IMPACT OF HEALTH AID EXPENDITURE ON CHILD MORTALITY IN KENYA, 1980-2010

BY

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DECLARATION

I hereby declare that this is my original work and that to the best of my knowledge it has not been presented for the award of a degree at any other university.

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Approval

This research paper has been submitted for examination with our approval as university supervisors.

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Dr. Mercy Mugo

DEDICATION

To my late aunt Jane Kamau and my adorable son Max

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May God bless you all!!

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ARCH	Autoregressive Conditional Heteroskedasticity
DPT	Diphtheria, Pertussis and Tetanus
ECM	Error- Correction Model
GDP	Gross Domestic Product
GMM	Generalized method of moments
GoK	Government of Kenya
HIV/AIDS	Human immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IMR	Infant Mortality Rate
IRS	Indoor Residual Spraying
ITNs	Insecticide-Treated Nets
JICA	Japan international cooperation agency
KEPI	Kenya Expanded programme for immunization
KDHS	Kenya Demographic and Health Survey
MDG	Millennium Development Goals
MoH	Ministry of health

NHA	National Health Accounts
NSGRP	National Strategy for Growth and Reduction of Poverty
PEP	Post Exposure Prophylaxis
PMCT	Prevention of Mother to Child Transmition
THE	Total Health Expenditure
U5MR	Under-Five mortality
UNICEF	United Nations United Nations Children's Fund
WHO	World Health Organization

ABSTRACT

Health care financing is a key determinant of health system performance since it is expected to provide the resources and economic incentives for operating health systems. It is argued that knowledge about health care financing helps to inform government policy by providing an assessment of the effects of their policies on healthcare delivery systems and overall health standards of a country.

This study examines the impact of health aid expenditure on child mortality in Kenya between 1980 and 2010, and identifies the other factors that influence child mortality in Kenya. The study uses time series data for a period of thirty years and employs semi log regression analysis on the model and later an Error- Correction methodology on the model to prevent for spurious regression results. The study reveals that the total health aid expenditure influences the under five mortality in Kenya. Other factors were also found to influence under-five mortality in Kenya they include the HIV/AIDS prevalence rate, notified cases of malaria, doctors' density and immunization coverage.

CHAPTER ONE

INTRODUCTION

1.1 Background

In the recent years, there has been a tremendous improvement in the health status of African countries as indicated by reduced mortality rates and improved life expectancies. However, the region still suffers from the worst health challenges like tuberculosis, HIV/AIDS, malaria and other communicable diseases that severely affect the citizens. These challenges are mainly due to the massive difficulties they face in mobilizing and managing resources for improved health outcomes (Peters et al. 2000).

Just like other developing countries, Kenya faces the problem of inadequate funds to deliver and sustain fully functional health systems. The total health expenditure (THE) is low with the average of 4.5% of the gross domestic product since 1992, with its lowest being in 2008 at 4.2% after the post election violence but it has indicated a positive trend since then with 4.8% being recorded in 2010. This is way below the targets set by the Abuja Declaration 2001 where African countries committed to devote a minimum of 15% of government funds to the health sector in order to address the massive burden of ill-health facing them.

The main factors contributing to this financing challenge are high levels of poverty, poor economic performance, high population growth and burden of diseases such as malaria and HIV/AIDS (Wambugu, 2010). In the recent years, the country has recorded an increase in donor contributions to augment national health budget which has resulted to a rise in the per capita health spending from (US$14) in1995 to (US$37) in 2010. Although this is above the world

health organizations (WHO) recommended per capita health spending of (US$35) that expected to provide a minimum health package for the citizens. The country is still not on track to meet the Millennium Development Goals (MDGs) target four of reducing under-five mortality to 33, and infant mortality to 26 deaths per 1000 live births by 2015 from 85 and 55 respectively in 2010 (WHO's website, 2012).

1.2 Healthcare Financing In Kenya

Health financing refers to the mobilization and collection of funds from various sources, pooling them together and using them pay for health services. The main objectives of health financing are to make funding available, ensure choice and purchase of cost effective interventions and ensure that all individuals have access to effective health care services (Wambugu, 2010).

According to the National Health Accounts (NHA) 2003, there are four major sources of health care financing in Kenya: out- of- pocket spending, general government expenditure, donors' (external resources) and the private companies. The government health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants. External resources for health are funds or services in kind that are provided by external entities either from international organizations, other countries through bilateral arrangements, or foreign non-governmental organizations. Out of pocket expenditure on the other hand is any direct payments, to health providers for goods and services whose primary intent is to contribute to the restoration and enhancement of the health. Lastly, private health expenditure includes direct household (out-of-pocket) spending, private insurance, charitable donations, and direct service payments by private corporations (World Bank website, 2012).

The table below shows the trend of Kenya health funding for the last 15 years.

Table 1: Health Care Financing Trends in Kenya

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
[illegible] on [illegible] as % of	4.3	4.1	4.1	4.5	4.2	4.7	4.6	4.5	4.4	4.3	4.4	4.5	4.4	4.2	4.8	4.8
[illegible] ure on health as % of	40.4	40.1	38.8	44.4	39.8	46.3	44.7	42.8	43.4	41.9	42.2	41.3	42.4	39.7	41.1	44.1
[illegible] expenditure (PvtHE) as	53.6	59.9	61.2	55.6	60.2	53.7	55.3	57.2	56.6	58.1	57.8	58.7	57.6	60.3	56.7	55.7
[illegible] sources as % of THE	5.1	8.8	11.6	9.8	12.4	8.0	14.5	16.4	11.3	17.7	22.0	20.6	26.1	27.3	34.0	36.1
[illegible] paid [illegible] as % of	78.3	79.1	79.2	80.4	80.4	80.4	80.5	78.3	79.1	78.2	77.4	73.5	76.6	76.5	76.7	76.7
[illegible] capita [illegible] on health	14	18	19	21	18	19	19	18	20	20	23	28	32	33	36	37
[illegible] expenditure in millions	19,827	28,541	31,718	38,223	38,062	43,321	47,157	46,989	50,345	54,657	61,711	73,229	81,056	87,765	108,474	118,271

Source: World Health Organization, 2012

From the table 1 above, we observe that, the THE as a percentage of GDP is low with an average of 4.5%, highest being 4.8% in 2010 and lowest 4.1% in 1996 /1997 which is lower than 15% targets set by the Abuja Declaration in 2001. The general government expenditure on health is

also low stagnating at approximately 42% of the total health expenditure. According to Kimalu et al (2002) Government expenditure on health was high during the 1965-1970 period of exceptional economic growth. However, due to the structural adjustments programs in the mid 1990s that level has been reducing (WHO, 2012).

While the government expenditure to the total health expenditure appears to stagnate at around 40%, the donor funding component has been increasing steadily, from 5.3% in 1996 to 36.1 % in 2010. In actual terms, the donor funding has increased from Kshs 1.05 Billion out of Kshs 9.2 Billion spent on health in 1995 to stand at Kshs 42.7 Billion out of Kshs 52.4 Billion spent in 2010 From the trend it appears as if the donor funds are used to replace or divert government funds from health to other sectors of the economy making the Kenya healthcare more dependent on donor aid. This worrying trend is not unique to Kenya; it is common in most low income and middle-income countries in the world. According to Lu et al. (2001), for every US$1 of health aid given to developing countries, those governments are found to reducing the amount of domestic government expenditures allocated to health by about US$0.43 to US$1.14. In general, this it has been found that to increase government health spending of developing countries by $1, global health funders need to provide at least $1.75 of aid for health.

In addition from the table, the private sources of funds account on average for over 57% of the total health expenditure in which 78% of this comes from out of pocket payments by households and 8% from insurance schemes. Thus the out of pocket spending remains the largest source of health funds in Kenya, contributing 44.2 % of total health expenditure total health expenditure in 2007 and 42.7 in 2010 (WHO, 2012).

1.3 Health Indicators in Kenya

1.3.1 General overview

According to WHO, (1993) health is a state of physical, mental and social wellbeing of the people and not just the absence of disease. Health indicator on the other hand is a measure of the physical and emotional wellbeing of an individual or a population (Witter et al, 2000). Generally health indicators include Birth rate, Fertility rate, infant mortality rate, maternal mortality rate, life expectancy etc. Infant mortality and life expectancy are the most commonly used health indicators since they portray the general level of health and overall development of country.

