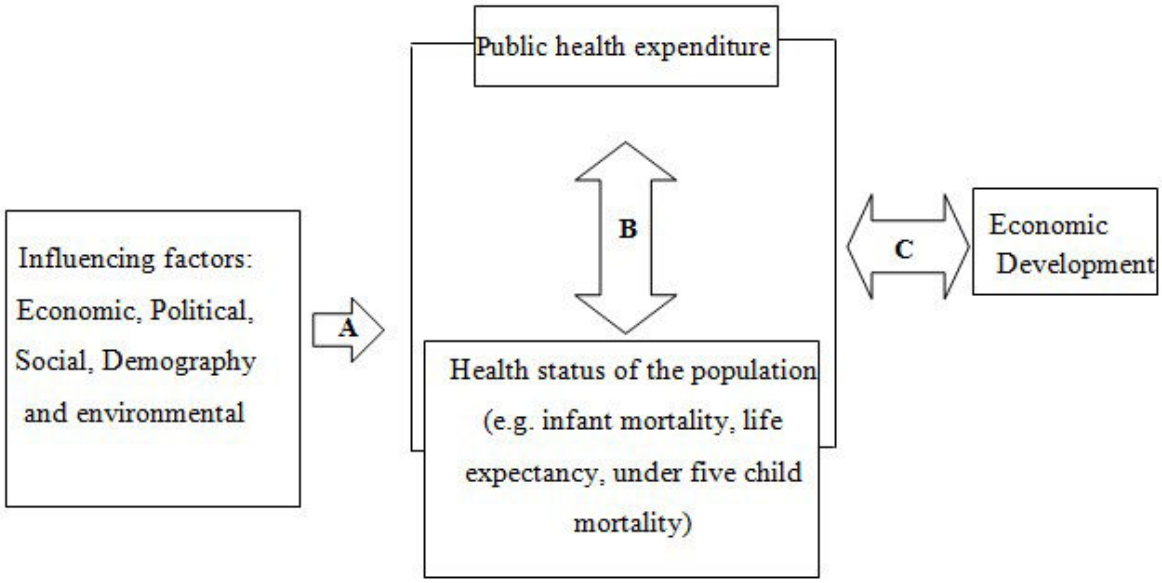
increase in government spending not only leads towards longer life and hence faster economic growth as reinforced by the longer life, it also implies a larger work force, which can also drive faster growth (Aisa Pueyo, 2004). For expansive based economic growth, developing countries have to draw attention towards human capital formation by investing in health and education, as higher spending is worthwhile (Webber, 2002).

Poor health may mean that people who are able to work have reduced productivity, shortened working lives, and increased number of days lost to illness. This imposes a higher level of risk on the poor than on people with more assets.

However, a related reason why better health may not automatically boost efficiency is that rapid population growth and an increasing labour force in many developing countries result in a labour surplus and, consequently, in higher unemployment or a sharp drop in the marginal productivity of workers (Sorkin, 1984).

Below, is a conceptual model (see figure 1) to better understand the link between political, social, economic, and demographic factors at aggregate level and their interaction with health expenditure, health status of the population, and in the long run with the development of the economy. The two way arrow means that there is a possibility of reverse causality and in some cases this hypothesis is also empirically tested, for example the relation of health expenditure and health status, the relation of infant mortality and income, relationship of life expectancy, income, health expenditure etc.

Figure 1: Relationship among Public Health Expenditure, Health Status, and Economic Development



Health is an important aspect of human development and is affected by political, social, economic, demographic, and environmental consequences. Therefore, at macroeconomic level a conceptual model is developed to analyse the channels that affect public health expenditures, health status, and hence economic development of a country. In this hypothetical model (panel A) shows the factors that affect public health expenditures at national level (Gerdtham, et.al. 1992; Newhouse, 1977).

Panel B shows underlining relation between health status and public health expenditure as well as other factors that equally affect health expenditure. It is assumed that the more improved the health status a society enjoys, it is more conscious of its health and hence positively affect health expenditure (World Bank, 1993; Okunade & Karakus, 2000 and Hamuodi & Sachs, 1999).

