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Research Article

The Contribution of Public Health Investments to the Economic Growth of Cameroon

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Abstract

The goal of this paper is to determine the contribution of public health investments to the economic growth of Cameroon. The study used the human capital model of Lucas (1988) within the framework of endogenous growth theories. The Vector Error Correction Model (VECM) was employed in the estimations procedure using the World Development Indicators (WDI, 2013) data from the World Bank over the period spanning from 1988 to 2013.The findings show that government health expenditures contribute to economic growth only in the long run. From our results, we recommend that: first, the government should increase health spending to 10 or 15 percent of its GDP as initially suggested by the African Union and the World Health Organization respectively; second, government should enhance the provision of health care services by the private sector by putting in place incitation measures; third, competitive awards should be granted to those health units that render quality health care services.

Keywords: Public Health Investments; Economic Growth; Cameroon

Introduction

Since independence, Cameroon exports are mainly agricultural and primary products such as banana, coffee, cocoa, rubber, timber, and oil. Among the products exported, oil yields the highest export revenues. However, the prices of these agricultural and primary products fluctuate very much on the international market.

In 1973, occurred the first oil crisis. The crisis began when the members of the Organization of Arab Petroleum Exporting Countries (OAPEC) placed an embargo on oil exports. By the end of the embargo in March 1974, the price of oil had risen from US $3 per barrel to nearly US $12 in 1979. Cameroon could sell its oil at higher prices. Furthermore, a second oil crisis broke out due to the decrease in oil production in the wake of the Iranian Revolution. Due to global panic, oil price rose to about US $39.5 per barrel. This led to an increase in the export revenues of Cameroon as it was selling oil at higher prices. The revenues obtained from the sales of oil and other agricultural products were used to fund development projects such as roads, schools, hospitals, and also the creation of public enterprises like the Cameroon Railway Corporation (CAMRAIL) and the Cameroon Airline Corporation (CAMAIR). The putting in place of these projects boosted production, created jobs, increased the income of Cameroonians and eventually boosted the exports of agricultural and primary products like banana, cocoa and timber. This led to the attainment of high economic growth rates. In fact, the 1970_S and the early 1980_S were the golden years in terms of economic growth ever witnessed in Cameroon. During this period, Cameroon was regarded as a development model due to its very high economic growth rate (Chauvin, 2012).

However, Cameroon plunged into an economic crisis in the late 1980_S and in the early 1990_S that resulted from a more than 60 percent fall in oil prices. This led to the fall in export revenues thereby affecting government income adversely. The government could barely meet up with its expenditures and ultimately the shortfall in government revenues led to a budget deficit. By 1990, all macroeconomic indicators were in the red: the national debt had moved from US $431.4 million in 1973 to US $3,367.4 million ten years later, and this debt even reached 126.7 percent of the Gross Domestic Product (GDP) in 1995. Public spending decreased from 15 percent of national budget in the 1980s to 2.2 percent in 1992; from

1986 to 1993, real per capita GDP fell by 50 percent; important banks representing 75 percent of the market went bankrupt (Gabriel, 1999). It was evident that something had to be done so as to ameliorate the economic situation.

It was in this light that the government enacted several Structural Adjustment Programs (SAP_S) with the International Monetary Fund (IMF) in 1988, 1991, 1994, and the World Bank in 1989 and 1994 (Tchoungui et *al*., 1995). The SAP_S aimed at stabilizing the country's public finances and stimulating its economy using actions on demand and supply sides. Unfortunately, the SAP_S failed partly because of the under estimation of its effects and inadequate governance (Tchoungui et *al*., 1995). The failure of the SAPs brought many deleterious effects to the economy of Cameroon.

The first was the massive informalization of the economy (considered by the World Bank as the most significant and least appreciated of the SAP_S) mainly due to the tremendous reduction of the formal sector employments that on its part resulted to the reinforcement of ethnic solidarity (Tchoungui et *al*., 1995).

