UNIVERSITI PUTRA MALAYSIA

IMPACT OF FDI, ENVIRONMENT AND INSTITUTIONAL QUALITY ON HEALTH OUTCOMES, HEALTH EXPENDITURE AND HEALTHCARE SYSTEM EFFICIENCY

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By

ADAMU YAHAYA

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Doctor of Philosophy

April 2017

DEDICATION

This thesis is dedicated to the best of all creature, our noble prophet MUHAMMAD (S.AW) and my parents & teacher Alh. YAHAYA UMAR TAFIDA , Hajiya ASMA'U YAHAYA (Dada) and Prof. Zaleha Mohd Noor.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the Degree of Doctor of Philosophy

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April 2017

Chairman : Norashidah Mohamed Nor, PhD
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From the time health has been identified as a key factor in human development, a lot of commitments have been made by the international community through Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) programs to improve health outcomes especially in the developing countries. The estimated period for the MDGs has elapsed but the majority of the developing countries could not achieve their health outcomes targets despite the tremendous resources committed within the 15 years of the program. Although there is an improvement in the health outcomes but the inability to meet the 2015 MDG health targets coupled with the high number of mortalities, ever increasing health expenditure and health systems inefficiencies remain the world unsettled issues especially to the developing countries. Therefore this research aims at exploring the indirect impact of FDI on health outcomes through income, poverty and education as the socioeconomic conditioning variables.

Using system GMM estimator, the study provides evidence in support of both modernization and dependency theories whereby the impact of the FDI on health outcomes was found to be nonlinear. The impact is not conditioned on the level of income alone but poverty and education were also found to be important and significant conditioning variables.

The second objective was to explore the impact of environmental quality on health expenditure and the nonlinearity relationship tendency between the two variables. This is motivated by the ever increasing health expenditure and the failure of the existing literature to account for environmental quality even though the greenhouse gases have also been rapidly increasing over the years. The same GMM was used and the study established the relevance of the greenhouse gases on the health expenditure by

providing evidence of inverted U-shaped relationship (non-linearity) between the two variables.

The third objective of the thesis evaluates the technical efficiency of healthcare systems and its determinants particularly the relevance of institutional quality in developing countries. The nonparametric DEA results show that most healthcare systems in developing countries are technically inefficient and the Tobit model result indicates that institutional quality is a significant determinant of healthcare system efficiency. Therefore it is concluded based on these findings that healthcare system in developing countries wastes 36% of the healthcare inputs. Consequently, less healthcare inputs can potentially produce the given level of the health outcomes in the systems. Institutional capacity can positively enhance technical efficiency of the use of the healthcare inputs in the developing countries.

As a matter of policy implication, the developing countries should enhance investment policies to realize the potentialities of the FDI for socioeconomic transformation particularly human development indicators like health. It is also of utmost importance for developed world to assist the developing countries to fast-track their institutions, environment management capacity for efficient healthcare system.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

KESAN FDI, PERSEKITARAN DAN KUALITI INSTITUSI TERHADAP HASIL KESIHATAN, PERBELANJAAN KESIHATAN DAN PENJAGAAN KESIHATAN SISTEM KECEKAPAN

Oleh

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Semenjak kesihatan dikenalpasti sebagai faktor utama dalam pembangunan manusia, banyak komitmen telah dilaksanakan oleh komuniti antarabangsa terutama di negara membangun menerusi program Matlamat Pembangunan Milenum (MDGs) dan Matlamat Pembangunan Mampan (SDGs) untuk meningkatkan hasil kesiahatan terutama di negara membangun. Tempoh anggaran MDGs telah berlalu, tetapi masih terdapat majoriti negara membangun yang tidak mencapai sasaran hasil kesihatan di samping komitmen sumber yang amat besar di sepanjang 15 tahun program tersebut. Terdapat peningkatan dalam hasil kesihatan tetapi ketidakupayaan untuk mencapai sasaran kesihatan MDG 2015 ditambah dengan bilangan mortaliti yang tinggi, kenaikan berterusan perbelanjaan kesihatan dan ketidakcekapan system kesihatan masih menjadi isu yang belum selesai terutama di kalangan negara membangun. Oleh itu kajian ini bertujuan untuk meneroka faktor yang bertanggungjawab menyebabkan hasil kesihatan yang tidak memberansangkan di mana penekanan khusus diberi kepada integrasi ekonomi menerusi aliran masuk FDI ke negara membangun.

Dengan menggunakan penganggar sistem GMM, kajian ini memberi bukti untuk menyokong kedua-dua teori pemodenan dan pergantungan di mana kesan FDI ke atas hasil kesihatan didapati tidak linear. Kesan ini tidak bergantung pada tahap pendapatan semata-mata tetapi kemiskinan dan pendidikan juga merupakan pembolehubah yang penting dan signifikan.

Objektif kedua adalah untuk meninjau kesan kualiti alam sekitar ke atas perbelanjaan kesihatan didorong oleh perbelanjaan kesihatan yang semakin meningkat dan kegagalan kajian yang sedia ada untuk mengambil kira kualiti alam sekitar walaupun pencemaran udara juga telah meningkat sejak beberapa tahun. Pegnaggaran GMM yang sama digunakan dan kajian membuktikan kesan gas rumah hijau adalah relevan

ke atas perbelanjaan kesihatan dengan memberi bukti hubungan berbentuk U terbalik (tidak linear) antara kedua-dua pembolehubah tersebut.

Objektif ketiga tesis, adalah untuk menilai kecekapan teknikal sistem penjagaan kesihatan dan penentunya, terutama peranan kualiti insititusi di negara membangun. Keputusan DEA tak berparameter menunjukkan bahawa kebanyakan sistem penjagaan kesihatan di negara membangun tidak mencapai ketidakcekapan teknikal dan hasil model Tobit menunjukkan bahawa kualiti institusi adalah merupakan penentu yang signifikan kepada kecekapan sistem penjagaan kesihatan. Oleh itu berdasarkan penemuan ini adalah dirumuskan bahawa sistem penjagaan kesihatan di negara membangun membazirkan 36% input penjagaan kesihatan. Kesannya, pengurangan input kesihatan masih berpotensi menghasilkan tahap hasil penjagaan kesihatan yang sedia ada dalam sistem. Kapasiti institusi secara positif boleh meningkatkan kecekapan teknikal penggunaan input penjagaan kesihatan di negara membangun.

Sebagai implikasi dasar, negara-negara membangun perlu meningkatkan dasar pelaburan untuk merealisasikan potensi FDI kepada transformasi sosioekonomi terutamanya petunjuk pembangunan manusia seperti kesihatan. Ia juga amat penting bagi dunia maju untuk membantu negara-negara membangun memperbaiki institusi mereka, seta memperbaikikeupayaan pengurusan alam sekitar untuk mendapat sistem penjagaan kesihatan yang cekap.

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I certify that a Thesis Examination Committee has met on 13 April 2017 to conduct the final examination of Adamu Yahaya on his thesis entitled "Impact of FDI, Environment and Institutional Quality on Health Outcomes, Health Expenditure and Healthcare System Efficiency" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Doctor of Philosophy.The members of the Supervisory Committee were as follows:

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Declaration by graduate student

I hereby confirm that:

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Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) were adhered to.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 An Overview

Human health is important not only for personal gratification but for economic growth and development. Its importance to human capital development has been documented for decades (Grossman, 1972). The campaign against the use of only GNI per capita as a measure of development promotes the use of non-income variables like health as the measure of development in any country (Hicks & Streeten, 1979). The new measure of development brings health to the centre stage for international development issues. Health[1] is a relative term that receives numerous definitions according to scholastic perceptions. It could mean the state of wellbeing of a man, absence of disease or the general condition of somebody's mind and body.

Ever since the issue of health became central to the international community, a lot of commitments have been made regarding capital and financial resources in tackling health issues especially in developing countries. The estimated period for the Millennium Development Goals (MDGs) has elapsed, and the majority of the countries (mostly developing) could not achieve their health outcomes targets despite the tremendous resource committed within the 15 years of the program.

The world economies today have been coming closer by the day as a result of globalization and trade liberalization. Consequently, the economic behavior and performances of the countries are not independent of the rest of the world. Therefore, public health and the health systems in the emerging economies became increasingly affected as both are influenced by factors outside their health systems. Healthcare systems are complex both in principle and in practice. Sound human health is an integral part of human development which cannot be relegated. Healthcare is also essential to keep people healthy. Health is an indispensable element of human capital that boosts economic development and output at both micro (individual) and macro (national) levels.

