

PUBLIC HEALTH EXPENDITURE AND HEALTH OUTCOME IN NIGERIA: THE IMPACT OF GOVERNANCE

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Abstract

A key element of public policy is the promotion of good health in order to attain broad based economic growth. Base on this paradigm, many countries devote huge budgetary allocation to health, but in most developing countries especially, this huge health expenditure failed to translate into better health status. This paper thus investigates how the effectiveness of public health expenditure is affected by governance in Nigeria. Data on public health expenditure and governance variable captured by the corruption perception index were regressed on infant mortality, under-five mortality and life expectancy, using both the ordinary least squares and the two-stage least squares. The result obtained showed that public health expenditure has negative effect on infant mortality and under-5 mortalities when the governance indicators are included. The policy implication is that achieving the Millennium development goal of lowering infant mortality by two-thirds by 2015; reducing under-5 mortality rate and raising life expectancy in Nigeria may be unattainable if the level of corruption is not reduced considerably

Keywords: Health expenditure, Infant Mortality, Life expectancy, governance

Introduction

Provision of health is seen as a key element of a policy to promote broad-based economic growth. The burden of diseases such as HIV/AIDS is known to slow the economic growth of developing countries. Therefore, every country devote huge public fund to health

care provision believing this would improve the health of the citizenry so that they can contribute meaningfully to economic growth and development. While increase in budgetary allocation to social services is highly desirable in a developing country like Nigeria, this by itself is not sufficient to guarantee enhancement in service delivery. Bad budget management has been identified as one of the main reasons for ineffective public spending in many developing countries (World Bank, 1998). In Nigeria, for example, despite the huge government expenditure on health provision, the health status of Nigerians is consistently ranked low. Nigeria ranked 74th out of 115 countries, based on the performance of some selected health indicators (World Bank, 1999). Nigerian overall health system performance was also ranked 187th among the 191 Member States by the World Health Organisation (WHO) in 2000 (National Health Policy, 2004). The Nigeria's rate of infant mortality (91 per 1000 live births) is among the highest in the world. It therefore becomes imperative to ask if governance has an impact on the effectiveness of health expenditure in Nigeria. This paper thus investigates how the effectiveness of public health expenditure is affected by governance.

Some researchers have carried out studies on the relationship between public expenditure and outcomes. For instance, Odusola, (1998); Gupta et al. (1999), Kaufmann et al. (1999) and Kaufman et al. (2004), Ricci and Zachariad (2006), McCarthy and Wolf (2001), Chete and Adeoye (2002), Dauda (2004), Glewwe and Kremer (2006), De La Croix and Delavallade (2006) Jayasuriya and Wodon (2007), and more recently, Fay et al (2009) and Sparrow et al, 2009. Most of these earlier studies did not focus on Nigeria. Those on Nigeria only concentrated on the effect of public expenditure on health outcome and economic growth, neglecting the role of governance.

Against this background, this study therefore investigates the link between public health budgetary allocations and health outcomes in Nigeria, factoring in the impact of governance. Following this introduction, the remaining part of the study is structured as follows: Section two following this introduction, presents the literature review and the theoretical framework. The methodology of the study is discussed in section three. Data analysis and interpretation of result is the main thrust of section four while section five draws up policy implication and conclusion.

2 Literature Review and Theoretical Framework

2.1 Literature Review

2.1.1 Public Expenditure and Outcome

The literature is replete with works on the relationship between public expenditure and outcome. The several endogenous growth models link public spending with the economy's long-term growth. Barro (1990, 1991) Levine and Renelt (1992) among others have examined the relationship between public spending and economic growth. Specifically, some researchers have investigated the link between sectoral public expenditure such as public health care expenditure and health outcomes. Among such studies are Ricci and Zachariad (2006), Sparrow, Pradhan and Kruse (2009). Ricci and Zachariad (2006), used data covering 72 countries from 1961 to 1995, in order to investigate the determinants of public health outcomes in a macroeconomic perspective, taking into cognisance households' choices concerning education, health related expenditure and saving. They found evidence for a dual role of education as a determinant of health outcomes. Sparrow *et al* (2009) on the other hand, using panel data set of 207 Indonesian districts over a 4-year period from 2001 to 2004, concluded that district-level public health spending is largely driven by central government transfers. Most of the studies on Nigeria examined the impact of health expenditure or health status on economic growth. Such studies include Dauda (2004). Dauda (2004) analyzed the impact of healthcare spending on economic growth in Nigeria, by adopting the neo-classical growth model. She used the ordinary least square methods of estimation and found a positive relationship between health care expenditure and economic growth.

