

MASTER'S THESIS  
INTERNATIONAL ADMINISTRATION  
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**AFRICA'S LOW ECONOMIC PERFORMANCE**

An Analysis of the Potential Causes of Africa's Low Economic Performance

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### **Abstract**

Many development specialists, policy makers, aid donors and recipient institutions have tried, with little or no success, to curb poverty in Africa. Though the continent is the poorest on the globe (more than half of its population still live below the poverty line of 1.25 dollar per day), considerable variations exist in income level among the various countries. Some countries (especially those in the North and South) have been observed to have good living standard and higher GDP per capita than other countries (primarily those at the Center). What then accounts for the difference in income levels among these countries? Reasons like poor institutions, historical slavery, culture, diseases, foreign aid, geography, unfair trade policies, have been used by researchers to explain why some countries are richer than others. This study seeks to investigate and depict the potential causes of Africa's poor economic performance, and why there are different in income levels among the African countries. The thesis' objective is thus to investigate if the following three explanatory strands: malaria, institutions, and foreign aid are responsible for the low economic performance in Africa. If yes which of the variable exerts the highest adverse impact on the continent economically, and how could the situation be mitigated? Using the multiple ordinary least square regression method, this study's findings underpin the view of Jeffery Sachs that malaria is the main cause of low economic performance in Africa. Countries with endemic malaria and good institutions were observed to be poorer than the non endemic ones with poor institutions. However, the results do not fully support Sachs' approach to alleviate poverty in the continent using financial aid (mainly provision of money by donors) because though malaria was observed to be the main cause, financial aid also significantly affects the economy negatively. However I still maintain that Africa needs foreign assistance to develop. Perhaps, assistance in the form of educational and technological development would be better than financial aid. I conclude this study by proposing measures by which malaria could be control so as to foster economic development.

*Key words: malaria, institution, foreign aid, GDP per capita, economic growth, economic development, poverty, economic performance*

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## 1. INTRODUCTION

Despite the global decline in poverty due to rapid economic growth in Asia, Latin America and the Caribbean, the economic situations in many African countries have stagnated or, worse, are regressing. Immediately after decolonization in the early 1960s, many countries on the continent experienced an economic boom, but in the later decades, their economic development has gradually declined relatively to other countries in the world. As such, many development specialists and policy makers have referred to Africa as lagging behind the rest of the world. Jeffrey Sachs<sup>1</sup> in his book *The End of Poverty* maintained that hunger, poverty and diseases are getting worse in many African countries and is calling on the international community to give Africa financial assistance especially. Recently, it is not uncommon to hear many talking about poverty alleviation in Africa, as there is a global effort to improve its countries' economic environment. Identifying the causes of the continent's economic distress is a prerequisite to providing recommendations, since these recommendations would be appropriate if, and only if, the actual problems are known. Though Africa, in general, is said to be the poorest continent, there still exist large differences in income levels among African countries. It is in this light that researchers, policy makers, and development specialist have used slavery<sup>2</sup>, diseases<sup>3</sup>, ethno linguistic fractionalization<sup>4</sup> and legal origin (la portal et al 2008) to explain the differences in income levels among countries in the world. I delimit my study only to African countries because, though classified as generally poor, some countries are doing much better than others; thus I also deem it necessary to understand why. My study will focus on three strands that have been used by recent development specialists, and policy makers to identify the underlying cause of the continent's economic problem. These strands are the high malaria prevalence rate, the very poor institutions that exist in Africa, and the continent's high dependency on foreign aid. Different studies have shown how each of the three strands negatively affects development in Africa as far as foreign aid (Moyo, 2009), institutions (Acemoglu et al 2001) and diseases (Sachs 2003; Acemoglu and Johnson 2007; Weil 2010) are concerned. These

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<sup>1</sup> He is an economics professor and was director of the millennium development goal from 2002 to 2006. He contributed immensely in the restructuring of eastern European countries economy during the transition from communism to a laissez faire economy. He shared the view that extreme poverty could be eradicated before 2025 if the developed countries increase the amount of foreign aid to the developing countries. But this view has been strongly criticized by many researchers.

<sup>2</sup> (Nunn, 2008; Inikori, 1992; Manning 1981), Institutions (Acemoglu et al 2001, 2002, 2005; North, 1981, 1989; Rodrick et al 2002, 2004, Knack and Keefer, 1995; Hall and Jones 1999)

<sup>3</sup> (Sachs et al 1997, Gallup and Sachs, 2001;; Sachs 2003, 2005; Acemoglu and Johnson 2007; Weil 2010) foreign aid (Moyo 2009; Andrew 2009)

<sup>4</sup> (Alesina et al, 2001, 2003)

three explanatory strands have, however, not been considered simultaneously and their relative strength can, therefore, at present, not be determined: This essay will contribute to previous work by using all three explanatory strands simultaneously, in a multiple linear regression (approach 2 and 3 of the regression) so as to determine their relative negative strength. I will identify which variable affects the continent the most and how this adverse effect can be overcome. The results from the multiple linear regression underpin the Jeffrey Sachs' view that disease (malaria) is the number one cause of Africa's poor economic performance, and best explains why there is income variation among states. In approach 1, the simple linear regression (explanatory variables run separately) result shows that each of the variables has a high negative impact on the continent's economic development i.e. malaria, poor institutions, and foreign aid significantly negatively affects Africa's economic development. In approach 2, the multiple linear regression (explanatory variables are run simultaneously) result indicates that, malaria plays a more significant role, while the other two become less significant. And in approach 3, multiple linear regression result, the significant of malaria still persists and outweighs all the other variables. Foreign aid and institutions become insignificant in this model.