In several studies it is explained that health is not only an input to development process but an end of this process to accomplish as well. Therefore, a reverse relationship is hypothesized in this model between health status and economic development of a country (Finlay, 2007 and Suhrcke et.al, 2005).

Preceding Studies

While it is a popular finding and belief that a higher average income contributes to a lower rate of mortality (Musgrove, 1996), some studies comprising Auster et al. (1969), Cornia and Mwabu (1997) and Lopes (2002) revealed income to be a less important determinant of health status. Besides Auster et al. (1969) found increased physician density to result in a higher rate of mortality.

In addition, there appeared to be a failure in relating health care expenditures and health status. Leu (1986) failed to identify a relationship between medical care expenditure and lower mortality, while Cremieux et al.

(1999) and Cochrane et al. (1978) found high health spending to be associated with significantly low infant mortality rate. Conflicting to this, Musgrove (1996) found health spending to have insignificant impact on health status. Nevertheless, he showed that much of this literature was done for developed countries.

Cross country studies dominate the area of empirical investigation because of the easily available country or regional level data of Demographic and Health Survey (DHS) and other household level surveys. Mturi and Curtis (1995) analysed the socioeconomic determinants of IMR and Child mortality using 1991-1992 Demographic and Health Survey (DHS) data from Tanzania by applying hazard model. Demographic and biological factors affect infant and child mortality in Tanzania much as expected and after controlling for other factors neither mother's education nor father's education play a significant role in IMR and CMR. On the other hand, most studies consider the mother's education an important indicator and a negative relation exists with mortality (Paris & Lillard, 1994 and Wagstaff et.al. 2004). Female schooling specially post primary has positive effects on reducing mortality (Hill & King, 1992 and Subbarao & Raney, 1995).

Gbesemete and Jönsson (1993) analysed social, economic, demographic, environmental, and political factors, using data of 28 low and middle income African countries. The negative sign reported for female literacy, health spending, and urbanization with IMR. Urbanization variable implies that a more urban country has less chances of infant mortality (IMR).

Filmer and Pritchett (1999) used cross national data to examine the impact of public health spending and other factors in determining child and infant mortality. Multivariate regression model is used with double log specification. Because of nonlinear relation of income with health status therefore, transformation of income into logarithmic form serves to properly capture the non-linearity. Income is used as a control variable because of its universally acknowledged impact on health which works rather indirectly through better living conditions, hygienic food, better housing facilities etc. Health spending does affect child mortality rate (CMR) but it appears insignificant at conventional level of significance. Musgrove (1996) also reported similar results for health spending. While some other studies (Bidani & Ravallion, 1997 and Jamison et.al., 1996) found statistically significant results for health care spending. As health spending accounting varies from country to country, the choice of countries can also have influence on outcomes as well as the functional form used. Notable is the argument of inefficiency of public spending and services provision to the population especially in developing countries. Issa and Ouattara (2005) used data from 160 countries to analyse the effect of health expenditure on IMR. Health spending data disaggregated into public and private expenditure. It is argued that low level of development public expenditure is more effective in reducing IMR while private expenditure are effective as a country develops. Schell et.al, (2007) used linear regression model by dividing countries according to their level of economic development and found that at any level of development public health spending remained non-significant contributor in reducing IMR.

Using panel data approach with fixed effect (FE) and random effect (RE) models for 25 OECD countries, Ramesh and Sam (2007) look at the economic, institutional, and social determinants of health outcomes. Parameter estimates of health employment variables are strongly significant for life expectancy and IMR with FE and RE. This indicates that increasing spending on health employment and personnel will definitely increase access to health care and help in improving life expectancy and reducing mortality. The most important factor affecting IMR includes physician supply, followed by immunization.

Banister and Zhang (2005) determined for China mortality levels that the number of doctors per population is robust and significant. Consumption is significantly affecting mortality and life expectancy in rural areas, because rural areas are underserved while urban areas having insurance system and better health facilities. Hanmer, Lensink and Howard (2003) using data for 115 countries using five years period from 1960-1997estimated that income per capita and health expenditure is consistent and robust in explaining variations in IMR and CMR. Therefore, most of the empirical work which finds that health interventions significantly affect IMR and CMR is supported while the view of Filmer and Pritchett (1997) who argued a weak effect of health spending on health status is rejected. It is recognized that growth in income is necessary to sustain health expenditures.

