

The determinants of healthcare expenditure in African countries: A panel ARDL Model approach

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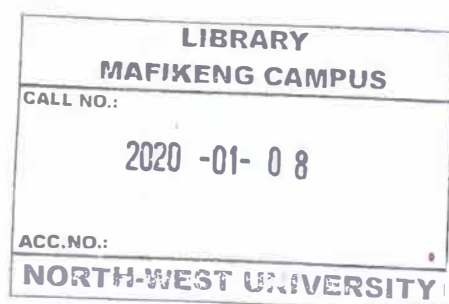
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ABSTRACT

Health care expenditure in the African region like in many other countries has been closely linked to the financial health of the economy. This relationship draws a link between economic growth and health care expenditure, which is what, is being explored in this paper. This paper investigates the determinants of health care expenditure of different African countries. The data used selected 20 African countries that fall in the sub-Saharan sector. A panel autoregressive distributed lag (ARDL) model was adopted in the study to assist in understanding the dynamics of health care expenditure. Annual data for 20 sub-Saharan African countries was used ranging from the year 2000 to 2016. Explanatory variables used in the investigation are gross domestic expenditure, population, mortality rate, inflation and income per capita. The study found evidence of cointegration among the variables, with the aid of the Wald test and the Pesaran critical value. The long run estimates found that population had a positive and significant (0.0001) relationship with health care expenditure. The mortality rate also had a positive and significant (0.0016) relationship with health care expenditure. Interestingly the main independent variable, gross domestic product which is a proxy for growth was found to have a positive yet insignificant (0.6300) relationship with health care expenditure. This was used as a proxy as it sets out the growth structure of many variables within the economy. Another gauge for price sensitivity which is inflate rate also had a positive yet insignificant (0.2345) with health care expenditure. Lastly gross national income was found to have a negative and insignificant (0.0643) relationship with health care expenditure. This former variable would have been an index of the affordability of health care for households. From the results a way forward, would be for government to intervene in the population changes within the economy. A law that stipulates the number of children every family can have, this decreases the dependency on government and decreases poverty in the already struggling families. Although economic growth shows to be insignificant, the positive relationship could suggest that by stimulating the economy, the people are left off better and having increased access to resources so as to better their general living conditions. The same case could be argued for a negative and insignificant relationship of gross national income, the higher the cost of health care expenditure and the more it takes away from household income. By subsidizing small to medium income earners, there can be pressure released from the expenditure cost of health care in many households.

Keywords: Healthcare expenditure, Autoregressive Distributed Lag (ARDL), Gross Domestic Product (GDP), Panel data, Africa.

DECLARATION ON THE COPYRIGHT

I, the undersigned Keamogetse Keepile, hereby declare that this research paper is my own original work and that all references have been acknowledged to the best of my ability that this document has not been previously submitted at any university for a similar or any other academic qualification.

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Date:/...../.....

DECLARATION ON RESEARCH ETHICS

I, Keamogetse Keepile, student number: 24382302, hereby declare that I am fully aware of the North West University's policy on research ethics and that I have taken every precaution to comply with the regulations.

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ACKNOWLEDGEMENT

Firstly, I would like to acknowledge the grace and mercies of the almighty for without them this work would not have been possible. The lord's guidance throughout this academic journey has indeed been greatly invaluable. Further, I would like to thank my parents (Keseabetswe and Tshiamo Tlatsana) for continuously being my motivation when it comes to bettering myself. To my friends and family who have encouraged me to always work hard, to not give up even when things seem very difficult, I am appreciative.

Lastly, I would like to thank my supervisors Prof. Y. Khamfula and Prof. G. Mah for their endless guidance through-out this research process. To the North West University merit bursary scheme for funding this journey, I say thank you.

DEDICATION

I dedicate this piece of work to my family and friends; may they always strive through the times we have not imagined for ourselves and know that with faith and love, many things can be achieve

LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
AIDS	Acquired Immunodeficiency Syndrome
ARDL	Autoregressive Distributive Lag
ECT	Error Correction Term
GDP	Gross Domestic Product
GNI	Gross National Income
HET	Health Care Expenditure
HDI	Human Development Index
HIV	Human Immuno-deficiency Virus
IMF	International Monetary Fund
IPS	Im-Pesaran-Shin
LLC	Levin-Lin-Chu
LRAS	Long Run Aggregate Supply
MDG	Millennium Development Goals
NHI	National Health Insurance
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
PPP	Public Private Partnership
ReHMIS	Regional Health Management Information System
SSA	Sub-Saharan Africa
UECM	Unrestricted Equilibrium Correction Model
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO THE STUDY

Economics as a social science focuses on the choices of consumers with regards to the limited or constrained resources they have at their disposal. The aim is to maximize output or consumption with the limited resources at hand, achieving this is difficult when there are other variables putting a strain on your decision-making process. Africa as a continent is experiencing this exact dilemma, having limited resources for production and also facing several socioeconomic problems. This strain makes it difficult for the implantation of any strategy or objective. On a specific level, looking at a constrained budget for an economy, sectors that are regarded bigger and of more importance will be allocated the biggest portion of the budget. Health care, unfortunately, tends to be ranked low among other national priorities in the drawn-up budget. On average, African countries allocation to health care as a portion of GDP is around 5%. For this reason and many others that will be explored in this research document, the study focuses on the African continent and closely to 20 Sub Saharan African countries with different economic variables. The meagre allocation of capital makes it impossible to cover the dire health situation in these countries (Kasaje, Sempebwa & Spencer, 1987). The countries analysed in the study are Burundi, Benin, Burkina Faso, Botswana, Central African Republic, Comoros, Ghana, Guinea, Gambia, Equatorial Guinea, Kenya, Liberia, Lesotho, Mozambique, Mauritius, Namibia, Swaziland, Seychelles, South Africa, and Zimbabwe.

Health care is a concern of every nation, a priority to the different governments. This responsibility lies on the hands of the government, at different levels. These different levels of the government are responsible for a varied number of service provision in the health sector. The local government is available for the provision of primary basic health services which include vaccination, preventative measures, and medical dispensaries. The provincial government has more responsibilities and greater cover in terms of region, it provides more catered services in the referral and general services and further on to specialist centres. For there to be a success in these levels, there is a need for efficient use of resources and all other aid provided in this sector. Health care does not only relate to medical supplies, access to medical professionals and innovative research and development solutions (Preker & Langenbrunner, 2005).

Proper access to basic human rights is of great priority to complement good health care service provision. The need to ensure that all have access to clean water, sanitation and sustained food security is just as important as receiving the right health care service. In the presence of compromised access to these basic rights, there is concern for increased health issues. This is the theme for most African countries where health is a concern. In a 2016 report by World Health Organisation (WHO), it stated that in the year 2012 at least 871 000 deaths were recorded and found to be due to the consumption of contaminated river water. Out of these deaths, 45% of them were recorded in the WHO African region (WHO, 2016).

Africa being a large continent, the riches within it are just as diverse as the misfortunes within it. Socioeconomic dynamics like poverty and social lifestyles play a large role in what disease burdens are faced within this continent. There is no specific poor/rich man disease, there may be a great number of cases in one country but that does not dismiss the existence of others. Although Africa is diverse, it has had the greatest challenge with communicable diseases such as malaria, tuberculosis and Human Immuno-deficiency Virus /Acquired Immuno-deficiency Deficiency (HIV/Aids). The greatest threat being HIV/AIDS, in which Africa was reported to bear 66 percent of the global burden by WHO. Poverty, a catalyst to many socio-economic problems, continues to grow concern for ill health and access to health care facilities. The transmission mechanism, which shows high connectivity between factors, is of great use when you want to trace the severity of poverty in an economy or even household. Consider this for example; a poor household has no income, no proper access to resources, in the event that a member of the household gets ill, inadequate capital (money, motor vehicle) denies them the ability to access the best healthcare. If they arrange finances to pay for services, they are far below than a household that can pay with ease out of pocket for any service required (Todaro & Smith, 2010).

The lack of access to resources highlights the need to address inequality in these states for there to be any kind of efficiency in healthcare provision. There is high inequality in the low-medium resourced countries, which heightens the concern of adequate access to any kind of resource (United Nations Development Programme, 2014). Betchoo (2016), in his book Public Sector Management, touches on how human welfare cannot be improved in developing economies when there is no sustainable growth. This brings in the complexity of interrelated social ills that hinder the overall growth of an economy and its people. Socioeconomic inequality describes the disparities of access and accumulation of assets or wealth that can improve the livelihood of a person. Essentially if there is a lack of any kind in your life, you are at a

disadvantage of getting the proper resources for yourself and your family. As a result of people in emerging markets starting off on a low base in terms of access to resources, they are at a disadvantage in addressing all responsibilities requiring some form of capital. This brings into question how important economic growth can translate into sufficient health care expenditure. Subsequently, health issues in African countries are found to be under-addressed, they have long lag time in resolving matters and ultimately allow for more complexities to grow. A study from the United Nations Development Programme reported that the health index of most African countries ranks much lower than most developed states. By virtue of this study an argument that says people in these low-ranking countries will have a shorter life span than their counterparts is understandable.

1.2 PROBLEM STATEMENT

According to a global burden disease study conducted in 2017, the African region bears a great burden of deaths caused by communicable and nutritional diseases. This disease burden in the year 2017 accounted for 47.24% deaths in the sub Saharan African region. Despite the high rate in disease burden, these regions continue to attract low levels of global aid which sits at a mere 1%. Funding from the public sector is highly irregular in the continent at large. The Abuja Declaration saw as many as 53 countries in Africa commit to spending 15% of their GDP on health care, yet many still continue to underspend and disregard the devotion (The Economist Intelligence Unit Limited, 2011). This initiative was an interesting measure that could help improve the handling of expenditure, related and specific to health care. Due to irregular and strained health care expenditure, there has been an increase in out of pocket spending. This form of funding is a strain for most of the African countries due to being low-medium income earners. In the case of Tunisia, out of pocket funding for health care expenditure is as much as 50%, putting a great burden on the poor (World Health Organisation, 2017). A great disease burden has high demands, in skilled labour, adequate resource allocation and most importantly high and efficient use of capital. A call for the African region and other development partners to invest more in health care is of great importance. The need to employ these funds into projects that have already started and found to be bearing fruit is important. Health care investment is ploughing resources into areas that can improve health care. Investment in research and development allows for a break-through to be made in the leading problematic areas in health. Payment to workers, enables smooth operations, lower waiting periods in health facilities and increases the rates of improved health care as a result of available health

practitioners. This involves investing in proper sanitation, water, proper governance, women empowerment and other cases relating to improved welfare.

At least 50% of the African population has no access to modern health care facilities in their regions and as many as 40% do not have proper access to clean water and sanitation (Kasaje et. al, 1987). This can be an initiative that could develop from the implementation of the Law of increasing state activity. This law highlights the importance of government intervention in a growing economy. As an economy develops and grows in its functions, the government is anticipated to be more involved. Through the stages of development, employed in the aforementioned law, the government is expected to intervene intensely in the second stage, identified as the period of industrialisation. The first stage requires the provision of basic needs for the people, secondly, the need for public resources through industrialisation and improved infrastructure is required. This second step is where social service providers such as education, welfare, and health care are incorporated and are likely to bring social and economic development.

In conducting this study, it was clear that health care is not a country-specific issue, but rather a continental issue. This matter requires for many to come into consensus about what is of great concern and importantly how to go about solving and combating this ill going forth. Initiatives aimed at combating poor healthcare are available and it is of great priority for those interested, to see the plans through for there to be a fruitful and pleasing end. The Abuja Declaration saw African countries pledge themselves into dedicating a 15% portion of their GDP into health care expenditure. More than 10 years have passed since this pledge, and the success story is not the same for all the 53 countries in the continent. With everything being the same, results would be positive on all spheres, but due to different socioeconomic problems and mainly finical differences, this has not been a great tale (Kasaje et al, 1987). Many are still far from reaching the target and others have even decreased their said health care budgets. A glimpse of success has been evident in countries such as Ghana, Rwanda, and South Africa. These specific countries have continued to increase health expenditure as a percentage of GDP and moved to make universal health care available to its people (The Economist Intelligence Unit Limited, 2011).

These efforts are welcomed from the international community and the local community; those well-known include US Aid and one other that continues to be implemented with continuous reinforcement is the Millennium Development Goal. The Millennium Development Goals

(MDGs) are a set of 8 goals which were adopted by the United Nations in the year 2000. The aim of setting these goals was to bring about development in many of the nations that had committed themselves to these goals. The year 2015 was where a measure would be taken to see the progress that would be achieved. These goals cover many aspects that when dealt with can be great contributors to economic development. The inception of these goals was the effort of different think-tanks that revolve their mandate on economic growth and development. The World Bank, the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD), are among the agencies that played a great role in the creation of the MDGs.

Economics has identified human capital as a vital resource to economic growth and development in several levels of the economy. The productive investment in people's abilities is important with special emphasis in health capital that allows workers or population, in general, an increased life span, productive life in the workspace and elsewhere (Todaro & Smith, 2010). Essentially what would be best for governments to do is ensure that health care is a priority from birth, so as to curb the high rates of infant mortality rates. In doing this a significant move in the fifth goal of MDG (reduce infant mortality), would've been achieved or reduced significantly. Sub-Saharan Africa (SSA) is struggling particularly with this goal; it is far behind its set target which is to reduce child mortality by two thirds by 2015.

Past research has been mainly focused on the causes of poor healthcare in the African continent; this is a great effort in trying to identify causes and highlighting how they can be combated. By identifying the challenges in finance management relating to healthcare, it allows for aid to be specific to the solutions it brings. Another factor that can be discussed or brought forth to try and eliminate or further understand the cost line that comes with health care is determining the factors that drive cost in African countries. By identifying these factors, the study will allow researchers and policy writers to understand the changes in the cost line of healthcare in Africa. If high unemployment is a factor that causes an expenditure to decrease, it implies that most African countries will spend less as most of the population here is unemployed. This study will try identifying the determinants of healthcare expenditure in the African continent, with the use of panel ARDL model that will draw relationships between economic variables.

1.3 AIM OF THE STUDY

The main aim of this study is to identify the determinants of healthcare expenditure in African countries such as Botswana, Liberia, Zimbabwe and Seychelles. This is achieved through the following objectives:

- To examine the determinants of healthcare expenditure.
- To discuss the challenges faced in the health care sector.
- To suggest policies concepts that will improve health care expenditure.

1.4 RESEARCH HYPOTHESIS

- H_0 : socioeconomic variables do not have an effect on health care expenditure.
- H_1 : socioeconomic variables have an effect on health care expenditure.

1.5 SIGNIFICANCE OF THE STUDY

This research study is motivated by the importance of underpinning the determinants of health care expenditure in African countries. By underpinning the variables that move health care expenditure it helps to explore measures that can be implemented to improve it for the better and stem out the unnecessary functions in it. It is also encouraged by the intent of contributing more to literature around health care expenditure. The cost of health care expenditure needs to be understood thoroughly for there to be seamless operations in the health care sector and cut out wasteful expenditure. The study will provide more understanding of the variables that contribute to the changes affecting the cost line in the health care sector and the national budget as a whole. In trying to find solutions to how to efficiently spend capital around the health care sector, this study aims to help draw attention to other factors that drive health care expenditure. By looking at how growth and other macroeconomic feeding variables tie in with expenditure, the study will assist other researchers and students to understand the relationship between these variables. Furthermore, the results of this study will provide some insights on how a panel ARDL model can be used to draw relationships between many economic variables for multiple countries.

1.6 LIMITATIONS OF THE STUDY

There was a lack of literature specific to the research study and those specific to the African content. Theoretical literature that could explain the variations in health care variables were also limited. In collecting the panel data for the 20 SSA countries, there was difficulty in finding denominations that were the same for all countries.

1.7 ORGANISATION OF THE STUDY

The study is ordered into six chapters that follow the introductory chapter. Chapter two will highlight the high-level discussions around health care in African countries and also present some measures that have been taken to combat poor health care. Chapter three introduces the literature review into the study, where relevant theories and previous works will be discussed to shed more light on the dynamics around the study. Following this will be Chapter four which highlights the research methodology of the study. This section will highlight what data is used and under what scrutiny it will be put under to arrive at a solution or result. Chapter five brings in the interpretation of the results obtained in the previous chapter; it identifies the uniqueness of the data. The last chapter of the study concludes the research and makes recommendations on how to improve going forth.

CHAPTER 2

AN OVERVIEW OF HEALTHCARE EXPENDITURE IN AFRICAN COUNTRIES

2 Introduction

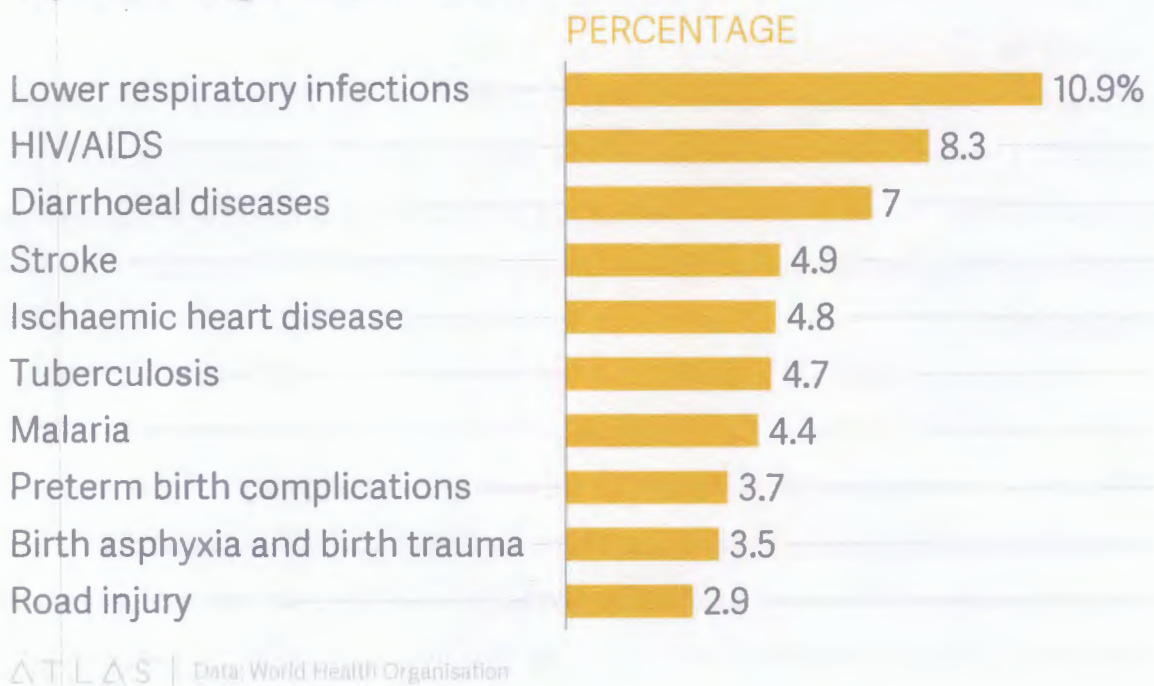
In this chapter, a literal discussion around different health situations in African countries will be discussed. This will further give insight into the kind of challenges that are experienced in these states and may draw differences or similarities between the countries. Lastly, a look into the different government interventions that are unique to the different countries will be sought and detailed out.