Despite the increasing prevalence rate of HIV/AIDS in Africa, malaria still stand out as the number one cause of death, especially among children. Statistics from the World Health Organization have shown that approximately one million people die each year as a result of malaria with most deaths coming from Sub Saharan Africa (World Health Organization, 2001). The high prevalence rate in sub Saharan Africa is due to the warm tropical climate that favors mosquito breeding and the development of the parasite. It is to this effect that many Sub Saharan African countries like Cameroon, Ghana, Gambia that are malaria endemic are poorer than countries in the North (Tunisia, Egypt) and South (Botswana, RSA) that are not malaria endemic. The effect of malaria on Africa's economy is enormous as it affects the continent directly and indirectly. Direct effect includes the high costs of prevention and treatment. Some African countries used as much as 60 percent of their public health sector budget for the prevention and treatment of malaria. The indirect effect is the cost due to loss in productivity as a result of morbidity and mortality. Many Africans don't go to work or drop out from school because they are either sick or forced to look after relatives who are sick. In 1987, the total estimated cost for the prevention and control of malaria in Africa was estimated to be \$0.8 billion dollar which represent 0.6 percent of the

continent's GDP (Malaney et al, 2005). Also, the growth rate of the GDP per capita of these malaria endemic countries were calculated to be about 0.25-1.3 percent per year less than that of non malaria endemic countries (Malaney et al 2005)<sup>5</sup>. Moreover, the GDP of malaria endemic countries is only one fifth that of non endemic countries (Gallup and Sachs, 2001)<sup>6</sup>. This implies malaria has a great adverse impact on Africa's economy because majority of the countries are endemic.

The second strand that I will use in this study to depict the continent's low GDP per capita is the quality of institutions. Rothstein and Teorell (2005:5)<sup>7</sup> consider quality of government to be 'the importance of impartiality in the exercise of governmental power'. Based on this definition, one could rightly say that governance in many African countries is very poor because the countries lack impartiality. Only one country on the continent scored a corruption perception index value above 5.0 in the 2010 Transparency International CPI ranking<sup>8</sup>. Discrimination, nepotism, tribalism and favoritism are common throughout Africa. This implies meritocracy is of little or no importance on the continent, as jobs are allocated to the people not based on their skills and experiences but rather on their social class (partial principles). Many development specialist and researchers have maintained that African countries are lagging behind because they lack impartiality in their institutions, as there is a strong correlation between quality of institution and economic growth/development (Easterly 2001; Easterly and Levine 2003; Rodrick, Subramanian and Trebbi, 2004) Clague et al 1999; Mauro 1995). Botswana, for example with the highest CPI value (most impartial country) has one of the fastest growing economies in Africa. Other researchers (Sachs 2005) have still opened room for the continued investigation of Africa's poor economy by questioning why some more partial countries in Asia and South America are having faster growth and higher GDP per capita, than impartial countries in Africa. Sachs used such an illustration to support the claim that African countries are poor not because they lack good institution but because they are malaria endemic. Following Sachs' discovery that malaria is the main cause for Africa's poor economy performance: he alongside policy makers, top rock and pop singers, and donor NGO's have encouraged the provision of foreign aid to Africa.

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<sup>5</sup> Malany Pia, Andrew Spielman and Jeffrey Sachs (2005). The Malaria Gap.

<sup>6</sup> Gallup J, Sachs J, 2001. The economic burden of malaria. *Am J Trop Med Hyg* 64 (Suppl): 85–96.

<sup>7</sup> Rothstein is a professor in the Quality of Government Institute, Department in Political science. Göteborg university.

<sup>8</sup> Botswana is the exception which has a cpi value of 5.8 see transparency international cpi ranking 2010 for more detail

