IMPACT OF PUBLIC HEALTH EXPENDITURE ON ECONOMIC GROWTH IN KENYA

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Abstract

This study determines the effect of PHE on GDP in Kenya. The study uses estimates of public health expenditure, population growth, inflation, life expectancy and physician, (1990-2012), as well as the economic survey and statistical abstracts for the same years. The analysis is a time series estimation of the effect of PHE on GDP, so as to explain the minimum amount of funding to be allocated to public health sector which would boost economic growth. The study employs OLS regression and correlation between dependent variable and the independent variables. The study attempts to determine the properties of health care in Kenya, and finds that health care in Kenya is a necessary good and has an elasticity of 0.22% to GDP per capita. This is to mean that for every 1% increase in PHE, GDP should increase by 0.22%.for the policy makers,

this study advice on a suitable strategy for financing healthcare in Kenya as it faces challenges of underfunding and an increased demand of quality and availability of healthcare services that are equitable and affordable for a growing population. In this study, PHE may simply refer to total public expenditure from government budgetary allocation and financial aid that the Kenyan health sector spends annually on health care delivery systems thus has a major impact on economic growth in Kenya.

Keywords: Public Health Expenditure, Life expectancy GDP per capita, OLS regression

INTRODUCTION

The goal of Kenya's Vision 2030 for the health sector is to provide equitable and affordable health care at the highest standards to her citizens. Good health is prerequisite for enhanced economic growth and poverty reduction and a precursor to realization of the vision's social goals. Health of a population is critical in the development of a country and its growth (Health sector working Report 2012).

Provision of health care is seen as a key element of a policy to enhance broad based economic growth. A country has to invest in among other areas, health, if it has to accumulate the human capital necessary for sustainable economic growth. Healthy individuals increase their value in the labour markets. An increase in productivity frees up resources to create new technologies, new businesses and new wealth, eventually resulting in increased economic growth and human welfare. Health has a positive and significant effect on economic growth .The government has been seen to allocate more funds on health sectors because it's expected to play a critical supportive role in maintaining a healthy working population which is necessary for the increased productivity that Kenya requires in order to match its global competitors.

Since independence the GOK has designed and implemented policies aimed at promoting access to modern healthcare in an attempt to attain its long term objective of health for all. In a number of policy documents, it has set forth the requirement that the provision of health services should meet the basic needs of the population, be geared to providing health services within easy reach of Kenyans and emphasize upon preventive, promotive and rehabilitative services. As stated in the Economic Recovery Strategy for wealth and employment creation (ERSWEC) 2003-2007 and vision 2030, the government is determined to provide equitable and affordable healthcare at the highest affordable standard to her citizens. It is important to note that good health plays an important role in boosting the human capacity and good health is important as part and parcel of a human being.

According to World Bank (2004), high income countries spend on average 7 percent gross domestic product on health and low income countries spend on average only 4.2 percent on the sector. This shows that developed countries spend a higher proportion of their gross domestic product on health which serves as a major driver for economic growth. The change in health expenditure can be explained by changes in economic growth which is the best indicator of the amount of resource a country can afford to allocate to health sector.

According to WHO, access to basic healthcare is considered a human right in virtually to all societies. People must be healthy to contribute and share in social and economic development. Despite the reason for developing countries to improve the healthcare systems, many still allocate a very small amount of government expenditure on public health. In most developing and developed countries the government always strives to ensure that the citizens are well catered for in terms of health. The allocation to the health sector by the government is therefore an important factor and hence the need to strengthen the allocation of resources towards the health sector.

Between 2002/2003 financial year ,Kenya's total health spending increased from Ksh 15.4 billion to 32.4 billion in 2007/2008 and this was 5.1 percent and 13.5 percent of the gross domestic product on health care respectively (Republic of Kenya, 2009).Also between 1990 - 2012 period, public expenditure on health increased by an average rate of 5% per annum.

In Kenya, like in most developing countries the tax revenue is the major source of funds and is a significant major determinant of overall public expenditure. The amount allocated to health sector by the government is not sufficient to enable it to carry out proper health care services. As for instance over 70% of the MOH recurrent budget is used to pay for staff salaries and allowances leaving only 30% for supplies and other expenses (National development plan 1997-2000).
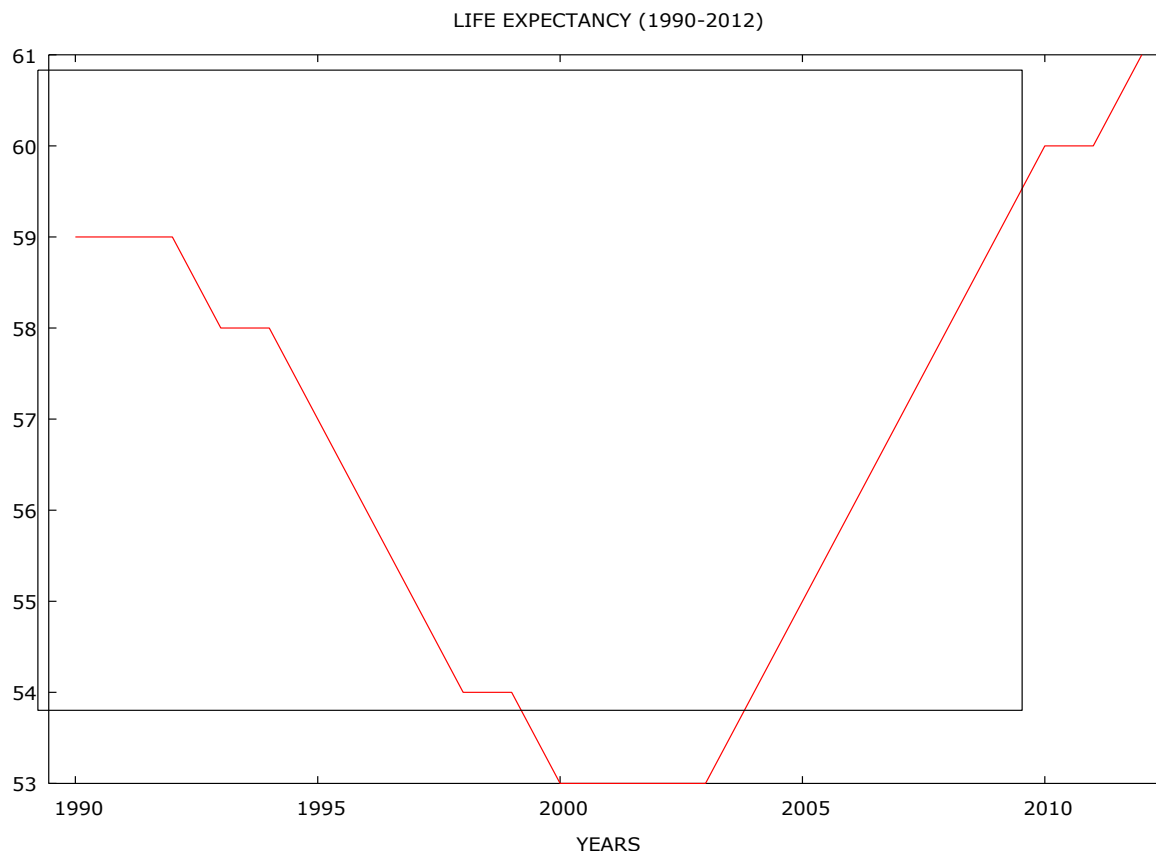
Economic Growth Indicators