Second, the significant rise in poverty level from 49 percent in 1983 to 71 percent in 1993, and a 55 percent decrease in per capita real GDP from 1986 to 1993 (Tchoungui et *al.,* 1995). These adverse effects reached the rural areas mainly because of a 60 percent reduction of the prices of 26 cash crops as well as a 40 percent fall in food crop production. This further reduced the GDP because revenues had fallen again; demand for goods and services drastically fell. It is worth noting that the growth rate of Cameroon between 1987 and 1994 was negative. Even after the attainment of the High Indebted Poor Country Initiative (HIPC) in 2006, the growth rate of Cameroon has not reached 7 percent.

Third, the SAP_S negatively affected the social structure, including the worsening of health indicators such as life expectancy at birth that moved from 53 years in 1986 to 49 years in 2006 (World Bank, 2014b). But according to the World Health Organization-WHO (2014b), the health status of a country's population is an important determinant or even a prerequisite for its economic growth and development since health contributes to people's happiness, wellbeing, economic progress, longevity, productivity and savings.

It is in this connection that many authors and international institutions brought out a positive link between improved population's health and economic growth. For instance, the report of the WHO's Commission on Macroeconomics and Health (2001) states, "Improving the health and longevity of the poor is an end in itself, a fundamental goal of economic development. But it is also a means to achieving the other development goals relating to poverty reduction. The linkages of health to poverty reduction and to long term economic growth are powerful, much stronger than is generally understood. The burden of disease in some low income regions, especially sub-Saharan Africa, stands as a stark barrier to economic growth and therefore must be addressed frontally and centrally in any comprehensive development strategy". Also, the relatively poor health conditions in Africa account for a substantial part of the difference between African growth rates and the average growth rates of other countries (Bloom and Sachs, 1998).

Nowadays, most countries including industrialized ones are multiplying reforms such as the OBAMA CARE in the United States of America (USA) to reduce health care cost, make it accessible for all social classes so as to have a healthy and productive population. Cameroon with weak growth rates is similar to many developing countries with high burden of diseases (both communicable and non-communicable) and concurrent development challenges like epileptic electricity supply and poor transport systems amongst others. The diseases plaguing the health of people reduce their productivity, life expectancy, and savings, affect the education of children and eventually economic growth. Could public spending in the health sector ameliorate the economic growth of Cameroon? This paper attempts to examine the impact of government expenditures aimed at improving people's health on the economic growth of Cameroon. To do this, the paper is organized as follows: section 2 looks at the literature review; section 3 discusses the methodology of estimation; section 4 analyzes the results of findings and section 5 presents the recommendations and conclusion.

Literature Review

In recent years, there have been remarkable improvements in people's health across the world. This is principally due to the advancement in medical technology, governments spending in the health sector, an increase in income levels and improvements in nutrition. The amelioration of the population's health has led to an increase in life expectancy at birth, a reduction of the number of deaths caused by diseases, an increase in income and so on. Good health can be thought of as a right independently of its relationship with income and economic growth. It is in this light that many authors brought out a positive link between population's health and economic growth. Improved populations' health affects economic growth through various channels. Some of which include: the accumulation of human capital, less absenteeism at work and increased productivity per worker, increased savings, and territorial attractiveness.

Accumulation of Human Capital

Human capital must be seen as a cumulative variable with positive externalities, and as the main driving force of a country's economic growth (Lucas, 1988). The main idea is that more educated individuals are more efficient and more productive at work. In fact, knowledge is an important element of production that has increasing marginal productivity for without knowledge, inventions and innovations are less likely to happen (Romer, 1986). Education enhances productivity not only through the knowledge or competencies acquired by individuals but also through the stimulation of physical investments and the adoption of technological development. If traditionally human capital is associated to the worker's education, more recently it has assumed a broader notion to include health factors.

The idea that human capital accumulation could be increased by investing in people's health was already advanced in the 60s by Schultz (1961) and Mushkin (1962) and gained definitively relevance after Grossman's (1972) pioneer work. Indeed, Grossman (1972) was the first to consider explicitly this issue, relating a higher preference for health (as a consumption good) to more educated individuals. As such, health status is regarded to be very important when it comes to human capital accumulation due to its direct link with education. In this case, human capital accumulation is seen as a progressive acquisition of knowledge that eventually renders people more creative, productive and innovative. Like physical capital, health depreciates over time but individuals can invest to improve their health status. For example, children who are healthy and adequately nourished can spend more time at school and be better learners. Also, the deworming of children in the USA, Columbia and Brazil had an effect on their educational achievements (Bleakley, 2003). Furthermore, the school attendance increased in Kenya following the deworming of children (Miguel and Kremer, 2004). As such, children can acquire more knowledge thereby enhancing human capital accumulation.