The continuous long term provision of foreign aid to Africa has weakened the economy and made it unproductive (Moyo, 2009). To this effect, another school of thought has emerged claiming that African countries are the poorest on earth today not because of institutions, or disease, but due to their high dependence on foreign aid. It is to this effect that in my continuous quest to identify the main causes of the Africa's problem, I will include foreign aid in the multiple cross country regression to see the level of its impact on the economy. Countries with the greatest proportion of foreign aid of Gross National Income (GNI) have also been observed to be among the poorest. Sixteen African countries, classified as low income and ten countries classified as poor, have been said to have aid flow of 50 percent and 75 percent of government expenditure, respectively (Moss and Subramanian, 2005). The unanswered question is 'does foreign aid cause poverty?' or 'does it help to mitigate the effects of poverty?' This is to say would African countries have been 'better off' or 'worse off' without foreign aid? To this effect, there are many ongoing debates analyzing the impact of foreign aid on Africa. While one school of thought advocates the complete cessation of aid to Africa, maintaining that it impairs both economic growth and economic development (Moyo, 2009), there exists another school of thought advocating a drastic increase of aid to Africa, claiming that it is the best way to alleviate poverty and increase the living standards of indigenous people (Sachs 2005). Proponents of complete cessation of foreign aid to Africa<sup>9</sup> claim it is destructive to the economy because it prevents the already weak industries on the continent from growing and competing in the international market. The continuous supply of wheat, flour, millet and other agricultural as well as manufactured goods like insecticide-treated nets for free by aid donors to African countries, weakens budding African industries, and this indirectly increases the unemployment rate on the continent. Moreover, this 'free money' also increases the value of the local currency of many recipient countries and this will result in an increase in the price of the country's goods and services. This may also have a negative effect on the manufacturing industries in the aid recipient countries because an increase in the value of the country's currency means the exported manufactured products would be sold at a higher price relatively to other

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<sup>9</sup> Dambesi Moyo who was named by the time magazine in 2009 to be amongst the top 100 most influential people in the world is one of the most recent advocates for no foreign aid to Africa. In her literature dead aid, she explicitly shows how foreign aid is negatively affecting the African economy.



exporting countries (what is also known as the Dutch diseases)<sup>10</sup>. This implies exportation will decline while the country will have sufficient money for importation.

### **1.1 Purpose of study**

The purpose of this study is two-fold: first to identify and explain the causes of African countries' low economy performance, and then to possibly look for ways in which the negative effects of the main cause could be mitigated and the economy improved. I believe identifying the causes is of extreme importance because we must know the major cause of a problem before we could proceed to look for the solution. The quest for Africa's economy poor performance and its solution is of utmost importance because worldwide sample studies on economic growth keep on showing a negative sign for Africa dummy (Collier and Gunning 1993). Many Africans still live below the poverty line. Though, recently, there is an increase in growth rate of some African countries, this growth rate is accompanied by high inflation and unequal distribution of wealth. Krishna (2010) in his book titled *'One Illness Away; Why People become Poor and How they may escape poverty'* shows that an increase in growth rate does not necessarily mean reduction in poverty, as many citizens in countries with high growth rates still wallow in poverty. In many of such countries, the elite are extremely rich while the masses are still languishing in poverty and finding it difficult to catch up with the skyrocketing increase in prices of basic goods. A positive reaction to this has been the adoption of the Millennium Development Goal by all the 192 members in the General Assembly of the United Nations in 2000<sup>11</sup>. Yet, it is unlikely that many African countries will be able to achieve some of the MDG goals as we have just four more years to the 2015 deadline, and the economic development of the continent is still low. It is for this reason that the objective of this study is to identify, analyze and depict the causes of the continent's economic problem. I believe an insight into African countries' economic problems will help both nongovernmental and governmental organizations to redefine the paradigm they are using to curb poverty and foster economic development.

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<sup>10</sup> The dutch diseases is a term that has been used by economist to describe how the discovery of natural gas in the Netherland in the late 1970s heavily affects the country manufacturing industrial sector because the sale of this natural gas led to an increase in the value of the country income, which was followed by a sharp increase in the in the price of goods and services in the non resource sector making exportation difficult. Presently the term is not only use to show how discovery of a country natural resource affects the economy but also how foreign aid and foreign direct investment affect the country.

<sup>11</sup> The MDG consists of eight development goals that the UN seek to achieve by 2015 in the world poorest countries, these goals are eradicate extreme poverty and hunger, achieve universal primary education, women empowerment and gender equality, reduce infant mortality, increase maternal health, combat HIV/AIDS, ensure environmental sustainability and develop a global partnership

## **1.2 Statement of problem**

In order to understand why African economy has been stagnating or, worse still, regressing over the past decades, this research will provide answers to the following questions

- What are the causes of Africa's poor economic performance? Which strand has the greatest impact on the economy?
- How could we mitigate the problem or improve on the economy?

## **1.3 Delimitation**

It was only in the 19<sup>th</sup> century that all African countries were created following the Berlin Conference of 1884 in Germany. To this effect, the continent is made up of young states that are still undergoing the nation building process, and trying to develop. Since these states were artificially carved, each has a high degree of ethno linguistic fractionalization; this has also impaired development on the continent.

Though the continent is still made up of young and emerging states, this research may have over-generalized that they are all poor because some of its countries like Botswana, South Africa, Algeria, Equatorial Guinea, Libya, have higher GDP per capita than some countries in Europe and South America. That notwithstanding, Africa is still the continent with the highest number of poor countries.