2.2.1 Healthcare situation in the various African countries of this study

Research from around the globe continues to show that health in Africa countries remains a high concern and has over the years required an increase in health care services, budgeting, and facilities. Health care services can be provided in the private sector and the public sector, the former is the function or responsibility of the government and has unfortunately been synonymous with negative service offerings. The public health care service is characterized by poor facilities; shortage in staff, long waiting periods to see practitioners, apart from these negatives, the public (households) has been surveyed and found to prefer private health care service over public servicing. This has seen an increase in the services provided by the private sector and also the financing that goes into it. A 2008 study by the McKinsey Quarterly found that at least 60% of health care expenditure in Africa was privately financed and offered by private providers (Grigorov, 2009). Another interesting fact noted in this study is that although Africa is characterised by high poverty and inequality, these private health care services were also reaching even the marginalised. Many countries were found to have a high dependence on private health care even though they registered amongst the lowest quintiles. Countries like Nigeria, Kenya, and Uganda were found to have 40% of its people benefiting from private health care offerings (Ghatak, Hazlewood & Lee, 2008). This level of dependency was expected to increase as these economies experience growth economically and in the health care sphere in general. The growth in the private service provision is a direct result of people having an improved experience, there is improved experience for the patients, quality services, facilities, and product.

Figure 1: Mortality statistics

Top 10 Leading Causes of Death in Africa



Source: www.worldatlas.com/articles/the-leading-causes-in-the-african-continent.html 2012

Figure 1 profiles the disease burden faced in the African region, HIV/AIDS, malaria and other communicable diseases are those that stand out in their statistics. These diseases are the highest threats in most sub-Saharan-African countries. Quite interesting to note is that, with enough education around these diseases and adequate use of health resources, these numbers could decrease tremendously. The proper provision of sanitation, clean water, and women empowerment can allow for many countries to shift their worry to more concerning disease profiles (World Health Organization: Africa Region, 2010).

Consequent to low levels of expenditure on health care in African countries, there are problems that arise from this. African countries have been identified as spending on average only 10% of GDP on health care; this is an aggregate of private and public health care expenditure with public sector contributing less (Novignon, Olakojo & Nonvignon, 2012). This low allocation to health care is evident in the poor infrastructure, health facilities have, making it difficult for the simplest of services to be provided. The lack of adequate health budgeting in these emerging countries pushes households into financial woes in their effort to cover health care costs. Through, out of pocket payment, household are faced with decisions of using disposable income for health care costs instead of on other household goods. Another area that these costs

can take away from is savings, or by last resort require for loans to be taken. This method of payment directly puts a strain on household finances and subsequently increases the inequality faced in accessing healthcare and creating savings for the future as indicated by Alam & Mahal (2014).

2.2.2 Challenges faced in the health care sector by African countries

The efforts that go into curbing and reducing high health risks and issues continue to be faced by many challenges, making it difficult to bring the much-needed help to patients or those providing health services. Challenges come in the form of lack of capital to fund projects, unethical conduct from health care institutions, corruption in the capital injection process and at times counterfeit products.

Although SSA has pledges from foreign programs, there is still a struggle to fund all projects that fight challenges in the health sector. This foreign aid has been found to have little impact on growth, but some changes have been identified in the short term. The level of dependency on aid by emerging countries has also come into question. The high dependency on aid has come to retard the economy and has worse put it into deeper debt; this finding was reported in a study by Ilorah, 2013. The level of dependency of Africa on aid is evident in their budgeting; most countries cannot budget without having projections of the expected cash inflow from lenders. This mind-set has left many of the African countries with lack of capital generative resources within the economy that can create a continuous inflow and cut away from aid. SSA region requires reform in its operations and development for there to be high independence and sustainable growth within all sectors and servicing in the economy.

A concerted effort between the government and the private sector is one intervention that has been drawn up and implemented in the health care sector. The effort of the two in bringing together resources that can help decrease disease burdens and other diseases is a great effort that has at times been met by negative and unethical conduct all because some participants get greedy and are self-serving. A challenge faced in public-private partnerships (PPP) is one of unethical conduct from practitioners and other providers and that of inconsistent service. These partnerships differ from general public health services in that here, there is a need for profit making and also proper service. The line of providing good services is erased by that of greed and looking after the bottom line. Practitioners are found to provide counterfeit products in efforts to enrich themselves; providers become money hungry forgetting about the health of

the patients. In the case of public service providers, they are notorious for providing poor inconsistent service and practicing unethically due to uneducated staff or ignorant staff. A big mistrust of the two is rooted in one or the other being self-serving, ignorant and practicing unethically (Ilorah, 2013).

2.2.3 Measures taken by the government in relation to the healthcare

In trying to reduce the burden of the health care bill, different governments have come up with innovative ideas that can do this. These measures are set to fast track the reduction in SSA health issues. One such measure is the introduction of national health insurance (NHI), partnering with private entities to pursue initiatives and changing regulation around how health care costs charged to consumers can be reduced.

The introduction of the NHI is an effort by the government to lower the health bill burden on its people and to also provide a universal insurance fund. The idea behind this insurance is that equal services are provided to the poor and the rich, no entitlement and finance accessibility comes between getting proper service and your economic stance. This intervention by the government can cut the inequality between people and takes pressure away from the spending power of the poor, as less capital will now be committed to health expenditure. The NHI initiative does take away some pressure from the consumer or patient but will still see them pay to access the insurance products.

The capitalization of this fund still lies with the household, as this remains to be a government product funded through taxation. Although the out of pocket cost for health may decrease, there is still a portion of income that will be devoted to the NHI. Due to most of the SSA countries falling between the low and middle tier income level, this change will be a drastic change to the already strain income levels. Slow economic growth and general negative sentiment around these regions makes one question whether this solution is viable as funding will face tremendous pressure (Department of Health, 2015).

The best care comes at a cost and this is what has kept the rich at an advantage compared to the poor who cannot afford expensive treatment and services. The reliance on out of pocket services will take time to die out; this implies the same for dependence on private health insurances. Although NHI is still in its infant stages, it has caused a stare and scare for insurance providers, due to the NHI providing a standardized service to all people. It will not

make sense to pay more to a private practitioner when you can get adequate services at a lower cost. This intervention will be introduced in stages so as to not confuse the consumer and also to allow for seamless follow through and implementation by the different health facilities and policy makers (Department of Health, 2015).

Other measures have been implanted on a continuing basis, although not as drastic as changing the financing model of health care, small initiatives to drive awareness and increase sustainable systems are worth noting. Simple programmes that are driven out into communities that aim to educate the locals on healthy living and managing their conditions, contribute to fighting the health scourge that is in Africa. By educating the community, they become empowered to improve their lives and those close to them. By having control of your lifestyle, you cut away illnesses that can be avoided and thus improve. Health initiatives and innovations should not be taken for granted as they can improve lives in the long run. Countries like Cambodia, Papua New Guinea have benefited tremendously because of vaccination initiatives, which have seen declines in malaria incidents and other diseases (World Health Statistics, 2017).

Integration of the above-mentioned interventions can also be done so as to increase capital and also deliver initiatives that directly service the people. The effects of PPPs can be fast-tracked by such collaborations. Botswana has these partnerships that have allowed for increased capital and ultimately an effect on health conditions in the region. Collaboration between the private sector and government has seen a commitment of US\$50m run over 5 years that is sourced to improving healthcare systems people (The Economist Intelligence Unit Limited, 2011). The success of these initiatives also depends on how the economy is performing, a strained fiscal stance will see government and businesses in the private sector struggle to contribute to all functions.

The government continues to be present in the fight within the health care system. Difficult as it may continue to be due to constrained budget in Africa, there are still actions that are drawn up and implemented. Cost-cutting measures, improving relations with different stakeholders and improving the health care institutions through investment are noticeable measures government continues to take in improving health care.

2.2.4 Health care in the context of Africa

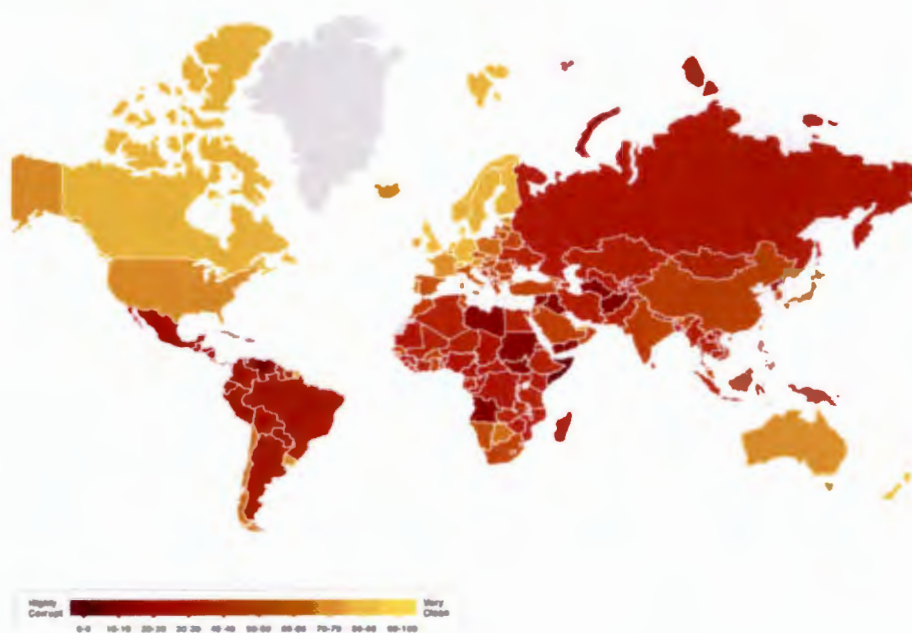
Africa as a continent has through-out many years had a high disease burden compared to other parts of the world. A large number of deaths within the region are caused by factors that can be combated or treated before death. Kirigia, Preker, Carrin, Mwikisa and Diarra-Nama, 2006, in their study attribute this to the low coverage and weakness in the healthcare system. As a result of a deficiency in the system, Africa bears the disease burden of communicable and non-communicable diseases. In the year 2005, global deaths were recorded at more than 58 million people, and out of that number 10.9 million were from the WHO African region. Out of that number, 19% of the deaths were as a result of HIV/AIDS, 10% from lower respiratory infections, 8% were malaria caused and 2% were as a result of low birth weight. These statistics from WHO (2007), highlight the severity of communicable diseases in many of the African regions. It is important to highlight that the problem is not only due to low coverage and weakness in the health care system, but that it is deeper than that.

Decision making in this specific matter is of great importance, therefore governance is required to be forth running on these matters. Governance and leadership need to be proactive in planning, managing and implementing policies that govern the healthcare system. Most African regions have good infrastructure, above average labour and some resources that can sustain growth in the health care sector but find they are unable to do so as a result of wrong leadership. In this test of availability of resources and lack of skilled leadership, there is a high inefficiency of resources. In the case where leadership has no legitimate strategy to bring about efficiency in the service, it ultimately drills down to affect household and displace them. This causes high misinformation for patients, in them being aware of new burdens or them knowing how to protect themselves from many of the preventable diseases. The most marginalised people are in rural areas, where great lack of most resources is a norm and a contributing factor to continued ill health.

Although most African countries have cut away from oppression and colonisers, that would have continued to marginalise people of colour, it still faces marginalisation from its own through corruption and self-enrichment. A study conducted by Kirigia et. al (2006) shows that more than 50% of the population in the African region lack proper access to essential medicines. The high levels of inequality and corruption take away resources from those who desperately need them. The theft and embezzlement of resources continue to happen at high levels, even the corruption index integrated by Transparency International indicates that. The illustration below shows the extremes of the corruption levels in the public sector on the

African continent and other areas of the world, where dark reds mean the most corrupt and the opposite is true for the yellow (lighter) colour. Not only does corruption take away actual resources from the needy, but also takes away the trust people have put in the different public service providers in their regions. The illustration below shows a corruption perception index which shows a clear indication of how trusting people have become in the institutions that are meant to help them.

Figure 2: Corruption Perception Index



Source: Visit www.transparency.org/cpi for more information

When the administrative tasks and resource access are at fault, it is of no surprise that it will spill-over into finance allocation and implementation. Aid and capital allocation in these regions are at low margins due to geography, and demographic dynamics. Not only does Africa face financial woes but it also faces high unemployment (mostly in youth), low levels of innovation, high inequality and a high cost of living. All these factors and many others cause for access to health care to be expensive and unequal.

The health care bill in SSA is quite low in comparison to other economies belonging to the OECD. This is a direct function of the economic dynamics in these economies. Africa is home

to low-income countries that have a low tax base. As a result of a continued low tax base, there is not enough revenue to spend on what the economies require. In the year 2009, these countries spent an average of 6.1 percent of their GDP on health care, 3.4 percent lower than the OECD countries. In more quantitative terms, low-income countries spend only \$25 per person on health care compared to \$4600 per person in the high-income countries (International Monetary Fund, 2011). The disparities in these numbers are a clear indication that SSA countries spend is alarmingly insufficient. This figure to a certain extent could be a giveaway of how and why Africa has a high disease burden. Economic growth from the above discussion is paramount in the facilitation of funds in the health care sector and many others. The need for reliable funding is important, this requires for economies to grow at constant exponential levels to keep up with the increasing costs of health care. According to the World Bank, the growth rate of SSA on average is 3.6 but has been revised several times in the past years, on average to the downside. Perhaps in the presence of better growth as projected by many institutions, Africa, in general, could see more GDP growth, but health care expenditure would still remain at a high cost.

Low-income countries are at a disadvantage in their search for alternative funding due to their high dependency on the primary and informal sector. These specific sectors in the economy make it difficult to have sufficient collections of revenue from the workforce. Not only is tax collection difficult because of poor systems but also because those revenues make up a small amount of GDP. The way informal markets are set up, they generally don't allow for insurance contributions for the workers. Employers want efficient workers at a low cost, the need to save every penny to grow the business is more important. Aside from the cost-saving measures, most of the population in low-income countries have low education and high unemployment levels. Other options to lure in more capital to increase health care expenditure ought to be sought outside the usual tax collections. In an effort to curb poor health and also increase revenue collections, governments have sought to tax high sugar goods and increasing the tax on demerit goods (Wagenaar, Salois, and Komro, 2009). Low-income countries are also characterized by being high consuming countries thus this could help increase tax revenues. Although this is a soundproof plan, it generally takes time to materialize into sustainable tax revenues and also in the lifestyle changes and eating habits of people in these countries. Many of the African countries are enforcing renewed reforms to improve administrative measures in tax collections and general economic efficiencies.

2.2.5 Measuring health

Health to this day cannot be measured or quantified in overall units for the whole population. What has been done rather, has been to break it down into sections or put expectations on what is desired as an achievement. To put a health measure in a quantitative output does not tell the actual story of what is happening on the ground. A good or clean bill of health cannot only be determined as the physical well-being of a person or that of citizens, but there are other factors that have to be considered as well.

A few measures to assess the health of nations have been put in place. To do this, factors such as life expectancy, infant mortality rates among others have been the most reliable. These are the most reliable because they measure how long a person can live against all factors that they are faced with. This measure is applied in many countries because it can be disproved by actual data, which most countries make accessible for understanding. Although this is a method that has been most relied upon, there are countries that have used data from the number of lost work days that people have clocked in and self-rating of workers.

A well-known measure that takes an effort to assess health is the human development index (HDI). The HDI is a measure used in comparison with the socioeconomic development of different countries. What it does is to calculate a rate that will be used to determine whether a country has high or low human development. In calculating the HDI, its function looks or incorporates determinants like education, health and real income per-capita of the citizens. A ranking of 0-1 will be placed according to the results obtained and will determine whether a country has high or low human development. This is achieved by including social factors and going on a micro-scale to explain the changes and differences in different countries. Assessments done through comparing income levels like the Gini coefficient aren't as precise as the scale that HDI uses.

Most of the high economically developed states tend to have a higher HDI since they are not faced with circumstances that will limit their health care expenditure. Countries like The United Kingdom, Canada, and Costa Rica have rankings above 0.7 which is really good. Those that have been previously colonised or are classified now as low-income countries (Ethiopia 0.389 and Rwanda 0.460) are likely to have low HDI as a result of lack of expenditure in health, education and other variables (Human Development Report, 2009).

Life expectancy is also an important measure that shows differences in health outcomes of health expenditure of a country. It highlights how good the well-being of the people in the

country is. For many years during war-time, the life expectancy was expected to be low due to several men dying at high rates. In most recent years there has been an increase in the life expectancy of many countries as compared to the times of war. In 2007 for instance, Afghanistan had a life expectancy of 43.6 and has seen an increase to 60.72 years according to 2015 data. Although this is a country that is still faced with much turmoil, there is an increase in the number of years its people are expected to live. According to the World Bank, African countries like Kenya, Uganda, and Rwanda have an average of 60 years in their life expectancy.

All the aforementioned factors that can be used to assess or measure health are important to look at so as to have a broad image of how well countries are performing on their health page. To seek answers with the use of only one variable will paint a vague image of what is truly happening. The interaction of the variables is helpful not only in understanding health outcomes better but also in understanding how to join forces in the event of compiling a budget that will be intended at improving health outcomes for the people. Education is again highlighted as a very important factor when assessing health.

A high HDI is reflective of how well a country is doing on so many levels, the index also being a socioeconomic measure is an important sign of how the country is doing socially and economically. These indicators when used side by side can help guide a country as to where it is lacking and where else it is overcompensating in an effort to better itself.

THE MILLENNIUM DEVELOPMENT GOALS

The Millennium Development Goals (MDGs) are a set of 8 goals which were adopted by the United Nations in the year 2000. The aim of setting these goals was to bring about development in many of the nations that had committed themselves to these goals. The year 2015 was where a measure would be taken to see the progress that would be achieved. These goals cover many aspects that when dealt with can be great contributors to economic development. The inception of these goals was the effort of different think-tanks that revolve their mandate on economic growth and development. The World Bank, the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD), are among the agencies that played a great role in the creation of the MDGs. These goals were developed in consultation with developing countries, to ensure that the African specific problems are addressed.

The first goal of the MDGs is to eradicate extreme poverty and hunger, its target by 2015 was to half the number of people who lived on less than one dollar a day. Achieving universal primary education is the second goal, with a target of ensuring that children finish off their whole primary education. What economic development highlights as a phenomenon is that these goals are interrelated for there to be a great success. An educated child is said to know more and thus make wise general life decisions. In an economy where economic development is desired, the promotion of equality and the economic emancipation of women are always in sight. It is not a surprise as it comes in as the third goal, aimed at eliminating the disparity in the education system. With just the three mentioned goals, it is clear that there exists an interrelation among the goals.

An educated and emancipated mother knows better, she knows how to feed her children well in order to ensure their good health. A society that is financially liberated can fight poverty, through educating itself and thus breaking the legacy of family poverty. Poverty and illiteracy are major contributors to poor health; this then brings in the other goals and their targets. The other MGDs are reducing child mortality, improving maternal health, combating HIV/AIDS, malaria and other diseases, ensuring environmental sustainability and lastly developing a global partnership for development.

The intention behind these goals was to bring about economic development, but like any other suggestions or objectives, they have faced some criticisms. In their book, Todaro and Smith (2010), highlight some concerns surrounding the goals. One among these is that the goals are not ambitious enough with the set targets; critics say that the \$1 a day is too low. The other concern brought forth was the manner in which reports were made, where the goals were singled out instead of showing the strengths of how they could strengthen development. Not only were problems seen with goals that are set but also with those that were omitted from the list. Variables such as promoting human rights and finding solutions to increased global warming are overlooked as contributors to economic development.

