Health Interventions and Child Health in Sub-Saharan Africa: Assessing the Impact of the Millennium Development Goal

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Abstract

The study investigates the role of health interventions on child health in developing Africa for the period 1990-2013 using a dynamic panel approach. Among others, the study examines the effect of millennium development intervention programme on child health outcomes. Our analysis reveals MDG intervention as extremely pertinent in reducing the incidence of child mortality in Africa. It implies that introduction of MDGs culminates into increasing the rate of child survival in Africa. Similarly, maternal literacy, maternal health and other child protective measures adopted were found to be statistically significant in improving child health outcomes. The proportion of under-five mortality (proxy for child health) responds more strongly and negatively to immunization coverage, exclusive breastfeeding and DPT vaccines. On the other hand, the quality of institution contributively impact under-five mortality in Africa. Finally, there is need to strengthen institutional arrangement, ensure compulsory basic education for women and strengthen the health system to achieve full packages of intervention, curtain the rising incidence of child deaths and attain the MDGs.

Keywords: millennium development goals, mortality rate, Sub-Saharan Africa

1. Introduction

The introduction of the Millennium Development Goals with one of its objective towards reducing under-five mortality by two-thirds gives a benchmark towards the progress of reducing human poverty and inequality to its barest minimum. Sub-Sahara Africa is a region characterized by general poor developments in almost all facets of life; though the MDG intervention has left the region with some health improvements. According to Africa Development Report (2011), Sub-Saharan Africa improved access to safe water by about 22 percent between 1990 and 2008, while the rate of improvement for the world is 13 percent for the same period. Likewise, access to improved sanitation in Sub-Saharan Africa increased by 15 percent between 1990 and 2008 compared with 16 percent for the world in the same period. Though, it has the lowest life expectancy of 54.7 years but it has the most improved life expectancy for the period 2000 to 2009. Consequently, the MDG Africa report (2013) opines that the proportion of undernourished people reduced from 32 percent in 1990-1992 to 27 percent in 2010-2012; while the proportion of children under age five who are moderately or severely underweight in 1990 and 2011 has reduced from 29 percent in 1990 to 21 percent in 2011 in Sub-Sahara Africa.

While it is necessary to note these improvements, it becomes pertinent to account for the significance of MDGs. Since the introduction of the MDGs, Sub-Saharan Africa has seen a faster decline in its under-five mortality rate, with the annual rate of reduction doubling between 1990-2000 and 2000- 2011 (United Nations Inter-Agency Group for Child Mortality Estimation, 2012). The observed health improvement following the MDGs programme have been attributed to improvements in health technologies, public health measures, health interventions, introduction of universal public health care systems, maternal age at first birth. In consonance with the submission by Acemoglu et al., (2007) which attributes health improvements to the wave of global drug and chemical innovations, the establishment of the World Health Organization, which greatly facilitated the spread of medical and public health technology to poorer countries and the change in international values.

Adequate access to safe water and sanitation facilities are pertinent, since most under-five mortality deaths are attributed to preventable and treatable diseases and these deaths are majorly water borne related or vector borne

related. Also, the WHO report (2004) suggests that 1.2 million people die of malaria each year, 90 percent of whom are children under five and that there are 396 million episodes of malaria every year. Also, 1.8 million people die every year from diarrhoeal diseases (including cholera); 90 percent are children under age five, and these cases are mostly in developing countries, while 88 percent of diarrhoeal disease is attributed to unsafe water supply, inadequate sanitation and hygiene.

Our study provides useful insights in assessing the impact of MDG introduction in Sub-Saharan Africa by addressing the following questions: i. has the introduction of MDG resulted in the decline of under-five mortality rate by 50 percent in SSA? ii. To what extent has the introduction of MDG improved life expectancy in SSA? iii. To what extent has the health improvements be attributed to improved access to safe water supply and adequate sanitation facilities?

This study holds tremendous relevance to the Sub- Saharan African region and to the Nigerian health target- which aims to evolve a "health sector that supports and sustains life expectancy of not less than 70 years and reduces to the barest minimum the burden of infectious and other debilitating diseases". It will also set a road map for consideration in post-2015 sustainable and inclusive development goals in a developing country context which is also in support with the Lancet Commission that posits that, in order to move towards global health goals by 2035, the right health investments and interventions are required.

This study investigates the effect of public health measures on child health improvements in Sub-Sahara Africa using a dynamic panel approach for the period 1990 to 2012. This study uses countries from Sub-Sahara Africa (SSA) and adopts the system generalized method of moments (SGMM); the choice of the SGMM is deem appropriate in order to overcome the problem of perceived endogeneity in our model. The different public measures considered in the paper include access to improved water supply and sanitation, inclusion of a dummy variable to capture the introduction of Millennium Development Goals (MDGs) and child health is captured using under-five mortality rate. Other explanatory variables in the study include; institutional quality, maternal health, maternal literacy, childhood immunization coverage, insecticide treated nets, exclusive breastfeeding and DPT vaccines. This study provides a guide to policy analyst and government in understanding the role the introduction and pursuance of MDGs has played in improving child health in the Sub-Sahara Africa, and the possible gains that would emanate from the introduction and pursuance of the Post-2015 agenda.

2. Data and Stylized Facts

The millennium development agenda recognised the benefits of globalisation but sought a more "inclusive" process in which the benefits would be shared more broadly. The MDGs were intended to build consensus among world leaders at the Millennium Summit, and to induce them to pledge to take concrete actions for which they could be held accountable. In other words, the MDGs served and continue to serve as normative objectives and evaluative benchmarks in global policy processes. The leaders at the summit committed their nations to a new global partnership to reduce extreme poverty while at the same time set out a series of time bound targets with a deadline of 2015 (Fukuda-Parr, 2013).

The fourth Millennium Development Goal (MDG 4) calls for a two-thirds reduction in deaths of children younger than five years between 1990 and 2015. Fortunately, the under-five mortality rate (U5MR) is declining in all regions, but many countries are still far from achieving the goal (Rajaratnam et al., 2010; Bhutta et al., 2010). In Ethiopia, the second most populated country in Africa, the decline in child mortality after 1990 has been steeper than in several other Sub-Saharan African countries (Accorsi et al., 2010). Rajaratnam et al., estimated a decrease in U5MR in Ethiopia from 201.9 per 1000 live births in 1990 to 101.0 per 1000 live births in 2010 (Rajaratnam et al., 2010). Still, more than 321,000 children die before they reach five years of age every year (Black, 2010). Black et al. estimate that neonatal complications (38 percent), diarrhea (22 percent) and pneumonia (12 percent) are the major causes of Ethiopian child deaths (Black et al., 2010).