Life Expectancy

Life Expectancy at birth is defined as being the number of years a new born baby would expect to live if they were to experience age-specific mortality rates throughout their lifetime. In Kenya life expectancy at birth in 1990 stood at about 59years.It declined to about 53 years in 2000 then increased in 2012 to about 61 years. This fall in life expectancy was attributed to the emergence of diseases such as HIV/AIDS, Malaria and TB among others as well as stagnation in economic growth. However there have been improvements in life expectancy, Infant mortality and HIV/AIDS prevalence in recent years. This is due to the increased funding to healthcare which has enabled the government to reduce the cost of drugs for example ARVS and malaria

drugs. Figure 1 below shows how life expectancy has increased from about 59 years in 1990 to reach a peak of 61 years in 2012.

Figure 1: Shows life expectancy (1990-2012)

Source: Republic of Kenya, statistical abstracts (1990-2012) from KNBS

GDP

Kenya's economic performance has witnessed an improvement over the period 1990 to 2012 with rapid economic growth in Kenya's history. Gross domestic product grew at an average of 66% and per capita income remained positive despite high population growth rates. In the last two decades up to 2012 the growth in real GDP was estimated at about 7 percent in 2007 which was highest in the last two decades. This increase in GDP also enabled an increase in spending the health expenditure

Figure 2 show that in 1990 GDP was 4.13 but declined to 0.4 in 1993.This was due to rise in inflation as it rose to 45.98 and political instability. In 1994 to 1995 GDP rose to 4.29 this was due to good economic strategies enacted by the government. In 1996 to 2000 GDP dropped to 0.6 this was due to unfavorable economic activities. In 2002 to 2005 GDP rose to 5.98 due to good economic strategies enacted by the NARC government which promoted

development. GDP dropped to 1.53 in 2008 due to post election violence which brought any economic activity to stand still. In 2009 to 2012 GDP rose to 5.13 due to proper economic strategies which focused on infrastructure development, introduction of ARVs introduced by the coalition government.

Figure 2: shows GDP per capita (1990-2012)
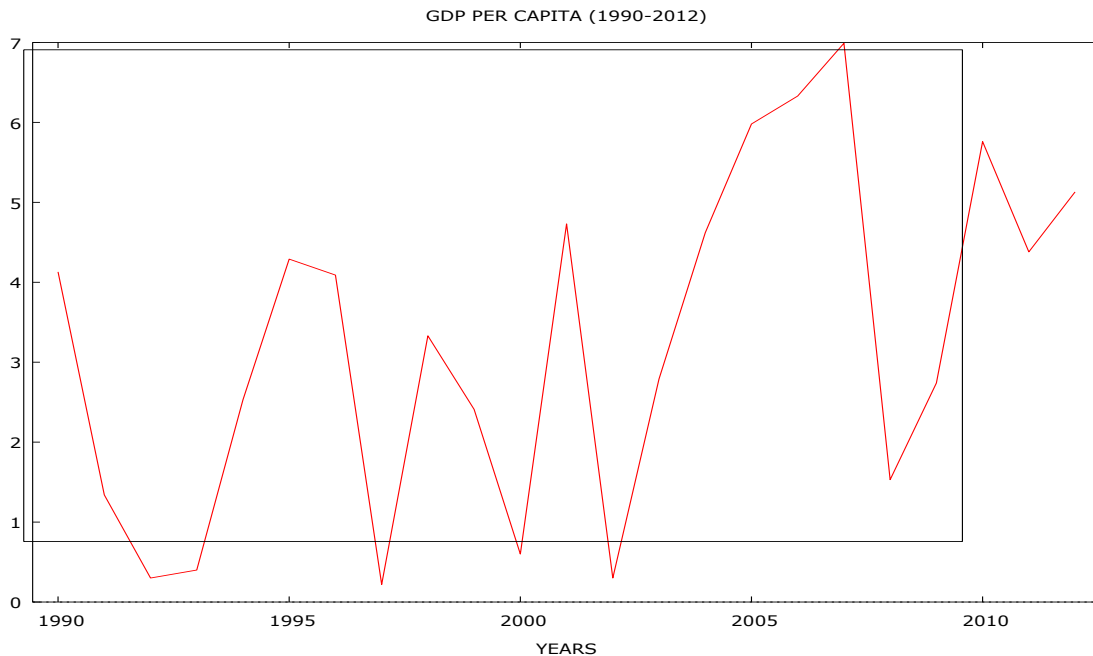
Source: Republic of Kenya, Central Bank of Kenya annual Reports (1990-2012)

Population growth

Over the last two decades Kenya population has been growing, it is within this period where Kenya underwent demographic transition where fertility and death rate declined leading to a large working population. Demographic transition are important for public health expenditure .Investment of human capital of the children and youth has the potential of increasing future economic growth as they are the next generation of entrepreneurs therefore population growth increases the amount of public health expenditure invested in the country especially because of the population fertility rate caused by chronic diseases overtime.