Economic development as a phenomenon looks at two very interesting matters, development and improvement of people on a psychological level in the midst of fluctuations of monetary economic growth. The MDGs are a great way to show the fusion of these two and how they can bring much-needed improvement in the lives of the poor. If noted and implemented in the correct and just manner these could bring about development, economically, institutionally and

CHAPTER 3

THEORETICAL AND EMPIRICAL LITERATURE

3.1 INTRODUCTION

This section of the study presents different views on health care and expenditure, through theories. These theories give insight into how different factors affect the dynamics of health and growth in general understanding. The empirical literature follows, which will show observations and findings of other researchers. Theories that apply to this study like Wagner's Law of Increasing State Activity, Peacock and Wisemans Displacement Effect thesis is discussed and will be followed by the application of the Game Theory in the healthcare sector

3.2.1 WAGNERS LAW OF INCREASING STATE ACTIVITY

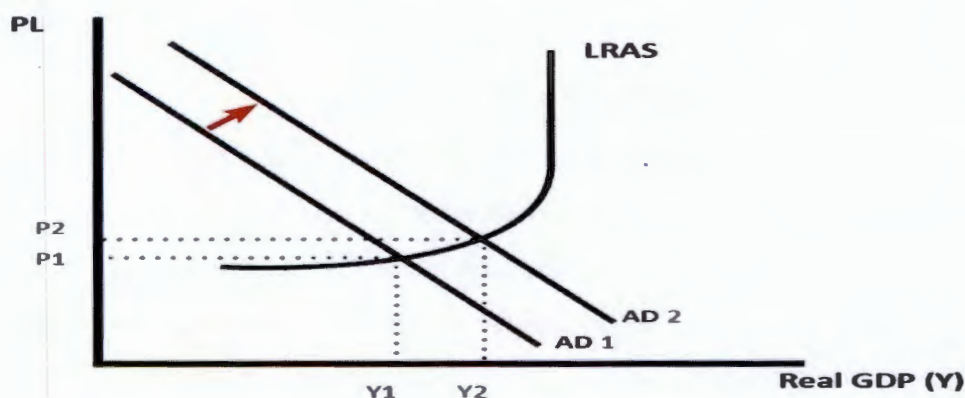
A closer look into determining variables that affect health care expenditure brings focus on the law of Increasing State Activity. The connection between how an economy and how it sets out its spending structures, could bring insight into the factors affecting health care expenditure (Kuckuck, 2012). Essentially for there to be fruitful expenditure, which comes in as an investment, there is a need for growth within an economy. The conjunctions that Wagner makes in his theory, give inklings to what factors contribute to a cost line. The law of Increasing State Activity helps in drawing assumptions that can contribute to government expenditure, and because health care is essentially a responsibility of many governments, it gives a forecast of what can contribute to health care expenditure.

Looking at the difference between public and private health care briefly, the main differences are the funding and access. In the public sector the government funds the services and offers this to all citizens of the country. Like with any other free good this service has a disadvantage of not being of the best quality and poor delivery or satisfaction to the users. Most public institutions lack quality facilities and lack quality operational practices thus disadvantaging the patients or users (Young, 2016). The alternative to this would be for patients to opt for private health care through insurance and private facilities. This must be said that it comes at a cost to the patient as payment guarantees access to quality health care services.

Adolph Wagner in his article published in 1893, developed a theory which looked at the relationship between economic growth and government expenditure. In his theory Wagner talks through how government intervention is determined by the state of the economy. This

means that as an economy develops over time, there will be increased state activity. In a simple quote that summaries the theory, it states that as real income of household increases, there is an expectancy of increased expenditure at the national level (Wagner, 1883). The need for government to be a part of increased and sustainable growth within the economy is highlighted as quite important. This theory brings into light the importance and dependency that people can have on the government as a provider of goods and services to them. The government in its function is meant to provide for its people and ensure that a proper standard of living is me.

Illustration 1: The effects of an expansionary policy

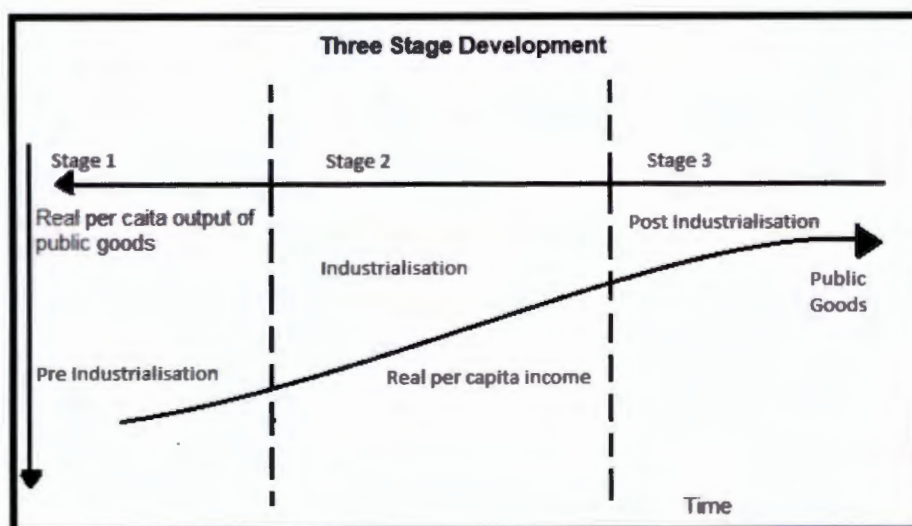


The provision of public goods by the government or the public sector as it is also named is an important lifeline for its people. For many of the countries in the SSA, there is a high dependency on government for many basic goods. In most of the African region, the public sector provides housing, social welfare, free education (level of education differs) and free healthcare. A mammoth task and responsibility to live to, but for the most part the governments do what they can with what they have. Another factor that plays into increased state activity is the tax revenue it collects from the workforce in the economy. Increased economic activity assumes there is growth in the workforce that will increase the tax base and thus determine the level at which the state can intervene. The opposite can be assumed to be true but could be found otherwise. The need for government to intervene at all times of the economic cycle is important and has been seen throughout the years. Expansionary and contractionary policy interventions are examples that have been implemented. An expansionary policy would involve an instance where there is increased state activity. Through increased expenditure of the state there is an increase in aggregate demand; low tax rates leave more disposable income. Above

is an illustration that depicts the effects of an expansionary policy that can come as a result of increased state activity, as Adolph Wagner's law suggests. AD1 is the original demand line; this shifts upward to AD2 as government becomes more involved and allows for increased demand and disposable income. In the case where government intervention decreased or is stagnant, the long run aggregate supply (LRAS) line would have a downward slope, indicating less disposable income and decreased aggregate demand as a result of inflated rates and prices.

Another illustration that can be used in explaining Wagner's Increasing state activity is the three-development stage. This illustration depicts the different stages that an economy would go through in its growth cycle and how the government would participate in that growth.

Illustration 3: Three Stage Development



The law uses stages of development to illustrate the regulations needed and the investments that the government should have in place to execute its plans. The implementation of this theory allows for thorough interrogation into the dynamic relationship of government spending and economic growth. It gives insight into country specifics and also allows for there to be comparisons between economies. The three stages of economic development have an impact on the level of government intervention through spending or investing. A study using this illustration found that for some economies increased government spending comes in at stage two or three (Kuckuck, 2012). It further found that out of the sample used in the study,

Wagner's law was validated in the early stages of economic development. The initial use of the development stages was for the industrialisation process but has become relevant in our time.

- Stage one: provision of basic needs such as food and shelter. In this stage, there is a greater presence of the public hand. This is because the provision of public goods is the responsibility of the public sector. State functions such as administrative departments and defence force will experience an increase.
- Stage two: collective consumption and increased per capita are experienced here. The needs of the society are now changing and there is general economic development. The state activity heightens further as there is a need for increased social services such as access to education, welfare, and health care.
- Stage three: At this stage, there is a need for industrialisation and growth in the standard of living. As a result, society has a greater choice and starts consuming more from the private sector.

In the midst of economic changes, the functions of the government will face changes or become more in line with what the economy requires in order to grow continuously. It will then ensure that market forces operate correctly and that there is regulation in public operations. Wagner's law has faced several testings at different times of the economy for many economies (Lamartina and Zaghini, 2008). The above-mentioned changes occurred in World War II, where the economy was faced with an increased role of the state in an effort to attain better results. For this reason and many others, this law has been incorporated in the works that look at cases where there is economic industrialisation. It is a theory that raises the question of which variable drives the other, is there economic growth before increased government spending. Although this theory has been of great use in the world, it still faces many challenges, many saying it is vague and leaves more questions than answers.

Although this law has been the underlying fundamental of many government expenditure growth theories, it faces some criticism as a result of how it was established and the assumptions in was constructed against. The first application of this theory was in Germany where the economy was faced with rising income which came as a result of current

industrialisation. The conditions of the economy became a perfect fit for the results that came after. Industrialisation brought about increased per capita, technology advancements and increased freedom. For the reason that economies develop at different rates and stages, this theory can cast some aspersion on the conditions that bring about economic growth or mass industrialisation.

Another criticism that this theory has come across is that in drawing assumptions, Wagner neglected to address the impact of wars on the expenditure of government. Wars are not the only assumptions that have been neglected. The effects of other natural or human devised disasters can also affect public expenditure. Irregular expenditure of government rises in cases where a cost is incurred but was not planned for. Lastly, Wagner's law has been criticised and questioned as to whether it would work on other economies that do not classify amongst the developed nations. Despite these shortcomings, this theory has been found to be factual in different economies. It remains to be the underlying too many public growth theories (Scharmer, 2002).

3.2.2 THE PEACOCK AND WISEMAN DISPLACEMENT EFFECT

The law of increasing state activity gave great insight into the factors affecting government spending. Many researchers through critique and adjustment used Wagner's law to give more understanding of changes and causes to government spending. Alan Peacock and Jack Wiseman in the year 1961 illustrated that government expenditure as a function to growth would increase in a pattern like movement. The pattern in expenditure would follow through on how social movements would occur; a particular reference to wars is made in their study. The study further highlights two main factors that determine the growth of public expenditure, firstly the economic stance and then lastly the changes in group behaviour that changes social relations and interactions. From the points made above, other studies have noted that cyclical changes are quite a factor in the timing of increased public expenditure (Arreaza, Sorensen & Yosha., 1999).

Peacock and Wiseman bring in a different view into understanding the dynamics of economic growth and public expenditure. A political perspective is introduced into this concept, where they assess whether politics have an effect on growth and expenditure. In 2000, Peacock and Scott criticized how Wagner lacked to define state activity, in this it made it difficult to classify the form of activity that has increased. Through the political view, public expenditure is

affected by the needs of the people because governments centrally aim to please and satisfy the people that put them in power. Increased activity in that instance will then be determined by the economic stance of the people and their social interactions.

In breaking down public expenditure, the study brings interest to the fact that there are various types of government expenditure and all have different effects on the economy. Alam Saltana & Butt (2010) analysis illustrates that social expenditure as one form has drastic effects on the social stance of an economy. The spending on infrastructure, education, health and other social interest has a substantial impact on the productivity level in economies. The availability of such resources allows for increased and easy access to facilities and opportunities, thus bringing changes in the everyday lives of people. Afonso and Jalles (2014) in their study validate the theory of Wagner, they find that there is strong evidence of a causal effect in public expenditure and per capita GDP. Wagner's theory is best justified when used in a sample that has two extremes in economic activity instead of one extreme, although it may have its faults, this theory has built space to improve the understanding of economic growth and public expenditure.

In the generation of today, the political and social climate is somewhat different from the time when these researchers were conducting their study. Political instability in the current time is a struggle for power in the polls instead of struggle in the battlegrounds. Social unrests have also risen as an influencer to what public expenditure due to strikes and shutdown being a cry of what is lacking in the different communities and economies on a broader level. State activity will then increase in an effort to address the lack of these communities. The commonality in these economies is that the struggle tends to be similar, the high unemployment rates, high corruption and proper governance in the running of the state.

Peacock and Wiseman in their work also highlight that the economic stance is just as important as how public expenditure changes. The latter is a function of tax revenue from households and corporate. Tax revenue base is highly dependent on how well the economy is performing, in a stagnant economy there will be low tax revenue and thus decline in public spending, the opposite would be true. It is at the governments' discretion that tax rates and other rates be charged in order to suite an expected growth level. Peacock and Wiseman bring a controversial matter into light, by stating that the government will tend to increase tax rates in bad times. A convergent relation will arise between a time of war (increasing public expenditure) and an

increased limit to taxation. The displacement effect takes precedence in that there is now a shift in tax revenue and government expenditure (Bird, 1972).

3.2.3 THE GAME THEORY

In the effort to shed more light on the pricing complexities in the health care sector, the Game Theory is employed to show dynamics of price changes and its interactions with the market in its formal structure or the informal structure. By using different pricing methodologies, the service providers reach a varied number of consumers and are allowed them to have options. By understanding the pricing dynamics of health care expenditure, it allows policymakers and researchers to understand the factors that apply to the expenditure line of health care expenditure in the government level and individual level.

The Game Theory studies the complexities of mathematical models and cooperation between rational decision makers. Major contributions to this theory were made by John von Neumann (1903-1957) who was also an inventor and a computer scientist. This theory excels when applied in social sciences, where there are conflict analysis and interactive decision making. For the Game theory to be applied there are preconditions that have to exist: there should be two or more decision makers, decisions are made based on a choice of strategies with different outcomes and lastly, all parties must have preferences of possible outcomes that will reflect in their payoffs (Colman,1995).

The literature of applying the Game theory to the health care system looks into how interactions of stakeholders in this system can be made successful for all concerned parties. The theory is helpful in detecting the best conditions for parties to interact in, when faced with competition and the changes of the market mechanisms. The concerned parties identified in this literature are the insurance holders, hospitals, insurers, and health practitioners. The assumptions that are made here state that prices set independently by health service providers can lead to price inflation in the health sector. Independent price makers are likely to be those using the fee-for-service pricing framework, while the alternative includes insurer pricing strategies and is likely to have more interaction among the parties.

The health care system in the United States has had its fair share of difficulties with the multidimensional interactions of its health system. The deployed system revolves around the autonomous optimizing mentality of the law of demand and supply; characterized by Adam

Smith's theory. Due to the market being vertical and consisting of suppliers and consumers who are linked through their use of insurance, there are implications. These involved parties under the market mechanism rule will be at war with each other due to the competition of getting higher profits and for the consumer getting quality for their money. Firstly, insurance companies will try with every effort to decrease the number of insurance claims so as to avoid paying too much. Secondly, health service providers such as pharmacies will increase their prices so as to make more profits, but these hikes are agreed to by the insurance companies and service providers. Lastly the consumer or patient will tend to decrease their health costs by buying less insurance (Agee & Gates, 2013).

The Game theory puts clarity on how to balance the matter of health care markets and that of providing at all times quality, effective and efficient services. This matter is of great importance thus it has the attention of health care policymakers and all administrators. For registration of progress and positive results in all this, there is a great need for an understanding of the interdependence of the health insurance industry, providers and the patients. The Game theory suggests modifying the autonomous behaviours of parties in the system. An assumption used in this theory is that all concerned parties are rational decision-makers who all have an end goal, be it maximizing utility or profits. Since the goals of the parties are different at times, to find a solution that could work optimally for all tends to take time as none wants to compromise. When the Game theory is applied it shows that given that the supply of health care is fixed there could be price inflation for health care insurance. The latter transmits to a rise in price setting interactions among health care providers and change in one affecting the other. This banter will then lead to price inflation as parties will be increasing their prices without concern of other parties that are involved.

The dilemma is referred to as the vertical externality which is the result of lack of cooperation in the behaviour of concerned parties when it comes to setting prices in the health care sector. An option to resolving this matter is through a contractual agreement of prices that will be charged between all parties. This solution also brings a sense of unity and sovereignty in the expenditures incurred in the health care sector.

3.3 EMPIRICAL LITERATURE

The efforts of many economists that contribute to policy generation and analysis throughout the year have been recognized by many sectors of the economy, this includes the healthcare sector. For the health sector to be feasible in terms of the services it provides, it requires correct policies that will govern how services are provided. The question of how to provide the correct health care at the right time, right place and in the right quantity is where economics interjects with health. The birth of health-economics comes in here as the two interact to provide a way forward for society.

A number of studies have been conducted in the health and economic field of study to try to find an understanding of how they work. One such paper looks at the inequalities in health care use and expenditure. With the use of empirical data from 8 selected countries of the Organisation for Economic Cooperation and Development (OECD), the article came to several conclusions with regards to health care expenditure. The results indicate that the richer majority have more access to health care when they are sick, meaning that they are likely to see a doctor and receive proper medication (World Health Organisation, 2000). The inequality is then evident as the poor have less access to proper health facilities and because of the lack of sufficient income will also spend less on health. The recommendations and results found in this paper can then be used to influence health policies.

A Granger causality study of health care spending and economic output found that there was a bilateral movement among its variables. The study examined whether gross domestic product caused health care expenditure or vice versa. With the use of 20 OECD countries the results proved that for some of the countries there was evidence of a bilateral movement between the variables. This then suggests that when drafting policy decisions and equations, caution must be taken when deciding on the dependent and independent variable as ignorance of this may cause model misspecification (Devlin and Hansen, 2001). The relationship between the two can bring a different conclusion as a result of the bilateral movement it has, a cause an effect relationship is not one way. A healthy nation in its finances is able to invest in its nations healthcare which enables them to be productive. Subsequently, a healthy nation that is productive assists in economic growth.

Hartwig (2007) in his paper employs panel data of 19 OECD countries, to assess what drives health care expenditure. He uses the Baumol's unbalanced growth model, which allows for the estimation of future costs of health expenditure. This model suggests that the health sector is

non-progressive as it does not bring profits, thus it does not contribute to economic growth. The paper continues to use health care expenditure and gross domestic product to find answers to the main question. The results of the paper seem to then correlate with Baumol's model that health care expenditure is driven by wage increases that are a result of increased productivity. Income per capita is vital in health care access and the productivity of people, access to proper health services require for affordability from consumers. Otherwise, there is a high cost in health care and with no one to pay for it. A classic example is a situation faced in most emerging African countries, due to health care being high in cost, people end up relying on cheap or free services from the government. This comes at the cost of receiving mediocre services and ultimately decreasing your productivity rate as a result of being ill and needing to take days off from work.

Where there is a low expenditure on health care, there is found to be an increase that is statistically significant in the number of child mortality cases. This is a revelation in the study of health care spending as determinants of health outcomes in Canada. A panel data study on Canadian provinces during 1999 of over 15 years was conducted by Cremieux, Ouellette, and Pilon. The study also reveals that decreased spending negatively affects the life expectancy of the country. The relation found is said to be independent of socio-demography, economic stance and lifestyle factors. Health care spending in China has been found to be increasing at a compounding annual rate of 11.8 percent, which has seen the life expectancy of the country increase on a year to year basis averaging 76years in 2015 according to an Industry Report, Healthcare: China, The Economist Intelligence Unit.

The topic of health care opens up many sub-questions as it is affected and influenced by many variables. From the above literature, there is proof that health care is highly affected by income. In an effort to highlight this point, Getzen (2000) conducted a study that questions whether health care is a necessity or a luxury good. The use of multi-level decision models is employed in the analysis of health care expenditure. The results of the study show that health care is not singularly a necessity or even a luxury, but rather it is both. The reasoning behind this finding is that the income elasticity is found to vary with the level analysis. For one instance the national health expenditure has an elasticity which is greater than one, whilst that of insurance holders is less than one.

Still, on the matter of luxury or necessity, a look into Nigeria's health expenditure reveals something about the nature of its health care industry. The results show that the demand for

public health is high and that consumer responsiveness is high with-it being income inelastic and positive making health a necessity. This study by Odoh and Nduka (2014) has also revealed that the (regime) Nigerian military government spent less than that which services the citizens. The authors motivate this by stipulating that the civilian government is more responsive to the needs of its people. A factor that was noted to affect healthcare expenditure is the level of advancement in health technology and the need to improve health conditions all round is a result of this being a positive variable. The variables of this study are found not only to be stationary at level and further the cointegration test but also find a relationship between per capita health care expenditure and the independent variables which are inflation rate, unemployment rate and the differences in the governance of the country.

A study close to home was conducted using the Regional Health Management Information System (ReHMIS) database, to bring more insight into health expenditure and finance in South Africa. The study, which was conducted by McIntyre, Bloom, Doherty, and Brijal (1995), had the intent of outlining why South Africa still had a large number of patients suffering from preventable diseases while the country spent a substantial amount on the health sector. The ReHMIS was useful in providing data on the distribution of health facilities in a geographical region. In their results, McIntyre et al. (1995) found that South Africa spent 8.5 percent of GDP on health. Furthermore, the healthcare infrastructure required more resources as many hospitals ran under-sourced with medical equipment and trained staff. Another observation made was that the quality of health care received throughout the country varied with the majority of the poor Africans receiving inadequate care.