The ultimate goal of a healthcare system is to have improved health outcomes, but human health is hard to measure. Human health transcends beyond mere sickness as it embodies the complete soundness in both mental and physical body of a man (WHO, 1948). The quality of any healthcare system is measured by its health outcomes[2]. Health outcomes problems, persistent increase in health expenditures and healthcare

[1] In 1948 World Health Organization defined the concept of health as ‘‘a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’’

[2]“Changes in the health of an individual, group of people or population which is attributable to an intervention or series of interventions” (Frommer, Rubin & Lyle, 1992). The most predominant health outcomes used in the literature are infant, under-five mortalities and life expectancy (Crémieux et al., 2005; Chung & Muntaner, 2006)

systems inefficiency become a serious challenge for the entire healthcare systems in developing countries.

This thesis addresses three issues involving health outcomes, health expenditure, and healthcare system efficiency in developing countries. Due to the global economic integration, the study will investigate the indirect impact of FDI through other conditioning variables on some of the MDGs health outcomes targets that have not been achieved within the stipulated time (1990-2015). Besides, literature predominantly concentrate on the impact of FDI health outcomes through economic growth but its indirect impact on human development like health through other socioeconomic factors like poverty and education have been ignored (Blonigen & O'Fallon, 2011).

The second issue focuses on the nonlinearity tendency of the impact of environmental factors on health expenditure. This is prompted by the glaring problem of the persistent increase in greenhouse gases and health expenditure in developing countries. The nonlinearity tendency is ruled out when the direction of the relationship between health expenditure and the greenhouse remaining the same at all levels of the greenhouse gases. On the contrary, the tendency stands when the direction of the relationship changes with the levels of the greenhouse gases.

The third issue concentrates on the determinants of healthcare[3] system efficiency with emphasis on institutional quality. Huge internally sourced resources and foreign aids for health have been increasing yet developing countries are still lagging behind in terms of better healthcare system performance compared to the other developed economies. Furthermore, health expenditures claim a significant share of government budget and donor health finances yet majority of the developing countries have poor health outcomes (O'Donnell, 2007). For this reason, governments are looking for ways of downsizing these costs at the same time to improve the health outcomes with the limited available resources.

Nevertheless, since health cannot be compromised for other needs because of its importance, the option left for the governments is to ensure optimal use of health resources for better health outcomes (Paula, 2008). Heller & Hauner (2006) argued that the only option for the public system to overcome expenditure pressure is through increased efficiency; therefore, determinants of healthcare system efficiency are going to be examined in developing countries.

[3] This term could be defined as a "prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by the medical and allied health professions" (Miller-Keane, 2003).

1.2 Background of the Study

Improved health has been a man's priority even before it's relevant to human capital development is documented. As a priority and necessary condition for economic development, countries have invested much in having better health outcomes within their limited resources. Moreover, better utilization of the health expenditure is guaranteed only under efficient healthcare system. Economic interdependence through globalization has made it practically possible for health issues to be accepted as a global challenge. This is clearly demonstrated in the concluded Millennium Development Goals (MDGs) where three out of the eight goals were health specific since health has been identified as a key variable to human development. The failure to meet these targets led to the formation of the Sustainable Development Goals (SDGs) set to be achieved within 2015 to 2030. Investigations on the determinants of health outcomes, health expenditures and healthcare system efficiency have been ongoing for decades, but the indirect impacts of FDI, environment and institutional quality on these issues have not been fully explored.

1.2.1 Health outcomes indicators and FDI

Health outcomes is a broadly used term in healthcare policy for some decades and the meaning of the term varies judgmentally contingent on the user and the context. Health outcomes means the changes in a population current and future health status that can be attributed to an intervention. Health outcomes are measured by the levels of mortalities and life expectancy. The probability of a new born baby dying before one year; five years per 1000 live births represent infant and under-five mortalities. The numbers of women who die due to related cases of pregnancy complications or twenty four days after pregnancy termination per 1000 live births refer to as maternal mortality (World Health Statistics, 2009).

Life expectancy on the other hand, denotes the number of years a new born baby expects to live should the prevailing pattern of mortalities at the time of birth remain the same. In the existing literature, there is no one variable that can solely represent health outcomes of a given population (Goodman, Gerald & Musgrave, 2004).

It is evident that though health outcomes in developing countries have shown relative improvement over the years yet much is needed to be done for the developing countries to keep phase with the developed world. Data from World Bank Database show that from 1995 to 2012 developing countries have witnessed improvement in their health outcomes, but there is a wide gap to catch-up with the advanced countries. Figure 1.1 indicated that the larger proportion of child mortalities occur in the developing countries. The declining rate of these mortalities in the developed countries over the time is insignificant because their health system is comparably better than the developing countries. Among all the indicators of health outcomes, maternal mortality seems to be the worst outcome in the developing countries. Moreover, Bingham, Strauss, & Coeytaux, (2011) have stated in their empirical analysis that 99% of maternal mortalities are found in developing countries and most of the mortalities can be avoided.

Figure 1.1 : Health Outcomes in Developed & Developing Countries (1995-2012)
(Data source: WDI World Bank Database, 2015)

Marmot, Friel, Bell, Houweling, & Taylor (2008b) revealed that wide disparities in health outcomes even among the same income level countries and the life expectancy might depend on where people are born and live. Countries in the same income level have a wide disparity in health outcomes, for example, infant mortality in Belarus was only three per 1000 live birth as against 96 per 1000 live birth in Angola. The under-5 mortality rate in Montenegro was only 5 per 1000 live birth as against 143 in Somalia. For maternal mortality, Sierra Leon has the maximum of 1360 per 1000 live birth as against only 4 in Belarus (WDI, 2015). These differences are consistent even among same income level countries and have created a research gap for investigation regarding the encompassing factors responsible for the health outcomes disparity especially among the developing countries.

Furthermore, the inability of the developing countries to achieve the Millennium Development Goals health targets of reducing infant and under-5 mortalities by two-third, maternal mortality by three-quota in 2015 remained big challenge to both local and international communities.

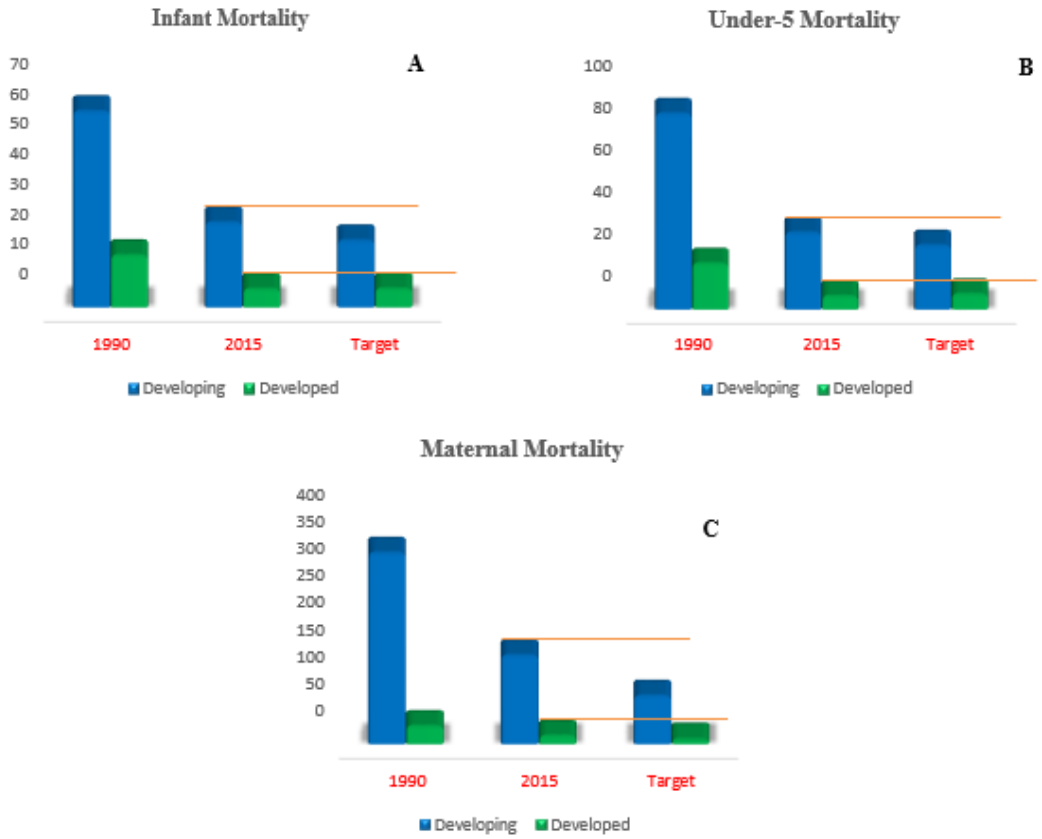

Figure 1.2 : Levels of infant, under-5, maternal mortality rate in Developed & Developing Countries
(Data source: WDI World Bank Database, 2015)