Also, lower mortality rate resulting from improved health will encourage parents to invest more resources in education of their children. This guarantees high levels of schooling and the acquisition of knowledge that will in return be used for future production and as such economic growth will be boosted (Kalemli-Ozcan, 2002).

Additionally, the high level of economic growth observed in East Asia is partly explained by the huge accumulation of human capital (Bloom et *al.,* 2000). For them, improvement in people's health is very necessary because it influences the capacity of workers to learn which eventually affect their productivity. Thus, improved population's health does not only benefit the people at an individual level but also at an aggregate level, as it permits people to learn better and to eventually use the knowledge acquired to boost production (Bloom and Canning, 2005).

Less Absenteeism at Work and Increased Productivity per Worker

Absenteeism at work refers to the non regularity of workers at their job sites. Productivity means the total output produced by a worker for a given period. Workers play an important role in a production process. They organize, manage, control machines, execute tasks and so forth. Better health makes workers more productive, either through fewer days off or through increased work efficiency. Moreover, improved health of family members will have a similar impact through reducing time lost caring for the sick in the family. Even if sick workers are present at their work places, the quality and quantity of work they do are not the same as when they are in good health.

Health like education is primordial in determining an individual's productivity and efficiency. Healthy workers have more energy to work, are more creative and productive (Schultz, 2005). Health also affects labor supply as health problems cause absenteeism at work, as well as presenteeism; a relatively recent concept meaning those individuals that even when they are sick still go to work although being less productive (Bloom et *al.,* 2001; Bloom and Canning, 2008). For instance, the average rate of absenteeism is between 3 and 6 percent in the European Union (EU), and its cost is estimated at about 2.5 percent of GDP (Edwards and Greasley, 2010). They added that absenteeism is chiefly accounted for by health issues, with respiratory and musculoskeletal problems being the two main causes. For example, focusing just on lost working days as a result of sickness bouts in malaria affected areas, adults can expect on average about two bouts of malarial fever yearly, with each bout resulting to a loss of 5 to 10 working days (Babu et *al.,* 2002). This leads to a reduction of about 5 percent in worker productivity (Murray and Lopez, 1996).

Nevertheless, improvements of workers' health in Britain between 1780 and 1980 led to an increase in worker productivity to about 0.33 percent per year (Fogel, 1994). This is because less time is lost due to illness and more time is consecrated to work. Moreover, healthier workers have higher chances of receiving skill upgrading investment from the firms they are working for and this will eventually increase their productivity. Also, a rise in the adult survival rate resulting from health improvements leads to an increase in worker productivity by 1.68 percent as people would like to earn and save more money for retirement (Weil, 2001). He also added that a worker in good health in a low-mortality country will be about 70 percent more productive than a worker suffering from ill health in a high-mortality environment because the later spends lesser time at work due to sickness bouts. This is a

large effect and implies that health differentials account for about 17 percent of the variation in output per worker across countries. Workers in good health have a better capacity to create and this makes it easy for them to learn new productive methods that will increase their output thereby fostering economic growth.

Increased Savings

Savings refer to money that is not used immediately but saved for future use. Poor health affects both the ability to save and the incentive to save. Sickness can impose large out-of-pocket medical expenses that reduce current and accumulated household savings. This occurs in developed countries but is of particular concern in developing countries (Smith, 1999).

In Cameroon, the weakness of health insurance systems means that out-of-pocket spending by households is the main source of financing health treatment (WHO, 2014b). This implies that most households pay for medical treatment entirely with their own money. As such, a deterioration of population's health will imply huge out-of-pocket spending on health. This will reduce savings because sick people mostly do not work and use their savings to pay for medical treatment (Blanchard, 1985). He further outlined that an ameliorated population's health leads to an increase in life expectancy and savings for retirement. This is because people expect to live longer and so they have to save for future consumption. For instance, it was found that increased life expectancy leads to greater wealth holding at the household level in the USA (Hurd et *al.,* 1998).