Using the Box-Cox model, a regression was constructed using per-capita GDP, Official Development Assistance (ODA), and Gini income inequality index and population dependency ratio. This study was conducted by Okunade (2005) in his analysis and implications of the determinants of healthcare expenditure in 26 African countries. The cross-sectional data presented results that translated to 75 percent of the variations in health care expenditure. Health care expenditure rises, as a result of ODA and population per health personnel, whilst income inequality diminishes it. Health care tends to behave like a technical tendency, this is seen when GDP elasticity measures in at 0.6.

Anyanwu and Erhijakpor (2009) in their paper present econometric evidence that helps answer the mystery of health expenditure and health outcomes in Africa. They use data from 47 African countries with a span running from 1999 to 2004. The evidence presented shows a link between

per capita total, government health expenditure and that of per capita income of two health outcomes. Furthermore, the results show that there is a negative and statistically significant relationship between health expenditure and infant/under-five mortality rate. The results found are said to have an effect in the effort of attaining the target of the Millennium Developmental Goals.

3.4 CHAPTER SUMMARY

This chapter took a closer look into Wagner's law of increasing state activity that assists in making sense of how expenditure is influenced. This law anticipates that if an economy grows, it will have increased state activity in the form of increased public expenditure. Insight on how the multiple factors that influence expenditure are highlighted and further previous studies that have different results in the field of health care expenditure and economic growth. A look into health measures and initiatives are set out for there to be goals that are attained in the long run.

CHAPTER 4

METHODOLOGY

4.1 INTRODUCTION

This section of the study presents the model used to analyse the determinants of health care expenditure in the African region for the period 2000-2016. The model estimates a relationship between economic variables affecting economic growth and cost structure of health care provision. The employment of a panel ARDL model is used to configure a long run relationship between the variables.

4.2 MODEL SPECIFICATION

The model used in the research is an econometric one that has multiple variables and is thus regarded as a multivariate model. The dependent variable is Health care Expenditure (HET), while variations in the model were Population (Pop), Mortality rate of children under the age of 5 years (Mort), Economic Growth (GDP), Inflation GDP deflator (INF) and Gross National Income per capita (GNI). All these variables were observed for all countries mentioned in Appendix B.

The basic panel-ARDL model structure of the econometric model will be as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \dots \dots \dots (1)$$

$$HET_{it} = \beta_{0i} + \beta_1 GDP_{it} + \beta_2 Pop_{it} + \beta_3 GNI_{it} + \beta_4 Mort_{it} + \beta_5 INF_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

Where: Y is the dependent variable; β_x is the coefficient of the constant and the independent variables respectively. X represents the independent variables and finally, ε is the error term that captures omitted variables.

The following is the econometric model to be used:

$$HET_{it} = \beta_{0i} + \beta_1 LogGDP_{it} + \beta_2 LogPop_{it} + \beta_3 LogGNI_{it} + \beta_4 Mort_{it} + \beta_5 LogINF_{it} + \varepsilon_{it} \dots \dots (3)$$

The model on equation 2, the research attempts to discover whether LogGDP_{it} , LogPop_{it} , LogGNI_{it} , LogINF_{it} , and Mort_{it} can cause a variation in the dependent variable which is HET_{it} . If the results prove that there is a significant difference caused by these variables, then we can adjust each in order to attain success in the access to healthcare services of many countries. Equation 3 shows the variables of the econometric model logged, this is done to avoid spurious results because of the different measuring units the variables were obtained in. The method of logging the variable enhances the chances of getting results which will show stable movement between the variables in the long run and eliminates outliers in the model (Greene, 2000).

4.3 DESCRIPTION OF VARIABLE AND THE EXPECTED SIGNS

HET is the total health care expenditure as a percentage of GDP, which covers preventive and curative services but does not cover the provision of water and sanitation. The expected sign for this variable is that it has a positive and significant result with the independent variables.

LogGDP at purchaser's price is defined as the sum of the gross value added by domestic producers. Due to GDP being a measure of economic growth the expected sign for this variable is that it has a positive and significant relationship with health care expenditure, as the economy improves, there is sufficient budget for all sectors. This enables the different departments to meet all set-out strategies and goals. According to Nwaeze, Njoku & Nwaeza (2014), economic growth is essential for an improved standard of living through health, housing and education.

LogPop defines or counts for all residents of a country, those foreign and local citizens. A direct relationship between population growth and health care expenditure is expected. As the number of people residing in one place increase, the cost of taking care of them and their habits is expected to increase, thus a positive and significant relationship is expected. Apart from taking care of costs of the population, dependency level on government is expected to be high in struggling economies as opposed to developed ones (Lamartina & Zaghini, 2010).

LogGNI is the total value added by all domestic producers, including any product taxes and value of those residing abroad. The relationship between the dependant variable and gross national income is expected to be inverse. As there is growth in the income of residents, there is expected less dependency on government to cover the health bill. A possible contrary suggestion is noted in a study by Lamartina & Zaghini (2010), where they note that increased

the government expenditure which translates into increased health budget can cause an increase in per capita GDP.

Mort quantifies the infant mortality rate in the number of children that die before reaching a full year; this is counted per 1000 births given in a year. The expected relationship between mortality rate and health expenditure is a positive one. As the mortality rate increases, the need for increased expenditure is required to curb and prevent early deaths. A study monitoring health care spending in Canada proved that lower healthcare spending was associated with an increase in infant mortality rates.

LogINF as measured shows the rate of price change in the economy as a whole. Due to inflation is closely related to economic growth, the expected relationship with health care expenditure is that as the cost of living or prices goes up so will health care expenditure.

4.4 DATA SOURCE

In constructing an econometric model, the study employed secondary data; this is because it is easy to access and also cuts the time constraints. The annual data collected runs from 2000-2016, this time period allows for a look into the economic changes that have happened in the economic space and the changes in general evolution in technology advances. The panel data is that of 20 Sub-Saharan African countries, ranging from low-income to high-income economies (see Appendix B). The decision to choose these countries with these categories is to find out whether economic differences can impact health care expenditure. These variations assist in drawing a relationship that is not one-sided and fits economies that are extremely poor or middle of the meter. The extremes of these countries will clarify the dynamics of health care and how it is influenced. Table 1 highlights the source of the variables and sheds light on the variables.

Table 1 Data Sources and Description

Variable	Description	Source
HET	Total health expenditure	World Health Organisation
GDP	GDP at purchasers' price	World Bank national accounts data
GNI	GNI per capita	World Bank national accounts data

Pop	Total population	World Bank
INF	Inflation, GDP deflator	World Bank national accounts data
Mort	Mortality rate, under-5 per 1000 births	UN Inter-agency group for child mortality estimation

4.5 ESTIMATION

The following tests were conducted throughout the study so as to convey the results of the research, thus simplifying the analysis and recommendations that will come at the end.

4.5.1 DESCRIPTIVE STATISTICS

Descriptive statistics are used to describe the data, through a thorough look at the characteristics of the data. According to William (2006), they are helpful for making summaries about the sample and measures used. This analysis gives insight into the data adequacy through checking for skewness level and checking for probability. By testing for skewness, the researcher is able to have a say on whether the data is prone to give multiple outliers or give reliable results.

4.5.2 VISUAL INSPECTION

This method is the fastest way to tell what the data are saying with regards to our hypothesis and analysis. Visual inspection is done through graphical outputs from the tests; it is done with the bar graphs and line charts of the normal distribution tests. Visual inspection is just the primary conclusion that can be disputed by further tests but is helpful in identifying where the results could lead. Gujarati and Porter, 2009 indicate that through a visual inspection, the researcher can see patterns of a fluctuating variable or a constant trend line of the variables.

4.5.3 UNIT ROOT AND STATIONARITY TEST

The stationarity test is the first of the few tests that are important to conduct when dealing with a quantitative equation. This is vital in ensuring that a significant relationship is formed between healthcare expenditure and its independent variables. A variable is found to be stationary. According to Brooks and Rew (2002) the stationarity of a variable is dependent on its properties and interactions with other variables and will be evident through a constant mean, constant variance and also a constant auto-covariance for every given lag

In the case where a series is found to be non-stationary, it will then be differenced a number of times so as to achieve stationarity. Once a variable is differenced, it is said to be integrated of an order that it reached its stationarity in $I(d)$. In an event where a variable is differenced twice, it will be integrated of order two $I(2)$ which means it has two-unit roots. An $I(1)$ series contain one-unit root and lastly, an $I(0)$ has no unit root and thus is said to be stationary. The disadvantage of using non-stationary series is that it will produce results that may be spurious and have shown to have a time-varying mean and variance. The panel unit root and stationarity testing can be conducted in two different ways that have different outputs but ultimately provide the same conclusion. One way to test for stationarity is by using visual inspection of line graphs, while the more formal method would be to use tests that provide coefficients and probability values that can be assessed and explained thoroughly.

Tests used in testing for stationarity are the Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), Fishers panel unit root test and the Handri panel unit root test. These tests will be conducted under different orders of integration, so as to achieve the best stationarity level. This step is not essential but the variables that we are investigating must be integrated of different orders ($I(0)$ and $I(0)$) for us to continue with the ARDL approach. In doing the panel unit root test, the study uses a null hypothesis that states that all panel unit root tests in the series contains a panel unit root. The alternative to this hypothesis is that all individual series in the panel unit root is stationary. An advantage of using the panel ARDL approach is that it can estimate the variables even when they are integrated into a different order of integration. Another positive about panel unit root testing is that it allows for the power of the tests to increase with the number of panel unit series used in the study.

The Handri test proposes a test that expands and also emulates other panel unit roots tests in their variable arrangement. It is used for testing the null hypothesis to determine whether the observable time series is stationary in a deterministic trend. The Handri test uses the ordinary least squares (OLS) residuals calculated from regressing the Y_{it} on a constant or plus trend. The null hypothesis of this tests states that there is no unit root in any of the series, which means the series is stationary. Alternatively, the hypothesis states that the panel has a unit root.

$$y_{it} = r_{it} + \epsilon_{it}$$

$$r_{it} = r_{i,t-1} + u_{it}$$

$$H_0 : \sigma_u^2 = 0$$

For there to be stationarity in the series, the variance U_{it} would have to be zero while the r_{it} would take the position of a constant and thus the series will be found to have no unit root or synonymously be stationary. Like many other tests the Handri test has some criticism for its over-rejection of the null hypothesis which raises concern of presenting spurious results. This criticism is brought about by autocorrelation that can distort the size of the unit root series.

The Fisher panel unit roots test on the other hand observes the *p-values* that are generated from the unit root tests for the individual tests. This test is also generated from other unit root tests, specifically the Augmented Dickey Fuller (ADF) test. This then suggests that it follows the rules of the ADF test in that there is need to specify the number of lags to be used in the regression. The positive of the Fishers test is that it is able to handle unbalanced panels and the lag lengths of may differ. This allows for tests to be run of series that have differing characteristics.

The Levin-Lin-Chu when used has the assumption that suggests that the persistence parameters have some commonality across cross-sections. The parameters can also be tested under an assumption of allowing unrestricted movement across cross-sections. The Levin-Lin model allows only for heterogeneity in the intercept, and the model is represented below. The limitation of this test is its dependency on the independence across individuals, but this is overcome by the proposal that panel unit root testing does away with having variables being an identical first order correlation. The equation assumes that the cross-section observations (N) and Time dimension (T) go to infinity at the same rate, to a point where they are constant. For the Levin-Lin-Chu test, as time dimension increases so does its power.

$$\Delta y_{it} = \mu_i + \beta y_{i,t-1} + \sum_{k=1}^p \phi_k \Delta y_{i,t-k} + \gamma + \epsilon_{it}, \quad i = 1, \dots, N, t = 1, \dots, T.$$

The null hypothesis of stationarity stipulates that's the variables are non-stationary, while the alternatives state that the opposite is true. The following is the hypothesis equation for the

Levin-Lin-Chu unit root test. The null hypothesis is rejected when the series is greater than zero.

$$H_0 : \beta = 0, \quad H_1 : \beta < 0.$$

The Im-Pesaran and Shin use the likelihood framework with the help of the t-bar statistics in testing for a unit root. This method is flexible in that it allows for the simultaneous stationarity and non-stationarity series. The t-bar shows the power of the series when it is large the unit root will be satisfactory and will be applied to each individual in the panel. This method can be advantageous in working with the general form of correlation across individuals.

The following equation shows the null hypothesis and alternative of the Im-Pesaran-Shin, where the alternative accepts some of the individual series to have a unit root.

$$H_0 : \beta_i = 0, \forall i, \quad H_1 : \exists i \text{ s.t. } \beta_i < 0.$$

The comparison of these two tests is important in understanding the power and significance of one over the other. Although there are some similarities between the two, they provide an alternative hypothesis that is different. The Levin-Lin-Chu alternative provides for a series which has identical first-order autoregressive coefficient, while the Im-Pesaran-Shin is more open to having different order autoregressive coefficients (Barbieri, 2006). In the event that these tests do not have the same conclusion, it is best to match the research qualities with the one that best fits with the test to ensure the results are correct and not misinformed.

4.6 AUTOREGRESSIVE DISTRIBUTED LAG (ARDL)

The autoregressive distributed lag framework will be adopted in this research. This method was conceptualized by Pesaran, Shin, and Smith (2001), with the aid of the bound testing approach to cointegration. The regression of the panel ARDL model includes the lagged dependent variable and the independent variables. Choosing lag length is important as it can be an influencing factor of having results which are spurious. This method tests the significance of the lagged levels of the variables used in a conditional unrestricted equilibrium correction model (UECM). The measure used in this test is the Wald statistic or the F-statistic in a generalized regression. This method is one above alternative such as the Engle-Granger and the Johansen. The benefits that come with using the panel ARDL model is that it is regarded

as efficient as it gives results that are diverse and allow for thorough discernment of information. This is due to using data that is diverse and not restricted to a small observation over a specific period. Furthermore, panel ARDL gives a broad analysis of data with its ability to assess cross-sectional data and time series data (Fazli and Abbasi, 2017). One other benefit of using the ARDL model according to Pesaran & Pesaran (1997) is that the model allows for flexibility as it can be applied on variables with different orders of integration. This is found to be different from the other methods like the Johansen technique, which requires variables to be integrated of the same order.

Other tests exclude a system if it is not integrated of order one $I(1)$, this is something that the panel ARDL method does not discriminate on. This implies that the panel ARDL approach is not dependent on the pre-testing of the variables. By doing so it eliminates the errors that can come with pre-tests, such as the low power of the unit root tests. The two-step approach of the Engle-Granger method is again brought to disrepute as it is said to have poor statistical properties when compared to the unrestricted equilibrium correction model (UECM). A set back of the ARDL model is that it does not give a guarantee of a unique cointegration vector which can be identified through the single equation cointegration. According to Pattichis (1999), the Engle-Granger method pushes the short-run dynamics into the residual terms. The use of the panel ARDL approach brings more insight by testing for a long relationship in the variables even with the uncertainty in their order of integration. By using panel data, we will also put to test the cross-sectional and time period dependence, as like in the research of Kollias et al. (2006) in their paper.

Steps in the panel ARDL model

1. Establish a long-run relationship.
 - The establishment of a relationship was first done through theory among the variables used. Theory gives a sense of which variables should be aligned but this can be found to be false once the model is structured. Using desired variables, a long-run and short-run relationship is constructed through an econometric model
 - The F test will be used in testing the existing long-run relationships. The null hypothesis for this test states that all regression coefficients are zero. The F test is also the deciding factor whose variable will be normalised.

The hypothesis of the cointegration test is as follows

$$H_0: \beta_1 X = \beta_2 X = \beta_3 X$$

$$H_1: \beta_1 X \neq \beta_2 X \neq \beta_3 X$$

The F test was further said to be dependent on three things: the order of integration of the variables used in the panel ARDL model, the number of the regressors and lastly whether the panel ARDL model contains an intercept or a trend.

2. Choose the number of lags desired for model

- A chosen selection criterion was used to select the appropriate order of the lags that were used in the panel ARDL model.
- Lastly, the selected model was estimated by the ordinary least squared method (OLS).

4.7 THE PANEL COINTEGRATION TEST

The bounds test will be used in this study as a measure that tests the coefficient restrictions. The test is used to assess if the regression estimation coefficients can explain any variations experienced by the dependent variable. The bounds test has the option of two statistics to make conclusions about an unrestricted regression. The joint F-statistic and the Chi-square statistic are used to conclude as to whether the unrestricted estimations are close to the restricted estimation. In the presence of the probability value of the statistics being less than the significance level (0.05), we can conclude by saying that the null hypothesis will be rejected and that the independent variables are not jointly equal. By not accepting the null hypothesis, we can also say that the independent variables have a long run association.

The bounds tests also test for cointegration through establishing a long-run relationship between the variables. When this is identified in the tests, there will then be evidence of comparable characteristics among the variables in the long run. The panel ARDL bound testing is suitable because with the multiple variables incorporated in the study there is a high chance of variables having different orders of integration. The test will be able to merge the long run and the short run relationship between the variables (Dube, 2017).

Another methodology that is used to test for the presence of a cointegrated relationship is the Pedroni test. Developed by Peter Pedroni in the late 1990s, this method is used for panel data.

In proving for the presence or absence of cointegration, this method uses seven panel cointegration statistics to test a null hypothesis of no cointegration, with an alternative of cointegration. Among these statistics is the within dimension based, which incorporates a variance statistic, a non-parametric Phillips and Perron statistic and its t-statistic as well as the Dickey-Fuller t-statistic. The last of the seven panel statistics is called the between dimension-based statistics which is based on the group mean approach (Bildirici, 2004). In the test, Pedroni's statistic involves the estimation of parameters from long run conditional variances. Under the null hypothesis the unvarying statistic will converge to form a normal distribution dependent on different elements. The opposite will be the result of the alternative hypothesis, such that the unvarying statistic will diverge into positive infinity, where the right tail of the distribution graph will reject the null of hypothesis of no cointegration.

4.8 CHAPTER SUMMARY

This chapter presented the techniques and processes that are involved in the panel ARDL model. The tests that are to be conducted ensure that the data is scrutinized thoroughly, and once it passes all the diagnostics testing and has satisfactory stationarity results it can be used to find conclusions about the topic. The methods used were chosen on the basis of being more suitable for the specific data used in comparison to other frameworks.

CHAPTER 5

EMPIRICAL RESULTS

5.1 INTRODUCTION

This part of the study presents data analysis from the model generated in testing for health care determinants in the African countries the following results are estimations done through the methods and models that were explained in the previous chapter. This chapter presents visuals and graphical representations of the tests conducted. The section starts by displaying the results of the descriptive statistics which assist in understanding the basic dynamics of the data. This is followed by the results and analysis of the panel unit root tests, which tests for the variables stationarity. In the concluding parts, a long run relationship is discussed, and further illustrations of the data are depicted, to tell the story of the data of determining health care expenditure.