Filmer and Pritchett (1999), in their own work found that public spending and health outcome are tenuously related. According to them doubling public spending from 3 to 6 percent of GDP would improve child mortality by only 9 to 13 percent. Surveying the literature on the link between public expenditure and outcome Pritchett (1996), notes that all of the negative or ambivalent findings on the effect of public spending on outcomes could potentially be a reflection of differences in the efficacy of spending which could arise due to a variety of reasons including corruption and patronage. Besides, it is also noted that the link between public spending and outcomes could be broken is the displacement of private sector effort by public spending. This argument is eloquently made in Filmer *et al.* (2000) while commenting on the weak links that several studies have found between public spending on health and health status. Although in most of the studies where public spending is found to

have low or negligible impact, it is argued that public provision could lead to a “crowding out” of private sector provision, they have failed to question the efficacy of public spending.

2.1.2 Corruption in Nigeria

In Nigeria Corruption has been identified as one of the unresolved problems which have not only remained a long-term major economic and political challenges (Sachs, 2006) but have also hobbled and skewed development critically. Corruption has stunted growth in all sectors of the country (Economic and Financial Crime Commission, 2005). According to the International Centre for Economic Growth, (1999), corruption ranges from petty corruption to political / bureaucratic corruption or Systemic corruption. Nwabuzor (2005) observed that the World Bank studies put the cost of corruption at over \$1 trillion per year, accounting for up to 12% of the Gross Domestic Product of nations like Nigeria, Kenya and Venezuela. The Transparency International Consistent ratings identified Nigeria as one the three most corrupt countries in the World (Ribadu, 2003).

It is opined that corruption has become so blatant and widespread in Nigeria such that it seems to have been legalized. Corruption has not only permeated the government and oil the fields, but the entire nation as well. Corruption and inefficiency are characteristic of service delivery in public places although private companies seem to perform more efficiently and less corruptly than public enterprises. To show the extent of corruption in Nigeria, Nigeria was labelled the most corrupt nation three times: 1996, 1997, and 2000: and placed in the bottom five four more times: fourth from the bottom in 1998 and second in 1999, 2001, 2002 and 2003. Figure 1 below shows the rating of Nigeria Corruption Perception Index, which is less than 3 at the best of times out of the maximum of six for the least corrupt nations.



Source: Transparency International, (2004).

2.1.3 Governance and Health Outcome

On the issue of the relationship between governance and health outcome, Kaufmann et al. (1999) and Kaufman et al. (2004), show that governance indicators such as voice, accountability, political stability and violence, government effectiveness and graft among others, have a strong direct negative impact on infant mortality. In the same vein, Gupta et al. (1999) find that countries with high corruption have high child and infant mortality rates. De La Croix & Delavallade (2006) find that countries with high corruption invest more in housing and physical capital in comparison with health and education with the associated rent seeking in physical capital which hampers economic growth. Rajkumar & Swaroop (2004), while contributing to the debate, explain that public spending often does not yield the expected improvement in outcomes and that the differences in the efficacy of public spending can be largely explained by the quality of governance. Overall, the empirical evidence have largely support a poor link between public health care spending and health outcomes on one hand, as well as poor link between governance and development outcomes on the other hand especially in developing countries. This paper links the two issues by examining the link among public health spending; governance and health outcomes such as life expectancy, infant mortality and under-5 mortality rates.

2.2 Theoretical Framework¹

Following Rajkumar and Swaroop (2009) who modelled outcome of a public programme, for example public health expenditure as:

$$\text{outcome} = GDPP^\alpha * \left(\frac{Pubexp}{GDP}\right)^\beta \quad \text{where } \alpha > 0, \text{ and } \beta > 0 \quad (1)$$

and $GDPP$ is per capita income, $Pubexp$ is public expenditure on health, GDP is gross domestic product, and outcome could for example, be indicators of health status such as life expectancy, infant mortality or under-5 mortality rates. Equation (1) implies that outcome (for example life expectancy) does the followings: (a) improves with an increase in per capita income; (b) improves (or does not worsen) if an increased proportion of the country's resources are spent on health care.