According to figure 3 below it is noted that from 1990 where it had a population of 24.4 million which had a growth rate of 2.5% per annum which the population increased gradually to 1998 with a population of 29.3 million. In 1999 it decreased to 28.7 million at a growth rate of 2% per annum. It decreased due to diseases like HIV/Aids, Malaria among others. Later on from the year 2003 to 2007 population growth rate increased to 2.9% per annum registering one of

the highest growth rates in the world. This was due to the introduction of ARV's and good economic strategies enacted by the NARC government. From 2008 to 2012 population has increased from 38.3 million to 43.2 million and a growth rate of 3.1% per annum.

Figure 3: Population (1990-2012)
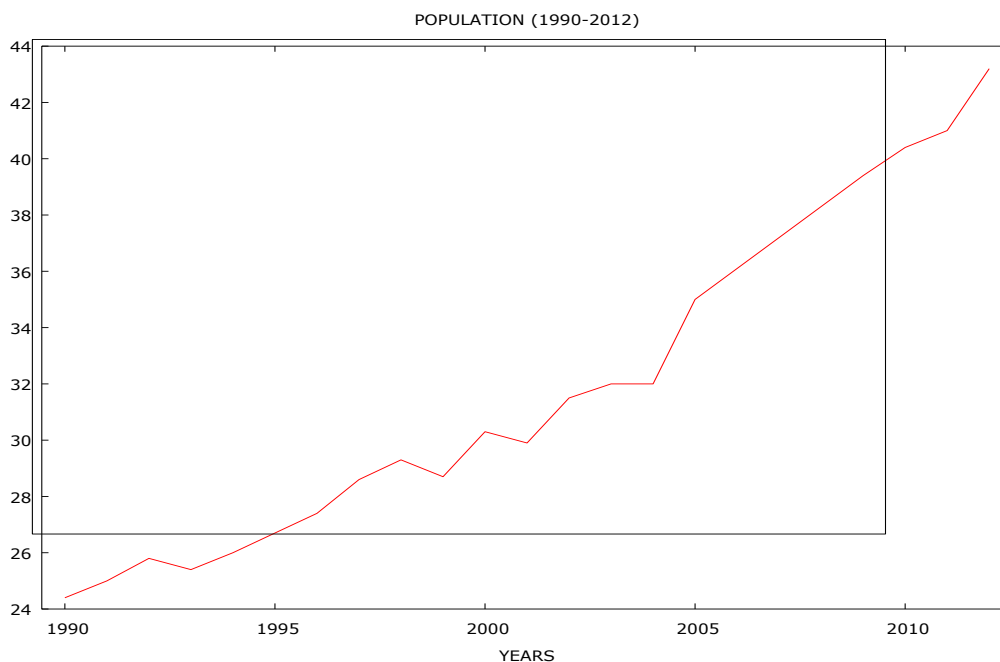
Source: Republic of Kenya, Kenya Economic Survey (1990-2012)

Inflation

Low and stable prices are critical for the achievement of sustainable growth. Options available for mitigating inflation include active stabilization of food prices and subsidizing food production. Low inflation, economic growth will increase hence allocation to health spending would increase which will improve health services.

The figure 4 below shows that high cost of food, energy and transport pushed inflation from 11.2 percent in 1990 to 45.98 percent in 1993 and slowed down to 1.55 percent in 1995 due to good economic strategies enacted by the government. From 1996 to 2001 they had been a high variation in inflation, 9.96% due to political issues and economic instability but it dropped to 1.97% in 2002 due improved economic policies. Later on in 2008 inflation rose to 15.1% due post election violence but it has been decreasing and by the year 2012 it stood at 9.9%.This is due to improved governance of the coalition government.

Figure 4: Inflation (1990-2012)
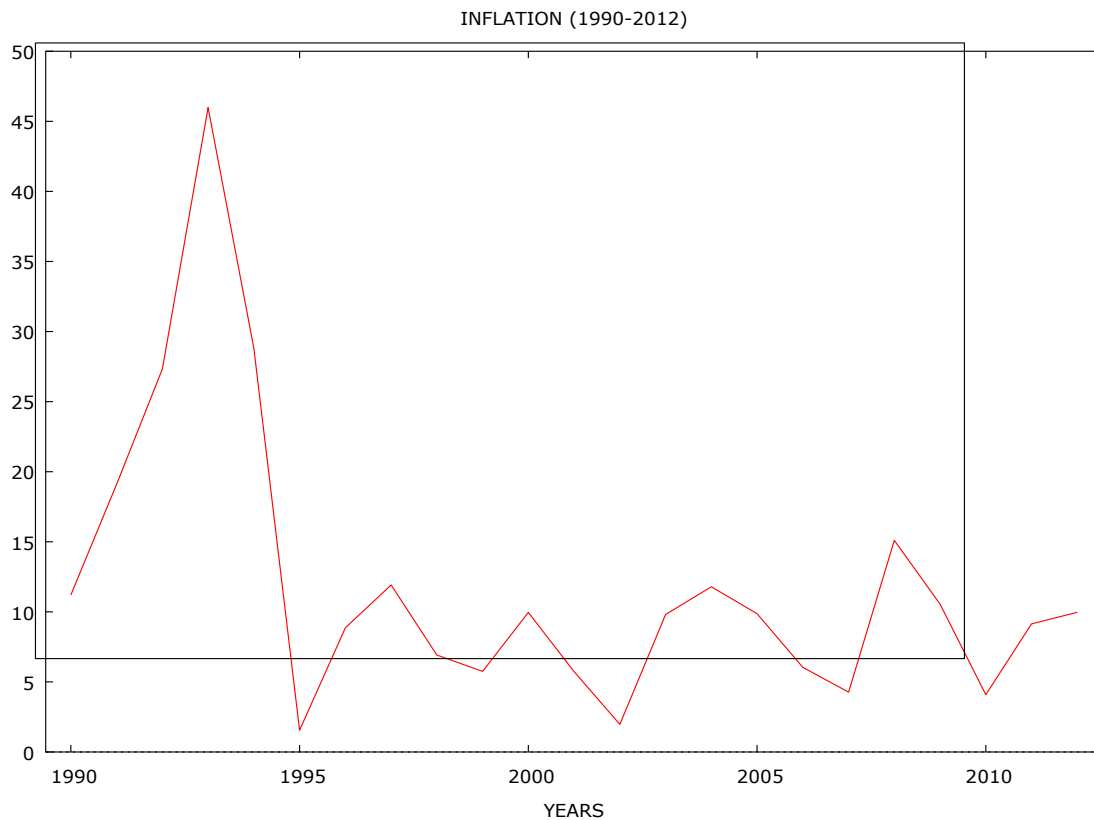
Source: Republic of Kenya, Central Bank of Kenya Annual Reports (1990-2012)