5.2 DESCRIPTIVE STATISTICS

The use and importance of descriptive statistics are to highlight the dynamics of the nature of the data we have used in the study. They are also helpful for making summaries about the sample and measures used. Once observed and discussed, these results give the researcher a detailed impression of the data collected (Terre Blanche, Durrheim & Painter., 2006)

Table 2: Descriptive Statistics

	HET	LOGGDP	LOGPOP	MORT	LOGINF	LOGGNI
Skewness	0.905	0.622	-0.420	-0.092	-1.292	0.610
Jarque-Bera	52.583	25.721	10.251	1.265	232.740	25.627
Probability	0.000	0.000	0.006	0.531	0.000	0.000
Observations	340	340	340	340	340	340

Source: estimation from Eviews

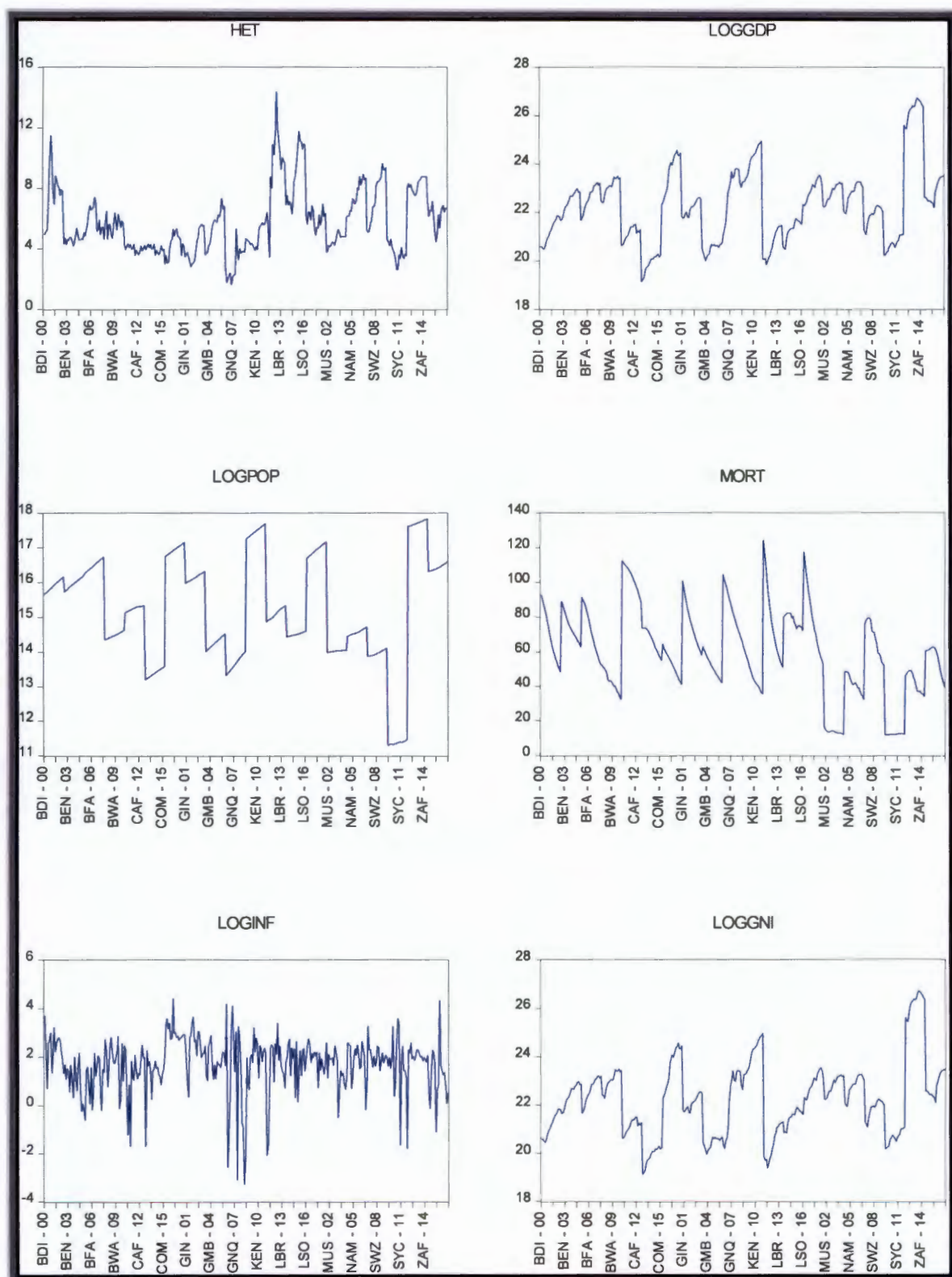
The skewness assesses the distribution of the data. HET, LOGGDP, and LOGGNI are positively skewed to the left. This conclusion is made with a retrospect of what Wenger (2012) says, which is that skewness is detected when the variables have values lying between a skewness coefficient of -0.5 and +0.5. LOGPOP, MORT and LOGINF are negatively skewed to the right. There is an equal bell shape, eliminating the possibilities of outliers and the possibility of bias

results. The Jarque-Bera tests for normal distribution of variables, through a rejection rule that suggests that when the p-value of the residuals is smaller than the significance level (0.05), the residuals are normally distributed. From the table above, HET, LOGGDP, LOGPOP, LOGINF, and LOGGNI have proven to be normally distributed as the probability of these residuals is below the significance level. This interpretation shows that the data is not scattered and will not give spurious results. The exception in this instance is Mort, which has a probability value above the significance level.

5.3 UNIT ROOT AND STATIONARY TEST

Unit root testing can have two different outputs; these two can be used to assess the stationarity of the variables. The visual inspection through graphs allows us to make conclusions with our naked eyes. This method is regarded as the easiest but may have a different result as conclusions may be subjective. According to Gujarati (2004), a stationary series is one that has a mean and variance that are said to move along together in the long run. Below there are depictions of unit root testing followed by a tabulated format that has a conclusion of what level of stationarity the variables have been found to be at.

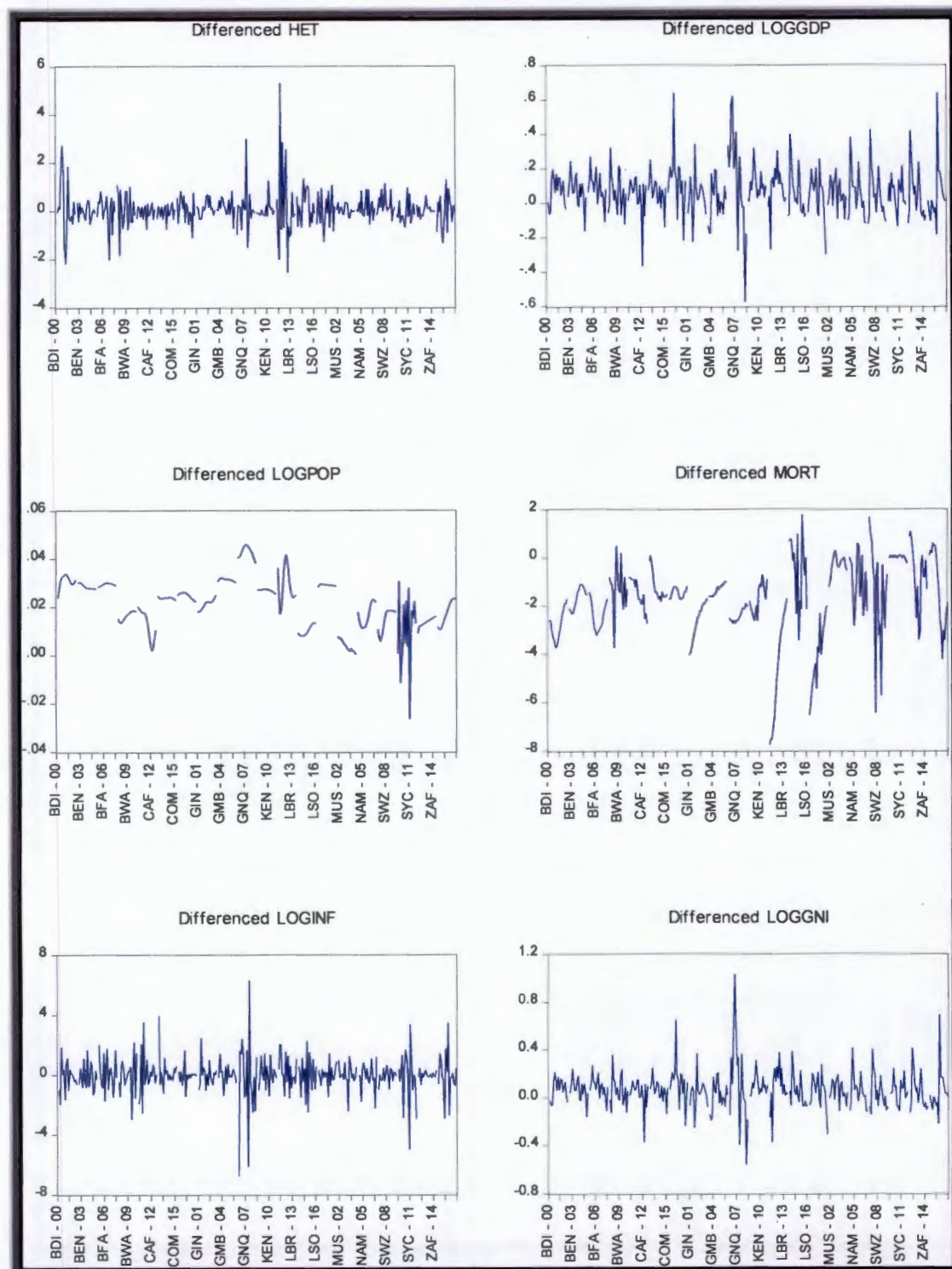
Figure 3: Graphical representations at the Level form



Source: estimation from Eviews

Figure 3 shows the variables in their Level form. With just a visual inspection, one can say that LOGGDP, MORT, and LOGINF are stationary. The remaining variables are not clear to state, which can be confirmed in the formal testing done.

Figure 4: Graphical representations at 1st Difference form



Source: estimation from Eviews

Figure 4 is a depiction the variables, once they are differenced this measure allows for the mean and variance of the variables to be more likely to move together, thus making them stationary. The above illustrations shows that the variables are all significant and integrated of level I(1). In the long run, the variables present a stationary movement. For a look at individual country results per variable used in the study, refer to Appendix C

Table 3: Panel data Unit root results

Variable	Levin, Lin & Chu t*	Im, Pesaran and Shin W-stat	ADF - Fisher chi-square	PP - Fisher chi-square	Handri Test	Level of significance
HET						
Statistic	-2.375	-0.867	44.717	56.026	6.439	
Probability	0.009	0.193	0.280	0.048	0.000	Level
LOGGDP						
Statistic	-6.526	-1.574	53.025	69.221	9.347	
Probability	0.000	0.058	0.081	0.003	0.000	Level
LOGPOP						
Statistic	-1.969	7.352	139.110	288.774	11.306	
Probability	0.025	1.000	0.000	0.000	0.000	Level
MORT						
Statistic	-8.615	-0.530	77.653	737.703	10.938	
Probability	0.000	0.298	0.000	0.000	0.000	Level
LOGINF						
Statistic	-4.456	-5.662	101.773	194.451	2.814	
Probability	0.000	0.000	0.000	0.000	0.002	Level
LOGGNI						
Statistic	-6.385	-1.479	52.108	68.378	9.102	
Probability	0.000	0.070	0.095	0.003	0.000	Level
Statistic	-5.690	-4.508	84.772	114.289	3.715	
Probability	0.000	0.000	0.000	0.000	0.000	1 st Diff

Source: estimations from Eviews

A formal test that can also be used to test panel unit root has been used in this paper. The Levin-Lin-Chu (LLC) test, Im-Pesaran-Shin test (IPS), Fisher's test and the Handri panel unit root tests are specific tests used. Table 3 shows that HET, LOGDP, LOGPOP, MORT, and LOGINF

are found to be stationary at Level, this means that statistically, the variables are significant and thus can be integrated of order zero $I(0)$. The remaining variable which is LOGGNI is then found to be stationary at first difference; statistically, it is significant with a probability value that is less than the significance level, which is 5 percent. With respective orders of integration, the null hypothesis is rejected, concluding that there is no unit root in the variables. Once the unit root testing is done, the next step is the choice of the lag length criterion with the use of the information criterion.

The Akaike information criterion (AIC) was sought in assisting to choose the best model and came to a conclusion of using the panel ARDL model with lag (1,1,1,1,1,1). The automatic computation of Eviews has selected the best model using the AIC model selector. The idea in choosing a lag length is to start off with the highest lag length and decrease to a lag length that has the lowest value. This means the criterion has set out one lag for every variable in the econometric equation and regarded it as best. This result is acceptable as annual data is used in the research, and the expected lag length with this kind of data is 1 or 2 lags. The premise of using this selection is because it also has the lowest AIC value among those tested.

5.4 BOUND TESTING FOR COINTEGRATION

The panel ARDL bound test is used for cointegration testing and it is important in highlighting if there is a long run association of the variables. Even though the research investigates health care expenditure of several countries, the long run evidence indicates that for all variables (being country specific) there is an influencing behaviour of one variable on the other. Taking into consideration that our variables are integrated of different orders, the panel ARDL bound approach is best (Pesaran & Shin, 1999). The use of the F-statistic from the Wald test will be used as a measure of assessing whether all the non-intercept coefficients are equal to zero.

Table 4: Bound test results

Statistic	Value	K
F-statistic	9.804561	5
Pesaran Critical Value		
Significance level	I(0) Bound	I(1) Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: estimations from Eviews

Table 4 shows the F-statistic as 9.480; this statistic is compared to the Pesaran critical value at 5 percent significance level. The chosen critical value is one that coincides with the specifics of the research. With five independent variables indicating k value and the chosen critical value, the lower bound value is 2.62 and the upper bound being 3.79. These statistics are under the unrestricted intercept and no trend table. By comparing the F-statistic with the upper bound statistic the null hypothesis can be rejected because F-statistic (9.804) > Upper bound value (3.79). This result proves that there is evidence of a long run relationship among the variables.

Table 5: Panel ARDL results (Long run relationship and short-run relationship)

Variable	Coefficient	Standard error	t-statistic	Probability
Long Run Equation				
LOGGDP	0.405	0.840	0.483	0.630
LOGPOP	5.977	1.526	3.918	0.000
MORT	0.039	0.012	3.204	0.002
LOGINF	0.029	0.024	1.192	0.235
LOGGNI	-1.541	0.828	-1.861	0.064
Short Run Equation				
COINTEQ01	-0.459	0.100	-4.608	0.000
D(LOGGDP)	-9.852	5.301	-1.859	0.065

D(LOGPOP)	100.552	51.231	1.963	0.051
D(MORT)	0.242	0.212	1.142	0.255
D(LOGINF)	-0.083	0.061	-1.358	0.176
D(LOGGNI)	10.746	5.361	2.004	0.046
C	-30.854	6.486	-4.757	0.000

Source; estimations from Eviews

Table 5 shows the results of the long and short run equations. From the long run equation, Population and Mortality rate are found to have a positive significant relationship with Health care expenditure. A one percent increase in Population and Mortality rate will result in a 5.98 and 0.04 increase in Health care expenditure respectively. The latter makes sense as it is expected that as more people come into existence, the cost of health will increase as a measure to cover all citizens. Cremieux, et. al (1999) brings forth once more the importance of health care expenditure by proving that low expenditure in health care has resulted in an increase in child mortality reports and also affects life expectancy. Gross Nation Income per capita is the only variable that was found to have a negatively insignificant relationship with Health care expenditure, in the presence of a one percent decrease in Gross Nation Income per capita, there will be an increasing health care expenditure. This notion is corroborated by Hartwig (2007) in his study, as results showed that health sector expenditure is non- progressive in the fiscal stance, it does not bring profit and contribute to economic growth. Interestingly so, expenditure on human capital specifically of the well-being of workers is expected to improve the productivity of workers. Furthermore, health services access favours those that have more income at their disposal allowing them to pay for services they are in need of. This also makes economic sense, as more people are unable to cover their health expenses; they turn to the government which will cause an increase in health care expenditure. For Gross Domestic Product and Inflation as a GDP deflator to be insignificant is interesting, as these two are factors that can be thought to highly influence any expenditure. Devlin & Hansen (2001) interestingly point out that there is a bilateral movement in health care expenditure and economic growth. One variable can be the cause of change in the other, which is why they highlight the importance of choosing a dependent variable wisely between the two.

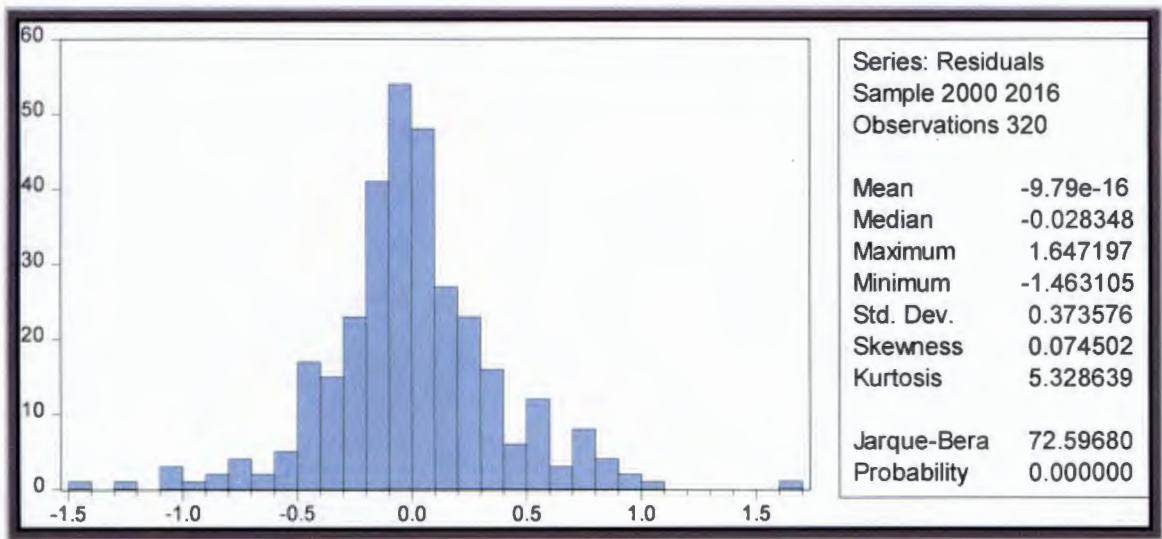
From the short run equation, it is clear that the error correction term (ECT) is negative and statistically significant. This is a good result as it will allow the speed of adjustment between the variables to be restored in the long run. The ARDL model provides evidence of cointegration with an error term of coefficient -0.459 with a value probability of 0.000.

5.5 DIAGNOSTIC TEST

5.5.1 NORMALITY TEST

The normality test is used to test the distribution of the variables. The null hypothesis states that the residuals are not normally distributed. From the probability value, we can thus say the residuals are normally distributed as it is less than the significance level which is 5percent.

Figure 5: Normality test results



Source: estimations from Eviews

5.6 CHAPTER SUMMARY

The importance of this chapter is to discuss the findings of the tests done in the study. In conducting the tests that asses the normality and standard of the data, the results show that the data was normally distributed and that it will not give spurious results. The stationarity tests that were used in the study have found that the variables of the study meet the requirements of being scrutinized further using the panel ARDL method. The stationarity tests is used to comprehend as to whether the variables have the same mean and variance are constant over time. The panel ARDL model was then used to test for a long relationship between the variables, which would determine whether the changes in the dependent variables actually impact the results of the independent variable, health care expenditure. In conclusion the error correction model finds the results satisfactory as it is negative and significant when measured against the probability value of five percent in the study.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

The aim of this last chapter is to summarize the work done in the study. It presents the conclusions reached with regards to the findings of the tests conducted in trying to determine the factors considered in health care financing and expenditure of African countries. Lastly, the chapter will offer some policy recommendations ideas that deal with health care expenditure.

6.2 SUMMARY OF THE STUDY

The intent of the study was to identify the determinants of health care expenditure in 20 African countries using the panel ARDL approach. Data for a period of 16 years (2000-2016) was collected for each country. The hypothesis of the study was that socioeconomic variables will not affect the health care expenditure of all 20 African countries. In an effort to come to a conclusion, tests were conducted so as to find results that can be used at the end of the investigation.

Literature was an important tool used in this study, to further enlighten about health care expenditure determinants. Literature does not only bring better understanding but also highlights the various views of those who have done studies similar to this or those with great interest in healthcare expenditure. To show the dynamics of health care expenditure in the different countries, empirical literature was sought. Knowing the differences and similarities that countries have with regards to the variables investigated was helpful in understanding the results in the past chapter. The theories that explain the dynamics of expenditure were used, for example, Wagner's law and the Game theory incorporated into health.