According to the WHO Global Health Observatory report, 6.3 million children under age five died in 2013 representing nearly 17000 every day. The risk of a child dying before completing five years of age is still highest in the Africa region (180 per 1000 live births), about 14 times higher than that in the European region (12 per 1000 live births). As seen in table 1 below, the Sub-Saharan Africa has the highest number of under-five mortality in the world though the figure has been declining drastically since 1990. In the year 1970, child mortality stood at 242 per 1000 live births in Sub-Saharan Africa, 30 per 1000 live births in Europe, 109 per 1000 live births in Asia and 119 per 1000 live births in the Carribean. As the year advances, the situation has slightly changed with declining under-five mortality with Africa experiencing the fastest rate of decline. The level of child mortality fell to 19 per 1000 live births in 1980 and subsequently to 4.7 per 1000 live births in 2012. In the same period, SSA also experiences a decline to 199 per 1000 live births and 98 per 1000 live births

in 1980 and 2012 respectively; while the world average decline from 116 per 1000 live births to 48 per 1000 live births in the same period. Though, Africa still remains the most risky continent for child to survive, with its populous country, Nigeria ranked the worst country for a child to be born (Economic Intelligent Unit, 2013).

Table 1. Under five mortality rate across region

Year	East Asia & pacific	Europe & Central Asia	European Union	Latin America & Caribbean	Middle East & North Africa	SSA	World
1970	109.15	54.55	30.34	118.64	206.48	241.25	144.6
	(0.755)	(0.377)	(0.209)	(0.821)	(1.428)	(1.668)	
1980	70.91	44.84	18.75	83.91	123.35	198.99	115.7
	(0.613)	(0.388)	(0.162)	(0.725)	(1.066)	(1.720)	
1990	56.53	32.03	12.64	54.27	64.97	177.94	89.8
	(0.630)	(0.357)	(0.141)	(0.604)	(0.723)	(1.981)	
2000	39.56	22.21	7.53	32.33	42.01	155.08	75.4
	(0.525)	(0.295)	(0.099)	(0.429)	(0.557)	(2.057)	
2010	21.62	13.16	5.12	22.70	25.76	106.03	51.7
	(0.418)	(0.254)	(0.099)	(0.439)	(0.498)	(2.051)	
2012	19.61	12.11	4.77	18.96	24.01	97.88	47.8
	(0.410)	(0.254)	(0.099)	(0.397)	(0.502)	(2.048)	

Source: compiled using WDI 2014

Sub-Sahara Africa has the lowest life expectancy rate of 54.7years compared to Middle East and North Africa which has 72.8 years and 69.9years for the rest of the world in 2011 (World Development Indicators, 2013). Likewise in 2008, it was estimated that about 4.2 million children under the age of five died of preventable and treatable conditions including pneumonia, diarrhoea and malaria. Sub-Saharan Africa has the highest rate of child mortality, where the figure has considerably fallen around the world. Under-five deaths have increasingly concentrated in Sub-Saharan Africa, where 1 in 9 children dies before age five, more than 16 times the average for developed regions (1 in 152) and Southern Asia (1 in 16). The deaths of children under the age of five are caused by pneumonia-18 percent of all under-five deaths; preterm birth complications-14 percent; diarrhoea-11 percent; intra-partum related complications i.e. complications during birth-9 percent; and malaria-7 percent. Almost 70 percent of deaths of children under age five occur in the first year of life, and 60 percent of this in the first month (United Nations Inter-Agency Group for Child Mortality Estimation, 2008).

Furthermore, Grantham-Mcgregor *et al.,* (2007) show that most of about 200 million children under 5 years not fulfilling their developmental potential live in south Asia and Sub-Saharan Africa, and that the risk factors among others are poverty and malnutrition, which affects cognitive, motor and social-emotional development.

Table 2. Maternal and public health measures across region

	Neonatal Mortality			Anaemia in Pregnancy			Health Expenditure			Water Access		
	1990	2000	2010	1990	2000	2010	1990	2000	2010	1990	2000	2010
East Asia & Pacific	24.03	18.44	11.35	37.53	30.96	25.63	NA	NA	NA	70.91	81.86	91.13
Europe & Central Asia	13.76	10.10	6.42	33.37	27.93	25.90	NA	14.71	15.39	95.50	96.46	97.89
European Union	6.85	4.19	2.99	29.79	24.69	24.64	NA	14.74	15.75	98.27	99.01	99.9
Latin America & Caribbean	22.29	15.33	10.43	39.53	34.55	28.77	NA	9.55	NA	75.96	93.57	94.20
Middle East & North Africa	27.49	20.15	13.86	4.88	33.90	30.96	NA	NA	9.47	87.43	88.70	90.87
SSA	45.24	41.74	33.79	52.92	52.24	46.75	NA	11.05	10.84	47.74	55.07	62.61

Source: compiled using WDI 2013

The region has experienced some level of health improvements, improvements in mortality rate, increased access to safe water among others, but when compared to other regions, it seems not sufficient. According to ADI (2011), Sub-Saharan Africa improved access to safe water by about 22 percent between 1990 and 2008 compared with 13 percent for the world in the same period. Access to improved sanitation in Sub-Saharan Africa increased by 15 percent compared with 16 percent for the world in the same period. Though, Africa has the lowest life expectancy of 54.7 years, but it has the most improved life expectancy for the period 2000 to 2009. According to MDG Report (2013), the proportion of undernourished people reduced from 32 percent in 1990-1992 to 27 percent in 2010-2012; while the proportion of children under age five who are moderately or severely has reduced from 29 percent in 1990 to 21 percent in 2011 in Sub-Sahara Africa.