Taking the logs of equation (1), we have the linear form of (1) as equation (2) below.

$$\ln \text{Outcome} = \alpha \ln GDPP + \beta \ln \left(\frac{pubexp}{GDP}\right) \quad (2)$$

¹ This section draws heavily from Rajkumar and Swaroop (2009)

In modelling the relationship between public spending and outcome as specified in equation (2) above, a researcher would usually take the information on spending from public budget documents. But it is known that only a fraction of the expenditure is actually undertaken while the remainder disappears as a result of corruption (in most African countries). To integrate this line of reasoning, we assume that only a fraction $\gamma(\cdot)$ of public resources are actually spent for productive purposes. Following Pritchett (1996), $\gamma(\cdot)$, the coefficient of public spending on programme p in equation (2) can be written as:

$$\beta = \gamma(\cdot) * \beta_p \quad (3)$$

where β_p represents the productivity of public capital that is created from the spending on programme p . Assuming $\gamma(\cdot)$ which measures the efficacy of public spending is a function of the state of governance. Therefore,

$$\gamma = \varphi_0 + \varphi_1 G \quad (4)$$

where G stands for the level of corruption at each time in a country.

Substituting (3) and (4) into (2), we have

$$\ln Outcome = A + \alpha \ln GDPP + \beta_p (\varphi_0 + \varphi_1 G) \ln \left(\frac{pubexp}{GDP} \right) \quad (5)$$

3.0 Empirical Model

Based on the model in equation (5), we estimate the following equation:

$$\ln(HS) = \partial_0 + \partial_1 \ln(GDPP) + \partial_2 \ln \left(\frac{pubexp}{GDP} \right) + \partial_3 G + \partial_4 G * \ln \left(\frac{pubexp}{GDP} \right) + BX + \epsilon \quad (6)$$

where HS is a measure of health status, which in this study is represented by infant mortality rate, Under-5 mortality or life expectancy, $GDPP$ is GDP per capita, $\frac{pubexp}{GDP}$ is the share of public health spending from GDP, G is a measure of governance, which in this study is the index of corruption and ϵ is error type. To capture the direct effect of governance on health status, G is included as an independent variable in the equation. X is vector of non-health related factor which may affect health outcome (for example population) and ϵ is error term.

4.0 Definition and Sources of Data

In the empirical analysis, we used data from 1980 to 2008. The data used in the study are sourced from the World Bank Development Indicators, 2010 C D Rom. We study the impact of public health expenditure on infant mortality, under-5 mortality and life

expectancy. We use the corruption index as a measure of governance, to interact with the public health expenditure. The corruption index is measured on a scale of 0 to 6. This index measures corruption within the political system, which among other things reduces the effectiveness of government. An index of 0 indicates most corrupt while 6 indicates least corrupt.

5.0 Empirical Result

Equation 6 was first estimated with the ordinary least squares (OLS) techniques. However because of the possibility of reverse causality or joint determination of health status and public health expenditure, it was re-estimated using two-stage-least-squares (2SLS) method. The result of the OLS is presented and discussed first and this is compared with that of the 2SLS.

Table 1: Summary Statistics of Variables Used

	Infant Mortality	Index of Corruption	Life Expectancy	Under-5 Mortality	Public Health Expenditure	Per Capita GDP
Mean	115.07	0.78	46.85	220.53	195264.90	372.81
Median	117.50	0.30	46.90	230.00	122400.00	367.98
Maximum	123.30	2.20	47.50	232.00	567944.90	442.58
Minimum	98.60	0.10	45.30	186.20	59787.70	309.69
Std. Dev.	6.97	0.76	0.62	15.22	151245.40	35.44
Observations	29	29	29	29	29	29

Source: Authors' Computation

The summary statistics presented in Table 1 shows that the average public health spending during the period of analysis is N195264.9 million while the maximum during that period is N567944.90 million. The mean per capita income during this period is \$372.81 (in constant US dollar) while the maximum is \$442.58. The mean infant mortality rate is 115 while that of under-5 mortality rate is 220.53 (both variables are measured per 1000 live birth). Life expectancy is 46.85 years on the average during the period of analysis. The average corruption index is 0.78 which is rather low. This indicates that the country is regarded as highly corrupt during the period of analysis.