Physicians

Physicians are the number of medical doctors including generalist and specialized medical practitioners per 100,000 of the population. They also plan, supervise and evaluate care and treatment plans by other health care providers. If the number of doctors, registered nurses lab technicians and medical officers in the country increase by 1% ,public health expenditure should increase by 1.65% taking into account value for money with time.   The number of registered medical personnel increased by 9,409 to stand at 105,369 in 2010.Overall, the number of medical personnel per 100,000 populations decreased from 248 in 2009 to 204 (RoK,2010). The registered nurses cadre of medical personnel was 83 per 100,000 populations while that of registered dentists was 2 per 100,000 populations in 2012.

In the figure 5 below shows in the year 1990 there were 167 physicians per 100,000 population and it rose gradually to198 physicians per 100,000 population in the year 2002.In the year 2003 the number of physicians dropped to 186.This was due to increase in population and insufficient amount allocated to health sector. From the year 2004 the number of physicians

started rising due to the policies that were enacted then by the NARC government to 267 physicians per 100,000 population in the year 2009.The number of physicians in the year 2010 declined to 248 physicians per 100,000 population due to high inflation rate and post violence election, few physicians were employed. The number increased in the subsequent years to 300 in year 2012 due to increased funding to public health sector and improved policies by the coalition government.

Figure 5: Shows physicians (1990-2012)
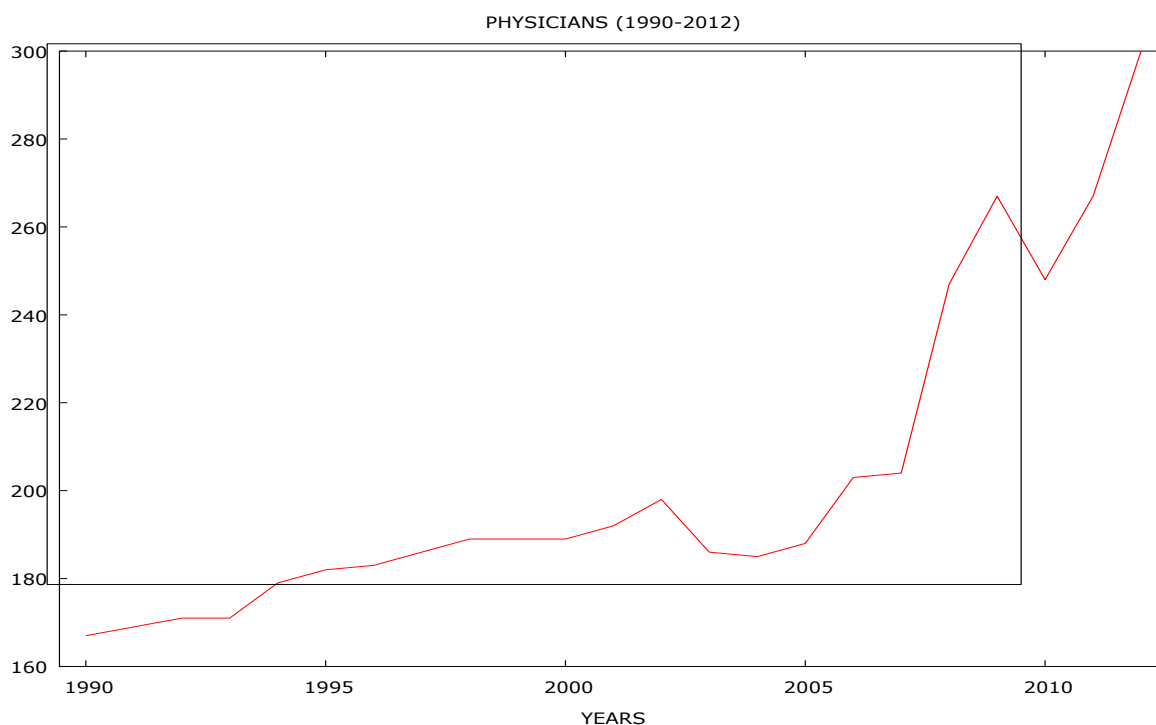
Source: Republic of Kenya, Statistical Abstracts (1990-2012)

Overview Of Macro-Economic Performance And Health Policy In Kenya

The economy has generally undergone mixed experience since independence in 1963. Kenya entered 1970 with a strong economy exemplifying the excellent macro-economic performance. Efforts have been made to improve the standard of living of the people and this aspiration has consistently been reflected in various government policy documents such as the sessional papers and development plans.

The country's health sector recorded tremendously growth especially in the public sector. The sectorial growth was attributed to the high priority accorded to the improvement of the health status of Kenyans in the socio-economic development of the country. This priority was reflected in the level and growth of resource commitments to the health sector. During

these decades the sector accounted for 5% of total of GDP and one average about 5% of total central government expenditure and 6% of the government's total recurrent rate. The high growth rate during these decades resulted in a phenomenal growth in the number of health care facilities, programs and personnel, and in the improvement of the health status of Kenyans. Some progress was made during the first decade of independence as shown by per capita income growing at 2.6% per year.

A number of government policy documents and successive national development plans have stated that the provision of health services should meet the basic needs of the population, place health services within easy reach of Kenyans and emphasize preventive, promotive and rehabilitative services without ignoring curative services. Perhaps as a result of these policies, both infant mortality and life expectancy at birth have improved significantly.

The second National Health Sector Strategic Plan (NHSSP II) by the MOH aims to reverse the downward trends in health indicators observed during the years of the first strategic plan (NHSSP I, 1999-2004), while applying the lessons learned and searching for innovative solutions. NHSSP II re-invigorates the Kenya Health Policy Framework elaborated in 1994.The health goals formulated in the framework underlined the need to pursue the principles of primary health care to improve the health status of the Kenyan population. The Kenya Health Policy Framework set the following strategic imperatives:

1. Ensure equitable allocation of government resources to reduce disparities in health status
2. Increase cost-effectiveness and efficiency of resource allocation and use
3. Manage population growth
4. Enhance regulatory role of the government in health care provision
5. Create an enabling environment for increased private sector and community involvement in service provision and financing
6. Increase and diversify per capita financial flows to the health sector

The policies that the government has pursued over the years have had a direct impact on improving the health status of Kenyans. Despite a decline in economic performance, cumulative gains have been made in the health sector as evidenced by the improvement in the basic health indicators.