For instance, Congo vaccination coverage for DPT$_3$, measles and immunization against polio has increased. DPT$_3$ coverage increased from 49 percent in 2003 to 77 percent in 2006, while measles and immunization vaccination coverage increased by 73 percent and 90 percent respectively in the same period.
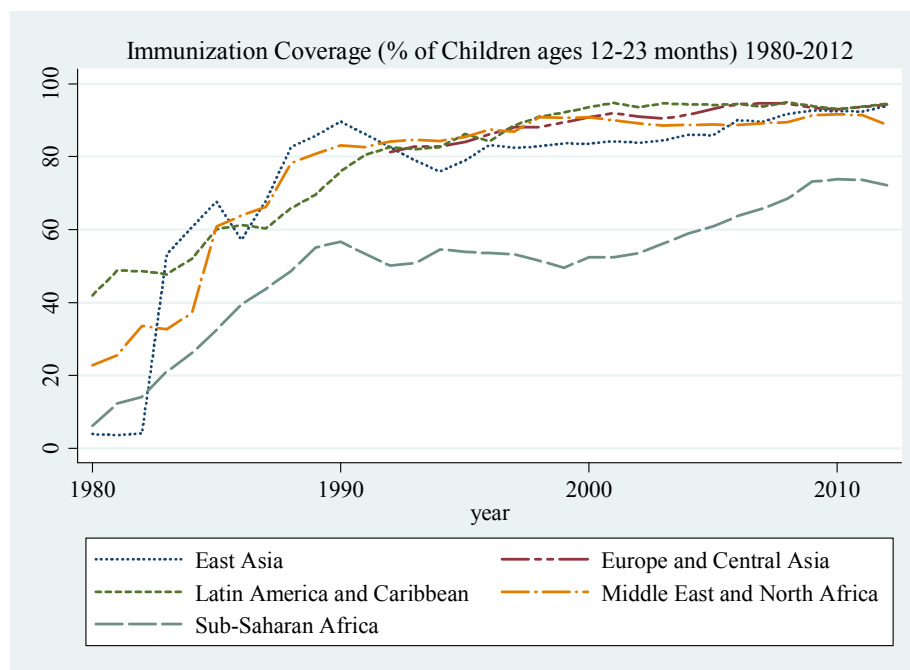

Figure 1. Immunization coverage in across region

Source: Compiled using Stata 11.0

3. Literature Review

A crucial question in the field of economic growth and development is whether health improvements make a population richer (Weil, 2014). The research by Acemoglu and Johnson (2007) suggests that this is not the case. Central to their argument is that health improvements translate into population increase, as people do not die at the same rate as before the improvements. However, the long-run population effect depends on how fertility adjusts, and the evidence on this mechanism is scant (Bleakley, 2010).

Studies on child health show that scale-up of effective interventions could have a high impact on child mortality (Jones *et al.,* 2003; Darmstadt *et al.,* 2005). But the gap between those in need of care and those who in reality have access to care is large (Bhutta et al., 2010; Kinney *et al.,* 2010). When the burden of disease is high and there are limited resources to invest in health care, decision makers face difficult dilemmas on where to invest their resources. To make these assessments, decision makers need valid and relevant information concerning the different alternatives and their distributive consequences as well as opportunity costs (Norheim 1999; Baltussen 2011). However, we lack information on which services will promote rapid health gains and which services to prioritize in a specific country. As of today, models on possible impacts and costs of introducing new interventions and scale-up of interventions exist for larger WHO regions (Chisholm *et al.,* 2012).

This study will also be of use to policy makers in Sub-Saharan Africa for prioritizing public health measure

towards the improvement of child health in a bid to reduce to risk of intergenerational transmission of poverty, since most children who do not fulfill their the developmental potential are concentrated in South Asia and Sub-Saharan Africa and has consequence for national development when the proportion is high (Grantham-Mcgregor *et al.,* 2007).

Achievement of health improvements can be seen as both a social and economic objective. The Commission on Macroeconomics and Health (2001) emphasized that the improvement in the health status of the poor is both an end in itself and a means to an end, in terms of achieving developmental goals. Major health improvements have been attributed to improvements in health technologies and public health measures that prevent the spread of infectious disease, and not higher incomes (Cutler and Lleras-Muney, 2006). Strittmatter *et al.,* (2012) notes that improving health conditions have a substantial effect on economic performance, and that public health policy and the institutional environment policy play a vital role for economic development. For instance, measures such as Insecticide Treated Bed Nets (ITBN) have been shown, to reduce childhood mortality in The Gambia and Kenya (Nevill, Some, Mungala, Mutemi, New, Marsh, Lengeler and Snow, 1996). In addition, large-scale public health innovations – including clean water technologies, sanitation, refuse management, milk pasteurization; economic innovation and nutritional gains and measures targeted at changing individual health behaviours have been found to contribute to reductions in infant and child mortality rates (Goff, 2010).

Similarly, in the words of Cutler (2005) and Lee (2007) Public health measures and health interventions such as clean water technologies and cleaning milk market has been found to have contributed to reductions in infant mortality (Cutler, 2005; Lee, 2007). Also, the Abuja Declaration of 2000, signed by 53 African heads of state, noted that "malaria has slowed economic growth in African countries by 1.3 percent per year making GDP for African countries 37 percent lower than it would have been in the absence of malaria (Ashraf, Lester, Weil, 2006); implying that a lower incidence of malaria is key to improvements in a country's aggregate output. Jack *et al.,* (2007), notes that vaccines, antibiotics, and other pharmaceutical developments have drastically reduced the incidence of illness and death.

Acemoglu *et al.,* (2007) notes the growing consensus that improving health can have equally large indirect payoffs through accelerating economic growth. The impact of health on economic growth has been well documented by various scholars in literature, (Grossman 1972; Bloom, Canning and Jamison, 2004; Bloom and Canning 2003). The literature has over time identified a strong relationship between health improvements and economic growth. For instance, WHO (2010) recommends increased spending on health as a way to promote economic growth, to raise both health status and household earnings and then achieve the Millennium Development Goals (MDGs). Likewise, Jack and Lewis (2007) suggested that extending the coverage of crucial health services to the world's poor could save millions of lives each year, reduce poverty, spur economic growth and global security. The Commission on Macroeconomics and Health (2010) estimates that economic benefit from health gains will be $360 Billion by the period 2015-2020, while the indirect benefits will be worth $180 Billion if health investments are scaled up.

Alleyne (2007) notes four phases of the evolution of health: the relationship between health and economic growth was perceived in terms of the effect of disease on labour productivity, especially at the microeconomic level, thus focusing on disease reduction. The second phase is the historical retrospective approach, drawing associations between health status and economic progress over time at the country level. The human capital approach emerged in the 1990s, treating health, like education, as a productive asset contributing to growth and the fourth phase is the relationship between macroeconomics and health. Health is just being recognized as a form of human capital that can contribute to economic growth.

Health affects economic growth through a variety of pathways. Strittmatter *et al.,* (2013) notes that health reflected by infant and adult mortality affects economic performance through human capital investments, physical capital accumulation, population growth, productivity and female labour force participation. Weil (2007) identified two ways in which health affects economic performance, the first way is the direct effect of health on economic growth; the second is the indirect effect of health on economic growth; where the indirect effect of health to economic growth could be through incentive to acquire schooling, lower absenteeism, higher cognitive functioning, and incentive to save. In the same manner, Grossman (1972) sees the implication of unhealthy people or ill health as loss of healthy (labour) time which ultimately affects a country's output.