In looking at the relationship of the variables in the short run, the study identifies that only the gross national income per capita is positive and significant in its relationship with health care expenditure. This highlights the discussion point of affordability when it comes to health care expenditure. The out of pocket payment in the short run can be handled by the patients but in the long run the cost becomes unbearable due to the pressure on daily expenditure. Although the relationships of the other variables of the study remain insignificant as the probability value remains larger than five percent the relationships of some have changed when compared to the long run. The relationship of gross domestic product and inflation is negative in the short run

but changes to positive in the long run. This change can be attributed to the fact that these two variables are best used as long run measures of change in growth and prices respectively. The impact that the two bring is enhanced and more useful in the long run.

The relationship between the dependent variable and the explanatory variables varies as expected because they cannot all share the same dynamics. The relationship between health care expenditure and economic growth was positive and insignificant, while population had a positive and significant relationship with health care expenditure. The insignificant relationship between health care expenditure and economic growth is surprising as health care expenditure is a percentage of gross domestic product, but this result could be due to health care expenditure being an independent variable for some countries when budgeting. Although according to Wagner's law, the growth in the economy is expected to translate into increased government expenditure that in most instances include health care. The positive and significant relationship between mortality rate and health care expenditure is expected in general sense, as there are more deaths of infants; there is an expected increase in health expenditure in the effort to curb premature deaths. Gross domestic deflator was found to have a positive but insignificant relationship with health care expenditure. Lastly gross national income per capita and health care expenditure have a negative and insignificant relationship. This relationship is understandable as income per capita decreases; there will be an increase in health care expenditure. The sample used in the research constitutes of countries that have a low-income per capita, these are economies that have experienced little to no change economic growth, and thus a negative relationship can be understandable. Game theory in the literature section highlighted the importance of understanding the pricing dynamics of health care and puts the question of affordability. Those with a high income per capita will find no problem in paying extra for health services as they can easily afford personal insurance and specialized services, where else those with a low-income capita do not have that luxury.

The panel ARDL model used annual data for all its variables, Health care expenditure being the dependent variable was the main variable that the research was trying to find answers to. The explanatory variables were GDP, Population, Mortality rate, Inflation and Gross Nation Income per capita. Unit root testing was done for all variables so as to ensure stationarity and to avoid spurious results.

The unit root testing found that the variables are integrated of different orders, and recorded only $I(0)$ and $I(1)$. These results are the preconditions of using the panel ARDL method as per

the findings of Pesaran et al. (2001), which was then further employed. The variables that were found to be integrated of order zero, which means they were found to be stationary at level were health care expenditure, gross domestic product, population, and mortality rate and inflation deflator. These were stationary at level after the probability value was found to be less than the significance level of 0.05. The last variable was found to be integrated of order one, after not meeting the properties of being stationary at level. The panel ARDL method further found evidence of long-run association among the variables. In the long run equation, evidence shows that Inflation (0.028) has a positive and insignificant relationship ($0.234 > 0.05$) with Health care expenditure but found to be negative and insignificant in the short run. In fact, the results show that all variables are insignificant in the short run, but at least two are significant in the long run. The results of the study have shown that the determinants of health care expenditure are population rate and the mortality rate.

Population and mortality rate are positive and statistically significant in the long run with coefficients of 5.977 and 0.039 respectively and with probability values of $0.000 < 0.05$ and lastly $0.001 < 0.05$. The long run relationship among these variables indicate that there is actual variance caused by the two in health care expenditure. From the normality histogram and the results of the ECM (-0.458) which is negative and statistically significant ($0.00 < 0.05$), it can be concluded that the panel ARDL model is stable and vigorous.

6.3 POLICY RECOMMENDATIONS

The empirical literature has highlighted that there are initiatives that are in place to try and assist nations in terms of health matters. One thing to improve health statistics would be for every country that has committed itself to these initiatives to stick to the targets and to take part in all efforts that are put in place to improve health conditions globally.

Many African countries have been found at fault for only reacting to symptoms and not directly addressing the causes of many diseases. The cost of treating symptoms and not rooting out the cause is one among many reasons why most African countries spend a great portion of their GDP on health yet still face high mortality rates and diseases. Perhaps by structuring health spending as a percentage of GDP to specific outcomes that can reciprocate the relation, there could be actual statistical significance between health care expenditure and GDP. An example would be to improve research and development in the health care sector that could be copyrighted and structured to improve health tourism and the export of health care goods.

Population from the results has a positive relationship with health care expenditure. From this, we can conclude that as one goes up, so will the other. By creating a policy around a restriction of the number of births per parent, Africa could possibly change its high cost on health care expenditure, but this could cause a rift where culture is concerned. By decreasing its population it can decrease the cost of health, and focus its finances on something else that could better its economy. By introducing a child policy like the one once adopted in China, the continent could have a hold on the rising youth unemployment, youth headed families and through that, support the citizens in other sectors that will ultimately put a focus on improving the general standard of living.

Dialogue and research around the National Health Insurance (NHI) that most African countries are considering to or have already implemented are inevitable. The strain that it will have on taxpayers may be too much of a burden although the poor will be assisted extensively, which can also contribute to the redistribution of wealth and thus decrease inequality. However, if not structured and executed meticulously, it may be a destructive policy for the African economy. This recommendation highlights the importance of research and development again but introduces a concern to household income or per capita income. With the knowledge that most African countries are in tatters financially, to ask the household to further pay for universal health insurance takes away more from those in the lower income bracket. Although this is beneficial to everyone and takes away from health service discrimination, it hurts the poor majority. The implementation of NHI should be structured according to income bracket so that the income of the poor does not spread thin in comparison to those that are rich.

The results in the study give answers the study; these results may not be satisfactory to other researchers. This gives room for improvement for other researchers, the use of other different variables in trying to find answers to the determinants of the health care expenditure. The use of a different approach in terms of the methodology can also be beneficial to a breakthrough in health care spending. These options are a possible way forward to researchers with an interest in health care expenditure in the African continent.

6.4 LIMITATIONS OF THE STUDY

This study has focused on the time period of only 16 years and used strictly Sub-Saharan countries. The absence of data before the year 2000 was a limitation faced in the study that reduced the observed number of fluctuations. The results prove to have answered some

REFERENCES

- Afonso, A. & Jalles, J.T. 2014. Causality for the government budget and economic growth. *Applied Economic Letters*, 21(17).
- Agee, M.D. & Gates, Z. 2013. Lessons from Game Theory and Healthcare System Price Inflation: Evidence from a Community-Level Case Study, *Applied Health Econ Health Policy*, 11(1), 45-51.
- Alam, K & Mahal, A. 2014. Economic impacts of health shocks on households in low and middle-income countries: a review of the literature, 10(21).
- Alam, S., Sultana, A. & Butt. M. S., 2010. Does social expenditure promote economic growth? A multivariate panel cointegration analysis for Asian countries, 14(1).
- AMREF (The African Medical and Research Foundation). 2011. Contributions of civil society organisations of health in Africa.
- Anyanwu, J.C. & Erhijakpor, A.E.O. 2009. Health expenditure and health outcomes in Africa, *African Development Bank: Economic Research Working Paper*.
- Arreaza, A., Sorensen, B.E., Yosha, O. (1999), Consumption smoothing through fiscal policy in OECD and EU countries. In: Poterba, J.R., Von Hagen, J., editors. *Fiscal Institutions and Fiscal Performance*. Chicago: The University of Chicago Press.
- Barbieri, L. 2006. Panel unit root tests: A review. *Serie Rossa: Economia*.
- Betchoo, N. K. 2016 Public sector management: A millennial insight. USA: Graduate Johns Hopkins University.
- Bildirici, M. 2004. Political instability and growth: An econometric analysis of Turkey, Mexico, Argentina and Brasil, 1985-2004. *Applied Econometrics and International Development*, 4(4).
- Bird, R.M. 1972. The displacement effect: A critical note. *FinanzArchive/Public finance Analysis*.
- Brooks, C. & Rew, A.G 2002. Testing unit root in a process exhibiting a structural break in the presence of GARCH errors. *Computational Economics*, 20(3).

Cipla, 2016. The cost of healthcare in South Africa. *Health24*, 29 November. <http://www.health24.com/Medical-schemes/the-cost-of-healthcare-in-south-africa-20161129>

Date of access: 29 Aug 18.

Nwaeze, C, Njoku, R. & Nwaeza, O.P. 2014 Impact of government expenditure on Nigeria's economic growth. *The Macrotheme Review*, 3(7).

Colman, A.M. 1995. Game theory and its application in the social and biological sciences. University of Leicester, 270 Madison Avenue, New York.

Cremieux, P., Ouellette, P. & Pilon, C. 1999. Health care spending as determinants of health outcomes. *Economics of Health Care Systems*, 8(7) 627-639.

Grigorov, V. 2009. Healthcare in Africa. *CVJ (Cardio Vascular Journal of Africa)*, 20(5).

De Haan, A. 2005. Poverty, disparities, or the development of underdevelopment in Orissa, *Economics & Political Weekly*, 40(22).

Department of Health: Republic of South Africa. 2015. National health insurance for South Africa: Towards universal health coverage.

Devlin, N. & Hansen, P. 2001. Health care spending and economic output: Granger causality, *Applied Economic Letters*, 8(8).

Dube, Z. 2017. The impact of exchange rate volatility on manufacturing production: A case study of South Africa. *University of Fort Hare*.

Fazli, P & Abbasi, E. 2017. Analysis of the validity of the Kuznets Curve of energy intensity among D-8 countries: Panel ARDL approach. *International Letters of Social and Humanistic Science*, 81(1).

Gawanas, B. 2006. African Union and Health Care Challenges in Africa: Strategies and Initiatives on Health Care Delivery, *African Renaissance*, 3(4).

Getzen, T.E. 2000. Health care is an individual necessity and a national luxury: applying multilevel decision models to the analysis of the health care expenditures, *Journal of Health Economics*, 19(2).

Greene, W. H. 2000 Econometric Analysis. 4th ed. Prentice-Hall.

Ghatak, A., Hazlewood J.G., & T., M. Lee. 2008. How private health care can help Africa, *McKinsey Quarterly*.

Gujarati, D.N. 2004. Basic Econometrics. India, McGraw-Hill Education.

Gujarati D.N. & Porter, D. C. 2009. Basic Econometrics. 5th Edition, McGraw Hill Inc., New York.

Hartwig, J. 2007. What drives health care expenditure? – Baumol's model of 'unbalanced growth' revisited, *Journal of Health Economics*, 27(3).

Ilorah, R. 2013. Is Africa trapped between foreign aid dependency and failed growth initiatives? *University of Limpopo*.

International Finance Corporation, 2007. Annual integrated report. World Bank Group

Janssen, 2011. The future of healthcare in Africa. The Economist: Economist Intelligence Unit.

Kasaje, D. Sempebwa, E. Spencer, H. Community leadership and participation in the Sarardid, Kenya, and rural health development programme, *Annals of Tropical Medicine and Parasitology*, 1987, 81.

Kirigia, J. M., Preker, A., Carrin, G., Mwikisa, C. & Diarra-Nama, A. J. 2006. An overview of health financing patterns and the way forward in the WHO African Region. *The East African Medical Journal*, 83(8).

Kollias, C., & Mylonidis, N. & Paleologou, S. 2006. The Feldstein-Horioka puzzle across EU members: Evidence from the ARDL bounds approach and panel data. *International Review of Economics and Finance*, 17.

Kuckuck, J. 2012. Testing Wagner's Law at different stages of economic development – A historical analysis of five Western European countries. *Institute of Empirical Economic Research*, Working paper 91.

Lamartina S. & Zaghini, A. 2008. Increasing public expenditures: Wagner's Law in OECD countries. *CFS Working Paper*, 13.

Lipton, M. and Simkins, K., 1993. State and Markets: Post-Apartheid South Africa. Johannesburg: Witwatersrand University Press.

McIntyre, D., Bloom, G., Doherty, J., & Brijlal, P. 1995. Health Expenditure and Finance in South Africa, *Health Systems Trust, and the World Bank*.

Novignon, J., Olakojo, S.A. & Nonvignon, J. (2012) The Effects of Public and Private Health Care Expenditure on Health Status in Sub-Saharan Africa: New Evidence from Panel Data Analysis. *Health Economics Review*.

Odoh, V. T. & Nduka E. K. 2014. Public health expenditure in Nigeria: Civilian versus military regimes. *Innovare Journal of Social Sciences*, 2(3).

Okunade, A.A. 2005. Analysis and Implications of the Determinants of Healthcare Expenditure in Africa Countries, *Health Care Management Science*. 8(4).

Pattichis, C.A. 1999. Price income elasticities of disaggregated import demand: results from UECMs and application, *Applied Economics*. 31(9).

Peacock, A.T & Wiseman, J. 1961. The growth of public expenditure in the United Kingdom. *The National Bureau of Economic Research*.

Peacock, A & Scott, A. 2000. The curious attraction of Wagner's law. Kluwer Academic Publishers, Netherlands.

Pesaran, M.H., & Pesaran, B. 1997. Working with Microsoft 4.0: Interactive Econometric Analysis, Oxford: Oxford University Press.

Pesaran, M.H., Shin, Y. & Smith, R.J. 2001. Bounds testing approach to the analysis of level relationships. *Journal of Applied Econometrics*. 16(3).

Preker, A.S. & Lagenbrunner, J.C. 2005. Spending wisely: Buying health services for the poor. *The World Bank*.

Scharmer, E. 2002. A critical appraisal of the theories of government expenditure growth. Munich, GRIN Verlag, <https://www.grin.com/document/16172>

Terr Blanche, M., Durrheim, K. & Painter, D. 2006. Research in Practice: Applied Methods for Social Sciences. 2nd Edition, UCT Press, Cape Town.

Todaro, M.P. & Smith, S.C. 2010. Economic Development. 11th ed. Courier Westford.

UNICEF (United Nations International Children's Emergency Fund). 2011. Levels and trends in child mortality. United Nations Inter-agency Group for Child Mortality Estimation.

United Nations Development Programme, 2014 Humanity divided: Confronting inequality in developing countries.

United States, Department of Health and Environment. 2014. Health assessment and improvement plan. Kansas.

Wagenaar, A.C, Salois, M.J. & Komro, K.A. 2009. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. 104(2)

Wagner, A.H. (1883), Finanzwissenschaft. Leipzig: C. F. Winter.

Wenger, T. 2012. Applied business statistics: Methods and Excel-based application. 4th ed. Cape Town.

William, M.K. 2006. "Descriptive Statistics," Research Methods Knowledge Base, <http://www.socialresearchmethods.net/kb/statdesc.php> Date of access: 18 Dec 18.

World Health Organisation, 2010. Towards Reaching the Health-Related Millennium Development Goals: Progress Report and the Way Forward, report of the regional director, World Health Organization Africa Regional Office for Africa, Brazzaville, Republic of Congo.

World Health Organisation, 2017. World health statistics: Monitoring health for sustainable development goals.

Young, M. 2016. Private vs. public healthcare in South Africa. Scholar Works at WMU, Western Michigan University.

APPENDIX A

Pesaran table: Unrestricted no trend

k	0.100		0.050		0.025		0.010		Mean		Variance	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
0	6.58	6.58	8.21	8.21	9.80	9.80	11.79	11.79	3.05	3.05	7.07	7.07
1	4.04	4.78	4.94	5.73	5.77	6.68	6.84	7.84	2.03	2.52	2.28	2.89
2	3.17	4.14	3.79	4.85	4.41	5.52	5.15	6.36	1.69	2.35	1.23	1.77
3	2.72	3.77	3.23	4.35	3.69	4.89	4.29	5.61	1.51	2.26	0.82	1.27
4	2.45	3.52	2.86	4.01	3.25	4.49	3.74	5.06	1.41	2.21	0.60	0.98
5	2.26	3.35	2.62	3.79	2.96	4.18	3.41	4.68	1.34	2.17	0.48	0.79
6	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43	1.29	2.14	0.39	0.66
7	2.03	3.13	2.32	3.50	2.60	3.84	2.96	4.26	1.26	2.13	0.33	0.58
8	1.95	3.06	2.22	3.39	2.48	3.70	2.79	4.10	1.23	2.12	0.29	0.51
9	1.88	2.99	2.14	3.30	2.37	3.60	2.65	3.97	1.21	2.10	0.25	0.45
10	1.83	2.94	2.06	3.24	2.28	3.50	2.54	3.86	1.19	2.09	0.23	0.41

Source: Pesaran et al. (2001)