Policy On Health Financing In Kenya

Health in Kenya is financed from different sources, including: the government, employers, development partners, private companies, non-governmental organization and households.

Households contributed 36 percent of their health cost while public, private sources, donors and others contributed 31 percent, 3 percent, 29 percent and 1 percent respectively.

Figure 6: Shows financing sources of PHE in Kenya (1990-2012)
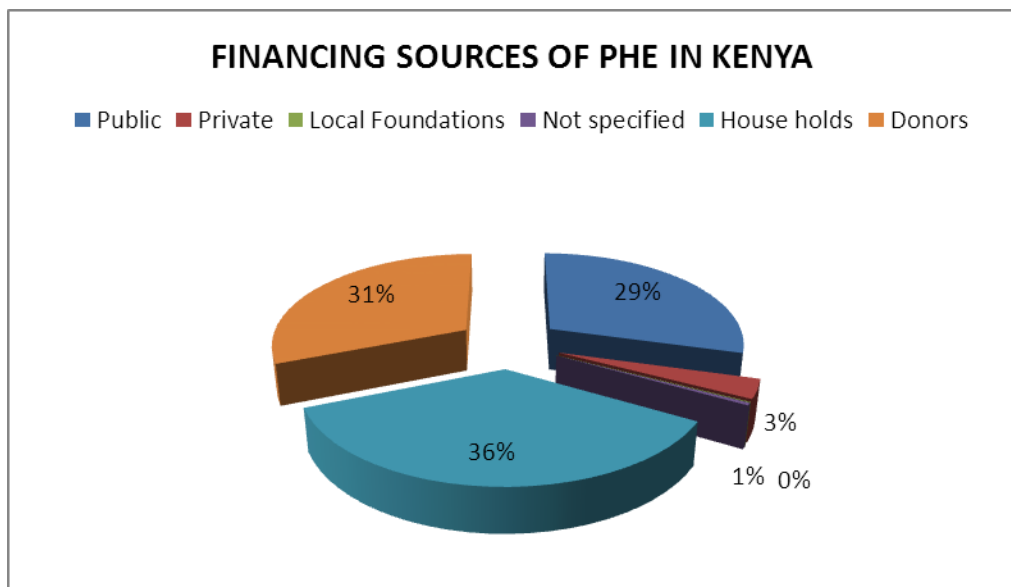
Source: Republic of Kenya, National Health Accounts Study (1990-2012)

This changed with the introduction of the 10/20 policy aimed at reducing the burden of cost sharing. The government has also been increasing expenditure allocations to the health sector as part of the ERS policy to enhance equity.

Total health spending increased from Ksh 2.3 billion in 1990/1991 financial year to Ksh 7.7 billion in 1995/1996. In 2001/2002 Ksh 14.3 billion increased to Ksh 32.4 billion in 2007/2008. Following 2008/2009 financial year, total spending was 33.9 billion and increased to 36 billion in 2011/2012 financial year. As a result, per capita expenditure increased from US$ 6.52 in 2001/2002 to about US$13.8 in 2007/2008; in 2008/2009 it was US$ 13.9 increased to US$15.1 in 2011/2012, Although this was still below the WHO recommended level of US$ 40.As a share of GDP ,expenditure on health is estimated at about 2%.Expenditure on preventive and promotive health as a share total ministry expenditure increased from about 5.3% in 2001/2002 to about 9.8% in 2007/2008.In 2008/2009 it increased to about 9.9% in 2011/2012.Rural health expenditure has been increasing in line with the government policy. Although the share of expenditure in curative health is declining gradually, it still takes the largest share of ministries expenditure.

Per capita health expenditure in purchasing power parity (PPP) and as a share of GDP remains comparatively low in sub-Saharan Africa. In PPP terms Kenya performs poorly against

Uganda and other countries under comparison. Kenya spent about US$86 compared to Uganda US$135, South Africa's US$748 and South Korea's US$ 1,135.

The health sector is one of the key components in addressing equity under the social pillar of vision 2030. The current policy framework is outlined in the National health sector Strategic plan (NHSSP),2005-2010 whose theme is "reversing trend". The NHSSP specifies the objective, strategies and priority goals for the sector up to 2010. The key objective include increasing equitable access to health services, improvement of quality and effectiveness of service delivery, and improved financing of the health sector. The key public expenditure policies include increased resources to dispensaries and rural health centers to enhance equity and access. The strategy also calls for increased focus of the ministry from curative to preventive and promotive healthcare.

In the figure 7 below, since 1990 to 2012 the government has been increasing its public health funding and by 2012 40 billion have been funded. This was due to growing population, training of physicians, building of hospitals' facilities and purchasing of medicines.

Figure 7: shows public health expenditures (1990-2012)