From the empirical literature, it is observed that most of the results derived are from studies conducted in developing countries of Central and South America. Studies based specifically on African countries are very limited. In this regard, there is very little to fall back on when it comes to comparing the results of this research, which is based on data from Ghana, with those of earlier studies in Africa.

Theoretical Model

According to Filmer and Pritchett (1999), a simple model of the determination of aggregate health status can be conceptualised as follows:

Health Status$_i$ = $(H_i / N_{i)}^{\alpha} \times NH_i / N_i^{\beta} \times e^{Ai}$ *1.1*

Where:

Health Status$_i$ is Infant mortality rate/ under five mortality rate
H_i = Public Expenditure in the Health Sector of Country i
NH_i = The Rest of GDP (inc0luding all non-public sector health spending)
N = population
A = Country Specific Factors (such as; access to safe water, access to sanitation, female education, location of a country, income inequality etc.)
Filmer and Pritchett (Ibid) postulated that the transformation of equation ***1.1*** to logarithmic form could help achievement of two objectives. Firstly, it can capture non-linearity of the model as most studies that examined the relationship between public spending and health status found a non-linear relationship between mortality and income. Secondly, the transformation allows for comparisons with earlier findings since the regression results provide elasticities, which are assumed constant over time.

The Empirical Model
The model employed for the empirical analysis undertaken in this study is derived from the work of Filmer and Pritchett as described above. The model is therefore estimated as follows:
Health Status$_i = \beta_{0i} + \beta_{1i}\, GDPPC + \beta_{2i}\, PEH + \beta_{3i}\, NP + \beta_{4i} HI + \varepsilon_i$ ***1.2***
Where;
Health Status$_i$ is Infant mortality/under five mortality rate ,GDPPC is GDP Per Capita measured in local currency unit (LCU) ,PEH is Public expenditure on health as a percentage of GDP (LCU) ,NP is Physician per population ,HI is Health Insurance (proximate by dummy) ,ε_i is Stochastic disturbance term to capture omitted variables and *i* is 1, 2, 3.

Data Collection and Data Analysis Method
A time series data is going to be evaluated over a period of ten years from 2001 – 2010. The data used was obtained from the Ghana Health Service.
Time series data consist of a collection of observations of well-defined data items obtained through repeated measurements over time at regular intervals. These entities could be states, people, or firms. The model is to be estimated to examine the long run relationship between public expenditure and health status in the country.
Time series approach is not free from problems, one of the problems being an issue of stationarity. The assumption of stationarity in time series analysis is important because of the reason that correlation between unrelated non-stationary series can be positive and/or negative unity as the length of time series in question increases (Yule, 1926).
Spurious regression is also an issue to take into account when dealing with time series data as it mostly exhibits trend, and if it is not taken care of, gives absurd results. Simple techniques of differencing will increase the problem of spurious autocorrelation. The use of the time series analysis in this type of situations offers a solution by examining closely the variable properties through short and long run relationships by developing dynamic models. Variables may drift apart in the short run, but not so far away in the long run that undermine the long run relationship
The Time Series approach will involve two major steps.
In the first step, the stationary nature of the series is determined. This exercise comprises:

- ***i*** Testing for a unit root in each series.
- ***ii*** Testing for the number of time series in the system, provided that the null hypothesis of unit root in each of the time series being studied cannot be reject.
- ***iii*** In order to examine whether the variables are integrated of the same order, each variable has to be differenced in order to turn the time series stationary.

In the second step, the short run relationship between the variables using time series method by OLS regression analysis is examined.

Analysis and Discussion of Results
The estimation of the model gives significant details of the nature of the relationship that exits between the health status and the various explanatory variables. Statistically, the significance of a time series analysis is better if the p-value(that is,prob>x2 or prob>F) is less than 0.0500.the physician per population and the health insurance are the only significant variables with p-values of 0.0266 and 0.0191 respectively. GDP and health expenditure are not significant.