APPENDIX B

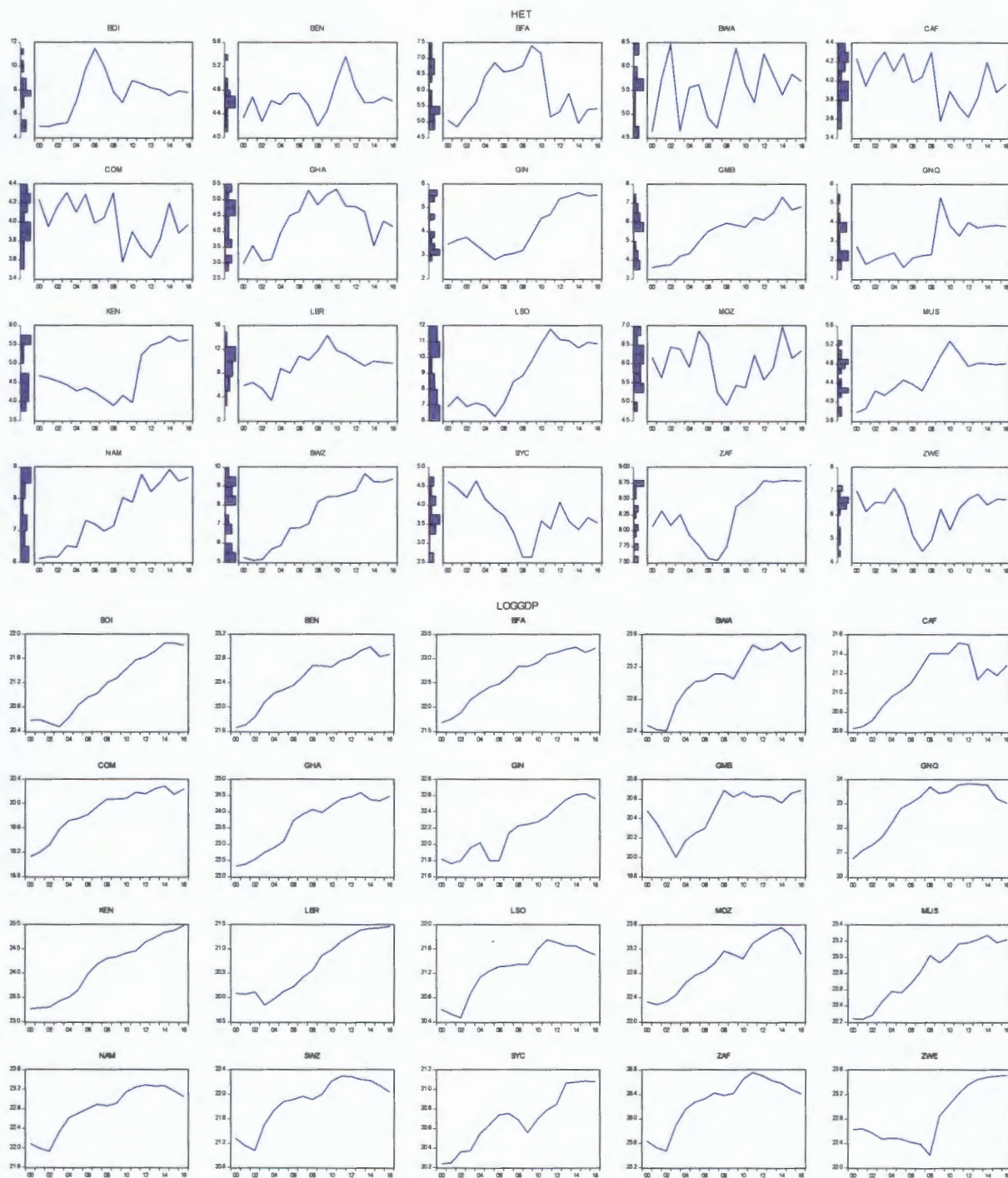
Countries used in the study

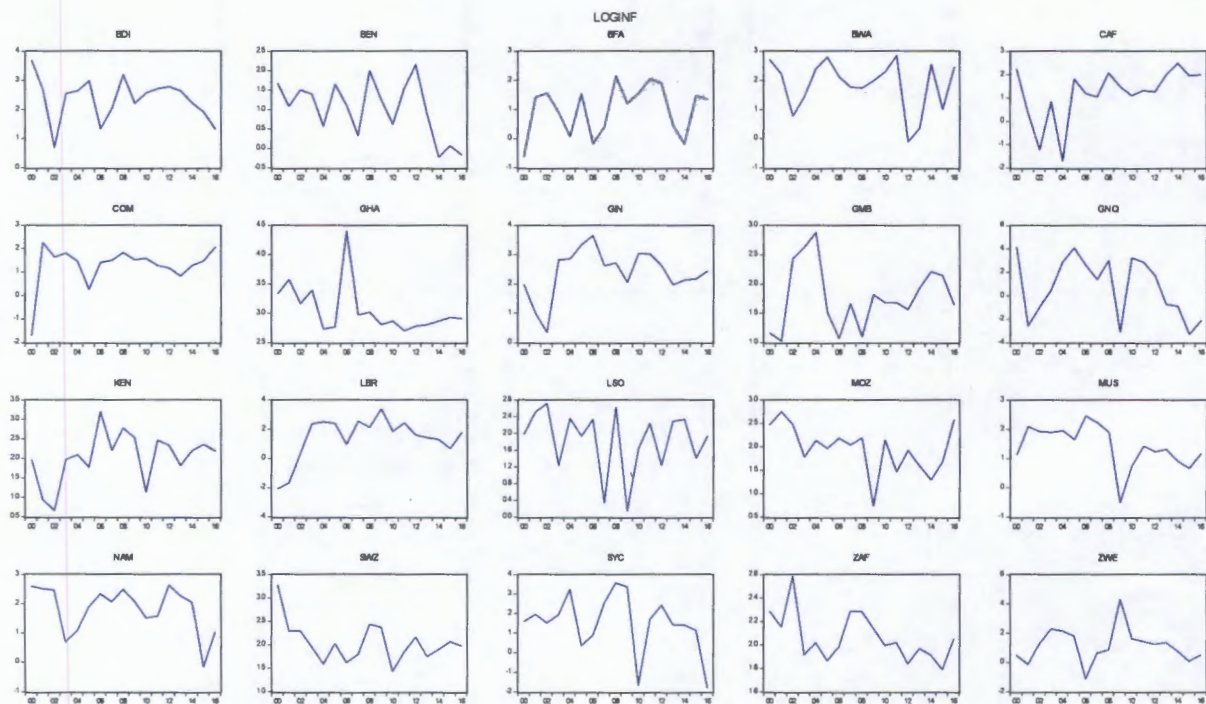
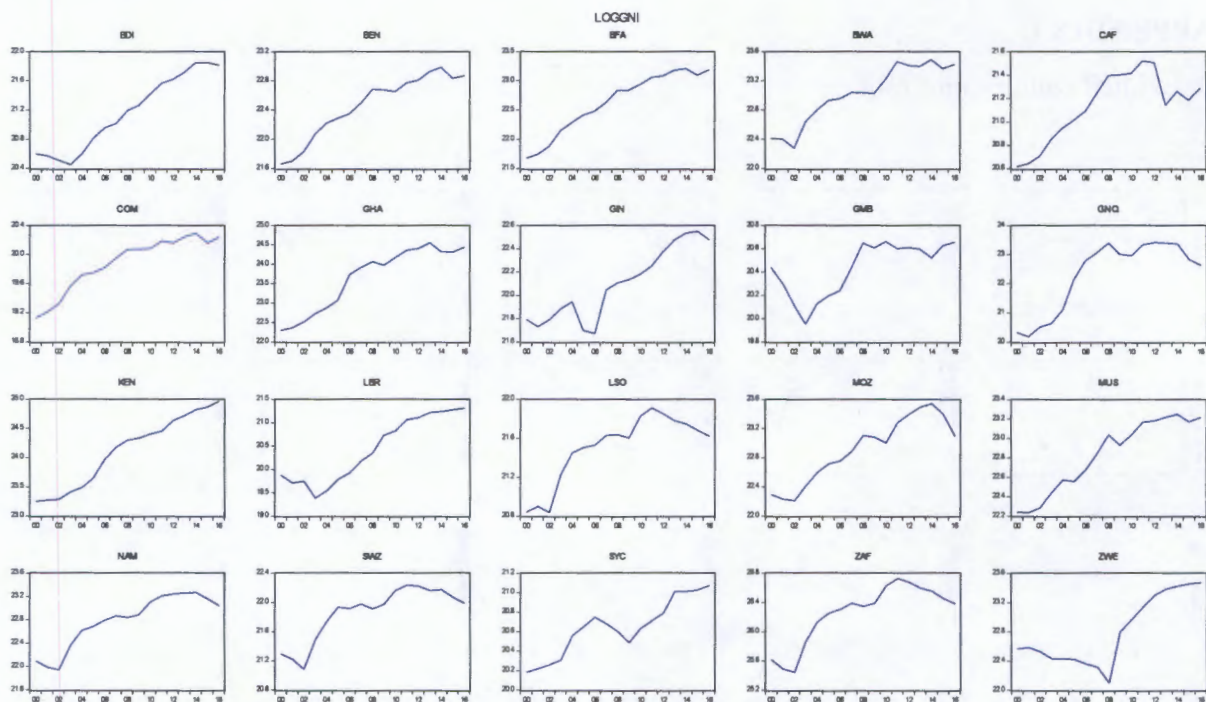
Burundi
Benin
Burkina Faso
Botswana
Central African Republic
Comoros
Ghana
Guinea
Gambia
Equitorial Guinea

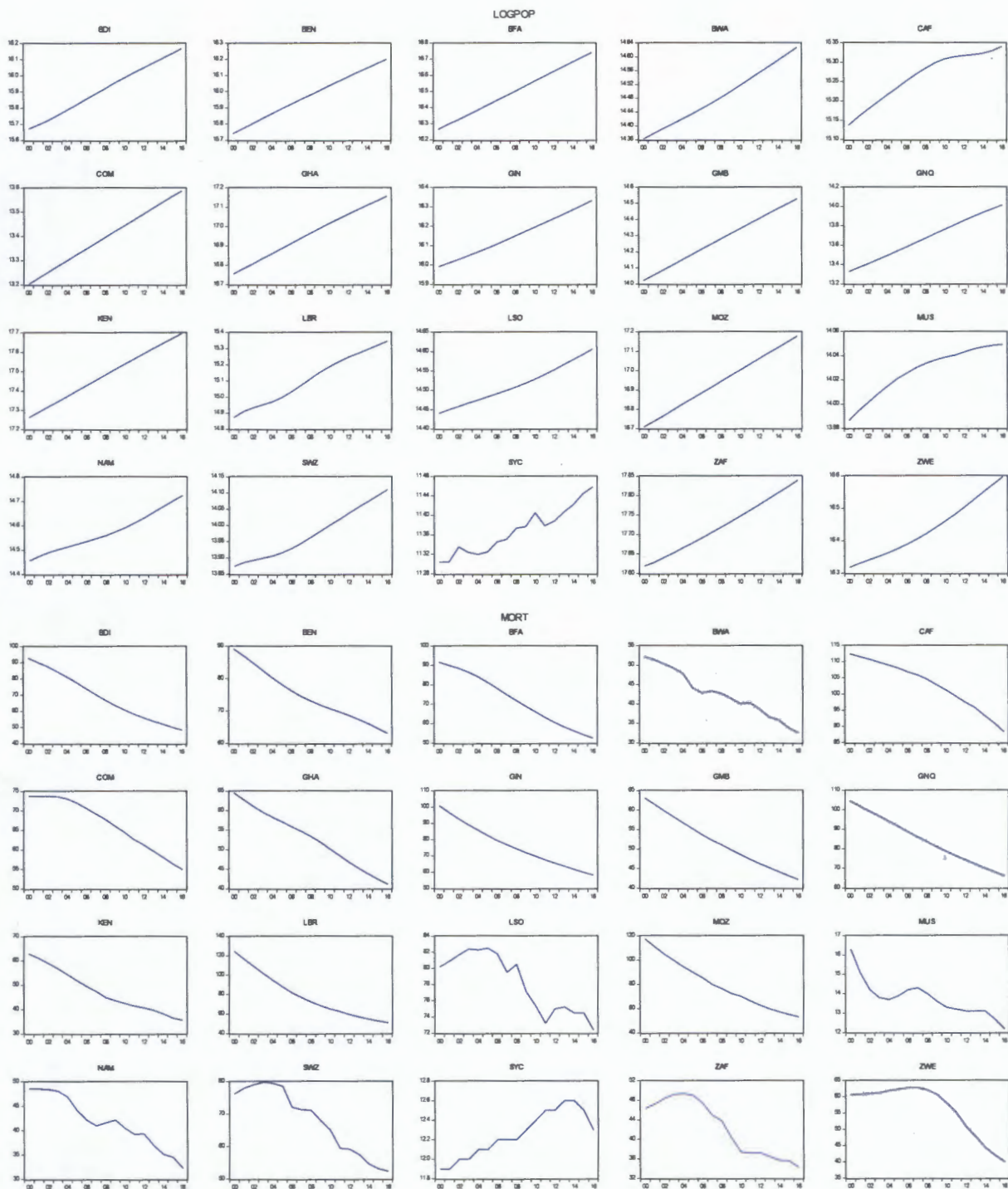
Kenya
Liberia
Lesotho
Mozambique
Mauritius
Namibia
Swaziland
Seychelles
South Africa
Zimbabwe

APPENDIX C

Individual country unit root







APPENDIX D

Data for all variables

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI	YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	BEN	4,97839061	870486065,9	6400706	92,8	38,9448932	884786065,9	2000	BEN	4,33873071	2569186643	6865951	88,2	4,338065007	2556919381
2001	BEN	4,96067407	876794723,1	6555829	90,2	13,71640679	864477157,8	2001	BEN	4,68672761	2680213931	7076733	87,1	1,972079109	2665637617
2002	BEN	5,15367588	825394490,2	6741569	87,6	1,027858567	811709078,1	2002	BEN	4,27443185	3054571082	7295394	84,9	3,553106878	3026431437
2003	BEN	5,24840706	784654423,6	6953113	84,6	11,94574864	766758030,8	2003	BEN	4,63066141	3905366188	7520555	82,6	3,06386771	3867272608
2004	BEN	7,10205754	915275323,4	7182451	81,3	13,14615934	887956197,1	2004	BEN	4,56185468	4521424807	7750004	80,3	0,77019549	4484423932
2005	BEN	9,83776739	1117257279	7423289	77,9	18,85693347	1099557234	2005	BEN	4,73384647	4803702821	7982225	78,2	4,293805217	4785944401
2006	BEN	11,49031352	1273180597	7675338	74,2	2,845127974	1264380597	2006	BEN	4,75046608	5142380779	8216896	76,3	2,091668629	5112167930
2007	BEN	10,02676743	1356078278	7939573	70,5	6,90187529	1350187529	2007	BEN	4,54583981	5969535132	8454791	74,6	0,390494254	5921075693
2008	BEN	7,85946357	1611634332	8212264	67	23,99094327	1607334332	2008	BEN	4,19564004	7132787397	8696916	73,2	6,434521826	7121478911
2009	BEN	6,96418727	1739781489	8489031	63,8	8,247352888	1722781489	2009	BEN	4,4643084	7097198712	8944706	71,9	2,540301108	7064203260
2010	BEN	8,82066864	2026864469	8766930	60,9	12,30329598	2014764469	2010	BEN	4,94824039	6970240895	9199259	70,8	0,878401222	6916757693
2011	BEN	8,57801472	2355652126	9043508	58,3	14,2943384	2338152125	2011	BEN	5,36875255	7814081156	9460802	69,7	3,733877525	7798579809
2012	BEN	8,20755375	2472384907	9319710	56	15,41650116	2463262534	2012	BEN	4,85686602	8152554487	9729160	68,6	7,699061801	8085816013
2013	BEN	8,03161378	2714505635	9600186	53,9	13,16338004	2713085280	2013	BEN	4,59205377	9156748441	10004451	67,4	1,396757931	9087751417
2014	BEN	7,53556539	3093647227	9891790	52	8,303402297	3093749316	2014	BEN	4,59429651	9707432016	10286712	66,1	-0,24736104	9646277722
2015	BEN	7,924910973	3097324740	10199270	50,1	5,886775972	3090096309	2015	BEN	4,6810721	8290986804	10575952	64,6	0,075030032	8263954911
2016	BEN	7,830696714	3007029030	10524117	48,4	2,795098014	2987029030	2016	BEN	4,622474127	8583031398	10872298	63,1	-0,178908271	8586235401

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	BFA	5,05909906	2628920056	11607942	91,6	-0,819771968	2602231361
2001	BFA	4,85203751	2812845514	11944587	90,2	3,179629518	2788422513
2002	BFA	5,26139343	3205592290	12293100	88,6	3,837945803	3186797137
2003	BFA	5,60978869	4205691222	12654621	86,7	1,48477964	4180054621
2004	BFA	6,45328338	4838551100	13030569	84,3	0,09062731	4807847964
2005	BFA	6,87238586	5462709498	13421930	81,4	3,739396495	5442137633
2006	BFA	6,57889926	5844669846	13829177	78,4	-0,17846399	5842308110
2007	BFA	6,62938857	6771277871	14252021	75,2	0,5049409	6753605287
2008	BFA	6,76855996	8369637065	14689726	72,1	7,639188433	8347656049
2009	BFA	7,40543097	8369175126	15141099	69,1	2,405470435	8342689809
2010	BFA	7,17005016	8979566766	15605217	66,2	3,779625593	9202852644
2011	BFA	5,16945672	10774061339	16081904	63,4	6,81120271	10391738752
2012	BFA	5,32688534	11166061508	16571216	60,7	5,823999478	10720553975
2013	BFA	5,91240213	11934606510	17072723	58,4	0,599621054	11727950240
2014	BFA	4,96026323	12400688571	17585977	56,3	-0,193669801	12016279659
2015	BFA	5,399850233	11148759325	18110624	54,4	3,414508182	10811530894
2016	BFA	5,424171864	12115155932	18646433	52,7	2,93756718	11816886689

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	BDI	4,97839061	870486065,9	6400706	92,8	38,9448932	884786065,9
2001	BDI	4,96067407	876794723,1	6555829	90,2	13,71640679	864477157,8
2002	BDI	5,15367588	825394490,2	6741569	87,6	1,027858567	811709078,1
2003	BDI	5,24840706	784654423,6	6953113	84,6	11,94574864	766758030,8
2004	BDI	7,10205754	915275323,4	7182451	81,3	13,14615934	887956197,1
2005	BDI	9,83776739	1117257279	7423289	77,9	18,85693347	1099557234
2006	BDI	11,49031352	1273180597	7675338	74,2	2,845127974	1264380597
2007	BDI	10,02676743	1356078278	7939573	70,5	6,90187529	1350187529
2008	BDI	7,85946357	1611634332	8212264	67	23,99094327	1607334332
2009	BDI	6,96418727	1739781489	8489031	63,8	8,247352888	1722781489
2010	BDI	8,82066864	2026864469	8766930	60,9	12,30329598	2014764469
2011	BDI	8,57801472	2355652126	9043508	58,3	14,2943384	2338152125
2012	BDI	8,20755375	2472384907	9319710	56	15,41650116	2463262534
2013	BDI	8,03161378	2714505635	9600186	53,9	13,16338004	2713085280
2014	BDI	7,53556539	3093647227	9891790	52	8,303402297	3093749316
2015	BDI	7,924910973	3097324740	10199270	50,1	5,886775972	3090096309
2016	BDI	7,830696714	3007029030	10524117	48,4	2,795098014	2987029030

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	CAF	4,23554071	914500299,1	3754986	112,4	8,506601078	901436083,9
2001	CAF	3,94971705	931833302,8	3832203	111,6	0,425938675	924010113,1
2002	CAF	4,16499024	991387870,1	3907612	110,8	-2,371881706	982309385,2
2003	CAF	4,30920674	1139754799	3981665	109,9	1,336418631	1136967017
2004	CAF	4,10144818	1270080251	4055036	109	-4,439785938	1256265520
2005	CAF	4,29009912	1350301057	4127910	108,1	5,196435574	1340079533
2006	CAF	3,98872906	1460562038	4207758	106,9	2,343950638	1449089912
2007	CAF	4,04420573	1698125618	4275800	106	1,871749224	1686871568
2008	CAF	4,30491314	1985239277	4345386	104,7	7,04168802	1962359935
2009	CAF	3,57683853	1981728141	4404230	103	3,482367421	1975904696
2010	CAF	3,89743425	1986014846	4448525	101,3	2,009208748	1995649833
2011	CAF	3,73272849	2212699747	4476153	99,4	2,756018418	2222415328
2012	CAF	3,62284672	2184183758	4490416	97,5	2,579975805	2195405956
2013	CAF	3,82208893	1518565219	449653	96	6,287832718	1524161866
2014	CAF	4,20022213	1702898940	4515392	93,5	11,06866108	1710074598
2015	CAF	3,88171926	1583776760	4546100	91,2	6,162298068	1590745517
2016	CAF	3,968010107	1756124677	4594621	88,5	6,355050552	1757937216

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	GHA	2,99813339	4983024408	18938762	64,5	27,2301138	4836061112
2001	GHA	3,55887452	5314909954	19421605	62,8	34,81794423	5206827726
2002	GHA	3,07302943	6166330136	19924522	61,1	22,81858456	6036889828
2003	GHA	3,12389313	7632406553	20446782	59,6	28,70440739	7467434241
2004	GHA	3,95738509	8881368538	20986536	58,3	14,35015113	8683188883
2005	GHA	4,50784786	10731634117	21542009	57,1	14,96371826	10600650557
2006	GHA	4,63638188	20409257610	22113425	55,9	80,7509418	20281934315
2007	GHA	5,30044343	24758819718	22700212	54,7	18,63027689	24618642536
2008	GHA	4,85068811	28526891010	23298640	53,4	19,41027092	28410855657
2009	GHA	5,17304409	25977847814	23903831	51,9	15,66516856	25883819208
2010	GHA	5,33452117	32174772956	24512104	50,2	16,5956141	31640997973
2011	GHA	4,80741948	39566292433	25121796	48,5	13,91594183	38336161728
2012	GHA	4,7900551	41939728979	25733049	46,8	15,20557129	39809765731
2013	GHA	4,62620018	47805069495	26346251	45,2	15,58107726	46453675605
2014	GHA	3,55729189	38616536132	26962563	43,8	16,68127544	36899140302
2015	GHA	4,324515723	37543361204	27582821	42,4	17,8017274	36411505263
2016	GHA	4,169335931	42689783754	28206728	41,2	17,42459053	41299113104