Evidences from empirical literature such as Bloom and Canning (2005); Bloom and Canning (2000); Bloom, Canning, and Sevilla (2004); Bloom, Canning, and Graham (2003); Commission on Macroeconomics and Health (2001); Easterlin (1999); Hamoudi and Sachs (1999) indicate that health influences income growth via its effects on labor market participation, worker productivity, investments in human capital, savings, fertility, and

population age structure. And this effect has been seen to account for differences in wages at the microeconomic level (Grantham-McGregor, Bun Cheung, Cueto, Glewwe, Richter & Strupp 2007; Behrman, 2009; Miguel, Edward, and Kremer 2002; Bleakly, 2007), and differences in productivity level (Weil 2007; Bloom & Canning 2009). At the macroeconomic level, there is a strong positive correlation between income per capita and life expectancy or other measures of health (Bloom, Canning, and Sevilla, 2004; Cooray, 2013). Micro-economists have found extensive evidence that an individual's health is an important determinant of his or her economic performance (Grantham-McGregor *et al.,* 2007; Behrman, 2009; Miguel, *et al.,* 2002; Bleakly, 2007; Gallup and Sachs, 2001). Though, findings have been with mixed results

The MDGs is a form of global goal and also a policy tool. It's been a tool for reducing under-five mortality rate within Sub-Sahara region. Global goals are relevant for global governance. They serve as a norm to create incentives that lead to behaviour change; secondly, as social objectives in concrete terms and as a tool for change of behaviour, which are prescriptive rather than regulatory (defines what ought to be done rather than prohibit what should not be done). This prescriptive nature of global goals are not enforced, but they are implemented indirectly through processes of self-regulation or regulatory decision making, which then leads to a self-regulation point (Fukuda-Parr, 2013). The MDGs have been instrumental in reducing under-five mortality in Sub-Sahara Africa by leading to change of behaviour which is a reflection of policy changes and adjustments. In the words of Mary (2009) and Porter (1994) the MDG indicators provides a basis for studying performance and incentives for self-regulation.

Prior to the introduction of MDGs (contained in the millennium declaration 1999); there have been global concerns over the surging child and maternal mortality in developing economies. This led to the establishment of the Global Alliance for Vaccines and Immunizations (GAVI Alliance), a global health partnership to assist the poor countries in vaccination of all children. The partnership was designed for funding assistance to countries with Gross National Income of $1,000 per capita (a number of SSA countries qualified while others were specially considered). Sequel to the introduction of the MDGs which witnessed huge national and multination investments; a group of eight European countries established the International Finance Facility for Immunization (IFFI) to support immunization services and strengthen health systems through channelling of additional funds to GAVI Alliance (UNICEF, 2007).

Other development initiative by the United Nations towards achieving MDG 4 include: 'The Every Woman, Every Child' (EWEC) movement, which aims at saving 16 million lives of both women and children. Similar to the EWEC but a new development strategy flagged by the United Nations is "A Promise Renewed (Note 1)" strategy which aims to improve the health of women and children through action and advocacy to accelerate reductions in preventable maternal, new-born and child deaths. In SSA, this initiative has led twenty of its leaders to commit to reduce under-five mortality rate to less than 20 deaths per 1000 live births by 2035 with the Government of Ethiopia taking the lead (APR Report 2013).

Following this renewed national and international commitments, many governments have set different types of target. In Sub-Sahara Africa, a demonstration of such commitment of governments can be seen in Nigeria where President Goodluck Jonathan launched the Save One Million Lives (SOML) by 2015 initiative. This is a scheme that is to expand access to essential primary health care services for women and children. This initiative focuses on evidence based, cost effective interventions that are proven to address the leading causes of woman and child mortality and morbidity. It includes improving maternal, new-born and child health, preventing mother to child transmission of HIV, malaria control and improving child nutrition. Another demonstration of this commitment is by the government of Zambia who aims to avert 104,000 under five deaths over a span of 4 years. Other countries in SSA that have taken actions include Democratic Republic of Congo, Uganda, Ethiopia, and Liberia.

Though, the MDG framework has its own limitations as outlined by Fehling *et al.,* (2013). They classified the limitations in areas of development process, structure, content, implementation and enforcement. Shortcomings such as little involvement of developing countries and civil societies constituencies, the exclusion of some items from the millennium declaration such as peace, security, disarmament; the extent to which some of the goals where adopted since the development of the MDG process. For instance, MDG 1 is to halve the proportion of people suffering from hunger and poverty rather than halving the absolute numbers of people suffering as suggested at 1996 World Food Summit in Rome. Another weakness is the neglect of the interconnectedness of some of these goals like MDG4 and MDG 5 where issues relating to both mother and child are separated (Brikci & Holder, 2011).

Despite these weaknesses, it distinguishes itself as a form of global goal from previous types of global goals in four different ways as outlined by Fukuda-Parr (2004). Firstly, it was generated by a large number of heads of

states of about 189 countries. Secondly, the focus of the goals are on human development, where the people and the kind of lives they live is the focal point, which is quite different from other previous goals which basically focus on growth, development and particularly industrialization. Thirdly, they are not just ideals, but they provide a framework of accountability, define concrete goals which can be monitored. In essence, they have quantifiable targets and deadlines set for the achievement of set targets which can used to evaluate the performance of each country. An exception to this is the Millennium Development Goal 8 – "Develop a global partnership for development" which are not specific as to how is to be achieved and at what point in time is it to be achieved. Fourthly, apart from development outcomes, they also address issues regarding the inputs from rich countries in terms of aid, debt relief and transference of technology. This aspect which is the major reason for the commitment of both rich and poor governments since the developing countries were not ready to open up their nations to international scrutiny if there wasn't a form of joint accountability.

The effort to achieve the MDG has put on all stakeholders- at the local level, country level and international level a task in contributing its own quota. The effort has led to unprecedented efforts in improving the welfare of the people, increase in vaccination and immunization coverage, reduction in the deaths of the most vulnerable (the children under the age of five) especially from preventable deaths, awareness for simple basic hygiene methods etc. which culminates into improvements in the health of the population.

The Commission on Macroeconomics and Health (Note 2) links the heavy burden of disease and its multiple effects on productivity, demography, and education to Africa's chronic poor economic performance. It opined that the high prevalence of malaria, for instance, costs Africa about 1 percent lost economic growth annually. Hence, experts assert that more than half of Africa's growth shortfall relative to high growing countries in East Asia can be attributed to its relatively high burden of diseases, demography and geography rather than traditional variables of macro-economic policy and political governance (Bloom and Sachs 1998). Philipson *et al* (2001) and Cutler *et al* (1997) notes that losses from poor population health manifest themselves quantitatively in reductions in market income, longevity, and psychological well-being (i.e. pain and suffering) caused by illness. Nordhaus (2002) posits that any evaluation of economic development that do not take into account the direct and indirect linkages of health status and economic well-being will tend to understate the economic benefits of good health. The burden of disease thus appears to stand as a stark barrier to economic growth and therefore must be addressed frontally in any comprehensive development strategy. Population health is a primary goal of sustainable development.