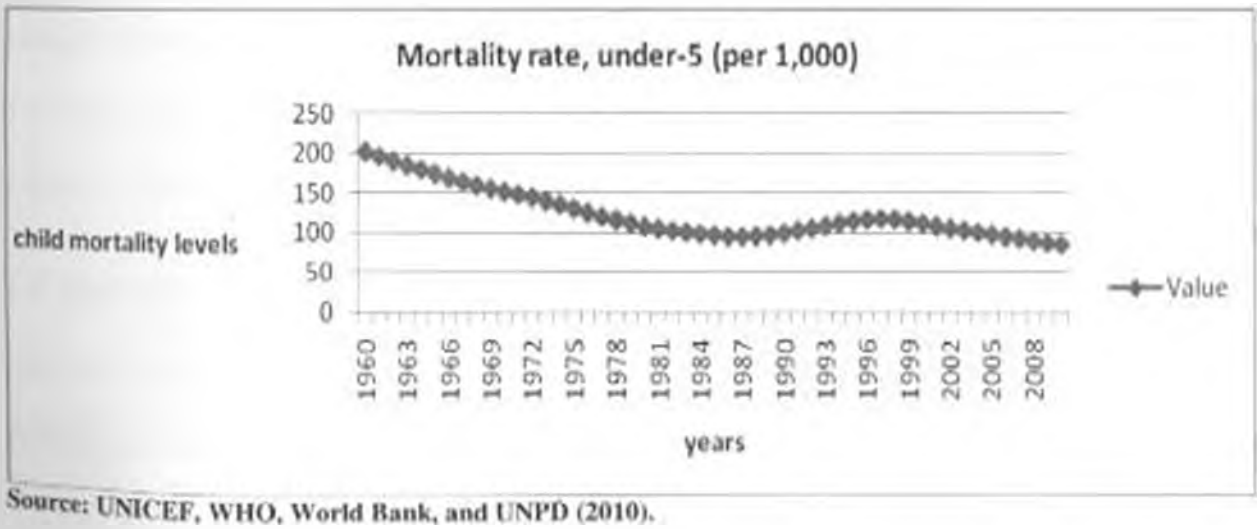
Infant mortality refers to the death of a child born alive before its first birthday while under-five mortality is the death of a child before its fifth birthday. The two indicators are also MDGs number 4 with a target of reducing under-5 mortality by two-thirds by the year 2015, relative to its level in 1990.

High infant and under-five mortality reflects the lack of proper childcare owing to poverty, lack of education, among others. It is given that factors that affect human development also affect infant mortality rates and vice versa. In a vicious cycle the population which is unhealthy will produce diseased and unhealthy infants, who in turn grow up to form sickly adults prone to diseases. This will dampen economic progress of country leading to lack of resources to invest back to the health care. The poor health will decreases worker productivity; leading to under utilization of natural resources. In the long run this will harm the next generation by decreasing enrolment of children in school, and the cycle will continue (World bank, 1993).

1.3.2 Infant and under five mortality in Kenya

During the period of 1960-1980, Kenya recorded an impressive decline in the under-five mortality rate. The level of under-five mortality was 201 deaths per 1,000 live births in 1960 while in 1980 it stood at 107 deaths per 1,000 live births. In the early 1980s, under-five mortality decline slowed and stagnated. However, between the late 1980s and early 1990s the under-five mortality levels increased from 89 deaths per 1,000 live births in 1989 to 96 deaths per 1,000 live births in 1993 due to the emergency of HIV/AIDS around this period (KDHS, 2003). In the early 2000 infant and under-five mortality declined rapidly and has continued to decline as a result of various global initiatives to improve child health adopted by Kenya namely Malezi Bora Strategy, expanded immunization programmes and roll back malaria strategies. As at 2010, the under-five mortality rate stood at 85 deaths per 1,000 live births while infant mortality stood at 55 deaths per 1000 live births. The graph below shows the trend of under five mortality rate in Kenya for the last 50 years.

Figure 1.1: The graph for under-five Mortality rate (per 1,000) in Kenya



Source: UNICEF, WHO, World Bank, and UNPD (2010).

1.4 Statement of the Problem

Health care financing in Kenya remains a challenge mainly due to high levels of poverty, country's poor economic performance, high population growth and disease burden such as HIV and AIDS and malaria Although the Kenyan government has over the year's undertaken critical reforms to enhance accessibility, improve quality and finance health services, there are major indications that the health sector is still underfunded and highly dependant on the donor aid. The infant mortality and under-five mortality rates of 55 and 85 respectively in 2010 are still high and off the target for the MDG target of 26 and 33 by 2015.

The government health expenditure is still low and reducing while the donor aid has been increasing steadily leading to over dependence on donor aid to finance health. This implies that the Kenya health sector is mainly financed by donor aid and out of pocket spending. However, with the recent news that the donors are expected to apply austerity measures in their disbursement of global funds for health to Kenya, it has raised the issue of sustainability of health aid and its impact on the general health standards, which is unknown if aid is cut or withdrawn from Kenya. As it is, health sector policies in Kenya lack this empirical foundation. Therefore, the purpose of this study is to contribute in filling this knowledge gap by carrying out a study on levels of health aid and its impact on health outcomes in Kenya.

1.5 Objective of the Study

The broad objective of the study was to investigate whether there is existence of functional relationship between health aid expenditures and under-five mortality levels in Kenya

1.5.1 Specific objectives

The specific objectives emanating from the broad objective stated were:-

(i) Determine the effect of health aid expenditure on under five mortality in Kenya

(ii) Determine the effect of other health expenditures on under-five mortality in Kenya

(iii)Determine the effect of other determinants of under-five mortality in Kenya

(iv)To recommend policies aimed enhancing healthcare financing and promoting health outcomes.

1.6 Motivation of the Study

Kenya is still faced with the challenges of meeting the millennium development goal number 4 of reducing under-five mortality to 33 deaths per 1000 live births and infant mortality to 26 deaths per 1000 live births by 2015. The current infant and under-five mortality rates still high hence; there is need for improvement in child health and general health standards of the country.

Motivation of this study is derived from the challenge that Kenya faces in its healthcare financing strategies. Donor/health aid has always been viewed as the main way of supplementing the financial gap in the health sector; acquiring medical equipment; technology, scarce human capital, financial resources and general equity in provision of healthcare to Kenyans at large. But it appears to be substituting instead of supplementing government funds for health

The study may be relevant to Kenya policy makers towards their understanding of health aid expenditures and their impacts on under-five mortality rates in Kenya. The empirical findings

will be used to recommend appropriate policies that can be implemented to increase the benefits of health expenditures in Kenya and thereby improve the accessibility of healthcare in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter has two sections. Section one focuses on theoretical basis of health outcome production. The second section deals with the empirical literature review with much focus on health aid expenditures and health outcomes in Africa. An overview of the literature is provided at the end of the chapter

2.1 Theoretical Literature Review

Just like other commodity outputs, health outputs, require a set of inputs for its production. According to (Mas-colell, Whinstone and Green, 1995), the microeconomics production theory analyses the behavior of the firm by specifying a production set. A production set Y is a set of all output vectors Q that constitute feasible production plans for the firm. The output is produced using inputs vectors X limited by technological constraints. This output-input relationship is commonly described by a production function f(x) that gives the maximum amount of Q that can be produced using input amounts X. The resulting production set is described as:

$$Y = \{(x_1, \ldots, x_{L-1}), q, -f(x_1, \ldots, x_{L-1}) \leq 0 \text{ and } (x_1, \ldots, x_{L-1}) \geq 0\}$$

Where

The marginal productivity is given by $\left(\frac{\partial q}{\partial x}\right)$ = effect of changes in inputs on output

A typical health production function faces a cost minimization problem since health is a public good and healthcare market is an imperfect market. This is due to the unique characteristics of the medical-care market namely: uncertainty; asymmetric knowledge/information; externalities; the nature of demand; expected behavior of the physician; supply conditions and the pricing practices (Mwabu, 2007).

Health can be produced, or restored after an illness, by using "medical care." This medical care is a set of activities designed to restore or augment the stock of health. The process of transforming medical care into health can be thought of as a standard production function. The process of transforming medical care (m) into health (H) in a manner similar to the transformation any inputs into outputs H=f (m). It is normally expected that more M produces more H, if the marginal productivity of medical care is positive. It can also be assumed, in line with standard microeconomics production theory that the incremental effect of M on H diminishes as more M is used, and after some point may even become negative.

In line with the above (Zeynep, 2000) developed a basic health production function in order to investigate factors that determine the health status of a population. The production process depends on the health care system, its resource input and also on the non-medical, social, economic and physical conditions. He specifies general form of a health production function as:

$$H = f(M, E)$$

Where H is a measure of the health status of the population, M is an indicator of medical resources, and E is a vector of non-medical social, economic and life-style indicators.