Figure 1.2A-C indicate that on the average developing countries were unable to meet their 2015 MDG infant, under-5 and maternal mortality reduction targets. Moreover, while none of the developing countries achieved the targets, developed countries reached their infant and under-5 mortalities however, the maternal mortality target is still unachievable (Figure 1.2C). The inability of the developing countries to meet any of the MDGs health targets might be the reason why they were all recaptured in the new economic development pact, the Sustainable Development Goals (SDGS).

Sustainable Development Goals has been initiated where the United Nations member countries adopted the resolution containing 17 goals with 169 integrated and indivisible targets to be achieved within 2015- 2030. Goal 3 with 13 targets of the SDGs is about healthy live and wellbeing of the people targeting the reduction of mortalities among which by 2030 maternal mortality was set to be reduced to less than 70 per 100,000 live births. Child and under-five mortalities were also targeted to be reduced as low as 25 heads per 1000 live births.

Nonetheless, considering the time, energy and resources committed for the MDGs, it is pertinent to investigate the determinants of the health outcomes in developing countries if the SDGs are desired to be achieved before 2030. Although, global aggregate child mortality rates have shown a declining trend for the past two and the half decades yet its current level still needs more attention. UNICEF reported 5.9 million under-5 mortality and 4.5million infant mortality were recorded in 2015. Consequently, these means that; 16000 under-5, 12000 infants die every day and the estimated figures are heavily concentrated in sub-Sahara, South Asia, and lower income countries (UNICEF, 2015). Despite the global recorded achievement in reducing the mortalities, more effort is required to improve the health outcomes especially reducing the mortality among children in the form of either infant or under-5 in the developing countries.

Currently, the interest in achieving a better evaluation of health outcomes at the international level has been renewed especially, as the world is fast becoming a common entity through globalization. The dynamic nature and the disparity in the socio-economic characteristics of nations and their interdependence trigger the common development targets as contained in the concluded MDGs and the current SDGs among which health is paramount. These targets were set by the United Nations with the aim of bridging the development gaps among nations. The advancement of practical and standardized measure of health outcomes is recognized as a vital first stride in order to measure and compare the quality of health systems globally. Nevertheless, to accomplish these targets, it is also essential to identify the factors behind the poor health outcomes especially in the developing countries that are at the periphery. This requires an appropriate identification and consideration of medical, socio-economic, political and institutional determining factors.

Investigation on the determinants of health outcomes at the aggregate level considering a wider range of factors is essential considering the limited literature related to the global economic inter-dependence. There has been some attempt about two decades ago in building theoretical models of health outcomes determinants (Evans and Stoddert, 1990; Hertzman, 1990; Feinstein, 1993), yet the empirical studies on economic interdependence through trade and investments like FDIs are intermittent.

> "Globalization is a key challenge facing health policy-makers……. a result of the rise of transnational corporations, challenges in healthcare….. creating the scope for increased 'foreign direct investment' (FDI)" (Smith, 2004, p. 2313).

Globalization can affect healthcare sector through various means that include trade liberalization and investment. It is a broad concept occasionally used in describing a phenomenon that represents a new phase of economic interdependence across nations. This scenario includes trade liberalization via free movements of goods and services, foreign direct investment, transnational capital flows, multinational corporation activities among others. This relationship is believed to have aided the spread of technology, acquaintances, art and literature across boundaries. Foreign direct investment is one of the manifestations of globalization and economic

interdependence. The reasons behind the inquiry on the likely influence of FDI on the health outcomes are not far-fetched. Concerning public sector funding like loans and grants, FDI is progressively becoming more important in the global economy (Woodward, 2001). For example, FDI inflows to the developing world grew from US$36bn in 1992 to US$155bn in 1999.

The FDI inflow into the developing countries accounted for more than three-times that of official development aid (HMSO, 2000). Secondly, being one of the major globalization indicators next to the volume of trade (import and export), FDI growth rate is more than the growth rate of trade in developing countries. From 1995 to 2012, the rate of trade as a percentage of GDP trends downward while FDI inflows (% of GDP) is upward trending in developing countries (figure 1.3 B and D).

Foreign Direct Investment (FDI) has been defined by many scholars with a different choice of words, but the lexical meaning remains the same. In a simple language, FDI refers to a state of ownership of assets, control of production and distribution of a firm in another country (Moosa, 2002). According to the World Bank, it is a cross-border investment related to a government or individual resident in one country partaking substantially in the management of an enterprise in another country. Technically it is the direct investment equity flows made up of equity capital, reinvestment of earnings and other capital in the host country. The common characteristic of these definitions lies in the term "control" which represents the most important characteristic that distinguishes FDI from portfolio investment since the latter does not seek control.

Janjararoen & Supakankunti (2002) argue that FDI can reinforce or weaken healthcare structure of countries involved. It has also been established that FDI can influence health outcome positively or negatively (Sarbajit & Ujjaini, 2012). The advocates for FDI as a positive determinant of health outcomes believed that FDI inflows comes along with various structural changes via new technology, new managerial skill to the recipient countries. The multiplier effect of the new foreign capital and the technical know-how improves people's living standard through increase in income, better nutrition, good housing, improved medical facilities and consequently the mortalities reduces. On the contrary the opponents of this view believe that profit repatriation, displacement of endogenous business through FDI creates unemployment, income inequality that at the end thwart growth and human welfare hence increase in mortalities.

The literature on the impact of FDI on growth and other human development has been increasing over the years but majorly skewed to it benefits only. Similarly, investigation of its indirect impact on human health is still new. The state of the FDI inflows into developing countries has been graphically demonstrated below.

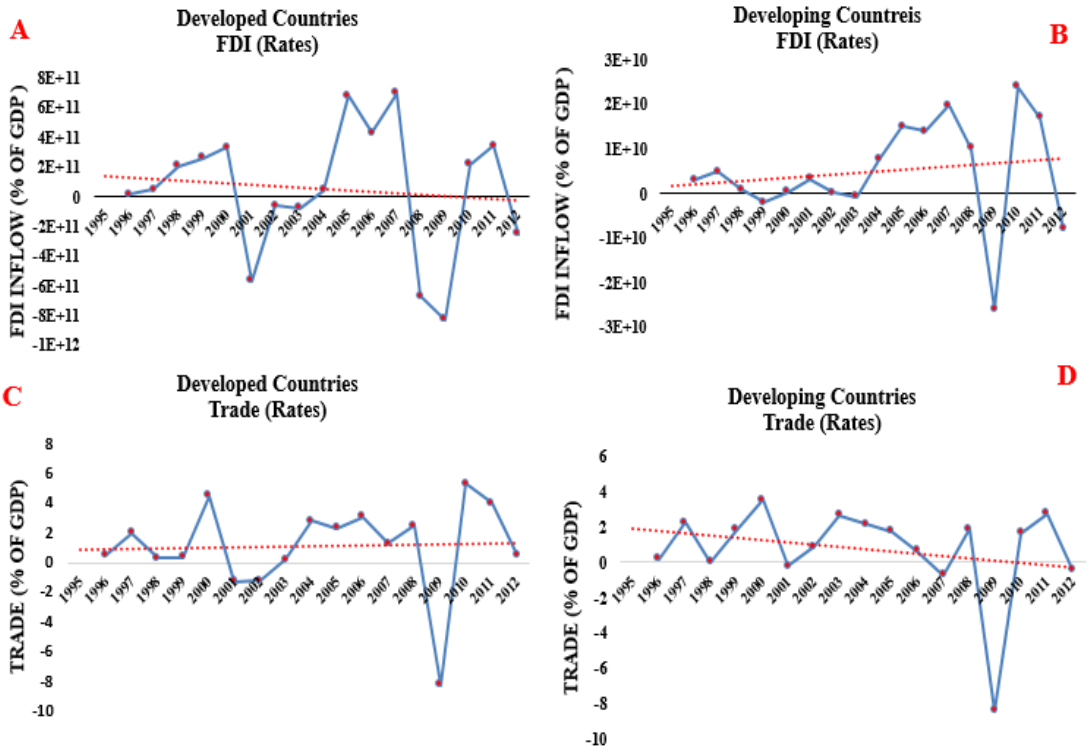

Figure 1.3 : FDI inflow & trade growth rates in Developed & Developing Countries (1995-2012)
(Data source: WDI World Bank Database, 2015)