4. Methodology

The study adopts a model similar to Musgrove 1987; Pritchett and Summers 1996; Fogel 1997; Schultz 1997 and Cornia and Mwabu 1997. This model suggest the following eclectic model of child mortality for a low income region which has been subject to shocks of the kind experienced in Sub-Saharan Africa during the last 15 years.

$$U5MR_{it} = \beta_0 + \beta_1 PCY_{it} + \beta_2 MTH_{it} + \beta_3 MTL_{it} + \beta_4 IMC_{it} + \beta_5 HXP_{it} + \beta_6 WTR_{it} + \beta_7 SAN_{it} + \beta_8 IST_{it} + \varepsilon_{it}$$

Where: $U5MR_{it}$ is under five mortality rate

PCY_{it} is Per capita household income measured as US$ at 2000 constant price

MTH_{it} is maternal health, primarily captured as the prevalence of anemia among

pregnant women. Maternal health is also proxied as depth of food deficit (kilocalories per person per day) and prevalence of under-nutrition (percentage of population)

MTL_{it} is maternal literacy is primarily captured as female primary school enrolment;

also proxied as secondary and tertiary enrolment differently.

IMC_{it} is measles immunization coverage, used as a measure of child disease

prevention and also captured using DPT immunization coverage, use of insecticide-treated bed nets, vitamin A supplementation coverage rate and exclusive breastfeeding (percent of children under 6 months)

HXP_{it} is public health expenditure captured as percent of government expenditure

WTR_{it} is improved water source captured as percentage of population with water

Access

SAN_{it} is improved sanitation facilities captured as percentage of population with

sanitasion access

IST_{it} is institutional quality captured using the indexes of institutions provided by

World Governance Indicators

ε_{it} captures the random disturbances

The choice of selected variables were pertinent, in such that a number of literature have espoused theoretical evidences validating the relevance of our explanatory variables as capable to influencing health outcomes. For instance, WHO (2010) stressed the need for extensive breastfeeding, hereby adjudged that premature introduction of complementary foods and nutritional deficiencies are among the major risk factors of child mortality. Malnutrition has been identified as the leading cause of deaths in under-five mortality, United Nations Inter-Agency Group for Child Mortality Estimation (2012). The WHO Global Health Observatory report also support suggests that difference in child mortality between high-income and low-income countries was 76 deaths per 1000 live birth, this represents in average about 13 times the rate in high-income countries, which stood at 6 deaths per 1000 live births. Similarly, the United Nations Children Fund (UNICEF) emphasised the role of maternal literacy in mitigating under-five mortality, it identifies that children are at a greater risk of dying before age five if they are born in rural areas, among the poor, or to a mother deprived of basic education (UNICEF 2012, Singh and Tripathi, 2013). Likewise, a theoretical exposition from Rutherford *et al.,* (2009) suggests that poor health expenditure leads to poor access to health care, delayed attendance at health facility or none at all which may be a key determinant of mortality in children under five years of age in developing countries.

In addition, Kaufmann et al (1999) emphasised that governance indicators such as voice and accountability, political stability and violence, government effectiveness have a strong negative impact on infant mortality. Gupta et al (1999), De la Croix and Delavallade (2006) stressed that countries with high corruption have high child and infant mortality rates. The data for variables contained in the model were all obtained from the World Development Indicators 2013 of the World Bank publication.

Two main identification strategies are employed to estimate the effect of aid on health outcomes. The first is OLS with a rich set of control variables, on a sample that pools all country-year observations. The second strategy is based on a dynamic panel data model with country fixed effects, and is estimated using the Generalized Method of Moments (GMM). In this model, all predetermined and endogenous variables are instrumented by their appropriate lags, to avoid introducing a spurious correlation between these variables and the error term.

4.1 Discussion of Results

Table 3. Pairwise correlation matrix

variable	Anpreg	Hexp	Wtr	Sant	pfen	mdg	immc	inst2
anpreg	1.0000							
hexp	-0.1238	1.0000						
wtr	-0.2837	0.0065	1.0000					
sant	-0.4314	-0.1391	0.5579	1.0000				
pfen	-0.5398	0.1064	0.6259	0.5894	1.0000			
mdg	-0.1706	0.1282	0.2413	0.0949	0.2241	1.0000		
immc	-0.4183	0.0521	0.5460	0.4524	0.5717	0.2760	1.0000	
inst2	-0.2397	0.1023	0.5258	0.3451	0.4859	0.0071	0.4532	1.0000

Source: computed using Stata 11.0

Our estimation procedure began with examining the strength, pattern and direction of collinear relationship among the explanatory variables. The study attempted this by conducting the pairwise correlation matrix in table 3. The result shows no serious problem of collinear relationship which implies that our model is void of multicollinearity and the specific influence of our regressors is distinguishable. Likewise, the pairwise correlation matrix provides an insight on the likely impact of millennium development goals on child health variables. Its becomes obvious that actualization of MDGs will culminate in reducing the percentage of pregnant women with anemia while its actualization increases health expenditure, water access, sanitation facilities, female education, immunization coverage and enhance the quality of institutions.

Table 4. Variance inflation factor

variable	VIF	1/VIF
pfen	2.28	0.4384
wtr	1.98	0.5044
sant	1.84	0.5425
immc	1.69	0.5932
inst2	1.59	0.6292
anpreg	1.55	0.6456
hexp	1.15	0.8718
mdg	1.09	0.9189

Source: Computed using Stata 11.0

Similarly, the variance inflation factor analysis was adopted to corroborate the results obtained using the pairwise correlation matrix; as the former provides a standard rule of examining the extent of collinear relationship. In order to ensure no serious problem of multicollinearity occurs, the variance inflation factor must be less than five and the degree of tolerance greater than 10 percent. An examination of the result presented in table 4 shows our explanatory variables do not exhibit any near or exact collinear relationship.