These savings of households are usually for future consumption and can be borrowed by enterprises to invest. When enterprises borrow these savings, they hire the various factors of production to produce goods and services. It is in this connection that rising life expectancy significantly accounted for the boom in domestic savings that later on fostered investments in Taiwan and China (Lee et *al.,* (2000). It should be noted that huge long term savings make money available for investors to borrow and lenders (banks) to lend. This makes access to financial resources for investments less difficult. Thus, there is a positive link between savings (resulting from an ameliorated population's health) and investments as improved population's health reduces out-of-pocket spending and increase savings for retirement (Alsan et *al.,* 2006). In fact, the availability and accessibility to financial resources increase investments and eventually economic growth.

Territorial Attractiveness

Attractiveness refers to the capacity of a territory to attract an important number of productive units (Hatem, 2004). Today, the world is characterized by the phenomenon of globalization which has made it easier for enterprises to move from one region to another in search for better economic prospects. This has pushed territories to adopt strategies aimed at attracting these enterprises in search for optimum location sites by implementing business facilitation measures, creating investment promotion agencies, liberalizing their investment frameworks and fighting contagious diseases that deter investors (Asiedu and Lien, 2004).

An ameliorated population's health by a reduction of contagious diseases does not only increase productivity but encourages the inflow of Foreign Direct Investment (FDI) and skilled workforce into a country (Alsan et *al.,* 2006). The inflow of FDI leads to the creation of enterprises, an increase in employment, as well as the production of goods and services. Also, FDI generate positive externalities such as transferring technology and skills, and increasing access to global markets (Lim, 2001). In this regard, a country with little prevalence rates of contagious diseases will not scare tourists from coming.

Conversely, infectious diseases lower productivity and deter investments. A classic instance of disease interfering with investment was during the building of the Panama Canal, where Ferdinand de Lesseps and the French were forced to abandon the construction project after yellow fever and other pathogens had claimed the lives of 10,000 to 20,000 workers between 1882 and 1888 (Jones, 1990). Also, how disease or even the fear of disease can dampen investment was better illustrated by the outbreak of Severe Acute Respiratory Syndrome (SARS); the inflows of FDI into mainland China declined during the year 2003 by US $2.7 billion (Business Daily Update, 2003). Similarly, the inflows of FDI into Hong Kong equally fell by 62% in one trimester (Tam, 2003). Once the outbreak was under control, the trends quickly reversed. This shows that the prevalence of contagious diseases that cannot be easily treated or immediately controlled does not only deter new investments but can stop ongoing production. It can be noticed that the poor health of population renders a territory (country) less attractive to investors and tourists. Thus, ameliorating population's health will make a territory more attractive to investors and tourists leading to an increase in investments and an eventual economic growth.

Methodology

Justification of Model

The theoretical model chosen is inscribed within the framework of endogenous growth theories. Endogenous growth theories emphasize on boosting long run economic growth from within. This is done by public spending (on health, infrastructure and education), innovation, human capital accumulation and so forth. In this work, it is the Lucas model (1988) on human capital that is going to be used because it brings out the importance of human capital

to economic growth. The model also outlines that an economy can achieve high economic growth rates by increasing investments in health and education as they determine the quality of human capital needed to produce goods and services. As such, human capital is considered as a very important factor of production as it directly concerns man who is at the center of production activities. Therefore, the VECM is the suitable econometric model for estimation in this work because it brings out the long run relationship between variables and also is appropriate for time series analyses as it is the case of this work.

Specification of Model

As the focus of our study is to analyze the contribution of public health investments to economic growth, human capital is separated into two parts; health human capital (H) and education human capital (E). Per capita income (Y) is assumed a function of the stocks of physical capital (K), health human capital (H), education human capital (E) and a vector of other variables (Z) that includes technology and other environmental variables.

Y = f (K, H, E, Z)……..…..(1)

H at time t is the sum of H in the previous period and in the current period, that is, $H_t = H_{t-1} + H_{present}$. It is assumed that the accumulation of H depends on the amount of resources devoted to health care and the efficiency by which this expenditure is converted into health stock. It is further assumed that the quantity of resources devoted to health investment is a product of the proportion of income devoted to health care (Yh) and the level of income. The stock of health human capital evolves in the following way

$H_t = H_{t-1} + H_{present}$and ΔH= λ Yh Y……..…..(2)

Where, λ is the productivity parameter of health expenditure and all other variables. The ability to transform health expenditure into health stock is assumed to be dependent on H. The health technology equation can be written as:

λ = λ (H). ……..……...(3)

Substituting λ into ΔH equation and that in turn into equation (1), the income growth equation becomes.