5.1 Ordinary Least Squares (OLS) Regression: Factors affecting health status

Table 2 below contains the estimates for the OLS model of equation 6. The first column under each of infant mortality, under-5mortality and life expectancy is the result for the simple version of equation 6, which does not contain the governance variables while the second column presents the results from the version that contains the governance variables. The result of the simple version for infant mortality indicates that there is a negative relationship between per capita GDP and infant mortality, which is in line with theoretical expectation, the coefficient of per capita GDP is however insignificant. Although the coefficient of health expenditure is significant, it carries the wrong sign. Population is also significant but in the wrong direction. The three variables included in the model explain 67 percent of the variation in infant mortality rate.

Table2: Ordinary Least Squares Results

Independent Variables	Infant Mortality		Under-5 Mortality		Life Expectancy	
	Eq. 1	Eq. 2	Eq.1	Eq.2	Eq.1	Eq. 2
Per Capita GDP	-0.05(-0.45)	-0.02(-0.16)	-0.01(-2.12)	-0.01(-1.47)	-0.006(-2.43)	0.01 (0.22)
Public Health Expenditure	0.07 (2.13)	-0.03(-2.25)	0.03(2.01)	-0.02(-1.17)	-0.004(-0.84)	0.02(3.47)
Population	-0.42 (-4.95)	0.19(2.24)	-0.28(-9.13)	-0.03(0.52)	0.10(7.49)	0.82(1.19)
Index of Corruption		1.14(1.13)		-0.41(-2.16)		0.02(2.37)
Index of Corruption X Public Health Expenditure		-0.09(-1.12)		0.03(1.80)		-0.01(-2.40)
Constant	12.00 (11.88)	0.90(0.50)	-0.16(-1.93)	2.11(2.47)	2.18(11.48)	0.02(-0.82)
Adjusted R ²	0.67	0.56	0.83	0.79	0.72	0.38

Source: Authors' Computation

In the second model we bring in the issue of efficacious public spending on health. To do this, we interacted public health spending with the index of corruption and also include the index of corruption as an additional regressor in order to capture the direct effect of corruption. This result is presented in the second column as mentioned earlier. For the infant mortality rate, per capita GDP has the expected sign but its coefficient is insignificant. Health

expenditure in this version is significant and in the right direction contrary to what obtains under the simple version. The coefficient of health expenditure indicates that a one percent increase in health expenditure is associated with 0.03 reduction in infant mortality rate. Population is also positively related to infant mortality rate but the coefficient is insignificant. Governance, as an independent variable, has positive but insignificant relationship with infant mortality rate contrary to expectation. When the health expenditure variable is interacted with the corruption index, the coefficient of the interactive term became negative but insignificant. In the Under-5 mortality model, the equation without the governance factor indicates a negative and significant relationship between under-5 mortality and per capita GDP as expected. The Public health expenditure carries the wrong sign but it is significant. Population has a negative and significant relationship. With the introduction of the governance variables, both health expenditure and per capita GDP became insignificant but correctly signed. The index of corruption carries the right sign and it is significant at the 1 % level. The coefficient of corruption indicates that if the corruption index goes up by one unit, this will lead to 0.41 percent reduction in the under-5 mortality rate. When the index of corruption is interacted with the public health expenditure, the coefficient becomes positive and significant. In the life expectancy equation, per capita income is rightly signed and significant. However the coefficient of the variable is small. A one percent increase in per capita income will only lead to a 0.006 percent increase in life expectancy. Public health expenditure has a negative but insignificant relationship with life expectancy. Population is wrongly signed though significant. With introduction of the governance variables, both per capita income and health expenditure became rightly signed but per capita income became insignificant. Population is not significant. The index of corruption has the right sign and it is significant at 1 percent. With a 1 unit increase in the corruption index, life expectancy would rise by 0.02 percent. When the public health expenditure is interacted with the index of corruption, the coefficient became negative and significant. The results in Table 2 supports two basic hypotheses: (1) higher per capita income would deliver lower infant and infant mortalities and high life expectancy which is consistent with results in the literature; and (2) the link between public health expenditure and infant and under-5 mortalities are negative but the efficacy of public spending in lowering infant and under-5 mortalities is positively related with the level of governance, which supports the argument for good governance.