Table 5. Static panel regression result

variable	Ols	Fixed effect	Random effect
mth	0.751***	0.742**	0.847***
	(0.119)	(0.288)	(0.227)
hxp	4.039***	-2.415***	-2.252***
	(0.629)	(0.537)	(0.525)
wtr	-0.798***	-2.100***	-1.592***
	(0.0903)	(0.225)	(0.171)
san	0.164**	-0.140	0.0632
	(0.0655)	(0.278)	(0.154)
mtl	-0.846***	-0.665***	-0.727***
	(0.0836)	(0.0725)	(0.0712)
mdg	-8.256**	-0.962	-3.037
	(3.731)	(1.917)	(1.887)
imc	-0.417***	-0.187***	-0.255***
	(0.0796)	(0.0650)	(0.0643)
ist	-11.13***	-7.539**	-4.137
	(2.514)	(3.835)	(256.3)
constant	189.0***	290.7***	256.5***
	(11.22)	(23.81)	(18.48)
observations	475	475	475
R-squared	0.725	0.720	
Number		43	43

Source: Computed using Stata 11.0

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The estimation results readily available in table 5 presents the ordinary least square (pooled) estimations, the fixed and random effect specifications. The result shows that all the explanatory variables significantly influence child health outcomes in Africa for the pooled regression. On the other hand, access to sanitation facilities and MDG intervention failed to exert any significant variation on child health outcomes for the fixed and random effect models. The ambiguous evidence arising from the fixed and random effect might not be unconnected with the earlier identified weakness of the static panel analysis in handling endogeneity problem. Nevertheless, maternal health, health expenditure, water access, maternal literacy, immunization coverage and institutions significantly influence child health. In the same manner, contrarily to maternal health and sanitation access, an improvement in the explanatory variables culminate in reducing the incidence of under five child mortality in Africa.

Table 6. Dynamic panel regression (Maternal health)

variables	u5mr	u5mr	u5mr
l.u5mr	0.900***	0.906***	0.905***
	(0.00388)	(0.00465)	(0.00685)
mth	-0.0106		
	(0.0390)		
fdf		-0.00550***	
		(0.00109)	
utn			-0.0544*
			(0.0279)
san	0.116***	0.177***	0.176***
	(0.0366)	(0.0436)	(0.0330)
mtl	-0.0990***	-0.0989***	-0.104***
	(0.00974)	(0.00849)	(0.00949)
mdg	-4.019***	-3.643***	-3.480***
	(0.683)	(0.665)	(0.733)
imc	-0.0723***	-0.0540***	-0.0564***
	(0.00499)	(0.00275)	(0.00425)
ist	4.211***	3.898***	3.508***
	(0.436)	(0.416)	(0.406)
hxp	-0.397***	-0.326***	-0.289***
	(0.0390)	(0.0568)	(0.0487)
wtr	0.0370	-0.0522	-0.0306
	(0.0251)	(0.0324)	(0.0346)
Constant	22.02***	23.81***	22.54***
	(2.855)	(2.675)	(2.786)
Observations	475	454	454
Number of id	43	41	41

Source: Computed using Stata 11.0

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In table 6, we adopted the dynamic panel analysis with emphasis on different measures of maternal health including anemia in pregnancy, depth of food deficit and proportion of undernourishment. While anemia in pregnancy failed to exert any significant influence on child health outcomes, depth of food deficit and proportion of undernourishment appeared as important determinant of child health with undernourishment exerting a larger

variation. This implies that under-five mortality tends to be more responsive to undernourishment. Our result is consistent with Singh and Tripathi (2013) which emphasised that increased wealth index and standard of living increases the chance of under five survivals significantly. The study also posits that nutrition education increases children survival by 24 percent. In same manner, Kutty, Thankappan, Kannan and Aravindan (1993) identified socioeconomic status (such as income, education, housing condition and land ownership) as having a definite influence on death rates. More so, an increase in maternal health brings about a fall in under-five mortality. Similar finding was reported by Singh *et al.,* (2013) suggesting that children of non-anaemic mothers have a 38 percent better chance of survival than mothers with severe anaemia.

Consequently, maternal literacy captured using female primary enrolment imposes a negative and significant influence on child health outcome suggesting mother's education reduces the risk of child mortality. In the same manner, MDG intervention, immunization coverage, health expenditure and institutional quality sustains the relationship evident in maternal health. Importantly, millennium development intervention exerts an influence on child health outcome both in significance and magnitude. It implies from our analysis that actualization of MDG could bring about between 350-420 percent reduction in incidence of under five child mortality in Africa. On the other hand, the positive relation obtained between child health outcome and institution reflects the state of weak institutional arrangement in Africa; though significant but our result reveals that the present level of institutions accentuates the incidence of under-five mortality. Our result could not provide an unambiguous evidence for sanitation and water access; while sanitation access was, though significant, but varies positively with U5MR; water access exerts a negative but non-significant influence on child health outcomes.

Table 7. Dynamic panel result (Maternal literacy)

variables	u5mr	u5mr	u5mr
l.u5mr	0.900***	0.939***	0.906***
	(0.00388)	(0.0174)	(0.00471)
mth	-0.0106	-0.0301	0.422***
	(0.0326)	(0.123)	(0.0334)
hxp	-0.397***	-0.724***	-0.670***
	(0.0370)	(0.148)	(0.0626)
wtr	0.0370	-0.149**	-0.0180
	(0.0251)	(0.0652)	(0.0542)
san	0.116***	0.0453	0.483***
	(0.0366)	(0.0397)	(0.0455)
mtl	-0.0990***		
	(0.00974)		
sfe		0.108***	
		(0.0326)	
tfe			0.0772*
			(0.0456)
mdg	-4.019***	-0.140	4.535***
	(0.683)	(1.822)	(0.713)
imc	-0.0723***	-0.0549***	-0.101***
	(0.00499)	(0.00773)	(0.00850)
ist	4.211***	2.867***	7.380***
	(0.436)	(0.990)	(0.781)
Constant	22.02***	19.59**	-16.72***
	(2.855)	(8.570)	(4.529)
Observations	475	340	468
Number of id	43	33	43

Source: Computed using Stata 11.0

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Also, among others, we examine the effect of different measures of maternal literacy. From the results in table 7, it's obvious that female primary enrolment tends to be more important than other category of enrolment in influencing under-five mortality; as we could not establish a meaningful link between child mortality and secondary, and tertiary female enrolment. Though, all levels of education appeared significant but the direction of relationship becomes ambiguous with secondary and tertiary enrolment. In consonance with our study Singh *et al.,* (2013) posits that compared with no formal education, the higher the level of mothers education, the greater the chance of under five survival. This evidence creates a gap to be filled by other researches in investigating where the incidence of mortality is intense and re-examine the impact of secondary and tertiary enrolment. If in the rural area then our result is justified, as basic education would be more necessary and needful in curbing under-five mortality. But if predominant in the urban area areas, it implies that finding arising from our results needs to be taken with caution. The former argument was espoused by the UNICEF report (2012) and Jahan (2008) which identified that children are at a greater risk of dying before age five if they are born in rural areas, among the poor or to a mother deprived of basic education. In the same manner and consistent with the previous regression results, MDG intervention, immunization coverage, maternal health and health expenditure were all important determinant of mortality. Finally, health expenditure improves child health in Africa. Similar result was obtained by Houweling, Caspar, Looman and Mackenback (2005) which implied that the association between public spending on health and under five mortality rates was stronger for the poor. On the other hand, the findings by Bhalotra (2007) and Filmer and Pritchett (1999) revealed a contrary result suggesting that state health spending saves no lives.