Table 1: Time Series Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPPC	0.000284	0.000292	0.972625	0.3754
PEH	-2.86E-07	5.21E-06	-0.054971	0.9583
NP	0.002242	0.000722	3.107740	0.0266
HI	5.703517	2.068398	2.757456	0.0400
C	49.97481	14.66738	3.407208	0.0191

R-squared	0.967845	Mean dependent var	85.00000
Adjusted R-squared	0.942121	S.D. dependent var	7.434006
S.E. of regression	1.788479	Akaike info criterion	4.307460
Sum squared resid	15.99328	Schwarz criterion	4.458753
Log likelihood	-16.53730	Hannan-Quinn criter.	4.141493
F-statistic	37.62414	Durbin-Watson stat	2.244404
Prob(F-statistic)	0.000634		

Source EViews

Table 2: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.208061	Prob. F(2,3)	0.4122
Obs*R-squared	4.460982	Prob. Chi-Square(2)	0.1075

Source EViews
Since the p-value (0.1075) of Obs*R-squared is more than 5 percent (P >0.05), we fail to reject the null hypothesis meaning that residuals are not serially correlated which is desirable for a regression model.

The first variable in the model corresponds to GDPPC, which is the GDP Per Capita measured in local currency unit (LCU). Corresponding to **Table 1** above, the column with the indication Prob represents the two-tail p-values that are tested for the significance of the explanatory variables. The corresponding 0.3754 p-value of GDPPC implies that income per capital is not significant to the dependent variable which is the child mortality. Thus the increase in the income per capital will not lower the rates of child mortality health status of the population. This result lends support to Cornia and Mwabu (1997) and Lopes (2002) who revealed income to be a less important determinant of health status as well as Musgrove (1996) that, there is no indication that given per capita income spending a larger share of GDP on health reduces child mortality.
The variable *PEH* which represents public expenditure on health with a p-value of 0.9583 indicates that it is not significant. This result is consistent with Filmer and Pritchett (1999) who explain that adding health expenditure to the model adds little explanatory power. Musgrove (1996) summarizes that health expenditures are not significant in determining health status in developing countries. Understanding why spending on health has no impact on decreasing mortality rates is important in policy design. We can express three possible explanations for this which include changes in health status are affected as a proximate matter by changes in the consumption of various health care services some of which may be more or less effective in improving health services. The second factor is how the consumption of health services changes with changes in the effective supply of those services. The third factor is how the impact of public spending will depend on the degree to which the public spending is able to create effective public services. For public spending to improve health status, public

expenditure must create an effective health service; the existence of these new services has to change the total amount effective health service consumed by the population and the addition health services consumed must be cost effective in improving health status.

The Physician per population variable is significant on the dependent variable (child mortality) with a value of 0.0266, and there exists a positive relationship between the variable and child mortality with a coefficient of 0.002242. The Physician per population is an important variable on health status specially in reducing child mortality. This result is in contrast with that of Younger (2001). It is estimated by Younger (2001) in a cross country growth regression framework that measures of health care personnel availability like doctors per 1000 population have no impact at all on the rate of decline of mortality. Indeed, Robst and Graham (1997), and Robst (2001) have found that more physicians reduce mortality rates mainly in rural areas, while the effect is small in urban areas. Grubaugh and Santerre (1994) also find that there is a positive impact on health. The implication of the positive result for doctor population ratio for child mortality is that more number of doctors means better access to health care services and less waiting time thus, leads to better health care delivery to the population. As the measure of doctor population ratio measures the curative emphasis of the health care system (Miller, 1978).

The variable *HI* which represents health insurance is estimated with a p-value of 0.0400 indicating that it is significant. The health insurance variable which is a dummy in the model has a coefficient of 5.7003517, indicating a positive relationship exists between explanatory variable and child mortality depicting the importance of health insurance in achieving better health status of the Ghanaian population. Therefore accept the hypothesis test. This result is consistent with Dow and Schmeer (2003) who find that insurance increases are strongly related to mortality decreases. This result implies that health insurance can lead to large improvements in child mortality, and that expanding insurance to the poor can substantially narrow socioeconomic differentials in mortality. This variable has a larger impact on child mortality than the physician per population ratio.