$Y = f(\Delta H + \Delta k + \Delta E + H_{t-1} + Z)$……(4)

Data

The data used are obtained from the database of the World Bank: the World Development Indicators (WDI, 2013). The data are annual and the period of analyses is from 1988 to 2013. The explained variable is GDP per capita (constant LCU), the explanatory variable is public expenditure on health (percentage of GDP) and the control variables are public expenditure on education (percentage GDP), general government final consumption expenditure (current LCU) and net FDI.

From Table 1, it can be seen that there are 26 observations for all the variables. Also, the mean and standard deviation of each variable are shown. As it can be noticed, GDP (constant LCU) has the highest mean (435091.2) and standard deviation (41470.98). Furthermore, net FDI has the lowest mean (1.103496) and Public expenditure on health (% of GDP) has the lowest standard deviation (0.301868).Thus the vector autoregressive (VAR) model with k explicative variables would be used to specify the nature of the VECM. Considering a VAR of the form;

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \cdots + \beta_k x_{kt} + \varepsilon_t \ldots\ldots\ldots\ldots (5)$$

Where the variables y_t and x_{1k} are not stationary, integrated of order one I(1). There is thus a high possibility of co-integration. It should be noted that a linear combination of these variables is stationary implying that they are therefore co-integrated. Estimating by ordinary least squares permits to calculate the residuals as shown in equation (6) below.

$$e_t = y_t - \widehat{\beta_0} - \hat{\beta}_1 x_{1t} - \hat{\beta}_k x_{1k} \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

If this residual is stationary, the hypothesis of co-integration between the variables is accepted. The Dickey fuller test of stationarity of residual would be carried out from the critical values tabulated by MacKinnon (1991) with respect to the total number of variables of the model. The vector of co-integration is given by

$(1\text{-}\widehat{\beta_0}\ \text{-}\hat{\beta}_1 \ldots\ldots\ldots\hat{\beta}_k)$…… (7)

In a general manner, with a dependent variable and k independent variables, that is, k+1 variables in total, there exists k co-integration vectors in total. The number of co-integrated vectors linearly independent is called the rank of the co-integration.

Table 1: Summary statistics of variables

Variable	Mean	Standard deviation	N	Minimum	Maximum
GDP per capita (constant LCU)	435091.2	41470.98	26	373103.0	550541.5
Public expenditure on health (% of GDP)	1.120031	0.301868	26	0.784630	1.859084
Public expenditure on education (% of GDP)	4.705060	0.368262	26	3.861243	5.357820
Net FDI	1.103496	1.412225	26	-1.011797	5.530867
General government final consumption expenditure (current LCU) in log	27.26140	0.493034	26	26.65199	28.15610

Results of Findings

The Augmented Dickey Fuller (ADF) test

It is used to test whether variables are stationary or not. A series is stationary if its probability distribution does not change as time proceeds.

The results of the ADF test in Table 2 illustrate that the variables are non-stationary at level but they become stationary at first difference. This means that they are integrated of order 1. Thus a linear combination of these series would yield stationary variables. These results imply that there is a high possibility of co-integration of these variables. In order to verify this, we shall use the Johansen test of co-integration.

Co-Integration Test

To investigate the existence of a long run relationship between public health expenditure and economic growth, the maximum-likelihood test approach established by Johansen and Juselius (1990) and Johansen (1991) is employed. This approach is especially appealing since it provides a unified framework for estimating and testing co-integrating relations in VECM. Hence, by treating all the variables as endogenous, this approach avoids the arbitrary choice of the dependent variable in the co-integrating equations as in the Engle-Granger methodology.

As it is already found that variables are stationary at first difference, that is, series of the model are integrated of order 1. Therefore, the co-integration can be determined between the variables. Second step involves choosing the optimal lag length using the VAR model based on Akaike's Information Criterion (AIC). The next step deals with determining the number of co-integrating vectors using the trace and eigenvalue statistics. The results of the test are presented in the following Table 3a.