Health expenditure can be thought as the capital injected to the healthcare production function and therefore, it is expected to have a positive impact on the heath levels of the country and negative effect on under-five and infant mortality rates. Thus an increase in health expenditure per capita implies a broader access to health care and services which helps to decrease under-five and infant mortality rates (Anyanwu and Erhijakpo, 2007).

2.2 Empirical Literature Review

A number of studies have tried to examine the link between health expenditure and health outcomes around the world. Hadley (1982) did a study on the relationship between health expenditure and mortality and found a positive relationship between health expenditure and mortality in the United States. In Kenya, Nganda and Ongolo (1999) Manyala (2000) and Oleche (2005) showed a positive relationship between health expenditures and various health outcomes in Kenya. In Europe, there is also some evidence pointing to a positive relationship between health care input and health outcomes (Collins and Klein, 1980).

Although health spending can affect health conditions, the efficiency of using the health spending to bring about health outcomes varies significantly. Poullier et al. (2002) looked at the relationship between spending and health status for 191 countries, and found out that higher spending was either associated with significant improvements in health status or had very little impact to improvements in health status.

Using the Generalized method of moments (GMM) regressions (Mishra and Newhouse, 2007) analyzed the relationship between health aid and infant mortality, using data from 118 countries

between 1973 and 2004. They concluded that health aid has a statistically significant effect on infant mortality and that doubling per capita health aid is associated with a 2 % reduction in the infant mortality rate. The results are in line with (Gebhard et al. 2008) who used a random coefficients model and found out that health-targeted aid is positively correlated with better health under certain conditions. In contrast, (Michaud and Murray, 1994) found that health status variables are not related to the amount of aid received a country. In their analysis of the trends of health aid to the health sector over the last twenty years cross the world, they concluded that this may be due to the fact that non-communicable diseases and injuries are usually underfunded.

Other studies on aid argue that foreign aid has always been driven by the political, economic, and institutional circumstances of both donors and recipients countries. The process which leads to a vicious circle: where the need for more funds is aggravated by the high ratio of aid to GDP. Making those countries aid dependent since, the more aid flows into a country, the more important that aid becomes to an economy, and the more difficult it is then for a government to refuse it (Kanbur, Sandler and Morrison, 1999).

Recent studies on the determinants of child mortality in Kenya shows, socioeconomic controls like including mother's education, household wealth, urban/rural residence, and the reproductive dynamics such as age of mother at the birth played important role in determining child mortality in Kenya. Apart from that, HIV and AIDS epidemic appeared to be the most probable cause of the recent increases in child mortality in Kenya (Hill, Bicego and Mahy, 1998).

Ssewanayana and Younger (2004), found that in Uganda, an increase in health care expenditures, particularly on vaccination, impacts positively on infant mortality in Uganda. According to them,

ncreasing vaccination rate to 100% would have the largest and probably most cost effective, impact of reducing infant mortality by 16 deaths per 1000 of live births. The results are in conformity with (Hill, Bicego and Mahy, 1998) who found that immunization coverage was significant in determining child mortality in Kenya.

According to (Akachi and Atun, 2011), Malaria accounts for 16% of deaths in Africa but the impact of international financing of malaria control on child mortality in Africa has not been studied. They found that the impact of insecticide treated nets (ITN) coverage on under-five mortality was statistically significant along with immunization, showing that 10% increase in households with ITN reduces 1.5 child deaths per 1000 live births. They recommended ITN prioritization in countries where malaria is a major cause of child deaths to save greater number of lives with available resources.

Medical brain drain, as measured by the expatriation rate of physicians, is found to have a negative impact on health outcomes in Africa. (Chauvet, Gubert and Mesple-somps, 2008). The same was confirmed by (Muldoon et al. 2011) who concluded that physician density significantly reduces infant and child mortality. Farahani et al. (2009) have shown that, human health resource may have greater long-term benefits than previously estimated. They concluded that physician density was significant while nurse density and the percentage of births attended by skilled attendant were not significant.

Other studies on child mortality have found that fertility rates, female participation in the labour force, per capita GNP, and female literacy rates significantly affect infant mortality rates (Zakir and Wunnava, 1999). On the other hand Mondal, Hossain and Ali, (2009) observed that the most

significant predictors of child mortality levels are immunization, ever breastfeeding, mother's age at birth and birth interval.

2.3 Overview of the Literature

There is an agreement that the level health expenditure is directly related to general health outcomes of a country which in turn brings about a healthier nation. The reviewed empirical studies found a number of variables determine the child mortality rates of the country. They include socio economic and demographic factors like health expenditures, prevalence of HIV and AIDS, malaria, Doctors' density, births attended by skilled health staff, immunization, access to safe water and the level of education.

The reviewed literature showed that most of the studies used different methodologies and variables to establish the impact of health expenditures on child mortality. Majority of the studies in Africa have been confined to establishing the effect of increasing government expenditure on health outcomes. This study will fill the knowledge gap by providing information on the relationship between health aid and under-five mortality rates in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The reviewed literature has provided theoretical models and empirical findings on the positive contributions of health expenditures and aid on the child mortality.

3.1 Model Specification

Infant and under-five morality rate are excellent health outcomes which is easily quantifiable, and serves as excellent health status indicators across and within economies.

Under-five morality just like any output involves use of different inputs. Assuming that these inputs are human effort (labor) and capital, the productions function can take a Cobb-Douglas functional form as follows:

$$Q = AL^{\alpha}K^{1-\alpha}$$

Where Q, = is the health outcome - infant mortality.

A = the level of technology.

L =labor for example doctors per 1000 of the population

K =capital for example health aid expenditure in country

The above production function can also be written using logarithm as.

$$lnQ = lnA + \alpha lnL + (1-\alpha)lnK$$

$(1-\alpha)$ Being the aid expenditure elasticity of infant mortality $\frac{d\ln Q}{d\ln K} = 1 - \alpha$

The most basic OLS regression equation specifies infant mortality as a function of previous period's aid, adopted from Mishra, P and Newhouse, D. (2007) is as follows:

$$Log U5M_t = \alpha_0 + \alpha_1 log\ THA_{t-1} + \alpha_2 logPHE_{t-1} + \alpha_3 PHIV_t + \alpha_4 NCM_t + \alpha_5 DD_t + \alpha_6 PFV_t + \varepsilon$$

Where $\alpha_{0\ b}$ the intercept while $\alpha_{1\_\_}\ \alpha_6$ are the are elasticities

$U5M_t$ = is the health outcome - infant mortality in period t.

THA_{t-1} = is the total health aid received in previous period.

PHE_{t-1} = private health expenditure funded domestically in previous period,

$PHIV_t$ = prevalence of HIV /AIDS.

NCM_t = malaria incidence rate.

DD_t = doctors density (Doctors per 100,000 population)

PFV_t = percentage of children fully immunized.

3.2 Analytical Hypotheses:

The hypothesis will be formulated as follows

Null hypothesis **Ho: α = 0** health aid inflows are not related to under-five mortality in Kenya.

Alternative hypothesis **Ho: A ≠ 0** health aid inflows are related to under-five mortality in Kenya.

3.3 Data problems and Diagnostic Tests

The study will use the semi-log regression analysis on the model using time series data. A number of diagnostic tests will carried out to ensure that the estimation results will not be spurious. They include Normality test, Stationarity tests (Unit root test) and test for cointegration.

3.4 Data type and sources

The study will use secondary data from various issues of demographic and health survey from Kenya. World Bank development indicators for the health indicators, and disaggregated data for health expenditures from the WHO data for the 30 years. The period covered will be 1980-2010 so as to better account for the trends of foreign aid inflows and infant Mortality rate in Kenya.

3.4.1 Description of variables used expected signs

Health Aid/ External resources for health- these are funds or services in kind that are provided by entities not part of the country to cater for health related programmes. This being capital injection to the health production function is expected to improve health outcomes therefore will have an inverse correlation with under five mortality in Kenya.

Private health expenditure- this includes direct household (out-of-pocket) spending, private insurance, charitable donations, and direct service payments by private corporations. Private health expenditure is expected to have an inverse correlation with under-five mortality rates

Prevalence of HIV, total (% of population ages 15-49) Prevalence of HIV refers to the percentage of people ages 15-49 that are infected with HIV. Prevalence of HIV is expected to

have a positive correlation with the under-five mortality since an increase in HIV cases increases the child mortality.

