PUBLIC HEALTH CARE SPENDING AS A DETERMINANT OF HEALTH STATUS: A PANEL DATA ANALYSIS OF SSA AND MENA

By

OLUYELE AKINKUGBE
UNIVERSITY OF BOTSWANA
GABORONE, BOTSWANA

- To Examine the distributional Impact of government intervention through public spending on the welfare of its citizens; Health Expenditure and Health Outcomes in the case of this paper
- Health Outcome here has been measured in terms of health status, using three indicators:
  - Life Expectancy at birth (years)
  - Infant Mortality Rate (per 1000 live births)
  - Under-five Mortality rate (per 1000)

Health Expenditure and Health Status in sub-Saharan Africa

- Tables 1 and 2 reveal the situation in terms of numbers in SSA as compared with MENA other regions of the world.

Table 1. *Health Expenditure, Access to health services and risk factors in Health in sub-Saharan Africa and other Regions of the World*

	Health Expenditure as % of GDP 1990-97	97-00	Health Expenditure Per Capita ($) 1990-97	97-00	Access to safe Water % of population 1990	95	00	Access to improved sanitation facilities % of population 1990	95	00	Child immunization rate % of children under age one (Measles) 1997	2001	Tuberculosis incidence per 100,000 people 1997	2000	Prevalence of HIV % of Adults 2001	Average annual population growth rate 1980-01	01-15
World	5.4	9.3	502	482	74	75	81	45	..	55	83	72	136	145	1.27	1.5	1.0
Low income countries	4.5	4.3	15	21	66	69	76	30	29	44	74	60	211	233	2.29	2.1	1.5
Middle income countries	4.4	5.9	89	116	76	79	82	47	..	59	93	86	119	107	0.67	1.4	0.8
High Income countries	9.6	10.2	2485	2736	..	..	..	..	..	..	..	90	24	18	0.33	0.7	0.3
Europe	8.9	9.1	1969	1808	..	..	..	..	..	..	75	85	22	17	0.28	0.3	0.0
Sub-Saharan Africa	2.7	6.0	34	29	53	47	58	54	47	53	58	58	267	354	8.36	2.7	1.9
Middle East & N. Africa	4.7	4.6	89	171	..	..	88	..	..	85	88	92	66	64	0.10	2.6	1.8
Latin America & Caribb.	6.3	7.0	274	262	82	75	86	72	68	77	93	91	81	73	0.67	1.8	1.3
East Asia & the Pacific	3.6	4.7	46	44	71	77	76	35	..	46	93	76	151	147	0.19	1.4	0.8
South Asia	5.0	4.7	16	21	72	81	84	22	20	34	81	58	193	190	0.64	2.0	1.4

Sources: World Bank, World development Indicators, 1997, 1999, 2002, 2003, The World Bank, Washington DC.

Table 2. *Indicators of Health Status in SSA and other Regions of the World*

	Life Expectancy at birth (Years)			Infant mortality rate Per 1000 live births			Under five mortality rate Per 1,000			Adult Mortality rate Male per 1000			Adult Mortality rate Female per 1000		
	1980	1997	2001	1980	1997	2001	1980	1997	2001	1980	1997	00/01	1980	1997	00/01
World	63	67	67	78	56	56	121	79	81	247	274	234	312	255	165
Low income countries	53	59	59	109	82	80	171	118	121	327	274	312	312	255	256
Middle income countries	66	69	70	55	34	31	80	43	38	230	199	207	161	137	127
High Income countries	74	77	78	12	6	5	15	7	7	174	133	128	91	66	66
Europe	74	77	78	13	5	4	16	6	6	172	128	125	83	59	58
Sub-Saharan Africa	48	51	46	118	91	105	192	147	171	486	428	520	403	375	461
Middle East & N. Africa	58	67	68	94	49	44	134	63	54	248	190	193	207	164	143
Latin America & Caribb.	65	70	71	61	32	28	84	41	34	225	189	229	151	116	124
East Asia & the Pacific	64	69	69	53	37	34	79	47	44	222	183	184	180	148	129
South Asia	54	62	63	115	77	71	176	100	99	279	219	252	292	212	202

Sources: World Bank, World development Indicators, 1997, 1999, 2002, 2003, The World Bank, Washington DC.

METHODOLOGY

- Earlier researchers have used either the Benefit Incidence Analysis (BIA) method or the econometric technique to investigate the distributional impact of public spending on the welfare of the citizens. The econometric technique was adopted for the analysis in this paper.