The OLS results presented above is based on the assumption that health expenditure is exogenous. It has been noted by earlier researchers that both public health expenditure and health status could actually be jointly determined. There is also the possibility of reverse

causation. For example, when the citizens of a nation face deteriorating health status, government would increase spending on health. When Nigeria was granted debt relief by the Paris Club, it was insisted that the relief should be spent on activities that would improve health and education outcomes. We address the endogeneity problem by testing the robustness of our results, using instruments for public health expenditure (as well as for the interaction term) in a two-stage least squares regression. The instruments used are lagged public health expenditure, lagged per capita GDP among others.

5.2 Two-Stage-Least-Squares Result

The two-stage least squares regressions results are reported in Table 3. In the basic equation without the governance variable, public health expenditure is wrongly signed although it is significant in infant and under-5 mortality equations. When the governance variables are included the public health spending became rightly signed and significant except in the life expectancy equation where it is wrongly signed and insignificant. The index of corruption is rightly signed and significant in all the equations. The interaction term is only correctly signed in the infant mortality equation. In the life expectancy equation without the governance variables, both public health expenditure and per capita GDP are wrongly signed although significant but when the governance variables are included, the variables became rightly signed. The coefficient of per capita GDP is 0.01 while that of public health expenditure is 0.02. This implies that a one percent increase in per capita income and public health expenditure would increase life expectancy by 0.1 and 0.02 percent respectively. This result conforms with what obtains under OLS.

Table 3: Two-stage-least squares Results

Independent Variables	Infant Mortality		Under-5 Mortality		Life Expectancy	
	Eq.1	Eq. 2	Eq.1	Eq.2	Eq.1	Eq,2
Dependent Variables	Eq.1	Eq. 2	Eq.1	Eq.2	Eq.1	Eq,2
Per Capita GDP	0.03(1.96)	0.13(-0.44)	-0.01(-0.49)	0.01(0.54)	-0.06(-2.34)	0.01(1.22)
Public Health Expenditure	0.09(2.76)	-0.10(-1.78)	0.05(2.36)	-0.06(-1.68)	-0.02(-3.64)	0.02(3.40)
Population	-0.48(-7.74)	0.20(2.24)	-0.33(-7.01)		0.19(5.83)	
Index of Corruption		-0.14(-1.83)		-1.19(-2.59)		0.14(1.91)
Index of Corruption X Public Health Expenditure		-0.36(-1.25)		0.09(2.45)		-0.01(-1.94)
Constant	12.32(15.9)	0.09(0.50)	10.82(18.46)	2.11(2.470)	0.83(8.22)	0.03(1.04)

	4)					
Adjusted R ²	0.75	0.51	0.79	0.88	0.96	0.40

Source: Authors' Computation

6.0 Summary and Conclusion

In this paper, we investigated the impact of public health spending on infant and under-5 mortalities as well as life expectancy. Because of the possibility of reverse causality, we estimated two-stage-least squares in addition to the ordinary least squares techniques. From the analysis carried out, it is revealed that public health expenditure has negative effect on infant mortality and under-5 mortalities when the governance indicators are included whereas it has wrong signs without the governance indicators. As the level of corruption goes down and value of the corruption perception index rises, there is an improvement in health status since infant and under-5 mortalities decline and life expectancy rises. This implies that simply increasing public expenditure on health is less likely to lead to improvement in health status unless corruption is issue is addressed. The policy implication of the findings of this paper is that achieving the Millennium development goal of lowering infant mortality by two-thirds by 2015; reducing under-5 mortality rate and raising life expectancy in Nigeria may be unattainable if the level of corruption is not reduced considerably.

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