In terms of volume, both FDI inflows and trade into developed and developing countries have been growing up throughout the study period[4].The scenario has totally changed when rates of these two variables have been considered between the two economic entities. Comparatively, the rate of the FDI inflows into the developing countries trends up as indicated in figure1.3B. The proportion of the flows between 1995 and 2012, had increased by more than 600%. Conversely, the experience is different in the developed countries where FDI inflows trends downward throughout the period (figure 1.3A). The reverse is the case in terms of trade because the rate of trade decreases in developing countries but it increases in the developed countries (figure 1.3 C and D). The figures clearly show that for about two decades, the rate of FDI inflows into the developing countries is greater than the rate of trade. Table 1.1, UNCTAD (2015) has shown the most recent inflow comparison of the FDI in the world. Although it is beyond the study scope yet it is important because it shows the consistency in the FDI inflow into the developing countries as shown in figure 1.3.

[4] Appendix C

Table 1.1 : FDI inflows in Developed & Developing Countries, 2013-2014
(Billions of US dollars)

Region/Economy	2013	2014	Growth rate 2013-2014
World	1363	1260	-8
Developed Economies	594	511	-14
Developing economies	677	704	4

Source: Global Investment Trends Monitor, UNCTAD 2015.

From Table 1.1, developing countries witnessed remarkable FDI inflows amounting to US$704 billion which is equivalent to 56% global share in 2014 compared to US$677 billion equivalent to 50% in 2013. This indicates that the FDI growth rate recorded was 4%. On the contrary, Global FDI inflows decreased by 8% in 2014 and during the same year, the developed economies recorded a negative (-14%) of FDI inflows. It is obvious therefore to state that the largest share of the global FDI inflows goes to the developing countries.

FDI has long been established to have the positive impact on some macroeconomic indicators like economic growth especially of the recipient countries. This goes along with the improvement in technology, technical knowhow, employment which can further lead to income growth and progress in human welfare. This relationship implies that more inflow of FDI is good for developing countries' health systems because it decreases the rates of infant, under-5, and maternal mortalities. This scenario is in conformity with the views that FDI brings development to the recipient countries through an increase in employment, income, business expertise which may have trickled down effect on health and human welfare. Although there is a contrary view from dependency theorists, who believed that the economic relationship between developed and the developing countries is responsible for the economic backwardness including health sector in the developing countries. Therefore, considering the global economic interdependence through trade and investment and their possible link with health outcomes, this study examines the relationship empirically to ascertain the indirect impact of FDI on the state of health outcomes in developing countries.

1.2.2 Health expenditures and environmental quality

The rate at which health expenditure grows becomes a global issue that concerns both developed as well as developing countries. For example, for the past two and the half decades, health expenditure has been rapidly increasing at the rate more than the growth rate in of GDP. Thus driving forces behind such rapid increase become a major concern of public policy makers. Meanwhile the ground-breaking study by Kleiman (1974) on health expenditure determinants has motivated further researches continuously.

Henceforth, there is a substantial growth of studies in the economic literature regarding the determinants of the health expenditures. Some of the studies include; Gerdtham, Sogaard, Andersson & Jonsson (1992); Gbesemete and Gerdtham (1992); Murthy and Ukpolo (1994); Murthy and Ukpolo (1995); Hansen and King (1996); Matteo and Matteo (1998); Gerdtham and Lothgren (2000); Murthy and Okunade (2000); Herwartz and Theilen (2003). The focus of the above studies was mainly on socio-economic factors such as ageing, population, income, the numerical strength of doctors, the rate of women labor force participation, government healthcare finance, external aid, urbanization etc. However, the non-economic factors like environment have been neglected. The most recent attempt to investigate the health expenditure and the environmental link include Narayan & Narayan (2008), Assadzadeh, Bastan, & Shahverdi (2014) but their focus was specifically on OECD and petroleum exporting countries not on developing countries .

Figures 1.4 A,B,C, and D show the public and private health expenditure, as a percentage of GDP between 1995 and 2012 increases in developed and developing countries.

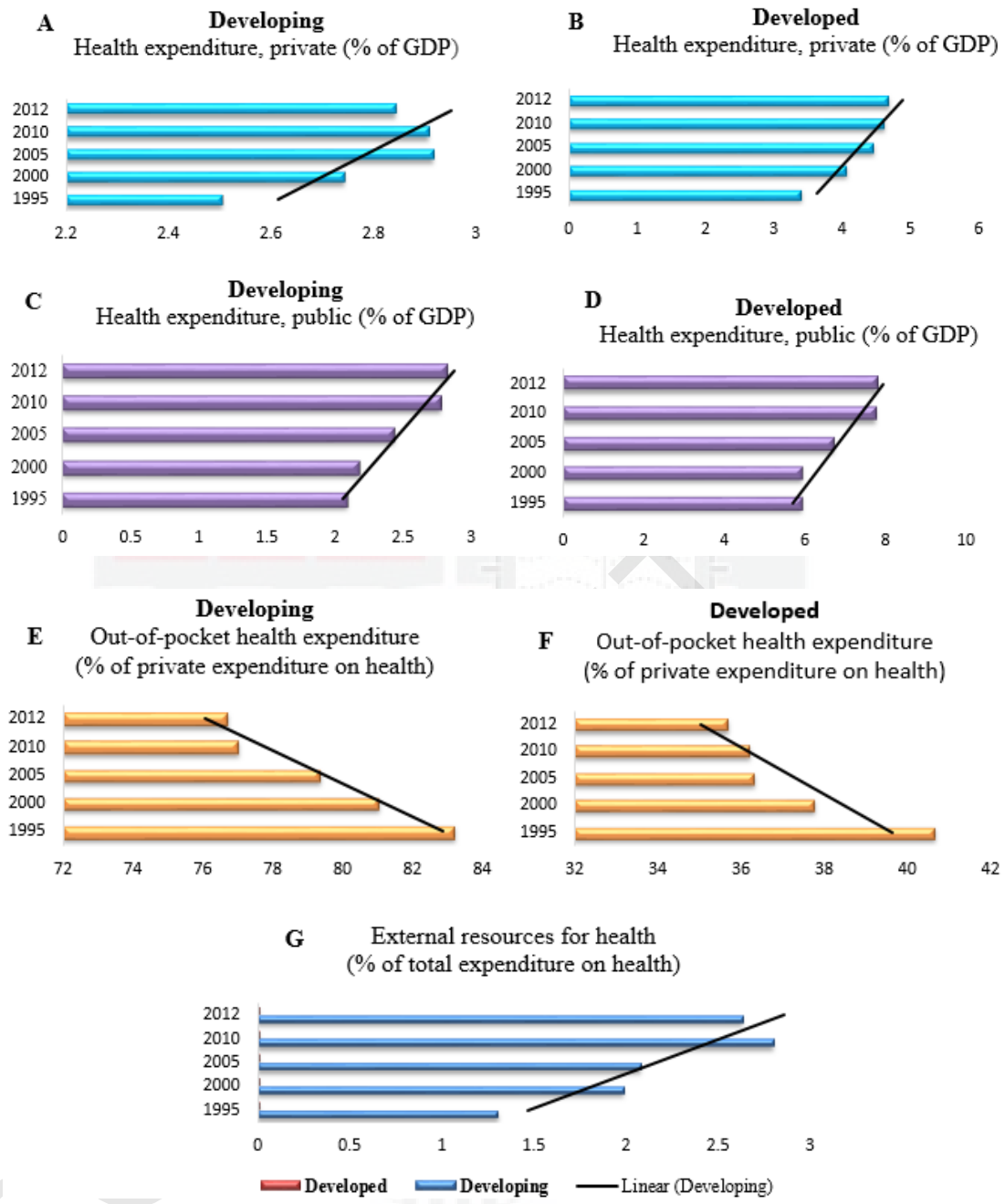

Figure 1.4 : Trend of various types of health expenditure (1995-2012)
(Data source: Global Health Estimate WHO, 2014)

As indicated in figure 1.4 A & C, although the private and public share of GDP devoted to health in developing countries are up trending, it is comparably lower than developed countries (Figures 1.4 B & D). Furthermore, out of pocket health expenditure decreases in the developing countries but its percentage of private health expenditure is higher than the developed countries (figures 1.4 E & F). The decreasing trend of the out pocket health expenditure is caused by the increased patronage of the health insurance scheme in the developing countries. Health insurance has been a priority since developing countries have considered it as a health intervention policy not just as a financial protection (Escobar, Grifin, & Shaw, 2010). Figure 1.4 G shows

an increasing trend for the external resources for health in developing countries which may be attributable to the foreign public as well as private organizations' aids for health. The figure also shows zero external resources for health for the developed countries and this may be as a result of their financial capability to manage their health systems without external assistance.