Table 8. Dynamic panel regression (Public Health measures)

variable	u5mr	u5mr	u5mr	u5mr	u5mr
l.u5mr	0.900***	0.903***	0.896***	0.913***	0.899***
	(0.00388)	(0.00839)	(0.0157)	(0.00767)	(0.00243)
mth	-0.0106	-0.0266	0.235***	0.0126	-0.0342
	(0.0326)	(0.0274)	(0.0907)	(0.0725)	(0.0286)
hxp	-0.397***	-0.355***	-0.677***	-0.705***	-0.243***
	(0.0390)	(0.0306)	(0.120)	(0.0991)	(0.0350)
wtr	0.0370	0.0177	0.140*	-0.0669	-0.00823
	(0.0251)	(0.0603)	(0.0830)	(0.0555)	(0.0179)
san	0.116***	0.111***	0.297***	0.421***	-0.0534**
	(0.0366)	(0.0374)	(0.0673)	(0.0630)	(0.0229)
mtl	-0.0990***	-0.0969***	-0.118***	-0.0287***	-0.0971***
	(0.00974)	(0.00811)	(0.0130)	(0.00719)	(0.00617)
mdg	-4.019***	-2.817***	-3.559**	-7.302***	-28.05***
	(0.683)	(0.751)	(1.685)	(1.328)	(4.574)
ist	4.211***	4.135***	-0.188	-3.368***	2.385***
	(0.436)	(0.434)	(0.879)	(1.057)	(0.398)
imc	-0.0723***				
	(0.00499)				
dpt		-0.0698***			
		(0.00719)			
itn			-0.0352***		
			(0.00608)		
vta				-0.00334	
				(0.00215)	

ebt					-0.0380***
					(0.00637)
Constant	22.02***	22.17***	-6.160	8.959*	49.06***
	(2.855)	(4.221)	(9.767)	(5.276)	(4.962)
Observations	475	475	378	349	409
Number of id	43	43	37	39	42

Source: Computed using Stata 11.0

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The regression results available in table 8 presents the public health interventions capable of reducing risk factors associated with under-five child mortality. These factors include immunization coverage, control of DPT, insecticide treated nets, vitamin A supplements and exclusive breastfeeding were all statistically significant in explaining variation in under-five mortality. Put succinctly, increasing the coverage of DPT and insecticide treated nets dwindle the incidence of child mortality by 6 percent and 4 percent respectively. Though vitamin A supplement does not significantly impact under-five mortality but under-five mortality was strongly responsive to exclusive breastfeeding. Generally, the result remains consistent with the different measures of public maternal and child health adopted as MDG interventions maintains its statistical significant in improving child health in Africa.

5. Conclusion and Recommendation

The study investigates the role of millennium development intervention programme on child health in Sub-Saharan Africa for the period 1990-2013 using the dynamic panel approach. In addition to developing a dummy status to capture the intervention of MDG, the study adopts several public health measures capable of influencing child health outcomes in Africa; these variables are categorized as maternal health, maternal literacy, health expenditure, risk control factors and institutions. The adoption of the dynamic panel based on the generalized method of moments becomes pertinent to overcome the problem of endogeneity in the model, as there exist a bi-directional linear interdependence between the regressand and the regressors in our model (Ogundipe and Ola-David, 2014). The evidences from the regression result reveals that MDG intervention programme was prominent in curbing child mortality in Africa, as MDG dummy varies inversely with under-five mortality. Succinctly, Our result indicate that child health outcomes tends to be highly responsive to MDG intervention programme, it implies that as MDG is intensified the proportion of children that survives beyond age 5 increases reaching about 400 percent in Africa. The observed relation between child mortality and MDG intervention remains consistent with the introduction of public health measures adopted in the study.

Consequently, maternal health and maternal literacy represent an important determinant of child mortality. Though we could not achieve an unambiguous impact for secondary and tertiary education, and improved water access whereas primary education and improved sanitation facilities exert a significant inverse relationship on child mortality. Similarly, other public health measures such as immunization coverage, DPT vaccines, insecticide treated nets, vitamin A supplements and exclusive breastfeeding all dwindle the incidence of child mortality in developing Africa. Conversely, the quality of institutions in developing Africa economies varies positively with the child health outcomes, it implies that the weak institutions contributes to the disproportionate high level of under-five mortality in Africa against what is obtained in other region of the world. The foretime surging of child mortality in Africa is in part reflected in the weak institution arrangement which contributes immensely to socio-economic impediments in developing Africa economies.

Strengthening the health system to achieve full coverage of key packages of interventions such as treatment and prevention of diseases and provision of comprehensive maternal and newborn care would put Sub-Saharan Africa on track to achieve MDG 4, and make substantial progress towards MDG 5.

References

Acemoglu, D., & Johnson, C. (2007). Disease and Development: The Effect of Life Expectancy on Economic Growth. *Journal of Political Economy, 115*(6). http://dx.doi.org/10.1086/529000

Bhalotra, S. (2007). Spending To Save? State Health Expenditure and Infant Mortality in India. *Health Economics, 16*(9), 911-28. http://dx.doi.org/10.1002/hec.1260

Bloom, D. E., & David, C. (2005). *Health and Economic Growth: Reconciling The Micro and Macro Evidence.* Working Paper No. 42, Center Democracy, Development and Rule of Law, Stranford Institute Internat Studies, Stranford, CA. Retrieved from http://cddrl.stranford.edu

Bloom, D. E., & Jeffrey, D. S. (1998). Geography, Demography, and Economic Growth in Africa. Brookings Papers Econ. Activity, no. 2: 207–73. http://dx.doi.org/10.2307/2534695

Bradley, D. J. (1992). Malaria: Old Infections, Changing Epidemiology. *Health Transition Rev., 2*(suppl.), 137–52.

Brikci, N., & Holder, A. (2011). MDG4-hope or despair for Africa? *Revista De Economia Mundial, 27*, 71–94. Retrieved from http://www.sem-wes.org

Cornia, G. A., & Mwabu, G. (1997). Health Status and Health Policy in Sub-Saharan Africa: ALong-term Perspective, UNU/WIDER, Working Paper No. 141, Helsinki, Finland.