## **2. THEORETICAL BACKGROUND.**

### **2.1 Introduction**

Africa is the second largest and second most populous continent on earth after Asia: it has a surface area of 30.2million square kilometers, which represents 20.4 percent of the earth's total land area (Sayre and Pulley, 1999); with a population of about one billion people (UN report on BBC NEWS, 2009)<sup>12</sup>. Africa's climate ranges from the tropical, with a mean temperature of 18 degrees centigrade to the subarctic, with a temperature of about 10 degrees centigrade. Many of the continent's countries are closer to the equator, with warm and wet tropical climates. It is the warm wet tropical climate that favors mosquito breeding and, as such, there is a huge mosquito nest in Africa. The high temperatures also favor the survival of the most effective anopheles vector mosquito, and also the most deadly specie (plasmodium falciparum). It is as a result of this that many African countries are malaria

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<sup>12</sup> <http://news.bbc.co.uk/2/hi/africa/8366591.stm>

endemic, and the disease has been used by Sachs (2005) in cross country (macro) study to explain why Africa's economy is poor. Krishna (2010) in a micro study supported the claim that disease causes poverty. Krishna interviewed many households who were once rich and now poor. Below is an excerpt from Krishna's study: the story of a victim named Chandibai who stumbled into poverty.

*'In an economically fast growing town in India, there lived a rich couple, called Chandibai and Gokalji, who owned a shop and vast agricultural land. In 1986 Gokalji became very sick and was confined to bed, and as such, not only he could not go to work but his wife also: she was obliged to look after him in the hospital. Then later came the hospital bills that was so expensive and Chandibai was forced to sell both the shop and the agricultural land so as to pay the bills. The worst happened when Gokalji died three years later and then Chandibai sold all the remaining assets to perform the funeral ceremony. Now Chandibai is very poor and finds it difficult to afford three square meals a day' (Krishna 2010).*

The above story clearly shows how disease causes poverty (I will explain detailly in subsequent sections), and this explains why I chose to use diseases (malaria) as one of my explanatory variables in depicting Africa's low economic performance, and the considerable variation in income levels among the states. Because of the high poverty rate in Africa, policies makers, Hollywood celebrities, and philanthropists have promoted the provision financial aid to the continent so as to remedy the situation. Famous rock and pop singers in 1985, were able to raise as much as \$125 million to Africa in a 'Live Aid Concert' that was opened in Wembley Stadium by princess Diana and Prince Charles. In 2005 Geldof Bob (an Irish rock singer) staged a series of new 'Live Aid Concert' before the annual G8 summit in Scotland in an effort to pressurize the rich nations to address extreme poverty in Africa. It was in the wake of this concert that the G8 members subsequently voted to cancel the debt of 18 heavily indebted poor countries and to increase Africa's annual aid to \$50 billion by 2010<sup>13</sup>. Such generous moves from the wealthiest nations to the poorest have led to a lot of controversy, as some researchers and development specialists are considering it as a means by the rich countries to protect their interest and control over the poor. To this effect, foreign aid has been considered by some to be more of a curse than a blessing to Africa. Moyo (2009) maintained that African countries are the poorest today because of the adverse impact of aid on their economy.

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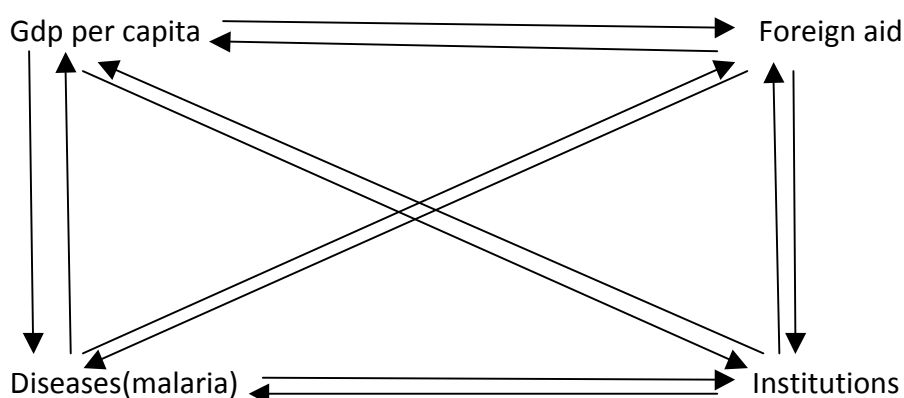
<sup>13</sup> <http://www.yeehee.com/2011/07/13/july-13-1985-live-aid-concert/>

On the other hand, proponents of foreign aid have maintained that it is the poor institutional quality that affects the continent's economic development: they maintained that foreign aid could be used as an incentive for the poor countries to improve on their institutions, which is a prerequisite for long term economic development. Some policy makers see foreign aid and good institutions as a necessity for Africa's sustainable development. Below is an excerpt of a speech by Tony Blair, former British Prime Minister, to the Guardian Newspaper, in Freetown/Sierra Leone:

*'Aid is important and it works and we should be really proud of what we as a country have done in aid, but aid is one half; the other half is governance. For most of these countries, their problems are every bit as much governance, as much as the lack or availability of aid.'* (Guardian News, 2011)<sup>14</sup>

While calling for the provision of more foreign aid, Blair noted that poor institutions in Africa should be blamed for the continent's economic distress. It is in this light that I decided to use foreign aid, institution, and malaria as my explanatory variables to explain the reasons for African countries' low economic performance, and the difference in income levels among the countries. However, there exists a complex relation and interaction between the three independent variables and the dependent variable due to the problem of proximity, endogeneity, and reverse causality (detailed discussion in subsequent sections). I tried to summarize these relations and interactions in figure 1 below.