Notified cases of malaria- Malaria incidence is expressed as the number of new cases of malaria each year. The number of cases reported is adjusted to take into account incompleteness in reporting systems, patients seeking treatment in the private sector, self-medicating or not seeking treatment at all, and potential over-diagnosis through the lack of laboratory confirmation of cases. The malaria prevalence is expected to have a positive correlation with the under-five mortality. This is because malaria is a leading cause of child deaths in Africa.

Doctors' density (Doctors per 100,000 populations) - they include generalist and specialist medical practitioners. This is expected to have an inverse correlation with the under-five mortality rate.

Percentage of children fully immunized. Child immunization measures the percentage of children ages 12-23 months who received vaccinations before 12 months. This is expected to have an inverse correlation with the under-five mortality rate.

CHAPTER FOUR

EMPIRICAL RESULTS

4.0 Introduction

This chapter presents results and interpretation of the results. This section is divided into section 4.1 descriptive statistics, 4.2 results of stationarity test, 4.3 cointegration test, 4.4 long-run model, and 4.5 dynamic error-correction model and finally 4.6 the interpretation of specific model regression results.

4.1 Descriptive Statistics

Table 2 below shows the characteristics of the distribution of the variables. For the variables; under-five mortality (U5M), total health aid (THA), Private health expenditure (PHE), prevalence of HIV/AIDS (PHIV), notified cases of malaria (NCM), doctors' density (DD) and the Percentage of children fully immunized (PFV).

Table 2: Descriptive Statistics outcomes of the variables

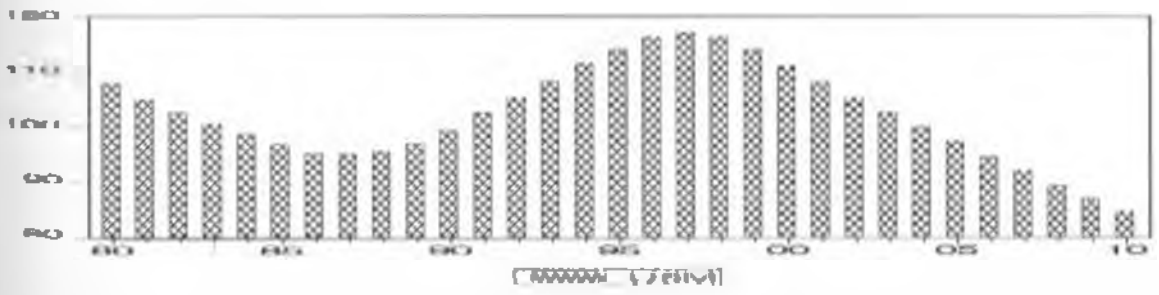
	Under-5 Mortality	Total Health aid	Private Health Expenditure	Prevalence of HIV/AIDS	Notified Cases of Malaria	Doctors' Density	Percentage of Children Fully Immunized
Mean	102.3613	8445.859	18925.06	5.506452	58.04529	14.75032	74.19355
Median	102.7000	2502.677	10632.17	6.000000	49.61608	14.70000	76.00000
Maximum	117.2000	47384.48	65876.12	10.50000	96.10691	18.00000	99.00000
Minimum	84.70000	639.2800	1353.440	0.000000	32.61357	12.60000	50.00000
Std. Dev.	8.779927	12856.93	19059.70	3.739246	18.65284	1.354554	11.94365
Skewness	0.017590	1.931678	0.999859	-0.343199	0.554057	0.346950	-0.454412
Kurtosis	2.236871	5.625998	2.978166	1.709962	2.035883	2.923734	2.715093
Jarque-Bera	0.753621	28.18596	5.165830	2.771501	2.786693	0.629448	1.171715
Probability	0.685977	0.000001	0.075553	0.250136	0.248243	0.729930	0.556628
Observations	31	31	31	31	31	31	31

Source: Computation from Eviews software

The normality test ensures that the variables used are normally distributed. The Jarque-Berra statistics test which utilizes the mean based coefficient of skewness and kurtosis was used in the study. The rule of the thumb is for the skewness to be within the ranges of -2 to +2 while kurtosis should be within -3 to +3. If the probability value is less that the Jarque-Berra chi-square statistic at the 5% level of significance, the null hypothesis of the normal distribution is not rejected. From the above table 2 all the variables are seen to be all normally distributed.

The under five mortality (U5M), the prevalence of HIV/AIDS (PHIV) and Percentage of children fully immunized (PFV) have negative skewness which means its distribution is left leaning which show most of the observations lie on the left hand side of the mean. The total health aid (THA), Private health expenditure (PHE), notified cases of malaria (NCM), and the doctors density (DD) are positively skewed implying their distributions are right- leaning as most the observations lays on the right hand side of the mean.

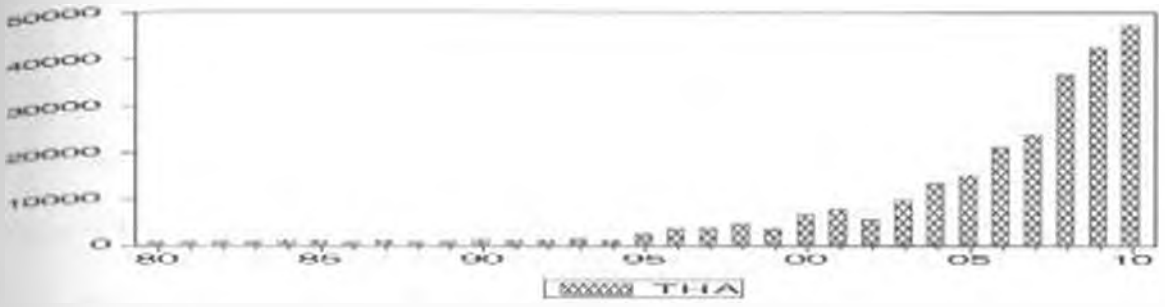
Figure 4.1: Under-Five Mortality (U5M) for the period 1980-2010



From figure 4.1, the under-five mortality rate has been declining between the periods of 1960 1980 but in the early 1980s this decline slowed and stagnated. However, between the late 1980s and early 2000 the under-five mortality levels increased steadily and the factors attributed to this increase was due to the emergency of HIV/AIDS around this period (KDHS, 2003). In the early

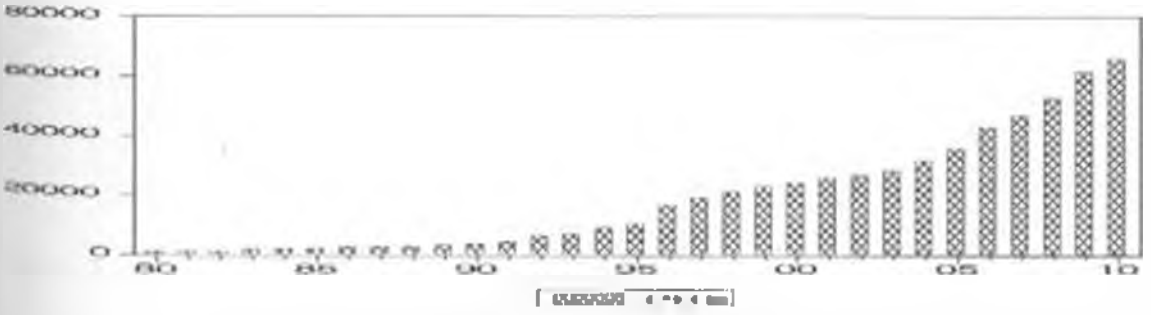
2000 the under-five mortality declined rapidly and has continued to decline as a result of various global initiatives to improve child health adopted by Kenya namely Malezi Bora Strategy, expanded immunization programmes and roll back malaria strategies.

Figure 4.2: Total Health Aid (THA), for the period 1980-2010



From figure 4.2: The total health aid has been steadily increasing in the recent past from 5.3% in 1996 to 36.1 % in 2010. The main factors attributed to this steady increase include the emergency of numerous UN agencies, the multilateral institutions such as the WHO and IMF, bilateral agencies such as the Japan international cooperation agency (JICA) and the German GTZ and non governmental organisations and networks, like Oxfam and Action Aid.

Figure 4.3: Private Health Expenditure (PHE), for the period 1980-2010



From figure 4.3: Since the cost sharing and the introduction of the user fees in government hospitals in the late 1980, the private health expenditure has been raising steadily to account on average for over 57% of the total health expenditure in the recent years. Out of pocket spending

by households accounts for about 78% of this private health expenditure thus implying that the out of pocket spending is the largest source of health funds in Kenya.