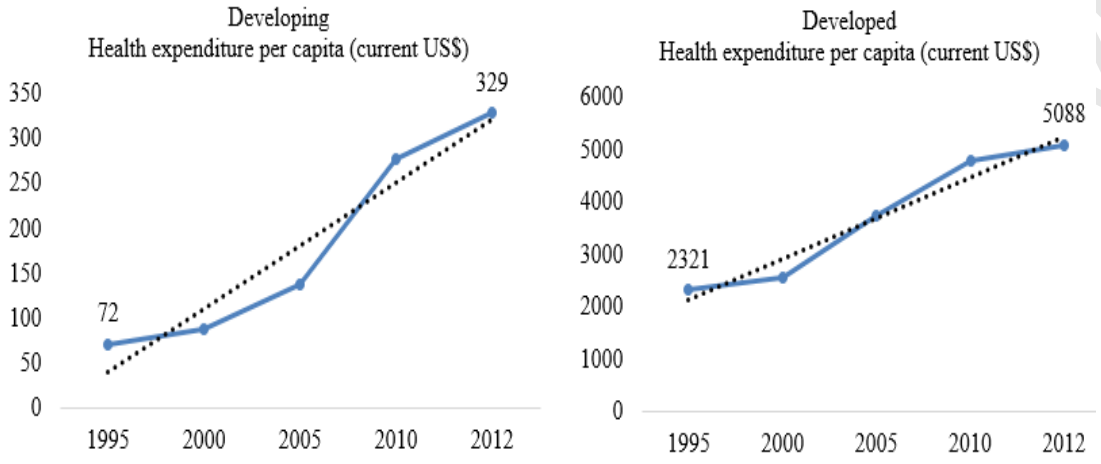

Figure 1.5 : Trend of per capita health expenditure in Developed & Developing Countries (Data source: WDI World Bank Database)

Per capita health expenditure in both developed and developing countries have been trending up for decades but the growth rate in the former is less compared to the latter. It is indicated in figure 1.5 that the average annual growth rate between 1995 and 2012 in developing countries was 49% as against only 22% in the developed countries. Moreover, the increase in per capita health expenditure from $72 in 1995 to $329 in 2012 in developing countries indicates an over three hundred percent increase within the timeframe.

The state of the environmental quality in the developing countries deteriorates since greenhouse gases emissions have been on the increase over the year. The transfer of the chemical production from the developed to the developing countries increases the direct toxic emissions into the air, water and the soil through mining, tanning and other constructions companies. This state of operations makes human beings prone to all kind of environmentally related diseases in developing countries (Human Development Report, 1998; Yanez et al, 2002).

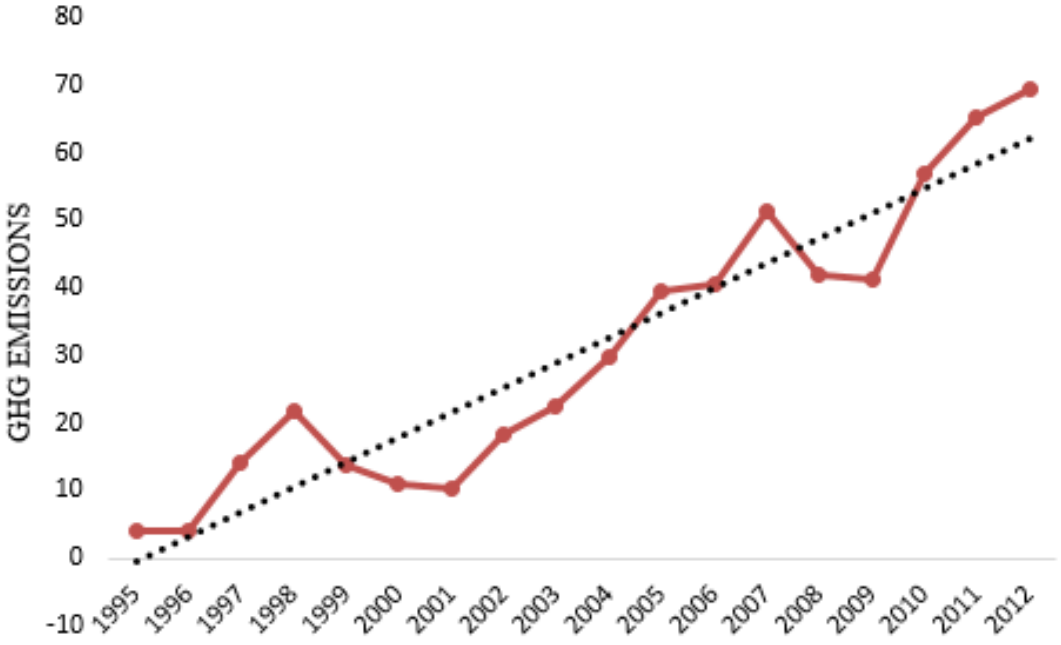

Figure 1.6 : Total greenhouse gas emissions in Developing Countries (% change from 1990) (Data source: WDI World Bank Database)

Greenhouse gases in the form of carbon dioxide, carbon monoxide, nitrous oxide, methane and other F- gases as indicated in figure 1.6 has shown an up trending movement from 1995 to 2012. This trend has some effect on health budgets since it has a direct link with human health. WHO report in 2012 proved that three million seven hundred thousand deaths were attributed to ambient (outdoor) air pollution. Nearly 88% of those deaths happened in low- and middle-income countries and the Western Pacific, and South East Asian recorded the highest burden. In the same year, 4.3 million deaths were caused by household (indoor) air pollution. Virtually all these deaths occurred in developing countries. In total, air pollution is accountable for almost 1 in every eight deaths (World Health Organization, 2014). The severity of the environmental menace is associated with poverty, lack economic capacity to invest in technology, poor environmental legislation and control measures (Briggs, 2003). Based on the trends of the health expenditure as well as the greenhouse gas emissions shown above (Figures 1.4 – 1.6), the following scatter plots demonstrate the possible link between the variables.