Cutler, J. A., Follmann, D., & Allender, P. S. (1997). Randomised trials of sodium reduction: an overview. Am J Clin Nutr. 65:643S-651S.

David de la Croix, & Delavallade, C. (2009). Growth, Public Investment and Corruption with Falling Institutions. *Economic Governence, 10*, 187-219. http://dx.doi.org/10.1007/s10101-008-0057-4

Fehling, M., Nelson, B. D., & Venkatapuram S. (2013). Limitations of the Millennium Development Goals: A Literature Review. *Global Public Health, 8*(10), 1109-1122. http://dx.doi.org/10.1080/17441692.2013.845676

Filmer, D., & Pritchett, L. (1999). The Impact of Public Spending on Health: Does Money Matter? *Social Science Med., 49*(10), 1309-23. http://dx.doi.org/10.1016/S0277-9536(99)00150-1

Fogel, R. W. (1997). Economic and Social Structure for Ageing Population. Philosophical Transaction of the Royal Society of London. Series B: Biological Sciences, December 352 (1363), 1905-17.

Fogel, R. W. (1997). New Findings on Secular Trends in Nutrition and Mortality: Some Implications for Population Theory. In M. R. Rosenzweig, & O. Stark (Eds.), *Handbook of Population and Family Economics* (Vol. 1A, pp. 433-481). Nort-Holland, Elsevier Science B.V., Amsterdam. http://dx.doi.org/10.1016/s1574-003x(97)80026-8

Fukuda-Parr S., Greenstein J. P., & Green, D. (2013). How Should MDG Success and Failure be Judged: Faster Progress or Achieving the Target? *World Development, 41. http://dx.doi.org/10.1016/j.worlddev.2012.06.014*

Fukuda-Parr, S. (2004). Millennium Development Goals: Why They Matter. *Global Governance, 10*(4), 395–402.

Gallup, J. L., & Sachs, J. D. (2001, January). The Economic Burden of Malaria. *American J. Tropical Medicine and Hygiene, 64*(suppl. 1), 85–96.

Grantham-McGregor, S. et al. (2007). Developmental potential in the first 5 years for children in developing countries. *Lancet, 369*(9555), 60-70. http://dx.doi.org/10.1016/S0140-6736(07)60032-4

Gupta, S., Davoodi, H., & Tiongion, E. (2000). Corruption and the Provision of Health Care and Education Services. International Monetary Fund, IMF Working Papers 00/116.

Houweling, T. A., Casper, A. E., Looman, N. N., & Mackenback, J. P. (2005). *Int. J. of Epidemiol, 34*(6). http://dx.doi.org/10.1093/ije/dyi190

Jahan, S. (2008). Poverty and Infant Mortality in the Eastern Mediterranean Region: A Meta-Analysis. *Journal of Epidemiol Community Health, 62*(8), 745-51. http://dx.doi.org/10.1136/jech.2007.068031

Kutty, V. R., Thankappan, K. R., Kannan, K. P., & Aravindan, K. P. (1993). How Socioeconomic Status Affects Birth and Death Rates in Rural Kerala, India: Result of A Health Study. *International Journal of Health Services, 23*(2), 373-86. http://dx.doi.org/10.2190/9N4P-F1L2-13HM-CQVW

Musgrove, P. (1987). The Economic Crisis and Its Impact on Health and Health Care in Latin America and the Caribbean. *International Journal of Health Services, 17*(7), 411-41. http://dx.doi.org/10.2190/7EC9-PM6N-6LLJ-X2PC

Nordhaus, W. D. (2002). *The Health of Nations: The Contribution of Improved Health to Living Standards.* NBER Working Paper No 8818. Retrieved from http://www.nber.org/papers/w8818

Ogundipe, A. A., & Ola-David, O. (2014). Foreign Aid, Institutions and Economic Development in West Africa: Implications for Post-2015 Development Agenda. http://dx.doi.org/10.2139/ssrn.2504477

Phillipson, C., Bernard, M., Philip, J., & Ogg, J. (2001). *The Family and Community Life of Older People: Social Support and Social Networks in Three Urban Areas.* London: Routledge. http://dx.doi.org/10.4324/9780203459058

Porter, T. (1994). Making Things Quantitative. *Science in Context, 7*(3), 389–407. http://dx.doi.org/10.1017/S0269889700001757

Pritchett, L., & Summers, L.H. (1996). Wealtheir is Healthier. *The Journal of Human Resource, 31*, 841-868. http://dx.doi.org/10.2307/146149

Rutherford, K. M. D., Langford, F. M., Jack, M. C., Sherwood, L., Lawrence, A. B., & Haskell, M. J. (2009). Lameness Prevalence and Risk Factors in Organic and Non-Organic Diary Herds in the United Kingdom. *Vet. J, 180*, 95-105. http://dx.doi.org/10.1016/j.tvjl.2008.03.015

Schultz, T. P. (1997). The Demand for Children in Low-income Countries. Chapter 8. In M. R. Rosenzweig, & O. Stark (Eds.), *Handbook of Population and Family Economics* (Vol. 1). North-Holland. Amsterdam. http://dx.doi.org/10.1016/S1574-003X(97)80025-6

Singh, R., & Tripathi, V. (2013). Maternal Factors Contributing to Under five Mortality at Birth Order 1 to 5 in India: A Comprehensive Multivariate Study. *Springerplus, 2*, 284. http://dx.doi.org/10.1186/2193-1801-2-284

United Nation Inter-Agency Group for Child Mortality Estimation. (2012). Levels and Trends in Child Mortality.

Weil, D. N. (2007). Accounting for The Effect of Health on Economic Growth. Q.J.E 1265-1306. http://dx.doi.org/10.1162/qjec.122.3.1265

World Health Report. (2010). *Health System Financing.* World Health Organization Publication.

Notes

Note 1. This strategy aims at mobilizing and intensifying global actions towards improving health of women and children. Committing to Child Survival: A Promise Renewed (APR) Progress Report (2013) notes that after the launch of the EWEC strategy, a total of 176 governments had signed the APR pledge and a lot of civil society groups and private individuals have mobilized actions and resources in support of the goal. This pledge represents a serious political commitment from such governments.

Note 2. The Commission on Macroeconomics and Health (CMH) was established by WHO in January 2000 to assess the contribution of health to global economic development. The Commission's report, presented to WHO in December 2001, concluded that health is a creator and pre-requisite of development. The Commission stressed that extending the coverage of health services and a small number of critical interventions to the world's poor could save millions of lives, reduce poverty, spur economic development, and promote global security. It argued that increased resources for health and a pro-poor focus could save 8 million lives a year by 2010 at a cost of US$27 billion a year and that the resulting increased productivity would yield US$186 billion a year.

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