Figure 4.4: The Prevalence of HIV/AIDS for the period 1980-2010

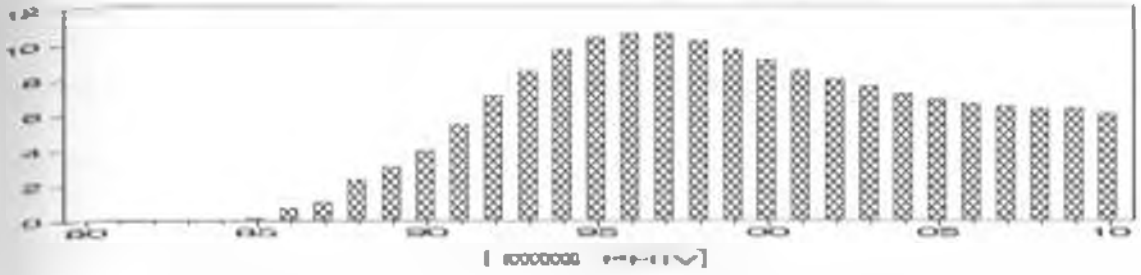


Figure 4.4 shows the trend in HIV prevalence in Kenya. Since the first case of HIV was discovered in Kenya in early 1980 the prevalence of HIV been increasing and peaked at 10% at the end of 1990s. But due to the numerous strategies like the introduction of post exposure prophylaxis (PEP), blood safety and prevention of mother to child transmition (PMCT) and other campaigns to fight the epidemic the prevalence rate started to decline to 7% in 2003 to further decline to 6% in 2010.

Figure 4.5: The Notified Cases of Malaria (NCM), for the period 1980-2010

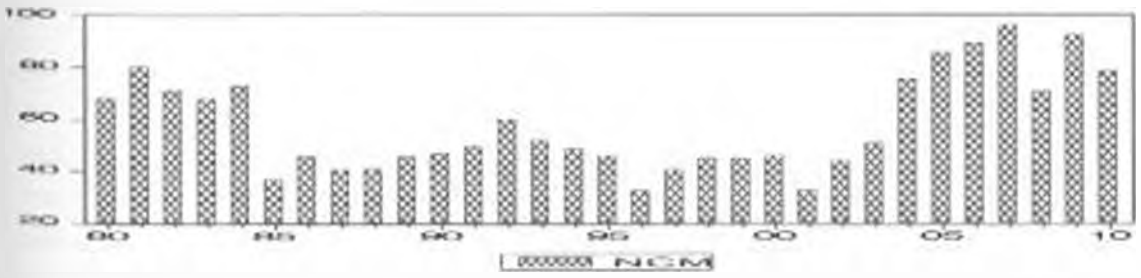


Figure 4.5 shows the notified cases of malaria. According to the world malaria report, 2008 Kenya ranks fifth in the list of countries that account for 90% of malaria cases in Africa. It is estimated that in 2007 that 30% of all outpatient morbidity and 19% of inpatient admissions were due to malaria. The notified cases of malaria has remained largely high due to the fact that fever

cases are still classified as malaria as confirmatory tests are not done in all suspected malaria cases. On notified cases of malaria the lowest number reported was 1996 and 2001 where the country recorded about 3.3 million cases while the highest cases were on 2009 at 9.2 million cases.

Figure 4.6: Doctors density (DD) for the period 1980-2010

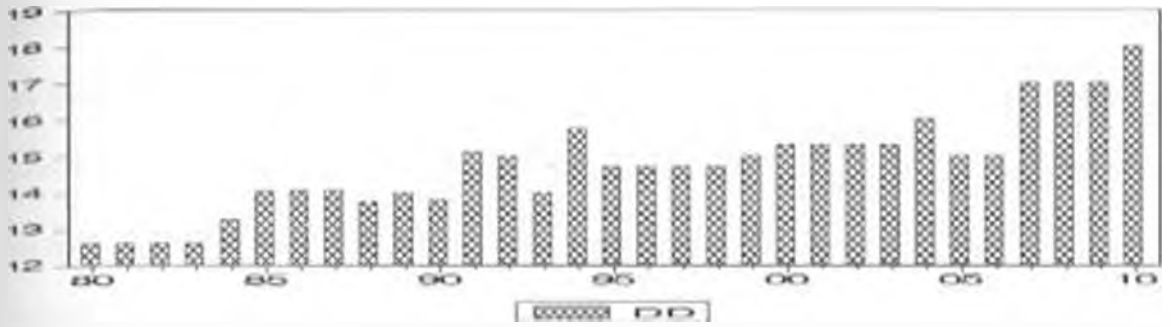


Figure 4.6 shows the doctors destiny (the number of doctors per 100,000 of the population). The doctors' density reported as the number of doctors per 100,000 of the population has been increasing for the last 30 years. In 1980s the number has been 13 doctors per 100,000 people up to around 18 doctors per 100,000 people in 2009 translated to 1,924 medical doctors.

Figure 4.7: Percentage of children fully immunized (PFV) for the period 1980-2010

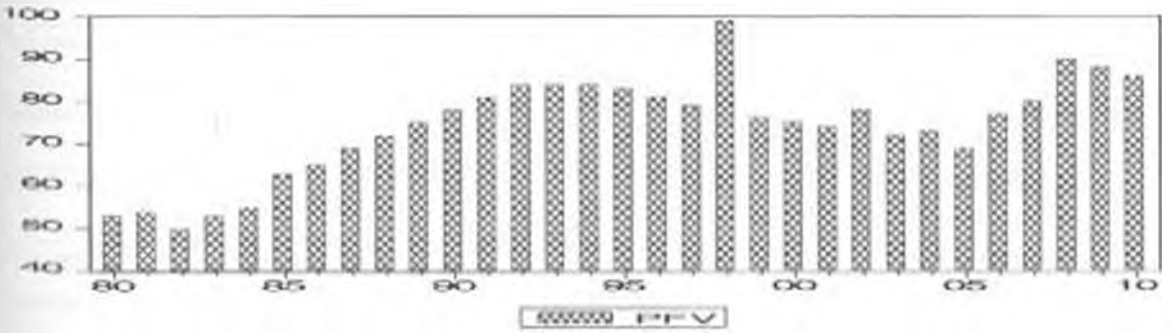


Figure 4.7 shows the percentage of children fully immunized. The percentage of children who are fully immunized is a key input in the MDG goal 4 campaign. The immunization levels has

been low in 1980 where on average only 50% of the children were fully immunized the number has been steadily increasing to over 80% in the late 2000s due to the extension of the Kenya Expanded programme for immunization (KEPI).

4.2 Results of Stationarity Test

Given that the study uses time series data a test for Stationarity is necessary to ensure that the statistical properties of the series process are constant over time. Since using non-stationary will lead to spurious results there is need to ensure that the series are stationary. Table 3 below presents the time series nature of the variables after employing ADF test on each variable. The results show that all the variables are non-stationary at levels since ADF statistic is greater than critical ADF t-critical at 5% level of significance.

Table 3: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variable	ADF Statistic	Critical Value (5 %)	Nature
Under 5 Mortality	-1.270701	-1.9571	Non-Stationary
Log Total Health Aid	2.112663	-1.9571	Non-Stationary
Log Private Health Expenditure	1.513060	-1.9574	Non-Stationary
Prevalence of HIV	0.383384	-1.9574	Non Stationary
Notified Cases of Malaria	0.663950	-1.9574	Non Stationary
Doctors Density	1.335683	-1.9574	Non Stationary
Percentage of children Fully vaccinated	0.446495	-1.9574	Non Stationary

Source: Computation from Eviews software

Since the all the variables are non-stationary at their levels. It is prudent to difference them to and carry out the same ADF test so as to make the series stationary. The results after first differencing are shown in Table 4. All the variables are stable after first differencing at 5% level of significance, since ADF statistic is less than ADF t-critical. This implies the variables in their levels are integrated of order one, I (1).

Table 4: Augmented Dickey-Fuller (ADF) Unit Root Test Results after First Differencing

Variable	ADF Statistic	Critical Value (5 %)	Nature
Under 5 Mortality	-2.029224	-1.9546	Stationary
Log Total Health Aid	-3.813700	-1.9546	Stationary
Log Private Health Expenditure	-2.351916	-1.9546	Stationary
Prevalence of HIV	-2.014141	-1.9546	Stationary
Notified Cases of Malaria	-3.348572	-1.9546	Stationary
Doctors Density	1.967352	1.9546	Stationary
Percentage of children Fully vaccinated	1.995186	-1.9546	Stationary

Source: Computation from Eviews software

The results from table 4 above shows that, the ADF t-statistics are less than the t-critical and therefore the null hypothesis of non-stationarity can be rejected. This implies that the series are stationary.