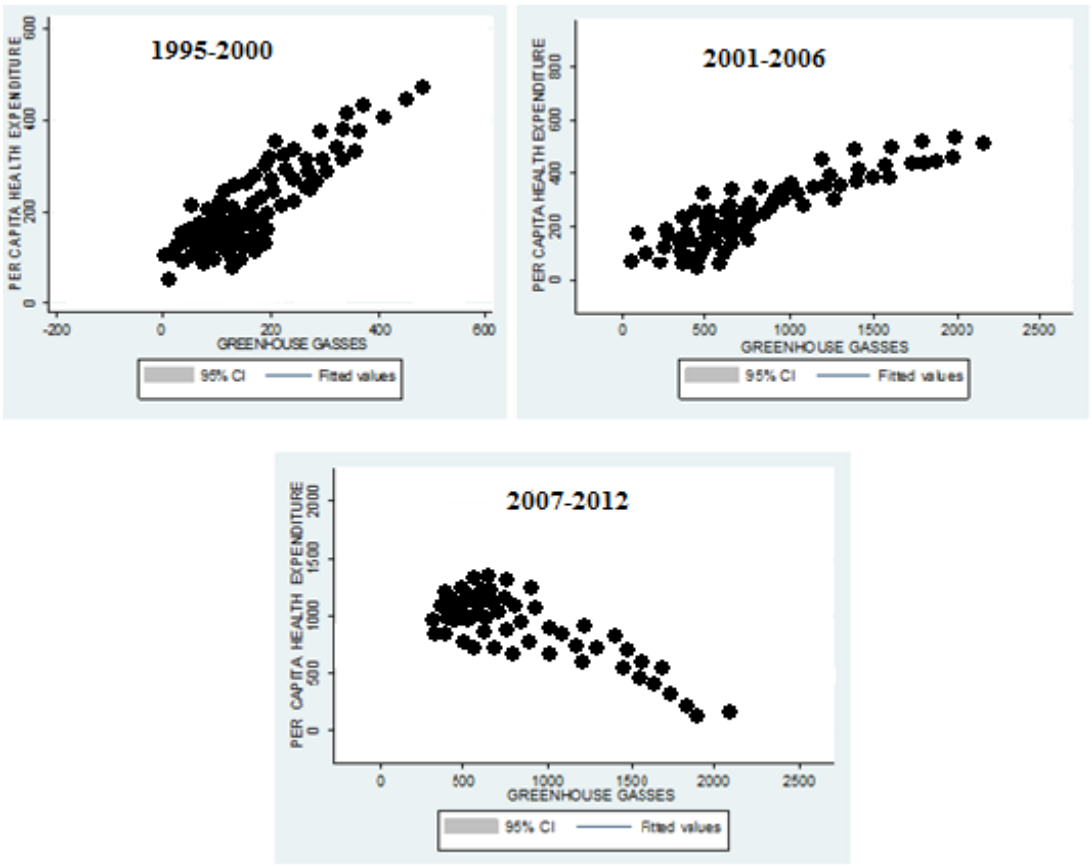

Figure 1.7 : Scatter plots for the per capita health expenditure and greenhouse gases in Developing Countries (1995-2012).
(Data source: WDI World Bank Database, 2015)

Figure 1.7 represents scatter plots for greenhouse gases and real per capita health expenditure in developing countries. To view the possible direction of the relationship, the sample period has been divided into three panels of six years each (1995-2000; 2001-2006; 2007-2012) respectively. Panel 1995-2000 shows a positive linear relationship that depicts an increase in health expenditure as the greenhouse gases increases. The second panel (2001-2006) also, indicates a positive linear relationship over the time. The third panel (2007-2012) shows a negative linear relationship between the health expenditure and the GHGs implying that an increase in the greenhouse gases leads to a decrease in the health expenditure. This is possible since increase in environmental degradation indicates increase in the tempo of economic activities and economic growth where people have more to spend on health. This, according to the Environmental Kuznets curve, reaches a point where the increase in income reduces the environmental degradation which can lead to decrease in health expenditure.

Health expenditures may be explained among others by the environmental quality since 80% of all kinds of diseases are caused by environmental vulnerability (WHO, 2011). It has been established that globally, people that are exposed to outdoor air pollution have been estimated to be one billion per annum and the financial

implication of this exposure in terms of GDP is 2% and 5% in developed and developing countries. Measures of curbing such emissions were properly implemented in most developed countries but most developing countries have no such measures (United Nations Environment Program, 2016). Moreover, air pollutions have a detrimental effect on human health since it is responsible for about 7million early deaths in 2012 (WHO, 2014).

Environmental quality as presented in Johnson et al. (1997) is a set of general or particular environmental characteristics and properties that affect human beings and other organisms. These characteristics relate to land, air, water and their possible effects on the physical and mental health of human beings (European Environment Agency, 2012). In this study, the use of greenhouse gases to represent environmental quality is considered because it has been established for more than a decade that air pollution is the main environmental risk to human health (WHO, 2004). The air pollutants may either be outdoor (Ambient)[5] or indoors[6]. The former denotes the quality of outside air in our surrounding environment. It is normally measured near ground level, away from direct sources of the pollution. The latter refers to the air in enclosed spaces like home, schools or workplaces. The quality of the air is termed poor when contaminants reach high enough concentrations to endanger human health and the environment (British Columbia air quality, 2016).

The major source of CO_2 is the fossil fuel consumption. Land usage[7] by humans is also one of the importance sources of the CO_2. Fuel combustion from vehicles and other engines is the major source of Sulfur dioxide (SO_2). It responds easily with other substances in forming harmful compounds, like sulfurous acid, sulfuric acid, and sulfate particles. It causes chest and an asthmatic problem for human through the breathing of the substance (Air quality fact sheet, 2005). Nitrous oxide (N_2O) is one of the Earth's nitrogen cycle in the atmosphere which emanates from human activities such as industrial processes, agricultural activity, waste management, and fossil fuel combustion. This compound is largely formed from agricultural activities (EPA, 2015). Carbon monoxide (CO) forms from the partial burning of natural gas and other carbon material like coal, gasoline propane, kerosene etc. and harms human because it moves oxygen in the blood and attacks the heart and other important organs of oxygen. By implication, the deterioration of the air quality causes various sicknesses which affect both public and individual health budgets.

Good environmental quality is a basic condition for human existence and its development. The state of the environmental quality in developing countries is deteriorating and environmental pollution has been a problem in developing countries particularly to the poor who are mostly exposed to the unhealthy environment. Therefore knowing the state as well as the dynamics of the environment is important especially to the policy makers. For more than a decade, it has been projected that by 2020, the world chemical production will be 85 percent more than its level in 1995,

[5] CO2 is the major element of the ambient (outdoor) air pollutants.
[6] The major elements of indoor air pollutants is CO.
[7] Especially through deforestation and land clearing for farming.

and the greater proportion (about 1/3) of this production will be in developing countries as against just 1/5 in 1995 (OECD,2001).

Narayan & Narayan (2008), Assadzadeh, et al. (2014) make attempt to examine the relationship between environmental quality and health expenditure. The former used CO, SO_2 and N_2O in eight OECD countries negating CO_2while the latter studied eight petroleum exporting countries considering only CO_2. Both studies found a positive link between the pollutants and the health expenditure. Narayan & Narayan (2008) have negated CO_2 which is the major element in the composition of ambient (outdoor) air pollutants. Similarly, Assadzadeh, et al. (2014) do not consider indoor air pollutant in their study. Given their short comings, this study considers the use of both elements greenhouse gases instantaneously as the representation of the elemental composition of both ambient and indoor air pollution.

In summary, the consistent rise in the health expenditure and the poor state of the environmental quality in developing countries is obvious. The inconsistent relationship over the time, and the concern over cost containment among countries is a motivation to investigate the role of the environmental quality on the health expenditures.

1.2.3 Healthcare system efficiency in Developing Countries

> "2 billion people live in developing countries with health systems afflicted by inefficiency…. These people account for 92% of global annual deaths from communicable diseases, 68% of deaths from non- communicable conditions" (Escobar et al., 2010 p.1).

The above quotation is in line with the inference made by Duncan & Frech (2014 p. 44) that "…. efficiency of the healthcare system, and the contribution made by the financing system to improving efficiency is an important topic for both health actuaries and health economists". Healthcare system comprises of all activities and structures put in place purposely to influence health outcomes positively. This view is in conformity with the description given by World Health Organization that health system is made up of the activities aims at promoting, restoring or maintaining health (WHO, 2000). The term efficiency is the ability to avoid waste of resources in terms of time, energy and money in pursuing the desired outcome. It is a commonly used concept in the applied economics particularly in the fields of production, industrial and agricultural economics. Farrel (1957) pioneered the analytical framework of the concept by dividing it into; technical efficiency, allocative efficiency and economic efficiency.

Technical efficiency is the production of maximum output with a given input or production of given output with a minimum input. Allocative efficiency on the other hand is the optimal combination of inputs and outputs given the market quoted prices. Allocative efficiency occurs once combination of input is at the minimum cost, given

input prices or when the output mixture maximises revenue, given output prices. Finally, economic efficiency is the combination of the technical as well as the allocative efficiency.

The state of health systems in terms efficient utilization of health resources has been an issue in developing countries. There is evidence of pervasive inefficient utilization of the health resources that leads to many economic wastes in most developing countries. Out of 122 developing countries studied using two different methodologies, only seven countries' healthcare systems were found to be technically efficient.This implies that about 94% of the health systems of the sampled developing countries were technically inefficient (Cheng & Zervopoulos, 2014).