MODEL

- The Model employed derives essentially from Filmer and Pritchett (1999).
- As follows:

Health Status$i$ = $\beta 0i$ + $\beta 1i$ RGDPPC + $\beta 2i$ HEXTGDP + $\beta 3i$ PHYS + $\beta 4i$ FELIT + $\beta 5i$ IMMS + $\beta 6i$ HOSPBED + μi

Where;

Health Status$i$ = Infant mortality/under five mortality rate/life expectancy at birth

RGDPPC = Real Per Capita GDP

FELIT = Female literacy rate (% of female aged > 15 years)

HEXTGDP = Public expenditure on health as a percentage of GDP

PHYS = Population per Physician

IMMS = Immunization for measles (% of children aged < 12 months)

HOSPBED = Hospital beds per 1000 people

u = Stochastic disturbance term to capture omitted variables

i = 1, 2, 3 and

βs are the parameters to be estimated.

Variables

- Dependent variables:
  - **Life Expectancy at Birth (LIFE):**
  - **Infant Mortality Rate (IMORT):**
  - **Under Five Mortality Rate (UFMORT):**

Explanatory Variables

- **Real Gross Domestic Product per Capita (RGDPPC):**
- **Ratio of Public Expenditure on Health to GDP (HEXTGDP**
- **Female literacy rate (FELIT)**
- **Immunization for Measles (IMMS):**
- **Population per Physician (PHYS):**
- **Hospital beds per 1000 people (HOSPBED):**

Data and Data Sources

- Pooled, multi-country annual time series data for the period 1980 to 2003 for 45 SSA and 12 MENA countries are used for the empirical analysis.
- The Major source of the data is the World Bank, World Development Indicators 2004, Online.
  - Serious problems of missing data points. Had to then use 3-year non-overlapping averages for all the variables.

Results

Table 3. *Results of Estimated Equations (Random Effects model)*

	Estimates and ρ Values		
	(1) Life Expectancy at birth	**(2)** Under-five mortality rate	**(3)** Infant mortality rate
Constant	3.593 (0.0000)	7.5927 (0.000)	6.75451 (0.0000)
Real GDP per capita	0.00109 (0.2891)	-0.23404 (0.0059)	-0.00623 (0.1593)
Health expen. As a ratio of GDP	0.0367 (0.0353)	-0.3492 (0.0113)	-0.05226 (0.01917)
Hospital Bed	0.0562 (0.0843)	-0.0342 (0.0178)	-0.07023 (0.0966)
Immunization against measles	0.0313 (0.0826)	-0.38102 (0.1344)	-0.10143 (0.1953)
Female literacy rate	0.1127 (0.2051)	-0.38167 (0.1592)	-0.02668 (0.0659)
Physician per population	-0.0097 (0.0820)	0.03515 (0.0378)	0.0340 (0.09685)
No. of observations	**1080**	**1080**	**1080**
No. of countries	**45**	**45**	**45**
$\check{R}^2$	**0.979611**	**0.9552**	**0.900496**

Source: Author's computations

NOTE: *The numbers in the parentheses below the parameter estimates are the ρ – values. A ρ – value that exceeds 0.10 indicates that the parameter estimate is not significant at 1%, 5% and 10% levels.*

Table 4. *Results of Estimated Equations for Middle East and North Africa (MENA) (Random Effects model)*

	Estimates and ρ Values		
	(1) (Life Expectancy at birth)	(2) Under-five mortality rate	(3) Infant mortality rate
Constant	6.683 (0.14)	3.743 (0.08)	0.521 (0.0.00)
Real GDP per capita	0.055 (0.0.00)	-0.179 (0.03)	-0.016 (0.04)
Health expen. As a ratio of GDP	1.314 (0.04)	-0.032 (0.07)	-0.021 (0.14)
Hospital Bed	0.739 (0.00)	-1.275 (0.11)	-0.003 (0.06)
Immunization against measles	0.019 (0.00)	-0.151 (0.31)	-0.181 (0.29)
Female literacy rate	1.138 (0.22)	-0.005 (0.83)	-0.109 (0.052)
Physician per population	1.246 (0.02)	1.175 (0.00)	0.080 (0.15)
No. of observations	**720**	**720**	**720**
No. of countries	**12**	**12**	**12**
$\check{R}^2$	**0.87520**	**0.76259**	**0.91367**

Source: Author's computations

NOTE: *The numbers in the parentheses below the parameter estimates are the ρ – values. A ρ – value that exceeds 0.10 indicates that the parameter estimate is not significant at 1%, 5% and 10% levels.*

Conclusions

- Health Expenditure as defined is a significant determinant of Health Status in SSA and MENA
- So also are: Availability of physicians, female literacy and Child immunization.
- Income, Not significant as a determinant of Life Expectancy and Infant Mortality rate in SSA; on the other hand, turn out as significant determinant of Health Status (as defined) for MENA.