Conclusion

Arising from these results, it could be concluded that despite the relationship between health status and many other possible determinants, the most important factors relevant to health status in Ghana are health insurance policy, and the availability of physicians. It would imply that, better health status seem to be associated with higher health spending and more physicians. On the other hand, and given the performance of the income variable, it may also be said that income does not influence health.

5.3 Recommendations

The key policy implications that can be drawn from this study for the government of Ghana is to channel more resources in hiring/educating more physicians and increase the share of public spending on health. The NHIA must also consider the possibility of extending the benefit package of the health insurance scheme to include traditional medicine. The NHIA must also review drug prices regularly and pay claims timely since it is the basic reason most providers fail to supply prescribed drugs to clients. Apart from recommendations that derive directly from the findings of this research, we may also suggest policies aimed at combating health sector inequalities in both the supply side for example the quality and availability of health services and the demand side such as inequalities in knowledge and access. The Ministry of Health should work more closely with other ministries and agencies and take an extensive outlook by, for example, exploring alternative health delivery methods. Moreover, resources should be redirected to focus on cost-effective methods to prevent and treat diseases and conditions that disproportionately affect the poor; these pro-poor interventions could include targeted interventions for malaria and tuberculosis. Or by directing funds, staff and supplies to areas where the poor live, work and learn. Government on priority basis has to establish a task force that can help to evaluate the public health expenditures spent on different heads (development spending vs. non development spending) and to see the impact of the scarce resources that can be utilized in an effective and efficient way.

The government should spend on health in the areas that will attract and increase the number of physicians in the country. Health sector expenditure must be allocated in a way that increases the provision of the necessary infrastructure and easy access to health care services. Focus should be on policies that promote greater access to health care facilities for both mother and child.

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APPENDIX 1: UNIT ROOT TEST FOR GDP PER CAPITAL
2^{ND} DIFFERENCE

Null Hypothesis: D(GDPPC,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.973501	0.0254
Test critical values:	1% level	-4.803492	
	5% level	-3.403313	
	10% level	-2.841819	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 7
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDPPC,3)
Method: Least Squares
Date: 06/02/13 Time: 16:51
Sample (adjusted): 2004 2010
Included observations: 7 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPPC(-1),2)	-1.519966	0.382526	-3.973501	0.0106
C	251.5123	2322.175	0.108309	0.9180

R-squared	0.759485	Mean dependent var	117.1800
Adjusted R-squared	0.711382	S.D. dependent var	11435.00
S.E. of regression	6143.247	Akaike info criterion	20.51905
Sum squared resid	1.89E+08	Schwarz criterion	20.50360
Log likelihood	-69.81668	Hannan-Quinn criter.	20.32804
F-statistic	15.78871	Durbin-Watson stat	2.301999
Prob(F-statistic)	0.010599		

APPENDIX 2: UNIT ROOT TEST FOR PHYSICAN PER POPULATION
2nd DIFFERENCE

Null Hypothesis: D(NP,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.402299	0.0568
Test critical values:	1% level	-5.119808	
	5% level	-3.519595	
	10% level	-2.898418	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 6

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NP,3)
Method: Least Squares
Date: 06/03/13 Time: 08:30
Sample (adjusted): 2005 2010
Included observations: 6 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NP(-1),2)	-1.949223	0.572914	-3.402299	0.0424
D(NP(-1),3)	0.538395	0.361283	1.490231	0.2329
C	-291.2126	685.8092	-0.424626	0.6997

R-squared	0.837801	Mean dependent var	-534.1667
Adjusted R-squared	0.729669	S.D. dependent var	3212.725
S.E. of regression	1670.405	Akaike info criterion	17.98637
Sum squared resid	8370762.	Schwarz criterion	17.88225
Log likelihood	-50.95912	Hannan-Quinn criter.	17.56957
F-statistic	7.747905	Durbin-Watson stat	3.015677
Prob(F-statistic)	0.065324		

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