Efficient utilization of the health resources is the primary driver of interests to the study of health system efficiency of any country particularly the developing ones. The ever increasing health expenditures coupled with the economic downturn strengthen the effort on how to improve health outcomes within the limited health resources. Countries are conscious about both health outcomes as well as budget sustainability. This problem is not peculiar only to developing countries because Maisonneuve & Martins (2013); Medeiros & Schwier (2013) argue that the rate at which health expenditure has been growing in OECD countries is faster than its income growth. It is indicated that health resources are not properly utilized even in the developed countries because health system inefficiency deprived OECD countries more than two years life expectancy on average if health expenditure is held constant (OECD, 2010). Moreover, Asandului, Roman, & Fatulescu, (2014) assert that even though some developing countries have efficient health systems but majority operate inefficient health systems.

In 2011, it was estimated about US$ 6.9 trillion was spent on health in the world and 20-40 percent of the amount ended up being misused inefficiently. As a result, the state of health remained a problem especially to the developing countries (WHO, 2010 ;Global Health Expenditure Atlas, 2014). Besides that, the estimation of DALY[8] for all causes of diseases in 2012 by the Global Health Estimate (2014) highlighted that most of the DALY burden was experienced in developing countries than in developed countries. The observed burden of disease through DALYs is able to provide important information about a population's health (WHO, 1990).

Over twenty-six percent (26%) of total health expenditure in developing countries is from foreign development assistant for health. Moreover developing countries suffer about 92% of the global burden of disease despite the significant increase in the official development assistant for health inflows over the years (Moon & Omole 2013).

[8] Disability-adjusted life year (DALY) is a measure of total disease burden, expressed as the number of years lost as a result of ill-health, disability or premature death. This measure was developed as a means of comparing the overall health and life expectancy among countries.

To adequately account for the fund's donations for health, recipient countries (developing in particular) should pay more attention in evaluating and measuring their health system performance and their determinants. This is because efficiency measurement stands as a first stride towards the appraisal of a coordinated healthcare system, and represents one of the solid mechanisms for coherent auditing distribution of human and economic resources (Marmot et al., 2008b). Recently a study revealed that increasing spending on health sector might not improve health outcomes as long as the efficiency of the spending is insignificant (Grigoli & Kapsoli, 2013). However, measuring efficiency is necessary but not sufficient solution to healthcare systems problems because:

> "Measuring current levels of efficiency is only the starting point in seeking to improve health system efficiency"(Smith, 2012 p.4)

Therefore, determinants of health system efficiency became vital in solving health system inefficiencies. Joumard, André & Nicq (2010) argue that institutional qualities can significantly influence efficiency. Weak institutions undermined the health systems capacity of developing countries in producing appreciable health outcomes efficiently (Cockcroft, 2008).

Building on the intuition that institutions[9] play a key role in health systems performance, it is pertinent to unveil the state of some selected institutional factors as follows:

[9] Quality of institutions improves with the restrictions enforced on administrative powers (North, 1990).

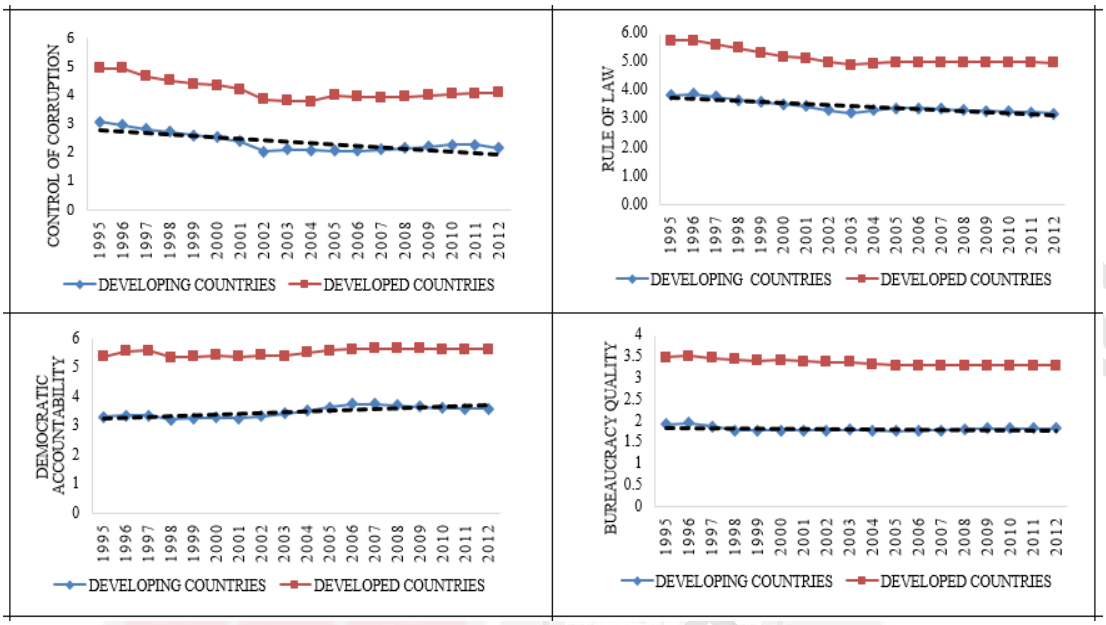

Figure 1.8 : Trend of Institutional Qualities in Developed & Developing Countries
(Data Source: International country risk guide (ICRG) corruption index published by the PRS Group)

Figure 1.8 indicates the trend of institutional qualities index measured from 0-4 and 0-6 respectively. Zero point means poor quality and it improves by going up to the maximum points (4 and 6). The rule of law, democratic accountability, and control of corruption index were measured from zero to six points while bureaucracy quality was measured from zero to four. The rule of law and control of corruption show a decreasing trend which means the quality is deteriorating over the years, conversely democratic accountability shows an increasing trend and this suggests the quality improves as it moves up. However, bureaucracy quality has been in a constant stage over the years.

Institutional qualities are numerous, and the application of all in detail in a single study might not be possible because they are highly correlated as argued Knack & Keefer (1995). Moreover, control of corruption appeared to be the worst amongst the four institutions represented in Figure 1.8 because as both controls of corruption and the rule of law deteriorate over the time, the latter was still above half of the scale in 2012. The former deteriorates below half of the scale. For these reasons, disaggregated qualities have been used to represent the institutions even though the total of all as a single measure of the institutions has been considered for robustness. The corruption-health link also has some empirical support because;

> "…. corruption in the health sector has a corrosive impact on the population's level of health. ….. reducing corruption can improve health outcomes by increasing the effectiveness of public expenditure"(Hussmann, 2011 p.5).

Furthermore Azfar & Gurgur (2008) also argued that corruption has a significant negative impact on public health just as Vian (2008) suggested that the negative impact of corruption on health is pervasive. Moreover, there is a strong argument that improved health system efficiency is also the fundamental driver towards universal health coverage that enhances healthcare services efficacy and ultimately better health for all (Chisholm & Evans, 2010).

Efficiency study measures input vis-à-vis the expected output whereas health system performance is observed through efficiency measurement. Within this context, the up trending of internal and external resources for health over the years also left most countries with no option but to look into the transformation mechanism through health system efficiency determinants to ascertain their worth. As technical efficiency reveals how inputs are properly used for outputs, what matters under health systems efficiency is not the quantum of health resources but on what and how best those resources were used.

It is evident that institutional quality is not a health input but it affects the inputs. For example, if the health system operates in an environment of weak economic and political institutions, it may be difficult for policy- makers to influence the system to provide a more optimal mix of services, or to produce a given set at the lowest possible cost. Considering the importance of efficiency in public spending as discussed in Rajkumar & Swaroop (2008) and by building on the works of Evans, Tandon, Murray, & Lauer (2001), this study examines institutional quality as a function of health system efficiency in developing countries.

1.3 Problem Statement

For the past two and the half decades, the world has witnessed progress in its commitment to improving health outcomes. It is certain that the MDGs laudable targets is to reduce child and maternal mortalities by two-third and three-quota respectively. Though some countries have witnessed some progress, yet the average health outcomes particularly the rates of mortalities in developing countries are still alarming (Schnell et al., 2007). Although there is an improvement but the inability to meet 2015 MDG health targets, the high number of the mortalities remain an unsettled issue to the world especially the developing countries (Sachs, 2012).