4.3 Analysis on Cointegration of series for Econometric Model

The study employs the Johansen (1988) Maximum Eigen value and Trace tests for cointegration since all the variables in the model are integrated of order one, I (1).

The results for these tests are shown in Tables 5. From the table it can be observed that the null hypothesis of no cointegration vectors is rejected by the L.R test at 5% level of for all variables. The hypothesis that there are seven co-integrating vectors cannot be rejected on the other hand which implies the variables in the model are not stationary. Based on the results we can conclude that there exist cointegration relationships between the five variables in model 1, hence their stationarity of linear combination converges to long run equilibrium.

Table 5: Results for Johansen Cointegration Test -Model

Eigen value	Likelihood Ratio (L.R)	5% Critical Value	1% Critical Value	Hypothesized number of Cointegration Equation(s)
0.976439	250.7113	124.24	133.57	None **
0.850706	138.2660	94.15	103.18	At most 1 **
0.599631	81.21084	68.52	76.07	At most 2 **
0.535456	53.74957	47.21	54.46	At most 3 *
0.464007	30.74862	29.68	35.65	At most 4 *
0.305115	12.03959	15.41	20.04	At most 5
0.036623	1.119318	3.76	6.65	At most 6

Notes: (i) *(**) denotes rejection of the hypothesis at 5 %(1%) significance level.

(ii) L.R. test indicates 5 cointegrating equation(s) at 5% significance level

Source: Computation from Eviews software

4.4 Diagnostics Tests

Diagnostic tests are essential to show if the model are consistent or not. The following tests were carried on the model and the resultant graphs are presented in the appendix section.

4.4.1 Breusch-Godfrey Correlation LM Test

As presented in appendix 1: the Breusch-Godfrey Correlation LM Test has an F-statistic of 1.646906 with a probability of value of 0.269074 shows that there is no serial correlation between the variables in the model at 5% significance levels.

4.4.2 Ramsey RESET Test

The Ramsey RESET Test presented in the appendix 2 shows, an F statistic of 1.414479 and a probability of 0.273087 that indicates that the model is not mis-specified.

4.4.3 Autoregressive Conditional Heteroskedasticity (ARCH) Test

Appendix 3, shows the Autoregressive Conditional Heteroskedasticity (ARCH) Test with an F-statistic of 1.515316 and a corresponding probability of 0.468763 which implies the coefficients of the model are stable.

4.4.4 Jarque-Bera chi-square statistic

The residuals normality test and the null hypothesis of normal distribution has a Jarque-Bera chi square statistic value is 1.515316 with a probability of value 0.468763 implying that the error term has a normal distribution

4.5 The Long -Run Model

Given the existence of a long run cointegrating relationships in the econometric model the long run model estimated can be presented as follows in table 6.

Table 6: Results for the Long run model

Dependent Variable: LOG Under 5 Mortality

Method: Least Squares

Date: 09/18/12 Time: 21:02

Sample: 1980 2010

Included observations: 31

Variable	Coefficient	Std. Error	t Statistic	Prob.
CONSTANT	5.499923	0.103013	53.39036	0.0000
LOG Total Health Aid	0.027013	0.023088	1.169979	0.2535
LOG Private Health Expenditure	-0.079216	0.034521	-2.294708	0.0308
Prevalence of HIV	0.037275	0.004457	8.362580	0.0000
Notified Cases of Malaria	0.000527	0.000396	1.331173	0.1956
Doctors Density	-0.021927	0.009793	-2.239106	0.0347
Percentage of children Fully Vaccinated	-0.002891	0.000848	-3.411045	0.0023
R-squared	0.920965	Mean dependent variable		4.624916
Adjusted R squared	0.901206	S.D. dependent variable		0.086406
S.E. of regression	0.027159	F statistic		46.61034
Durbin-Watson stat	1.400047	Prob(F-statistic)		0.000000

Source: Computation from Eviews software

The above gives a rise to a linear equation of the model as follows:

LOGU5M = 5.50+ 0.027*LOGTHA -0.079*LOGPHE +0.037*PHIV-0.000527*NCM -
(53.39036) (1.169979) (-2.294708) (-2.294708) (-1.331173)

0.022*DD -0.002891*PFV

(-2.239106) (-3.411045)

Where, the figures in brackets are the t-statistics of the corresponding estimated coefficients.

From Table 6 above, Most of the coefficient in the equation have taken the expected signs except the total health aid and notified cases of malaria. The R^2 of 0.920965 shows that, the explanatory power of the independent variables is about 92%, while the DW test is 1.400047 shows no serial correlation of the residual.

4.6 Dynamic Error Correction Model (ECM)

Since all the variables are non-stationary in levels, but cointegrated, their dynamic relationship needs to be specified by an error correction methodology so that the short run and long-run relationships can be captured. Two lags and current levels for all the variables were used in estimating the model. The choice of the three lags was based on the estimated residuals of the ECM passing the normality and serial correlation tests. The procedure involves re-estimating the general ECMs by deleting the insignificant variables until we get the parsimonious ECMs. The long run relationship for under-five mortality rates is expressed as:

LOGU5M = 5.50+ 0.027*LOGTHA -0.079*LOGPHE +0.037*PHIV-0.000527*NCM - 0.022*DD -0.002891*PFV

The error correction term (ECT) is given as:

RESID1 = LOGU5Me - 5.50+ 0.027*LOGTHA -0.079*LOGPHE +0.037*PHIV-0.000527*NCM -0.022*DD -0.002891*PFV

Table 7: General Error Correction Model under-five mortality rates

Dependent Variable: DLOG Under-5 Mortality
Method: Least Squares
Date: 09/19/12 Time: 21:21
Sample(adjusted): 1983 2008
Included observations: 26 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob
CONSTANT	0.005212	0.002763	1.885943	0.1324
DLOG Under-5 Mortality _1	0.405980	0.236973	1.713194	0.1618
DLOG Under-5 Mortality _2	0.072130	0.163764	0.440450	0.6824
DLOG Total Health Aid	0.001163	0.002613	0.444917	0.6794
DLOG Total Health Aid _1	0.005465	0.004580	1.193218	0.2987
DLOG Total Health Aid _2	-0.010817	0.004485	-2.412042	0.0734
DLOG Private Health Expenditure	0.018691	0.009004	-2.075966	0.1065
DLOG Private Health Expenditure _1	0.006839	0.008616	0.793839	0.4717
DLOG Private Health Expenditure _2	0.015170	0.009785	1.550346	0.1960
D Prevalence of HIV	0.008008	0.004553	1.758933	0.1534
D Prevalence of HIV _1	0.011626	0.002696	4.312340	0.0125
D Prevalence of HIV _2	-0.004477	0.002617	1.711161	0.1622
D Notified Cases of Malaria	-0.000136	4.65E-05	2.912122	0.0436
D Notified Cases of Malaria _1	-9.27E-05	5.97E-05	1.553091	0.1954
D Notified Cases of Malaria _2	2.81E-05	4.35E-05	0.645043	0.5540
D Doctors Density	-0.003650	0.001305	-2.797201	0.0490
D Doctors Density _1	-0.000320	0.001174	-0.272735	0.7986
D Doctors Density _2	-0.000783	0.001353	-0.579095	0.5936
D Percentage of children Fully Vaccinated	-0.001176	0.000288	-4.078668	0.0151
D Percentage of children Fully Vaccinated _1	0.001029	0.000289	-3.557140	0.0236
D Percentage of children Fully Vaccinated _2	0.000569	0.000188	-3.030916	0.0387
RESID1_1	0.479650	0.086676	-5.533849	0.0052

R-squared	0.998880	Mean dependent variable	-0.005377
Adjusted R-squared	0.993001	S.D. dependent variable	0.022673
S.E. of regression	0.001897	F statistic	169.9020
Durbin-Watson stat	2.288276	Prob(F statistic)	0.000075

Source: Computation from Eviews software

Dropping the insignificant variables in the general error correction model in table 7 above gives rise to the specific error correction model table 8 below.