Figure 1: Relations and Interactions among variables



It could be observed, from the above figure, that there are so many correlations between the variables. In the next section, I will explain the correlation, and the issue of reverse causality between each of my explanatory variables (foreign aid, institution, and malaria) and economic development (GDP per capita), the dependent variable. I will discuss the multicollinearity effects in section 5.

<sup>14</sup> <http://www.guardian.co.uk/politics/2011/jun/17/tony-blair-stronger-african-governments>

## ***2.2 Foreign aid and economic development***

When Jeffery Sachs, who was then the head of the Millennium Development Project, and also Kofi Annan, special advisor, visited the Sauri villages in Nganza Province in Kenya in 2002, he saw the level of poverty, hunger, diseases and said that the severity is far more than what is written in many official documents. After a face to face encounter with the villagers, and knowing their plights, he outlined five great development interventions: agricultural inputs, investment in basic health, investment in education, power transport and communication services, safe drinking water and sanitation (Sachs 2005) and emphasized that they must be looked into in no time by the international community. In order to improve on the living standards of poor areas like those in Sauri-Kenya, Sachs called on International aid donor agencies to scale up their amount of aid supply. He believes as much as \$75 billion of financial aid is needed per year to improve on the continent's economic situation. This will be the theme in this section because Sachs' approach (increase of foreign aid) to curb poverty in Africa, just like that of Tony Blair, and famous rock and pop singers, has brought a lot of contention among development specialists and researchers. One researcher strongly objects to Sachs' approach, and even exposes the dubious plan of some aid agencies in Africa such as the British Charity Christian Aid, which fights against African trade liberalization (Collier 2007:155). And how, in most cases, when donors finally disburse the aid money, it hardly reaches its destination such as the case in Chad, where the Ministry of Finance disbursed money to help in the construction of the country's rural clinics and yet, only one percent of the money disbursed finally reached the clinic and 99 percent did not reach its destination (Collier 2007:66). The worst part of it is that about two fifths of the aid most dependent regions' private wealth has been kept in foreign banks abroad<sup>15</sup> by the corrupt leaders. However, many researchers have maintained that the debate on foreign aid, economic growth and development still remain inconclusive (Boone,1996; Burnside and Dollar, 2004; Easterly et al., 2004). Perhaps these different researchers have different result because of methodological pitfalls such as endogeneity issues, and multicollinearity (Roodman, 2008 in Nellisen 2009).

Another area in which the study of foreign aid still remains inconclusive is its effect on institutional quality and, to date there still exist mixed results. Bräutigam and Knack (2004), in their study on the effect of aid on institutional quality in sub Saharan Africa, posit that aid

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<sup>15</sup> Such as the Swiss bank in Switzerland that keeps the highest amount of Africa money abroad.

reduces institutional quality by creating moral hazard problems and reduce accountability at the local level (also see Moyo 2009; Djankov, Montalvo; and Alesina and Weder 2002). These authors claim that aid reduces institutional quality by encouraging rent seeking, while at the same time discouraging accountability, and press freedom. Svensson (2000) supported the above claim but maintained that the negative effect of foreign aid on institutional quality is limited to countries that are highly ethno linguistically fractionalized<sup>16</sup>. However, studies by Tavares (2003), Dalgaard and Ollson (2008), and Dunning (2004) contradict the above claim by showing that foreign aid decreases corruption. Tavares supported his result with the view that aid money could be used to increase the salary of workers and this will reduce the incentives for corruption. Moreover International Monetary and Donor Organizations often provide aid money with conditionality so as to increase transparency and fight corruption. This implies continuous provision of aid money over a certain period may attenuate the incentive for corruption. The mixed and inconclusive results of the above researchers is partly due to the fact that there is no specific definition of the term 'institution' and as such in their cross country study, they use the term differently. For example, while some scholars refer to institution as a wide scale of societal constructs which varies from norms and traditions governing the decision making process in a society, others refer to it as a temporal institutional arrangement, which shows policies choice and contracts in that society (Williamson 2000, in Nillessin 2009).

This implies that, in the various studies, some authors consider institution to be fixed and unchanging (Glaser et al, 2004), while others see it to be changing regularly with policies and choice (Knack and Keefer 1995; and Rodrik et al, 2004). Moreover, 'Economists' definitions of governance are either extremely broad or suffer from a functionalist slant that weakens their applicability' (Rothstein and Teorell pg 3). Some Economists have made the term more specific, to simply mean good for economic development (La Porta et al. 1999, 223). Thus, different institutional measures will result in different results. As mentioned earlier, the debate on the effect of foreign aid on economic development still remains inconclusive. The basic questions that have been put forward in some of these debates are Does foreign aid work?, Is foreign aid Working in Africa? Why did foreign aid help rebuild Europe (the

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<sup>16</sup> His view is based on the fact that the different ethnic and linguistic groups in a heterogenous society are likely to get involve in rent seeking activities for the aid money.