PUBLIC HEALTH EXPENDITURE (1990-2012)
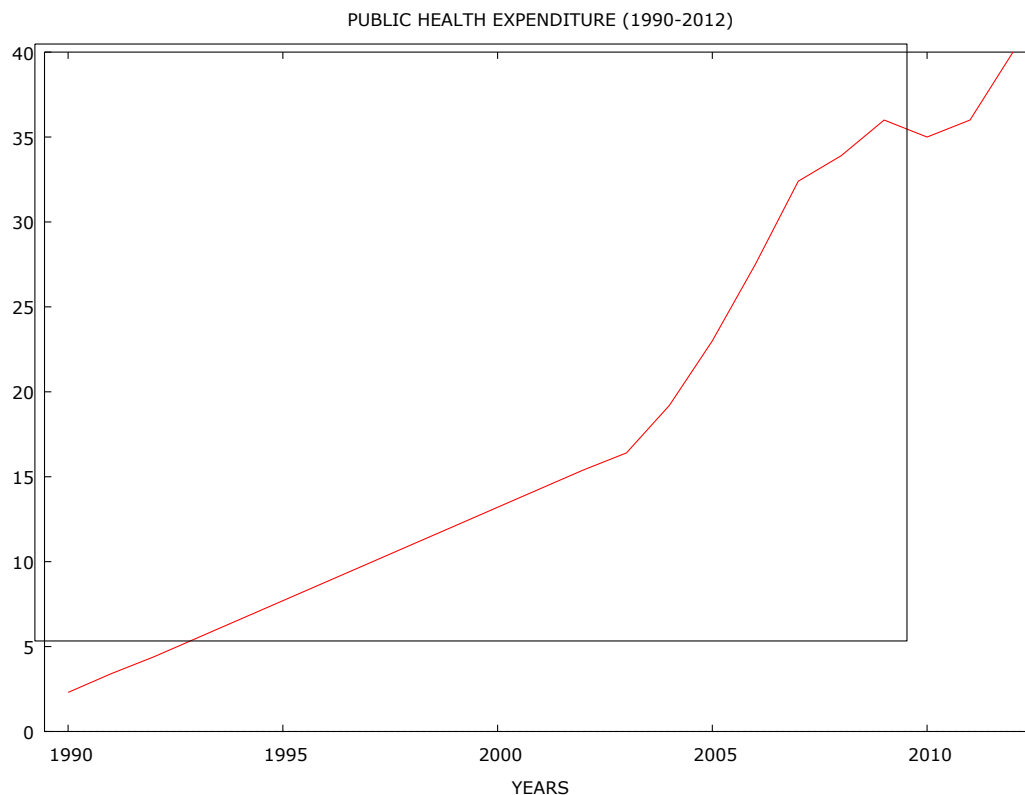
Source: Republic of Kenya, Ministry of Health (1990-2012)

Statement Of The Problem

The study problem is based on the fact the public health expenditure is inadequate, and there exists disparity in allocation between rural and urban areas. Majorities of Kenyans therefore have to rely on financing their health expenditure privately due to cost sharing in the public hospitals but since they are poor about 60% of the population cannot afford the much needed health services thus worsening the health indicators of the country. Therefore the problem is the declining economic growth compounded by inadequate health expenditure. There are few studies that have been done to determine the impact of public health expenditure on economic growth. This study aims to bridge this knowledge gap.

Objectives Of The Study

To determine the relationship between public health expenditure and economic growth in Kenya.

The specific objectives are:
(i) To identify the nature of the relationship between public health expenditure on economic growth
(ii) To analyze the results of the study that will serve as a basis for an action plan to improve policy measures in public health expenditure so as to facilitate economic growth.

Justification Of The Study

This study will help policy makers and economist to design, implement and monitor public health expenditure strategies with a view to improving economic growth. In addition the study will help policy makers and planners to determine which health policy is appropriate in improving economic growth in Kenya. Thus it would be necessary to enable economists to carry out the overall improvement of the economic growth of Kenya. Government can use the findings to help the poor to improve their access to medical services. Thus this study will provide policy makers with a good framework to act as the foundation for policy maker to effectively, equitably and adequately fund the health care system in Kenya.

LITERATURE REVIEW

Empirical Literature

Manyalla (2000) argued that expenditure on education and healthcare improves health status. He further noted that per capita income is significantly linked to the levels of Mortalities. He observed that some of the negative trends in health status could have been attributed to

unfavorable growth and insufficient social spending on health. In his findings income elasticity's were all statistically significant, current income had the expected effect on life expectancy but not on infant mortality. He further found that if mothers are malnourished and are in poor state of health; their infants will inherit part of this poor health and therefore will be at a greater risk of mortality relative to infants of healthy mothers.

Oganda and Ong'olo (1999) carried out an analysis of government expenditure on basic social services in Kenya. The objectives of the study were to determine how much of the national budget and international aid flows were being spent on basic social services and the financial implications for basic social services in improving health status. They attributed the decline of public expenditure to the improved health services especially the increased emphasis on immunization. Life expectancy at birth also improved from 39 years in 1950's to over 60 in the 1993.They found that the proportion of healthcare spending on health care as a share of real GDP had been falling. The results further revealed that only 10% of the government budget in the recent times went to development activities while the rest went to recurrent items. These results revealed a decline in infant mortality rate and thus attributed its improvement to the increase in expenditures on health.

Murray et al (1993) carried out a study on the impact of "Global Domestic Expenditures on Health" by categorizing expenditure into public and private sector expenditures. Public sector expenditures comprised of government and parastatal expenditures on health and private expenditure included private voluntary and household spending. The study found out that public health expenditures accounted for 44% of total expenditure in Africa. Capital expenditure accounted for about 17% of the total government health expenditures.

George et al (1997) observes that global spending on health amounted to about $2.3 trillion in 1994 or about 9% of total global income. High-income countries spent just over $2 trillion amounting to 89% of total health expenditure while their populations account for 16% of the global population. Developing countries with 84% of the world population account for only 11% of all health spending. This disparity underscores the enormous difference between developed and developing countries in terms of capacities and type of health services that can be provided. This translates into large difference in health infrastructures and health.

Caldwell et al (1986) in his paper wrote about low mortality in poor countries; examine cross-national differences in the widest and best-measured indicator of health status, child (under 5) and infant mortality. He established two major points about the cross-national relationship between health status and public spending on health. First there is an enormous gap between the apparent potential of public spending to improve health status and the actual performance. Second, while public spending appears to explain little differences across

countries, infant and child mortality are well explained by economic and social factors. He further notes that there are poor countries with exceptionally good health status and outcomes which leaves little to be explained by independent variation in health policy. He included a dummy and hypothesized that these countries will have higher mortality. He further argues that both aggregate and household size show that higher levels of female education are associated with better health status.

Schultz (1999) did a study on health and schooling investments in Africa. He argues that health status will rise with increased public spending on health services. He further notes that it will fall with a rise in relative prices of health inputs such as salaries of medical personnel, cost of drugs and other medical supplies, relative to prices of nutrients that help fight off infections and disease. He found higher levels of education are correlated with low mortality even after holding household income constant. The relationship between mother's education was stronger than the father's which could be explained by the fact that they are more often in charge of child care than father's. He observes that an additional year of schooling to the mother in low-income countries such as Africa is often associated with a 5-10 percent reduction in the child's likelihood of dying in the first five years.