Table 8: Specific Error Correction Model

Dependent Variable: DLOG Under-5 Mortality

Method: Least Squares

Date: 09/19/12 Time: 21:47

Sample(adjusted): 1982 2008

Included observations: 27 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	0.005143	0.002493	2.062931	0.0730
DLOG Under-5 Mortality _1	0.460812	0.082912	5.557814	0.0005
DLOG Total Health Aid _1	-0.007753	0.003135	-2.473015	0.0385
DLOG Total Health Aid _2	0.010389	0.002955	3.515041	0.0079
DLOG Private Health Expenditure	-0.019819	0.009013	-2.198783	0.0591
DLOG Private Health Expenditure _1	-0.005992	0.005367	-1.116376	0.2967
DLOG Private Health Expenditure _2	-0.014223	0.007273	1.955729	0.0862
D Prevalence of HIV	0.009892	0.002883	3.431472	0.0089
D Prevalence of HIV _1	0.009859	0.002539	3.883173	0.0047
D Prevalence of HIV _2	-0.004486	0.002188	-2.050247	0.0745
D Notified Cases of Malaria	0.000146	4.77E-05	-3.048477	0.0159
D Notified Cases of Malaria _1	9.61E-05	5.12E-05	1.878578	0.0971
D Notified Cases of Malaria _2	3.83E-05	3.86E-05	0.993485	0.3496
D Doctors Density	0.002833	0.001009	2.806906	0.0230
D Doctors Density _2	5.85E-05	0.000802	0.072969	0.9436
D Percentage of children Fully Vaccinated	-0.001283	0.000243	-5.270361	0.0008
D Percentage of children Fully Vaccinated _1	0.001075	0.000243	4.419483	0.0022
D Percentage of children Fully Vaccinated _2	0.000585	0.000177	3.312304	0.0107
RESID1_1	-0.477710	0.078560	-6.080834	0.0003

R-squared	0.997663	Mean dependent variable	-0.005998
Adjusted R-squared	0.992403	S.D. dependent variable	0.022466
S.E. of regression	0.001958	F-statistic	189.6957
Durbin-Watson stat	1.485736	Prob(F-statistic)	0.000000

Source: Computation from Eviews software

4.7 Interpretation of the Specific Error Correction Model Regression Results

From the results in section 4.6, Table 8 for specific error correction model, the F-statistic of 189.6957 and the corresponding probability value of 0.000000 illustrates that the coefficients of the explanatory variables are statistically significant. The value for R^2 is 0.997663 which shows that the explanatory power is about 99%. The DW test is 1.485736 which shows no serial correlation of the residual.

All the coefficients in the equation have taken the expected signs. This is a clear indication that the variables have relationship on the under-five mortality rates. As the expected health expenditures increases leads to mortality rate declines. As HIV/AIDS and malaria increases under-five mortality increases and finally increases in doctors' destiny and immunization rates reduces under-five mortality rates.

Total health aid expenditure, influences the under-five mortality in Kenya in the short run just like in the long-run. The coefficients of first and second lags of total health aid expenditure are both negative and statistically significant at 10% significance level. The net effect of the first and second lags of total health aid expenditure on the under-five mortality is a 1% increase of the previous periods health aid expenditure leads to a decline of about 0.018142% in under-five mortality. This implies the previous periods health aid expenditures impacts the health outcomes on the current period this is due to the fact that majority of this aid is used in health care investments and infrastructural development of the health sector whose impacts can be felt after sometime. This expenditure on health reduces under five mortality since more funds are spent on health care services such as healthcare facilities, drugs promotive and preventive healthcare

and improving access to the majority of the poor in the villages. The magnitude of this total health aid is low at 0.018142 given that the majority of the funds are aimed at HIV/AIDS, Malaria and tuberculosis while some non communicable diseases are underfunded. These underfunded diseases like pneumonia and diarrhoea are increasingly killing more children than earlier anticipated.

The private health expenditure influences the under-five mortality in the short run like in the long run. The coefficient is negative and statistically significant at 10% level of significance. The net effect of the first and second lags of total health aid expenditure on the under-five mortality is a 1% increase of the current, first and second lag of private health expenditure leads to a decline of about 0.04034% in under-five mortality. This private health expenditure reduces under five mortality more that the health aid because its demand driven. The out of pocket payment by households is paid at point of receipt of medical care hence directly affects the health outcomes of the population

The prevalence of HIV/AIDS influences the under-five mortality in the short run unlike in the long run in Kenya. The coefficient is positive and statistically significant at 10% level of significance. The net effect of the current, the first and the second lags of total health aid expenditure on the under five mortality is a 1% increase of the current and the previous period's prevalence of HIV/AIDS leads to an increase of about 0.015265% in under five mortality.

The notified cases of malaria in Kenya influences the under-five mortality in the short run unlike in the long run in Kenya. The coefficient is positive and statistically significant at 10% level of significance. The net effect of the first and second lags of notified cases of malaria on the under-

five mortality is a unit increase of the current and the previous period's notified cases of malaria leads to an increase of about 0.00028% in under-five mortality. In actual terms an increase of malaria cases by 100,000 new cases increases the under-five mortality rates by 28%.

The doctors' density and the percentage of children who are fully immunized influences the under-five mortality in the short run unlike in the long run in Kenya. The coefficients are negative and statistically significant at 10% level of significance. The net effect of the pervious period's doctors' density on the under-five mortality is an increase by one in the number of doctors per 100,000 people leads to a decline of about 0.0028915 % in under-five mortality. On the other hand the net effect of the percentage of children who are fully immunized on the under-five mortality is a 1% increase in the immunization coverage leads to a decline of about 0.08208 % in under-five mortality in Kenya.

CHAPTER FIVE

SUMMARY, POLICY RECOMMENDATIONS AND CONCLUSION

5.0 Introduction

Chapter five has four small sections. The first section 5.1 the summary, traces all the work carried on and results. Second section 5.2 policy recommendations, draws on the empirical findings and formulates some policy suggestions. Third section 5.3 conclusions, tries to relate with other studies around the world. Lastly section 5.4 limitation and areas of further research, points out the drawbacks of the study and area for future research.

5.1 Summary

Since the literature establishes that health care financing is crucial in achieving the goals for health systems, namely good health, responsiveness to the expectations of the population, and fair financial contribution. The health care financing challenges in Kenya thus is a problem that needs to be solved.

The focus of the study was therefore to estimate the impact of health aid on the under five mortality rate for the periods of 1980-2010. The literature reviewed in this study helped identify other factors that affect mortality rates in a country at a macro level. Factors like Private health expenditure (PHE), prevalence of HIV/AIDS (PHIV), notified cases of malaria (NCM), doctors' density (DD) and the Percentage of children fully immunized (PFV) were found to be affecting under-5 mortality rates.

To achieve its objectives this study applied a semi log OLS regression analysis on the under-five mortality rate (dependent variable) against independent variables; total health aid, private health expenditure, prevalence of HIV/AIDS, notified cases of malaria, doctors' density and the Percentage of children fully immunized The results shows the explanatory variables are important in explaining the changes in the under-five mortality rate in Kenya

Similar to results we came across in most studies; all the coefficients in the equation took the expected signs. This is a clear indication that the variables have relationship on the under-five mortality rates. As the expected health expenditures increases leads to mortality rate declines. As HIV/AIDS and malaria increases under-five mortality increases and finally increases in doctors' destiny and immunization rates reduces under-five mortality rates.

5.2 Policy Recommendations

The study established the significance of the fore mention factors on health indicators in Kenya This finding has a great policy implication which must be addressed by the health policy makers with the view of improving the health care system in the country. The study recognizes that increases in the under-five mortality can not be fully attributed to low funding but also other factors like prevalence of HIV/AIDS, notified cases of malaria, doctors' density and the Percentage of children fully immunized. In order to improve the health the government should rethink about the health care financing critically since some policy impact negatively on health.

In terms of health aid expenditure it can be recommended that the country should rethink of diversifying the donor money to cover non-communicable and other diseases and stop over

funding and over emphasizing on of HIV/AIDS, malaria, tuberculosis. The other diseases that requires attention include diarrhea and pneumonia which are leading children killer in Kenya.

To ensure that the goal for health systems of responsiveness to the expectations of the population and fair financial contribution there is need to reconsider the out of pocket private health funding given that majority of Kenyans live below poverty line. This can be achieved by removing user fees to marginalized groups to promote access of primary healthcare to the citizens.

It can be recommended that greater finances and healthcare resources be directed to primary health care clinics and district hospitals where the majority of people seek healthcare services. More doctors should be hired and posted in the primary level healthcare levels and a review of remuneration of medical staff to ensure retention of doctors at government hospitals.

5.3 Conclusion

This study concludes that health aid plays an important role in improving health status of Kenya. Around the world studies have found that health aid expenditure have conflicting impact on health outcomes.

The findings of this study on the role of health aid expenditure are in accord with those of Mishra and Newhouse, (2007) and Gebhard et al. (2008) who found that health status variables are related to the amount of aid received a country. However, these results are in contrast to those of Michaud and Murray, (1994) and Kanbur, Sandler and Morrison, (1999) who found that health status variables are not related to the amount of aid received a country. Study extends the debate from Poullier et al. (2002) on the efficiency of using the health aid to booster the health outcomes which vary significantly from country to country. It also concludes that health

outcomes in Kenya can improve by increasing the efficiency of health aid expenditures and other health expenditures in Kenya.