Table 3a shows the trace statistics which indicate that there are two co-integrating relationships. As such, the variables can be linearly combined in two ways to have stationary ones.

Table 3b indicates the maximum Eigen value statistics is used and it confirms the results of the trace statistics that there are two co-integrating relationships, confirming there is a long run relationship between public health expenditure and economic growth. This lays grounds for the estimation of the Vector Error Correction Model (VECM). But before doing that, it is more coherent to know the direction of causality between variables.

Table 2: Results of the Augmented Dickey Fuller test for unit Roots

Variables	At level			At first difference		
	trend & inter	Probability	Degree of integration	trend & inter	Probability	Degree of integration
GDP per capita(constant local currency)	-1.418002	0.0969	I(0)	-10.22400	0.0000	I(1)***
Expenditure on Health (% GDP)	-5.815922	0.0325	I(0)	-6.145270	0.0000	I(1)***
Expenditure on education(% GDP)	-4.319741	0.0821	I(0)	-5.196975	0.0000	I(1)***
Foreign direct investment net	-4.575734	0.09870	I(0)	-8.075752		I(1)***
Government final consumption expenditure (constant LCU)	-4.319741	0.235	I(0)	-5.196975	0.0000	I(1)***

Table 3a: unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.928258	133.6308	69.81889	0.0000
At most 1 *	0.854222	73.03330	47.85613	0.0000
At most 2	0.572403	28.74287	29.79707	0.0658
At most 3	0.245448	9.202685	15.49471	0.3470
At most 4	0.111736	2.725180	3.841466	0.0988

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 3b: unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.928258	60.59755	33.87687	0.0000
At most 1 *	0.854222	44.29043	27.58434	0.0002
At most 2	0.572403	19.54018	21.13162	0.0822
At most 3	0.245448	6.477505	14.26460	0.5527
At most 4	0.111736	2.725180	3.841466	0.0988

Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table 4: Results of the Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
EDUCATION does not Granger Cause FDINET	24	0.61802	0.5495
FDINET does not Granger Cause EDUCATION		0.65259	0.5320
HEALTH does not Granger Cause FDINET	24	2.21452	0.1366
FDINET does not Granger Cause HEALTH		0.20953	0.8128
LGDPC does not Granger Cause FDINET	24	1.85571	0.1836
FDINET does not Granger Cause LGDPC		0.49224	0.6188
LGFCEXP does not Granger Cause FDINET	24	3.45899	0.0524
FDINET does not Granger Cause LGFCEXP		0.01517	0.9850
HEALTH does not Granger Cause EDUCATION	24	1.52512	0.2431
EDUCATION does not Granger Cause HEALTH		0.89521	0.4251
LGDPC does not Granger Cause EDUCATION	24	4.07625	0.0336
EDUCATION does not Granger Cause LGDPC		1.67770	0.2133
LGFCEXP does not Granger Cause EDUCATION	24	10.2322	0.0010
EDUCATION does not Granger Cause LGFCEXP		0.43332	0.6546
LGDPC does not Granger Cause HEALTH	24	3.15444	0.0656
HEALTH does not Granger Cause LGDPC		0.64763	0.5345
LGFCEXP does not Granger Cause HEALTH	24	4.78138	0.0208
HEALTH does not Granger Cause LGFCEXP		0.78976	0.4683
LGFCEXP does not Granger Cause LGDPC	24	11.1703	0.0006
LGDPC does not Granger Cause LGFCEXP		17.9499	4.E-05

Granger Causality Test

This test determines the direction of causality between variables. The results of this test are presented in the following Table 4.

Table 4 shows that government final consumption expenditure Granger causes net FDI. Also, GDP per capita Granger causes expenditure on education while government final consumption Granger causes expenditure on education. The results also outline that GDP per capita Granger causes public health expenditure. Furthermore, government final consumption expenditure Granger causes public health expenditure. Finally government final expenditure Granger causes GDP per capita and GDP per capita Granger causes government final consumption expenditure.

Results of VECM

The results show that the coefficient of long run adjustment is negative and significant. Thus, we conclude that there is a long run effect of public health investments on economic growth as shown in the following table.