Marshall plan), and is apparently unsuccessful in Africa<sup>17</sup>. Moyo (2009) argues that the Marshall Plan was successful because the aid money was used in reconstructing the war torn Europe. This is to say there was already a preexisting technological knowledge and as such, the aid money was meant for rebuilding what has been destroyed. Perhaps this was not the case in Africa as the post colonial states lack the technological knowledge for construction (not reconstruction).

Snyder (1993) is one of the early proponents of foreign aid. In his study, he finds a positive correlation between foreign aid and economic growth when he takes into consideration the country size. He maintained that 'Previous econometric analysis has not made allowance for the fact that larger countries grow faster, but receive less aid' while donors favor small countries in loan disbursement for numerous reasons. Fayissa and El-Kaissy (1999), just like Chenery and Strout(1966), showed that foreign aid positively catalyzes economic growth by increasing the amount of domestic capital. The former authors conducted cross country regression for 77 countries with time series from the interval 1971 to 1980, 1981 to 1990 and 1971 to 1990 to support their hypothesis. They further concluded in their study that domestic savings and human capital are positively correlated to economic growth. Aid's proponents claimed that African countries have inadequate capital to attract investment and as such foreign aid is the best means to provide these countries with enough physical and human capital to attract investment. However other studies have shown that foreign aid discourages investment (Moyo 2009; Svensson, 2000; Williamson 2009), as many investors consider it risky to invest in an aid dependent country. Other authors like Burnside and Dollar have explained when best foreign aid works. 'Aid has a positive effect on growth in good policy environments' (Burnside and Dollar 2000 p.847). Many international agencies appreciated the conclusion of Burnside and dollar as it simply meant that foreign aid should be given to countries only with good policies. While Collier and Hoeffler (2004) supported the above findings, Guilaumont and Chauvet (2001) challenged it. The latter authors maintained that aid works well in countries with poor economic environment. In using triple interacting term, Collier and Hoeffler (2004) concluded that aid works best in countries that

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<sup>17</sup> The Marshall plan witnessed an inflow of \$13 billion into Europe after the Second World War. Since America wanted to maintain its relationship with Europe, she readily provided fund to European countries that were affected by the war. It is this money that help rebuild and reconstruct Europe. On the other since 1960s Africa has received a gross sum of over \$300 billion as foreign aid, yet economic development is not only halt but regressing in many parts of the continent.

have experienced civil war and are recovering, and have good policies. Researchers that have focused on the impact of aid on growth in the tropic concluded that aid works only outside the tropics but not in it (Dalgaard, Hansen and Tarp (2004).

Recently, the debate on the effect of foreign aid on economic development is concentrated on Africa because the region has received an unprecedented amount of foreign aid (about \$300 billion) for over 50 years yet there is still much poverty. While advocates of foreign aid are calling on donor agencies to not only double but triple their supply to Africa so as to meet the Millennium Development Goals by 2015 (e.g. Jeffrey Sachs), other researchers are calling for the complete cessation of aid to the continent as they see it to be the number one cause of the continent's economic downfall (Moyo 2009).

Easterly (2006), on his part, sees foreign aid to have done so much ill and very little good in Africa because international donor agencies (the West) are adopting a 'one size fits all' approach. In this approach, Easterly refers to the West as the 'Planners,' who think they already know the answers to the problem and as such use a top down model to solve the problem. This explains why the West has spent more than 2.3 trillion dollars as foreign aid to Africa in the last half century yet poor families are unable to purchase a mosquito net, which costs 4 USD and many children still die of preventable diseases. Hunger and starvation are not uncommon to many families. Moreover, most of the fortunate poor families that receive free mosquito nets still end up not knowing how to use it for the right purpose. Some of them ignorantly use it as fishing nets and/or wedding veil.

An example of the giant project in which the 'Planner' embarked on was the construction of a \$5 billion public steel mill in Nigeria, which, till date, has produced nothing. Another example is a project that was executed by the World Bank and the Canadian Development Aid Agency that sought to help farmers in the Thaba Tseka region to develop modern forms of crop production and livestock management (Easterly 2006:170). This project, at the end, was unsuccessful because the modern livestock technique conflicted with the local laws of the people that allowed for open grazing. Moreover, the local people awareness of wrong crop production site chosen by the aid donor agency was ignored. Easterly contrasted this planner approach to the 'searcher' model, which, he believes, is applicable to a free market economy and democratic countries. The searcher adopts the bottom up model and emphasizes that development must commence from homegrown produce. The searchers claim not to know the answers and thus see the causes of poverty to be more complicated



than it seems. According to Easterly, foreign aid will never make poverty a thing of the past in Africa. Rather, it is the homegrown political and economic reform that could end poverty. How then could foreign aid, which is provided by the donor with the intention of reviving the economy of the poor, be a curse instead of a blessing? Could it only be that the 'planners' are the ones providing the answers or does the aid money have some sort of direct negative impact on African countries' economy? This last section will look at the latter but it must be noted that the answer to this question is not as easy as it seems because there is a problem in identifying the direction of causation. That is to say, is it foreign aid that weakens Africa's economy or is it because of the so much poverty that Africa has received the highest amount of foreign aid? As shown above, different studies have explained the aid – poverty causality in both directions and it is really difficult to say which variable has a direct effect to the other. That notwithstanding, there are many direct disadvantages of foreign aid on Africa's economy, a few of which I will outline below.