Jamison et al (1996) used an econometric procedure to estimate less than 5 mortality. He found that public spending on Health lowered mortality, in a sample of Latin America countries. They found a positive and significant impact of public spending on health status.

Bidain and Ravallion (1997) estimated the relationship between the level of life expectancy and infant mortality using a multivariate regression that explains health outcomes without any health sector variables. They consistently find an impact of public spending for the poor but not for the non-poor. Their findings are still consistent with impact of spending on aggregate health status.

Hitris and Posnett (1992) in their study on the determinants and effects of health expenditure in developed countries noted that a reduction in health care spending is associated with reduced life expectancy for both female and male with increased death rates among children less than a year old. They note that improved health outcome is important because it has been so difficult to identify in research. They find very limited evidence of a relationship between health care expenditure and mortality rates. They argue that few studies have found strong link between health care spending and some measure of quality of life expectancy.

Filmer et al (1998) explains why public spending in health might not be an important health indicator even though relatively cheap and effective medical interventions might be possible. He further argued that cross-national differences in the public spending on health does

not always translate into large supply of effective health services and that public money might be spent on expensive but ineffective curative services.

Baldacci (2004) explored the role played by health expenditure. He constructed a panel data set for 120 developing countries from 1975-2000. He argued that spending on health care within a period of time affects growth within that same period, while lagged health expenditure appears to have no effect on growth. He inferred from this result that the direct effect of health expenditure on growth is a flow and not a stock effect.

Ochieng (2010) argued that greater health expenditure in Kenya did not improve the outcomes. Instead he stated that the most important factors relevant to health were namely: number of health professionals, proportion of GDP spent on health, female literacy and immunization coverage. Thus better health would be achieved if the government focused on these factors. This would in turn lead to increased productivity hence economic growth.

Romer (1990) pointed out the role of government spending on research and development with respect to the endogenous growth theory. Furthermore, he stated that spending on education and health is viewed as promoting human capital, which would lead to improved endogenous technical progress and thus accelerated economic growth.

Wilson (1995) showed that medical care expenditure influences the economic growth rate and that the rate of economic growth increases the spending for medical care. He studied the relationship between economic growth and medical care expenditure in Organization for Economic Cooperation and Development (OECD) countries. The results of his study showed a strong correlation between medical care spending and GDP. He concluded that medical care spending is a significant predictor of the rate of growth of an economy.

Overview Of Literature

Empirical studies reviewed have used different methodologies and variables to establish that public expenditure and health expenditure are statistically significant in determining public expenditure and health status. Non economic variables considered in the different studies have shown some consistency with what economic theory predicts. However major shortcomings of the studies reviewed are that the results of these studies have differed in several ways. Most of the studies reviewed have found a statistically insignificant positive relationship between public expenditure and health status. Out of the several studies that considered national income, only a few found that there is a positive and statistically significant relationship between public spending and health status. Most of the studies have a major weakness that they never show any of the health effects of this expenditure. However this study will fill the knowledge gap by providing precise information on the relationship between public expenditure and health status.

Considering the budgetary allocation to health care services is supposed to be enjoyed by both the rich and the poor, the public health facilities services are greatly influenced by the amount of funding they get from the government. It is therefore clear that insufficient funding to the health sector causes low productivity through labor supply and human capital and thus affecting economic growth.

METHODOLOGY

Empirical Model

We specify and estimate a simple form of economic growth function model. We employ a Cobb-Douglas production model because GDP depends on Public health expenditure and other explanatory variables. We explore the effect of public health expenditure on GDP by estimating the equation below. Economic growth function is specified as:

GDP=f (PHE, INF, POP, PHYS, LIFE EXP)

The focus of the study will be on the effect of PHE on GDP per capita (Economic growth)

$lnGDP = \beta_0 + \beta_{1I}nPHE + \beta_2 lnINF + \beta_3 lnPOP + \beta_4 lnEXP + \beta_5 lnPHYS + \mathcal{E}t$

where:

β_0 = is the regression constant

β_1 = Elasticity measure of changes of exogenous variables to GDP

lnGDP = natural log of GDP per capita

lnINF = natural log of inflation

lnPOP = natural log of population growth

lnPHYS = natural log of physicians per 100,000 population

lnEXP = natural log life expectancy

$\mathcal{E}$ t = error term

The equation is a non linear equation used to measure the change in GDP per capita by finding its derivative with respect to PHE. This means a change that a change in PHE will change GDP per capita by β1.Given that the study involves PHE that study shall employ population growth, inflation, physicians, life expectancy as other control variables that affect economic growth.

Data Source And Type

The study will use time series data from (1990-2012) on public health expenditure, inflation, population, number of physicians and life expectancy. The data sources used in this analysis will be from KNBS Statistical abstracts, Economic Surveys and WHO reports.

ANALYSIS AND FINDINGS

The data was first subjected to descriptive statistics followed by model testing using OLS method.

Descriptive statistics

Table 1: Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GDP PER CAPITA	23	.22	6.99	3.2574	2.11816
PHE	23	2.3	40.0	18.000	12.2750
INFLATION	23	1.6	46.0	11.987	10.0962
POPULATION	23	24.4	43.2	31.896	5.7814
LIFEEXP	23	53	61	56.57	2.608
PHYSICIANS	23	167	300	202.61	36.517

From the table 1 above the means for the variables GDP, Public health expenditure, Inflation, Population, Life expectancy and Physicians were 3.2574, 18.000, 11.987, 31.896, 56.57 and 202.61 respectively. These figures represent the average values of the variables for the period of study.

Standard deviation represents the dispersion of a set of data from its mean. In which Physicians has the highest dispersion of data set from its mean of 202.61 while inflation has the lowest dispersion of data set from its mean of 11.987. Thus the figures represents dispersion of data from its mean for the period of study.