Table 5: VECM results showing the long run impact of public health investments on economic growth and the Statistical Significance of the Parameter Estimate

	Coefficient	Std. Error	t-Statistic	Prob.
Long runcausality	-0.205765	0.112727	-1.825331	0.0979
Expeducation(-1)	0.009603	0.051214	0.187503	0.8550
dGDP(-1)	1.084839	0.263103	4.123244	0.0021
dGDP(-2)	-0.866914	0.397478	-2.181036	0.0542
dExpEducation(-1)	0.000577	0.036722	0.015724	0.9878
dExpEducation(-2)	0.015995	0.022724	0.703897	0.4976
dExpHealth(-1)	-0.037092	0.060853	-0.609533	0.5558
dExpHealth(-2)	-0.120059	0.054945	-2.185062	0.0538
dGrossgov'texp(-1)	0.343736	0.147482	2.330704	0.0420
dGrossgov'texp(-2)	-0.156273	0.087687	-1.782164	0.1051
dfdinet (-1)	-0.010656	0.005645	-1.887937	0.0884
dfdinet(-2)	-0.003641	0.003997	-0.911043	0.3837
constant	0.014369	0.008791	1.634578	0.1332

R-squared	0.815837	Meandependentvar	0.026141
Adjusted R-squared	0.594841	S.D. dependent var	0.032968
S.E. of regression	0.020985	Akaike info criterion	-4.592490
Sumsquaredresid	0.004404	Schwarz criterion	-3.950689
Log likelihood	65.81364	Hannan-Quinn criter.	-4.431079
F-statistic	3.691640	Durbin-Watson stat	1.877595
Prob(F-statistic)	0.023434		

From Table 5, it can be seen that the adjustment coefficient is -0.2 which indicates that 20% of the disequilibrium of the previous year is corrected in the present year. There exists a two-way relationship between improved population health and economic growth. Hence, public health investments positively affect economic growth.

The statistical significance of the parameter estimate is verified by the value of R-squared, the standard error test, and the F-statistic.In this work, the value of R-squared is 0.815837 and close to 1 implying that the long run impact of public health expenditure on economic growth is not only positive but also very significant. Health and other forms of human and physical capital increase the per capita GDP by increasing productivity of existing resources coupled with resource accumulation and technical change. Furthermore, some parts of this increased income are spent on human capital investment which results in further growth. This process is not immediate, that is why the positive effect is felt only in the long run.

Conclusion and Recommendations

Man plays a central role in every economy as he is a resource himself that is highly needed in every activity; he takes decisions regarding production, he brings in financial resources and so on that are required to produce goods and services to satisfy human needs.

However, man cannot effectively play this central role in an economy if he is not in good health. It is in this connection that many authors like Bloom and Canning (2000) underlined that the health of the population is primordial for the attainment of high economic growth. As such, governments across the world including that of Cameroon became more concerned in ameliorating their population's health by constructing new hospitals, recruiting more health personnel, rehabilitating equipping health centers, and so forth to attain and reap the benefits of high growth rates.

In this paper, it is found that public health spending contribute to the economic growth of Cameroon. Moreover, this contribution is strong as indicated by the value of R-squared (0.815837). Nevertheless, these health

investments impact economic growth only in the long run. As such, future economic growth can be ameliorated by increasing government expenditure on health. Therefore, the following public policy recommendations should be put in place:

First, the government should increase significantly the level of health investments so as to better improve on the health of its citizens and to continue reaping the benefits of economic growth. It should spend 10 or 15 percent of its GDP on health as underlined by the AU and WHO respectively. By increasing these health investments, health care provisions will be widened and ameliorated. Hence, more people especially the poor will benefit from health care improvements. Moreover, the population of Cameroon is growing; increasing public health investments will guarantee a healthy workforce in the future that will be more productive thereby paving the way to higher economic growth rates.

Second, more emphasis should be laid on enhancing the provision of health care services by the private sector by facilitating the creation of private health units and increase subsidies granted to them in order to reduce their running cost.

Finally, competitive awards should be granted to all health units (private and public) based on the quality of health care services offered. This will lead to the improvement of the quality of health care services in all health units thereby ameliorating population's health at all levels.

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