5.4 Limitations of the Study and Areas for Further Research

The study had a number of limitations; chief among them was the availability and the quality of the data since secondary data was used. Data from different institutions gave conflicting figures, which made it difficult to get ideal information. This led to the study using some averages in some instances. Since the data collection and measurement may not be accurate, it is likely that measurement errors were obtained in the national account data used in this study. Another major limitation was the unavailability of private health expenditure data since most of them were estimates. The study would have been more exhaustive if the actual expenditures on private health services would have been obtained. As a result of these shortcomings, the conclusions and policy recommendations may have suffered from the same inferences.

Therefore, further research is needed to ascertain the efficiency of this health aid expenditure in Kenya and also the use of micro-level variables like education and household income and their impacts on under-five mortality in Kenya.

REFERENCES

Akachi, Y and Atun, R 2011, "Effect of Investment in Malaria Control on Child Mortality in Sub-Saharan Africa in 2002–2008". *PLoS ONE 6(6):* e21309. doi:10.1371/journal.pone.0021309

Anyanwu, J. C and Erhijakpor, A. E 2007, "Health Expenditures and Health Outcomes in Africa" *Journal compilation for African Development Bank Economic* Research Working Paper No 91 pp. 400-433

Chauvet, L, Gubert, F and Mesplé-somps, S 2008a, "Are remittances more effective than aid to improve child health an empirical assessment using inter and intra-country data". *Distribution*, pp.1-33.

Collins, E and Klein, R 1980, "Equity and the NHS: Self-reported morbidity, access and primary care". *British Medical Journal*, 281, pp. 1111-15.

Engle, R.F and Granger, C.W.J 1987, "cointergration and error correction: representation, estimation and testing" econometrica

Farahani, M and Subramanian, S. V 2009, "The Effect of Changes in Health Sector Resources on Infant Mortality in the Short run and the Long-run: A longitudinal econometric analysis". *Social Science & Medicine* 2009, 68:1918-1925.

Gebhard, N, Kitterman, K, Mitchell, A, Nielson, D and Wilson, S 2008, "Healthy Aid? Preliminary Results on Health Aid Effectiveness", *Journal compilation for American Political Science*, Boston Massachusetts, pp.1-27

Green, W 2003, "*econometric analysis 5th edition*" prentice hall

Gujarati, D.N, and Sangeetha 2007, "*Basic Econometrics, Fourth Edition*", Tata McGraw Hill New Delhi

Hadley, J 1982, *More Medical Care, Better Health?* The Urban Institute Press, Washington DC

Hausman, J.A 1978, Specification Tests in Econometrics, *Econometrica*, Vol.46 (6).pp 1251-1271

Hill, K, Bicego, G, and Mahy, M 1998, "Childhood Mortality in Kenya: An Examination ofTrends and Determinants in the Late 1980s to Mid 1990s",*Pediatrics*, pp.1-16.

Johansen, S. (1988), "Statistical Analysis of Cointegration Vectors", *Journal of Economic Dynamics and Control*, Vol.12, p.p 231-254

Kanbur, R, Sandler, T and Morrison, K 1999, "The Future of Development Assistance: Common Pools and International Public Goods", *Policy Essay No. 25*. Washington, DC: Overseas Development Council.

Kimalu, P.K, Nafula, N.N, Manda, D.K, Bedi,A, Mwabu, G, and Kimenyi, M, 2004, "A Review of the Health Sector in Kenya" *Kenya Institute for Public Policy Research and Analysis* KIPPRA Working Paper No. 11

Lu, C, Schneider, M.T, Gubbins, P, Leach-kemon, K, Jamison, D, and Murray, C. J 2001, "Public fi nancing of health in developing countries: a cross-national systematic analysis", *The Lancet*, 375(9723), pp.1375-1387.

Manyala, K, 2000, "Effect of economic growth and public expenditure on health-the case of Kenya" university of Nairobi, unpulished MA thesis

Mas colell, A, Whinstone, M.D and Green, J.R 1995, *"microeconomic theory"* Oxford university press New York

Michaud, C and Murray, C.J, 1994, "External assistance to the health sector in developing countries: a detailed analysis, 1972-90", *Bulletin of the World Health Organization*, 72(4), pp.639-51.

Mishra, P and Newhouse, D 2009, "Health Aid and Infant Mortality", *IMF Working Paper*, number WP/07/100.

Muldoon, K, Galway, L, Nakajima, M, Kanters, S, Hogg, R and Bendavid, E 2011, "Health system determinants of infant, child and maternal mortality: A cross sectional study of UN member countries", *Globalization and health*, 7(1), p.42.

Mwabu, G 2007, "Health Economics for Low-income Countries," in: *Handbook of Development Economics, Volume 4*, eds, T. Paul Schultz and John Strauss, Amsterdam: North-Holland

Mondal, N. I, Hossain, K and Ali, K 2009, "Factors Influencing Infant and Child Mortality: A Case Study of Rajshahi District, Bangladesh", *Journal of Human Ecol, 26(1): 31-39 (2009).*

Nganda, B. M. and Ongolo, D 1999, "Public Expenditure On Basic Social Services In Kenya" Consultancy Report Prepared for *Social Dimensions Of Development Secretariat Office Of The President*, Nairobi, UNDP (Kenya) and UNICEF (Kenya)

Nganda, B, M 1994, "structural reforms of the Kenya healthcare systems" unpublished PHD dissertation, *University of York*, U.K

Oleche, M. O 2005, "Analysis of the impact of health expenditures on key health indicators in Kenya", *university of Nairobi*, unplilished MA thesis

Poullier, J.P, Hernandez, P, Kawabata, K and Savedoff W, D, 2002. "Patterns of Global Health Expenditures: Results for 191 Countries" *World Health Organization Discussion Paper* No. 51

Republic of Kenya, 1994, Ministry of Health, "*Kenya National Health Accounts*", various years (1994, 2003, 2005) government printers, Nairobi.

Republic of Kenya, 1994, Ministry of Health, *"public expenditure reviews"* various years (1994, 2003, 2005) government printers, Nairobi.

Republic of Kenya, Kenya National Bureau of Statistics, "*Kenya Demographic and Health Survey*", Various years (1993, 1998, 2003, 2008-09), government printers, Nairobi.

Sridhar, D and Batniji, R 2008 "Misfinancing Global Health: A Case for Transparency in Disbursements and Decision Making," *The Lancet* 372, no. 9644 (2008): 1185-1191.

Ssewanyana, S and Younger, S. D. (2004), "Infant Mortality in Uganda: Determinants, Trends and the Millennium Development Goals", *journal of African economies*, volume 17, number 1, pp.34–61

Wambugu, M 2010, "Pillars of successful health care financing" *Chak times* September - December 2010 p. 7

Witter, S. Ensor, T. Jowett, M and Thompson, R 2000, *'health economics for developing countries: practical guide"* Malaysia Macmillan. MacMillan Education, London, 2000.

World Bank, Health, "World Development Report 1993" *Investing in Health*, Washington DC: The World Bank

World Bank 2012, *"the world bank"*, Washington DC viewed on 20th may 2012 <http://data.worldbank.org/indicator>

World Health Organization, 2000, "Health systems: improving performance" *World Health Report*, Geneva, WHO Press.

World Health Organization 2012, *"the World Health Organization"*, Geneva *viewed* on 20th may 2012 <*http://www.who.int/nha/en/*>

Zeynep, O 2000, "Determinants of Health Outcomes in Industrialized Countries: A Pooled, Cross Country, Time-Series Analysis" *OECD Economic Studies* No. 30.

APPENDICES

Appendix 1: Breusch-Godfrey Serial Correlation LM Test Results for Specific Error Correction Model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.646906	Probability	0.269074
Obs*R-squared	9.569049	Probability	0.008158

Test Equation:

Dependent Variable: RESID Source: Computation from Eviews software

Appendix 2: Ramsey RESET Test Results for Specific Error Correction Model

Ramsey RESET Test:

F-statistic	1.414479	Probability	0.273087
Log likelihood ratio	4.969180	Probability	0.025803

Test Equation

Dependent Variable: DLOGUSM

Method: Least Squares

Appendix 3; ARCH Test Results for Specific Error Correction Model

ARCH Test

F-statistic	0.557130	Probability	0.580724
Obs*R-squared	1.205165	Probability	0.547396

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Source: Computation from Eviews software