In 2015, UNICEF report indicated that majority of the developing countries were not able to achieve their 1990-2015 MDG health targets (Figures 1.2A, B & C). Only 62 out of the 195 UN member countries that signed the treaty met the target. Impliedly 68% of the countries could not reduce the mortality target despite the noticeable national and international health interventions. Consequently, about 16000 under-5 and 12000 infants die every day, and these estimates are heavily concentrated in developing countries (UNICEF, 2015). Moreover, Bingham, Strauss, & Coeytaux, (2011) have reported that 99% of maternal mortalities are found in developing countries and most of the mortalities can be avoidable.

Moreover, studies on determinants of health outcomes especially child mortalities are available: Bhalotra (2007); Gani (2008); Anyanwu and Erhijakpor (2009); but studies on the health outcomes and global economic interdependence such as FDI is limited. It is expected that the ever increasing FDI inflows into developing countries over the years (figure 1.3D) should explain the state of health in those countries particularly the mortality rates. It goes along with the belief of some development theorists that economic integration through trade and investment like FDI improves human welfare and health through a rise in income via created employment and transfer of technology. On the contrary dependency theorists maintained that such relationships do more harm to the developing countries than good because FDI always come with some social and economic compromises. In-between the dissenting views, all things being equal, the purpose of this part of the study is to explore the indirect impact of the FDI on health outcomes (infant, under-5 & maternal mortalities) in developing countries .

Secondly, health expenditure claimed a significant share of government budget, private and donor health finances. The expenditure has been on the increase for decades as in 2012, the health expenditure per capita in developing countries was $329 as against $72 in 1995 (figure 1.5). It shows that the per capita health expenditure within this timeframe had increased by over 300%. Although there are many studies on the determinants of health expenditure which may be triggered by the persistence increase in the global health expenditure and financial crises but very few had focused on the environmental quality especially as the toxic gaseous emissions keep increasing over the years (figure 1.6). Nevertheless, it has been reported that people that are exposed to the outdoor air pollution are estimated to be one billion per annum and the financial implication of the exposure is up to 5% of GDP in developing countries.

Moreover, the per capita health expenditure and greenhouse gases raw data scatter plots in figure 1.7 give an ambiguous direction of relationship since it shows both positive and negative relationship within the timeframe. While the first and second sampled periods (1995-2000 & 2001-2006) showed a positive relationship, the third sample (2007-2012) showed a negative relationship. Based on this ambiguity, therefore, its shows that the initial direction of the relationship wears out at a point indicating a non-linearity tendency between the health expenditure and the greenhouse gases in developing countries. The study explores the nonlinearity tendency given the report that 80% of all kinds of diseases are caused by environmental feebleness (WHO, 2011).

Thirdly, efficient utilization of the health resources is the major driver of curiosity to investigate health system efficiency particularly of the developing countries. The continuous increase in the use of health resources coupled with the economic downturn strengthens the determination to have better health outcomes with the limited health resources. Developing countries suffer about 92% of the global burden of disease despite the significant increase in the official development assistant for health inflows over the years (Moon & Omole 2013). It is evident that health systems inefficiency syndrome is pervasive as it affects most of the developing countries (Evans et al., 2001).

Furthermore it was empirically evidenced that over ninety percent of health systems in 122 developing countries were recently found to be inefficient (Cheng & Zervopoulos, 2014). The inefficiency problem coexists side by side with the poor quality of institutions (Figure 1.8) in the developing countries but no study investigated the quality of the institutions as potential determinants of the health system inefficiency. While most studies were basically comparing the level of the efficiency among countries, it is pertinent to determine the factors behind the inefficiencies.

Hence, since the ultimate aim of a health system is to improve health outcomes with the limited resources, this study examines institutional quality as a potential determinant of the established health system inefficiency in the developing countries.

All issues raised above are in developing countries peculiarities. With the evidence above it is obvious that developing countries have unsettled issues about their health outcomes, health expenditure and healthcare system inefficiency.

1.4 Research Questions

The research is determined to provide in due course empirical answers to the following research questions:

1. What is the indirect impact of foreign direct investments (FDIs) on health outcomes in developing countries?
2. How relevant is environmental quality to per capita health expenditure in developing countries?
3. What is the impact of institutional quality on health system technical efficiency in developing countries?

1.5 Objectives of the Study

The main objective of this research is to investigate the impact of FDI, environment and institutional quality on health outcomes, health expenditure and health system efficiency in developing countries.

Specific objectives are:

1. To examine the indirect impact of FDI on health outcomes in developing countries.
2. To determine the impact of greenhouse gases on per capita health expenditure in developing countries**.**
3. To evaluate the effect of institutional quality on the efficiency of healthcare systems in developing countries.

1.6 Significance of the study

Unlike the previous studies this study contributes to the existing literature by unearthing the relevance of the global economic interdependence, environment and institutional qualities to health. When the previous studies concentrate on the direct determinants, this study explores the indirect relationship conditioned on a variety of factors. Although Nagel, Herzer, & Nunnenkamp (2015) studied FDI effects on health through income but important factors like education and poverty have been ignored and they basically used absolute values of the variables. This study uses rates instead of the absolute values and the reverse causation tendencies have been tackled by the technique of the analysis used. Unlike the previous studies, this study captured the indirect relationships conditioned on a variety of factors like income, education, and poverty. In objective 2, the impact of air quality on health expenditure has also been investigated through.

Regarding policy implications, as the world is fully committed in achieving the sustainable development goals, there is urgent need to find possibly all factors that determine health outcomes, health expenditures, and health system performances especially in developing countries. This study's novelty is the consideration of the global economic interdependence (FDI), environmental quality and institutions in determining health outcomes, health expenditure and healthcare system efficiency respectively. This can enable both public health policy makers as well as health allied agencies to proffer some solutions to the problem that causes many countries could not meet their MDG health targets. Thus, once these problems are identified, prudent interventions that can bring improvements which can lead to the realization of the Global Sustainable Goals (SDGs) will be socially and economically easier.

Specifically, this research will serve as a guide to both local authorities as well as international development and health donor agencies. It can also show the role of globalization (economic inter-dependence) and environmental factors on health outcomes and health expenditure respectively.

This study has an applied value since countries around the globe are struggling to make policies for the efficient administration of health systems and to improve public health. The research will also guide policymakers, donors and analysts to understand the factors that influence health system performance and how to improve it.

The health funding agencies whose aims are to monitor, evaluate and keep documents for future development assistance for health can also use the findings as a guide to channel more resources for health interventions. The realization of these objectives ultimately determines the ideals of health, environment and the economy. This is very important to the preparation of economic policies that will be capable of guaranteeing economic growth, dealing with diseases, environmental problems system inefficiencies and restoration of human self-worth in developing countries. Without addressing the problems identified above, it may likely be impossible to have

improved health outcomes, public environmental health policies and human development in developing countries.

Moreover, this research work will also identify and suggest means of allocating public health resources for better health outcomes, efficient health system and economic growth within the scope of the study.

1.7 Scope of the study

In research generally, scope is necessary. For this study it is divided into: conceptual scope, geographical scope and time scope. Conceptually, this study dwells on health outcomes, FDI, health expenditure, environmental quality (air pollutants); efficiency and institutional quality. Geographically, the research is confined to developing countries peculiarities depending on data availability under each objective. Based on data availability 83, 125 and 77 countries were sampled out for objectives one, two and three respectively. The sample selection was based on data availability.

The time scope for objective one and two is 1995- 2012, while the third objective covers 2005-2012 as constrained by the data availability.

1.8 Organization of the study

This study is organized into five chapters. The present chapter focuses on the introduction and background of the study. The latter part of chapter 1 discusses the problem statement, research objectives and significance of the study. Chapter 2 contains the theoretical and empirical reviews of the literature on the main issues of the study that include; FDI, health outcomes, health expenditure, institutions, environmental quality, and healthcare system efficiency. The third chapter presents the methodology of the study, data sources, models and their appropriate specification for the realization of each objective of the study. Chapter 4 discusses on the empirical finding of this study. The discussion will involve the interpretation and discussion of the empirical results for each objective and by each method, as specified in the models designed. Finally, chapter 5 is a summary of the thesis leads to an analysis of policy implications and proposed avenue for future research.

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