### ***2.2.1 Disadvantages of foreign aid***

- Benefits of aid and its long term effects. Though foreign aid could be observed as advantageous and beneficial in the short run, it impairs long term sustainable development on the continent. This is because it indirectly weakens the young industries, which are still trying to grow. For example, taking into consideration a mosquito net company and a food processing company that produce mosquito nets and wheat respectively, these companies create jobs, provide employment and also contribute to the technological development of the continent. Moreover, with the much 'extended family system' that exists on the continent, the employed workers will have to look after their relatives. There is no doubt that inflow of free mosquito nets and wheat from international donor agencies will be beneficial to natives at the moment. However, at the same time, this will weaken the young emerging food processing and mosquito net companies as they will not be able to sell their products and generate income. This will result both in poor technological development and retrenchment of workers. Not only will the retrenched workers suffer but also the hundreds of relatives that they were sponsoring while working. Within two to five years, the free mosquito nets will expire and get out of use, and also the food given will be exhausted. Furthermore, the local food processing and mosquito net companies will collapse, as they shall not be able to generating revenue. What a long

term negative effect to the continent! Could this be avoided? And if possible, how? Donor agencies could mitigate this by stopping the free supply of manufactured produce while providing subsidies to the local industries so that they should produce more and sell at a lower price.

- Foreign aid causes the Dutch disease: As discussed earlier, the Dutch disease is an economic term that describes an increase in the value of a country's local currency and a decline in its manufacturing exporting sector (non resource). The term originated in the 1970s in the Netherlands to describe the negative effect of much income generated in the sales of the country's natural gas, which devastated the export sector. In as much as foreign aid increases a country income, it equally causes the Dutch disease. Using Cameroon as an example, let us say the country has one million CFA (equivalent of 1524euro) freely floating in its economy and then the international donor organization decides to pump in 10000 euro as foreign aid. Since the CFAF is the country's legal tender, as it is the only currency accepted by businessmen and shopkeepers, the additional 10000 euro in the country's economy must be converted to CFAF. This implies that there will be an increase in demand for the CFAF, as holders of the euro will want to buy the CFAF. Since the CFAF is freely floating, an increase in its demand will equally increase its value and, as such, the CFAF will become stronger than before. An increase in the value of the local currency implies that Cameroonian export products will be more expensive than before and, as such, the export sector will collapse. This will heavily affect the manufacturing industries because they will find it difficult to sell their products on the international market (since it is now more expensive). As such, the industry might collapse or, worse still, retrench some of its workers, a situation which will then lead to high unemployment. One way to solve this problem will be for the Cameroonian authorities to adopt a fixed exchange rate system so that all CFAF vendors must sale at a fixed rate. Yet, the Dutch disease is likely to appear again because the aid money will increase the demand of domestic goods. This will increase the price of other manufacturing goods that are limited in supply.
- Foreign aid causes inflation. With an increase in the amount of aid money in the economy, the demand for locally made goods will rise. Let us say, for example, a corrupt administrator embezzles five million CFAF and uses it to buy a car. The car

vendor then uses this money to buy other semi manufactured goods like loin cloths and wood. As such the aid money keeps flowing below the line. In a society where production is low, (like in Africa) this causes a serious problem as there will be little or no goods to purchase with the aid money. This general increase in demand for locally made goods will result in an increase in prices. Inflation will now erode the economy and, to worsen the situation, in some cases, more aid money will instead be pumped in to remedy the situation.

- Foreign aid weakens the middle class: It is a strong and healthy middle class that helps build the economy of any country. This is so because in a normally functioning society, the government generates its income by taxing the middle class and, in return, the middle class does the checks and balances for the government. Thus the government accountability is ensured by the middle class. The 1832 reform act in England was successful because there was a strong middle class that checked the government and when necessary protested if the government failed to implement its obligations. It was the strong middle class that led the protests and demonstrations in cities like Derby, Nottingham, and Bristol when the House of Lords first rejected the Reform Bill (Rude 1967). In all developed countries there exist strong civil societies, which serve as a backbone for long and sustainable development. It has been observed that the civil societies (middle class) in most African countries are weak, possibly because of foreign aid. Foreign aid short circuits the relationship between the active civil society and the government because citizens in an aid dependent country will have less incentive to hold the government accountable since they do not pay tax. The governments on their part will also have less incentive to tax the citizens since they know there exists another source of generating income (through foreign aid).
- Foreign aid and social capital: Social capital which is the 'invisible glue of relationship that holds business, economy and political life together' (Moyo 2009:58) is very necessary for a country's economic development. Since foreign aid encourages rent seeking (because government officials have means to get money without trade and production) activities and thwarts accountability in the recipient countries, it helps to weaken social capital. Citizens in aid dependent countries are unlikely to trust one another and pursue a general development objective because

of the availability of aid money that is easily stolen. To summarize this, aid breeds and fosters corruption and in any corrupt society, social capital is weak; and poor social capital results in low economic development. Moreover, studies have also shown that there is a strong correlation between social capital and institution (Letki 2003; Rothstein 2005), where social capital highly determines the quality of government institutions.