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	GIN	3,45616834	2995360969	8808546	100,7	6,30012396	2922327098
2001	GIN	3,65332963	2833442750	8971139	96,7	1,752426317	2746252750
2002	GIN	3,76254133	2949637039	9137345	92,8	0,432772377	2917012439
2003	GIN	3,44611461	3446442219	9309848	89,1	15,91069656	3200990696
2004	GIN	3,13747392	3666349049	9490229	85,7	16,52158332	3395183789
2005	GIN	2,82148862	2937071767	9679745	82,5	27,39084537	2657936712
2006	GIN	3,02029095	2931625105	9881428	79,6	37,58389017	2593527162
2007	GIN	3,07812234	4134173275	10096727	76,9	12,98687799	3763725917
2008	GIN	3,2070461	4515824647	10323142	74,4	14,10921148	3992667540
2009	GIN	3,84851388	4609923756	10556524	72	6,806336767	4107952429
2010	GIN	4,54713891	4735956493	10794170	69,8	20,1995783	4302274718
2011	GIN	4,73099737	5067360009	11035170	67,6	19,73220792	4624809469
2012	GIN	5,39134293	5667229759	11281469	65,6	12,89151081	5234948923
2013	GIN	5,49316028	6231725485	11536615	63,7	6,289062831	5777915797
2014	GIN	5,64479793	6624068016	11805509	61,8	7,50068081	6134091142
2015	GIN	5,509767047	6699203543	12091533	60	7,823395109	6225650529
2016	GIN	5,549241752	6298927773	12395924	58,3	10,57794352	5786844111

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	GMB	3,61338256	782915402,4	1231844	63,1	2,216982654	752681081,7
2001	GMB	3,70840054	687408804,6	1270495	61,5	1,8054337659	656184060,9
2002	GMB	3,75098777	578236035,1	1311349	59,9	10,39134477	545288099,1
2003	GMB	4,21918804	487038821,6	1354194	58,3	12,83934099	464321035,4
2004	GMB	4,3519662	578785278,8	1398573	56,7	16,84620743	551599208,8
2005	GMB	4,9668598	624174723,7	1444204	55,2	3,593680993	591849405,4
2006	GMB	5,52277969	655068696	1491021	53,7	1,931768802	617208279,1
2007	GMB	5,76134541	798870894,2	1539116	52,3	4,293977782	754335945,2
2008	GMB	5,9455552	965769128,2	1588572	51,1	2,011360281	931333334,8
2009	GMB	5,84983434	900639747,9	1639560	49,8	5,180453626	892548464,2
2010	GMB	5,75051063	952429030,4	1692149	48,6	4,36854821	944381893,5
2011	GMB	6,24125427	904256643,4	1746363	47,4	4,372960958	888511026,3
2012	GMB	6,12343327	912569886,8	1802125	46,3	3,794307157	893932356,7
2013	GMB	6,49113393	903779326,2	1859324	45,2	5,952157821	881379327,3
2014	GMB	7,34040076	849122624,8	1917852	44,2	8,094295943	820322624,8
2015	GMB	6,651655987	938794719,4	1977590	43,2	7,537604549	909968844,9
2016	GMB	6,827730226	964599177,5	2038501	42,2	4,188460035	936815006,9

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	GNQ	2,73288105	1045998496	614323	104,5	64,7350223	675806916,3
2001	GNQ	1,78308363	1461139022	639762	102	-11,97152744	587616433,7
2002	GNQ	2,05102618	1806742742	666407	99,4	-1,582890271	821380430,5
2003	GNQ	2,22972919	2484745935	694611	96,8	0,635621902	924205363,8
2004	GNQ	2,39764528	4410764339	724817	94,1	16,92276351	1481460301
2005	GNQ	1,63062912	8217369093	757317	91,5	59,32905067	4173013695
2006	GNQ	2,12883668	10086528699	792217	88,8	12,9763712	7939532609
2007	GNQ	2,24801409	13071718759	829327	86,2	3,037653859	10450746474
2008	GNQ	2,311263	19749893536	868418	83,6	19,84003893	1463683123
2009	GNQ	5,32060059	1502795173	909111	81,1	-20,83023096	9938850407
2010	GNQ	3,83919384	16298542028	951104	78,7	24,90553418	9569119907
2011	GNQ	3,29221335	21329395901	994290	76,4	17,04510657	13801136010
2012	GNQ	4,0084211	22388627294	1038593	74,3	4,854786563	14845082205
2013	GNQ	3,73335792	21942597765	1083746	72,2	-1,072684215	14680027933
2014	GNQ	3,80407904	21461989483	1129424	70,1	-1,431464336	14174589222
2015	GNQ	3,846093023	12162117377	1175389	68,2	-25,40001145	8151259308
2016	GNQ	3,794509994	10178967206	1221490	66,2	-7,086731756	6784918070

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	KEN	4,68273816	12705357103	31450483	62,8	6,079848488	12575576937
2001	KEN	4,62224717	12986007426	32321482	61	1,573120299	12838507614
2002	KEN	4,53836443	13147743911	33214009	59	0,933205556	13026157962
2003	KEN	4,44734056	14904517650	34130852	56,8	6,197313239	14738442157
2004	KEN	4,28974554	16095337094	35074931	54,4	7,126841556	15953749660
2005	KEN	4,36354595	18737897745	36048288	51,8	4,899649719	18731703508
2006	KEN	4,24362134	25825524821	37052050	49,5	23,53013325	25755442381
2007	KEN	4,07795506	31958195182	38085909	47,5	8,129485595	31814012977
2008	KEN	3,89959146	35895153328	39148416	44,9	15,15117496	35863494629
2009	KEN	4,16756719	37021512049	40237204	43,6	11,63730368	36976859034
2010	KEN	3,97371597	39999659234	41350152	42,5	2,093803343	39852031724
2011	KEN	5,2314281	41953433591	42486839	41,3	10,79161341	41960414724
2012	KEN	5,49053237	50412754822	43646629	40,6	9,379789942	50097078420
2013	KEN	5,56790477	55097343448	44826849	39,6	5,168843141	54497375263
2014	KEN	5,70292126	61445345999	46024029	38,2	8,067750442	60577101119
2015	KEN	5,592909467	63767539357	47236259	36,5	9,622988236	63083473893
2016	KEN	5,627035166	70529014778	48461567	35,6	8,026256183	69845123153

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	LBR	5,91313981	529064600	2884522	124,3	-6,891738343	427664600
2001	LBR	6,40765167	521000000	2991132	116,6	-4,317028355	364500300
2002	LBR	5,42610813	543000000	3062863	109,1	0,443206918	379200400
2003	LBR	3,43834059	416000000	3116233	101,6	9,672410129	263100100
2004	LBR	8,77485716	474700000	3176414	94,5	11,19655418	308400200
2005	LBR	8,0358831	550000000	3261230	87,9	10,04984404	394400200
2006	LBR	10,90408771	604028900	3375838	82	1,64774365	452028800
2007	LBR	10,23524323	739027200	3512932	76,9	11,69923971	584827100
2008	LBR	11,82501159	850040500	3662993	72,4	7,34935156	690440500
2009	LBR	14,39018881	1155147400	3811528	68,5	29,05326814	1010547300
2010	LBR	11,86712183	1292697100	3948125	65,2	5,473707484	1113297000
2011	LBR	11,23228864	1545400000	4070167	62,2	10,48844974	1420555200
2012	LBR	10,18650065	1735500000	4181563	59,4	3,987770731	1473530000
2013	LBR	9,25436605	1946500000	4286291	57	3,177443819	1645006500
2014	LBR	10,03633328	2013000000	4390737	54,8	2,69634158	1680000000
2015	LBR	9,825733327	2034000000	4499621	52,9	1,043219076	1754000000
2016	LBR	9,705477552	2101000000	4613823	51,2	4,973579234	1820000000

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	LSO	6,91527558	887295262,2	1868699	80,2	6,300218556	1130529943
2001	LSO	7,52988554	825706966,8	1885955	80,9	11,47305587	1194386614
2002	LSO	6,90802017	775780697,3	1902315	81,7	14,20693196	1123290825
2003	LSO	7,1297893	1157832936	1918097	82,4	2,438813357	1654878422
2004	LSO	6,96398382	1511236652	1933728	82,3	9,600392477	2072881339
2005	LSO	6,29584414	1682350942	1949543	82,5	5,922843305	2183409542
2006	LSO	7,11552059	1800105593	1965662	81,8	9,31098847	2243386089
2007	LSO	8,46770338	1820597205	1982287	79,5	0,400803477	2483038578
2008	LSO	8,85089519	1868776303	1999930	80,5	12,8449121	2494431802
2009	LSO	9,79523187	1864004707	2019209	77,1	0,155729905	2416181833
2010	LSO	10,87000705	2394097299	2040551	75,3	4,161286206	3031333661
2011	LSO	11,78852824	2791545696	2064166	73,2	8,453199742	3301152718
2012	LSO	11,14497984	2678243067	2089928	75	2,434334588	3093300853
2013	LSO	11,07282138	2532392022	2117361	75,2	8,854225974	2883968058
2014	LSO	10,61767672	2520952363	2145785	74,5	9,404384452	2799487685
2015	LSO	10,94515931	2335194894	2174645	74,5	3,112935006	2614645463
2016	LSO	10,87855247	2199709489	2203821	72,4	5,951219512	2462946647

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	MUS	3,78342769	4582555125	1186873	16,3	2,085981243	4552726099
2001	MUS	3,86541671	4536538211	1196287	15,1	7,099825067	4550029781
2002	MUS	4,23599832	4767303154	1204621	14,2	5,853830854	4780519895
2003	MUS	4,14728086	5609831328	1213370	13,8	5,714790146	5579976302
2004	MUS	4,29214123	6385695187	1221003	13,7	6,090583879	6371512595
2005	MUS	4,46865768	6283803256	1228254	13,9	4,258955826	6275700517
2006	MUS	4,37870539	7028803366	1233996	14,2	10,78478705	7060624888
2007	MUS	4,24109725	8150138757	1239630	14,3	8,308315292	8348135161
2008	MUS	4,60310258	9990370016	1244121	14	5,686692805	10127474273
2009	MUS	4,96772048	9128843109	1247429	13,6	-0,654200833	9089199557
2010	MUS	5,28526703	10003670690	1250400	13,3	1,126418905	10123211757
2011	MUS	5,02482988	11518393367	1252404	13,2	3,161463791	11549850206
2012	MUS	4,7562462	11668885524	1255882	13,1	2,465523579	11708352745
2013	MUS	4,82151957	12129642296	1258653	13,1	2,750881118	12153419714
2014	MUS	4,80954464	12803445934	1260934	13,1	1,480636807	12479165034
2015	MUS	4,795770137	11681761261	1262605	12,7	0,952194821	11596271184
2016	MUS	4,808944782	12164207330	1263473	12,2	2,239731774	12099798565

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	MOZ	6,16162092	5016469069	1806787	117,5	10,90252432	4823569067
2001	MOZ	5,64277897	4766928747	18588758	111	14,62032533	4541128746
2002	MOZ	6,44871089	5031510909	19139658	105	10,95675106	4428310909
2003	MOZ	6,3923101	5597367853	19716598	99,6	4,916111477	5431867856
2004	MOZ	5,91276381	6831808930	20312705	94,5	7,493728189	6532308933
2005	MOZ	6,86781935	7723846195	20923070	89,8	6,197670173	7364003430
2006	MOZ	6,51278626	8312078525	21547463	85,4	7,904869902	7677625882
2007	MOZ	5,25271234	9366742309	22188387	80	6,713518582	8775165188
2008	MOZ	4,91337392	11494837053	22846758	76,3	7,982327988	10852914434
2009	MOZ	5,43496409	10911698208	23524063	72,4	1,076609983	10634786295
2010	MOZ	5,3803234	10154238250	24221405	70,1	7,643517374	98133293356
2011	MOZ	6,23470157	13131168012	24939005	66,1	3,332125638	12941180125
2012	MOZ	5,57950644	14534278446	25676606	62,7	5,854608735	14494893755
2013	MOZ	5,89790701	16018848991	26434372	59,8	3,917514281	15960259330
2014	MOZ	6,97558186	16961127046	27212382	57,2	2,633984072	16759214292
2015	MOZ	6,150998437	14798399862	28010691	55,1	4,381298308	14574754915
2016	MOZ	6,341495769	11014858592	28829476	53,1	12,16729256	10760007923

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	NAM	6,11401617	3908661518	1899257	48,5	12,33557731	3941875731
2001	NAM	6,17906153	3546783708	1933596	48,5	11,25937435	3545657006
2002	NAM	6,16746382	3361251198	1962147	48,4	10,72829913	3395036430
2003	NAM	6,52403029	4931312147	1986535	48,1	1,006712117	5160233321
2004	NAM	6,47197619	6606858786	2009228	46,9	1,903991618	6690272010
2005	NAM	7,31871061	7261333795	2032196	44,1	5,52868033	7148900036
2006	NAM	7,19928741	7978734402	2055734	42,1	9,272906386	7926899505
2007	NAM	6,99321064	8740865600	2079915	41	6,909023696	8578495898
2008	NAM	7,14986622	8486721917	2106375	41,6	10,90850533	8348194415
2009	NAM	8,05232515	8876191121	2137040	42,1	6,962891214	8708821365
2010	NAM	7,89329936	11282192605	2173170	40,5	3,564140802	10849382547
2011	NAM	8,78046547	12409629836	2215621	39,2	3,80506442	12075134787
2012	NAM	8,23537727	13016272899	2263994	39,3	12,88187328	12495078721
2013	NAM	8,52898331	12713366873	2316520	36,9	8,717667569	12627445257
2014	NAM	8,92868766	12853963143	2370992	35,1	6,751967143	12827449013
2015	NAM	8,564349413	11491507356	2425561	34,5	-0,182493059	11455564343
2016	NAM	8,674006794	10267157280	2479713	32,3	1,778656129	10235043777

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	SWZ	5,25519849	1738100848	1061468	76,2	25,34294111	1772303678
2001	SWZ	5,11405331	1542477355	1072927	77,9	8,942622897	1644811374
2002	SWZ	5,15565081	1432228173	1080930	79	8,914928711	1435491523
2003	SWZ	5,70622138	2197612761	1087392	79,7	6,005495005	215555432
2004	SWZ	5,88376476	2770082815	1095053	79,4	3,871285847	2772685221
2005	SWZ	6,79799069	3178126548	1105873	78,5	6,556824287	3356415165
2006	SWZ	6,813272502	3291353813	1120514	72,1	4,041159467	3505353916
2007	SWZ	7,0494846	3469363931	1158434	71,3	5,014296438	3510463727
2008	SWZ	8,19474448	3294093360	1138897	71,1	10,4257398	3288893340
2009	SWZ	8,46365405	3580417157	1180675	67,9	9,769931141	3504865745
2010	SWZ	8,46995395	4438778554	1202843	65,1	3,197176152	4212627103
2011	SWZ	8,61329306	4820499498	1225258	59,4	5,340932489	4584821984
2012	SWZ	8,75829595	4807282468	1248158	59,1	7,659721326	4506003540
2013	SWZ	9,65813772	4575596301	1271456	57,5	4,751050557	4214533236
2014	SWZ	9,25193954	4486261555	1295097	54,6	5,720213523	4267606290
2015	SWZ	9,22279107	4137638727	1319011	53,1	6,863953161	3852731721
2016	SWZ	9,377622777	3727303664	1343098	52,4	6,215199384	3563097682

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	ZAF	8,06849287	1,36367E+11	44896856	46,3	8,843786474	1,33188E+11
2001	ZAF	8,31481812	1,21516E+11	45312937	47,2	7,604663831	1,17779E+11
2002	ZAF	8,08571189	1,15482E+11	45855482,88	48,3	12,24055287	1,12693E+11
2003	ZAF	8,25734824	1,75257E+11	46418193,9	49,1	5,793571813	1,70647E+11
2004	ZAF	7,92666753	2,28594E+11	47001700,99	49,3	6,527008604	2,24282E+11
2005	ZAF	7,76856193	2,57773E+11	47606670,24	48,9	5,449047625	2,52831E+11
2006	ZAF	7,56779385	2,71638E+11	48233804,48	47,4	6,255382788	2,66503E+11
2007	ZAF	7,53305757	2,99416E+11	48883944,99	44,9	8,849410175	2,89648E+11
2008	ZAF	7,74694468	2,8677E+11	49557573,3	43,7	8,831503768	2,77827E+11
2009	ZAF	8,38628739	2,95936E+11	50255813,11	40,3	7,504533385	2,89309E+11
2010	ZAF	8,5041601	3,7549E+11	50979432,36	37,3	6,350977419	3,67345E+11
2011	ZAF	8,61362713	4,16419E+11	51729345,36	37,1	6,532210955	4,05769E+11
2012	ZAF	8,79451471	3,96328E+11	52506515,08	37,2	5,282845756	3,85568E+11
2013	ZAF	8,77541891	3,66624E+11	53311955,61	36,4	6,145449385	3,57013E+11
2014	ZAF	8,79698456	3,50851E+11	54146734,74	35,6	5,770182567	3,41494E+11
2015	ZAF	8,798972727	3,17407E+11	55011976,68	35,5	4,994046164	3,0954E+11
2016	ZAF	8,787125399	2,94841E+11	55908865	34,2	6,794158712	2,86651E+11

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	SVC	4,61725436	614879764,8	81131	11,9	3,983727231	583245913,4
2001	SVC	4,45396104	622262057,2	81202	11,9	6,156758855	604826410,6
2002	SVC	4,20887554	697518248,2	83723	12	3,613165237	629509051,1
2003	SVC	4,64427154	705704816	82781	12	5,946831619	662710852,3
2004	SVC	4,17338663	839319927,3	82475	12,1	24,67412016	848756836,4
2005	SVC	3,90758098	919103254,5	82858	12,1	0,458645157	928911545,5
2006	SVC	3,72881909	1016418229	84600	12,2	1,442344622	1026768792
2007	SVC	3,30160537	1033561654	85033	12,2	11,79983858	961671203,2
2008	SVC	2,6367745	967199594	86956	12,2	34,96512789	884729021,3
2009	SVC	2,63590921	847397850,1	87298	12,3	27,49417926	791820792,2
2010	SVC	3,59400354	969936525,3	89770	12,4	-4,212723766	915708538,4
2011	SVC	3,38253043	1065826670	87441	12,5	4,496235805	991854010,2
2012	SVC	4,08323853	1134267367	88303	12,5	10,48963647	1072469556
2013	SVC	3,57848961	1411061261	89949	12,6	3,218898852	1338967342
2014	SVC	3,36981689	1422530792	91359	12,6	3,14972847	1335880121
2015	SVC	3,677181677	1437722206	93419	12,5	2,135322054	1357934564
2016	SVC	3,541829392	1427323889	94677	12,3	-4,981935607	1427244480

YEAR	COUNTRY	HET	GDP	POP	MORT	INF	GNI
2000	ZWE	7,00975099	6689957600	12222251	60,6	0,627899893	6328908700
2001	ZWE	6,15713524	6777384700	12366165	60,7	-0,130888895	6447326700
2002	ZWE	6,53175852	6342116400	12500525	61	2,712950053	6072330100
2003	ZWE	6,51500899	5727591800	12633897	61,2	8,801275345	5507714700
2004	ZWE	7,13051837	5805598400	12777511	61,8	7,611524637	5522050000
2005	ZWE	6,43560337	5755215200	12940032	62,3	5,136601248	5480616600
2006	ZWE	5,1241363	5443896500	13124267	62,8	-2,017678847	5131054900
2007	ZWE	4,47385581	5291950100	13329909	62,8	0,894887041	4929377100
2008	ZWE	4,95530438	4415702800	13558469	62	1,349222859	3972333100
2009	ZWE	6,25858308	8366794000	13810599	60,6	74,29817514	7970560000
2010	ZWE	5,37316536	10052045200	14086317	58	4,067035765	9444218400
2011	ZWE	6,30657418	12071733500	14386649	55	3,231982467	11195196600
2012	ZWE	6,68618346	14058378300	14710826	50,8	2,506687326	13202589700
2013	ZWE	6,88119338	15273528900	15054506	47,8	2,866514536	14306476300
2014	ZWE	6,43947119	15834069900	15411675	44,4	1,211730687	14870634200
2015	ZWE	6,668949343	16072380200	15777451	42	0,079975482	15405229000
2016	ZWE	6,663204638	16289212000	16150362	40	0,650662299	15607421800