Correlation Results

Table 1: Correlation between the variables

	Spearman Correlations						
		Y	X1	X2	X3	X4	X5
Y	Correlation Coefficient	1.000	0.519	-0.489	0.519	0.142	0.392
	Sig.(2-tailed)		0.011	0.018	0.011	0.517	0.064
	N	23	23	23	23	23	23
X1	Correlation Coefficient	0.519	1.000	-0.340	0.995	0.123	0.929
	Sig.(2-tailed)	0.011		0.112	0.000	0.578	0.000
	N	23	23	23	23	23	23

X_2	Correlation Coefficient	-0.489	-0.340	1.000	-0.350	0.329	-0.445
	Sig.(2-tailed)	0.018	0.112		0.102	0.125	0.033
	N	23	23	23	23	23	23
X_3	Correlation Coefficient	0.519	0.995	-0.350	1.000	0.129	0.926
	Sig.(2-tailed)	0.011	0.000	0.102		0.558	0.000
	N	23	23	23	23	23	23
X_4	Correlation Coefficient	0.142	0.123	0.329	0.129	1.000	0.104
	Sig.(2-tailed)	0.517	0.578	0.125	0.558		0.638
	N	23	23	23	23	23	23
X_5	Correlation Coefficient	0.392	0.929	-0.445	0.926	0.104	1.000
	Sig.(2-tailed)	0.064	0.000	0.033	0.000	0.638	
	N	23	23	23	23	23	23

* Correlation is significant at the 0.05 level (2-tailed).

Note: X1=Public health expenditure, X2=Inflation, X3=Population, X4=Life Expectancy, X5=Physicians

Correlation is the degree of association between the variables. The correlation coefficients in the table range between -1 and +1. From our data set the correlation between GDP and other variables (PHE, INF, POP, LIFE EXP and PHYS) is 0.519, -0.489, 0.519, 0.142 and 0.392. When PHE increases by 1 unit GDP increases by 0.519, thus PHE is significant and positively related to GDP. When inflation increases by 1 unit GDP decreases by 0.489, thus inflation is insignificant and negatively related to GDP. When population increases by 1 unit, GDP increases by 0.519, thus population is significant and positively related to GDP.

Life expectancy increases by one unit, GDP increases by 0.142 hence Life expectancy is not significance but positively related. Physicians increases by one unit, GDP increases by 0.392, thus Physicians is not a significant but positively related to GDP. Thus from this, Public health expenditure and population are correlated to GDP and Inflation is not correlated to GDP.

Regression Results

Table 2 : Regression results

	Coefficient	t-ratio	p-value
PHE	0.317660	2.593	0.0184
INF	-0.109104	-2.761	0.0129
POP	-0.246927	-0.9240	0.3677
LIFE EXP	0.350472	2.727	0.0138
PHYS	-0.0646444	-2.833	0.0110

Sum squared residual   39.48703

Adjusted R-squared   0.859192

Akaike criterion   87.70216

Model: GDP= 0.318PHE - 0.109INF + 0.35LIFE EXP - 0.065PHYS

Testing for Statistical Significance

$H_0: \beta = 0.$

$H_1: \beta \neq 0.$

The t- test approach was used to test for the significance of the predictors. When the t calculated is greater than critical value of t, reject the null hypothesis at the chosen level of significance and conclude that the variable is a significant predictor. The absolute calculated t-ratios for the variables PHE, INF, LIFE EXP and PHYS were 2.593, 2.761, 2.727, and 2.833 respectively. Using two tailed test at 5% significance level, the following results were obtained:

PHE: 2.593>2.093 (significant)

INF: 2.761>2.093   (significant)

LIFE EXP: 2.727>2.093 (significant)

PHYS: 2.833>2.093 (significant)

From the regression table above it shows Sum Squared Residual of 39.48703, indicating minimum value of residuals thus the model is a good fit.

The model shows that 85.9% of the variations in GDP are caused by the dependent variable in the model.

A one percent increase in PHE increases GDP by 0.32%. This shows a positive relationship and implies that public expenditure encourages economic growth in Kenya. It is also a significant predictor. A one percent increase in INF decreases GDP by 0.11%. This suggests that inflation is negatively related to GDP and implies, as it decreases, the economic growth rate increases in GDP terms. It was found that inflation was also significant variable. A one percent increase in LIFE EXP increase GDP by 0.35%. This implies that as life expectancy increase GDP increases hence there is a positive relationship between them. It is a significant predictor. When PHYS increases by one percent, GDP decreases by 0.065% thus it is negatively related but it is a significant predictor. Population was dropped due its insignificance as its t ratio was less than t critical thus it did not have any effect on GDP because 0.9240<2.093

CONCLUSION

The main objective of this study was to determine the relationship between public health expenditure and economic growth in Kenya. The data was collected from secondary sources and estimated using ordinary least squares to meet the stated objectives. From the results, public health expenditure, and life expectancy showed a positive relationship with economic growth whereas, inflation and physicians showed a negative relationship to economic growth.

From the study we can conclude that the variables have a direct impact on economic growth, but to varying degrees. Secondly, life expectancy has a greater impact on GDP compared to the rest of the variables including the main variable while physicians had the least effect. Thirdly, public health expenditure was highly correlated with GDP.

RECOMMENDATIONS

Taking into account the results obtained from the study, we can recommend that the government increases its budgetary allocation to healthcare to meet the 20% threshold of the total budget set by the Geneva declaration of 2005.

Secondly, greater finances and health care resources (including drugs and staff) should be directed to primary care clinics and district hospitals where the majority of the people seek health care.

LIMITATION OF THE STUDY

The study had some major limitations on the availability of data from the earlier periods. The data obtained was majorly from Kenya National Bureau of statistics which normally been updated early and that limited the quality of data obtained and accuracy on the study obtained which could have been encountered on the data collection period.

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APPENDIX

List of Abbreviations/Acronyms

ARVs	:	Anti-retroviral
CBK	:	Central Bank of Kenya
ERS	:	Economic Recovery Survey
ERSWEC	:	Economic Recovery Strategy for Wealth and Employment Creation
GDP	:	Gross Domestic Product
GOK	:	Government of Kenya
HIV/AIDS	:	Human Immunodeficiency Virus/ Acquired immune Deficiency Syndrome
INF	:	Inflation
KNBS	:	Kenya National Bureau of Statistics
Life Exp	:	Life Expectancy
MOH	:	Ministry of Health
NARC	:	National Rainbow coalition
NHSSP	:	National Health Sector Strategic Plan
NHSSP	:	National Health Sector Strategic Plan
OECD	:	Organization for Economic Co-operation and Development
OLS	:	Ordinary Least Square
PHE	:	Public Health Expenditure
POP	:	Population
PPP	:	Purchasing Power Parity
Ro K	:	Republic of Kenya
TB	:	Tuberculosis
WHO	:	World Health Organization