- Aid provokes civil war: Due to the fact that many internal conflicts are caused by competition for control over the country's resources, foreign aid, just like other natural resources, provokes internal conflict. In countries like Sudan and Somalia, many have blamed the escalation of conflict because of the availability of large food aid in which the rival parties are fighting to take control over (Grossman 1991, 1992; Moyo, 2009). On the other hand, Collier and Hoeffler (2002), in their study, observe no effect of aid inflow on the onset of civil war and, in a subsequent study, later found out that aid works best in a country that is just recovering from civil war (Collier and Hoeffler 2004, 2007). Their study is based on the fact that with large aid money, the government would be able to buy surplus war equipment and get additional strength, and as such could get easy control over the rebels. The rebels would have less incentive to fight as they are unlikely to win the war. Nillesen (2009), using donor GDP per capita as instrument for aid inflow supported the view that, aid inflow in sub Saharan African countries significantly reduced the probability of conflict continuation. Their study showed that 'A 10 percent increase in foreign aid is estimated to decrease the probability of continuation by about 8 percent points' (Nillesen, 2009)

### ***2.2.2 Could the donor coordination help the recipients to effectively use aid?***

Researchers have maintained that foreign aid is likely to have a negative impact on the recipients countries if there is lack of coordination among donors, as each donor would be preoccupied with its own objectives (Knack and Rahman 2004; Bigsten 2006). As such, recently, a call has been made among donor countries and agencies to coordinate and see that aid budgets are effectively used by the recipients to achieve economic development. This could be seen via the Room Declaration on Harmonization, where the donors tried to 'harmonize the operational policies, procedure and practices of their institution to improve

the effectiveness of foreign aid' (Bigsten 2006)<sup>18</sup>, which was then followed by the Paris Declaration in which 'Partnership commitment with regard to harmonization, alignment, and mutual accountability were then specified'<sup>19</sup>. Some researchers and development specialists have maintained that donor coordination helps mitigate the above negative effects on foreign aid (Dutch disease, free rider problem, poor governance) in the recipient countries. Knack and Rahman (2004) posit that since different donors have different objectives in the recipient countries, they are less likely to maximize overall development. Thus coordination of donors could help solve these problems and help increase the overall development impact of aid in the recipient countries (Bigstene: 2006).

### **2.3 Institutions and economic development**

North (1993) defines institution as 'humanly devised constraints that structure human interaction, and are made up of both formal constraints (rules, laws), informal constraints (norms of behavior and self imposed codes of conduct) and their enforcement characteristics'. Institutions have been used in many studies to explain the difference in income levels between countries in the world. 'Countries with good institutions and secure property rights and less distortionary policies will invest more in physical and human capital, and will use this factor more efficiently to achieve a greater level of income' (North and Robert 1973) in Acemoglu et al (2001). This shows that institution is also important in economic development. There exist several other studies which show how institution affects economic development (Knack and Keefer, 1995; Mauro, 1995; Brautigam and Knack, 2004; Rothstein and Teorell 2005). In order to show how the quality of institution affects economic development, especially at the micro level, below is an excerpt from a study carried out by Rothstein and Teorell, (2005).

*'In St Lucia, a pretty poor country in the Caribbean, are two run down restaurant sheds that are very close to the Virgie Air Port. These sheds are really in bad shape as one could see no chairs or tables, but just broken stools and pallets to serve passengers/tourists waiting to travel. The result to this is that tourists hardly visit the sheds to get coffee or drink while waiting their flight, though both sheds are at the beach, and serve high quality food at very cheap price. Instead, the tourists would prefer going to a restaurant inside the Air Port Building that serve poor quality food, very expensive, and overcrowded. In trying to find out from the women who own the run down sheds why can't they*

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<sup>18</sup> See OECD 2003:10 in Bigsten Arne 2006: donor coordination and the use of aid.

<sup>19</sup> *ibid*

*make better use of the location like buying new tables and chairs and investing on the porch, one of them give the following answers;*

*Brilliant idea, i thought of that before but could not do it because though i have been here for twenty years, I am only squatter and so can be forced out any time by the police/government. Secondly, even if I succeed to open a real restaurant, I won't be able to bribe the health inspectors. In subsequent conversation the woman reveals that she doesn't know if it is possible to hire or buy the land from the government'. Rothstein and Teorell (2005).*

This story is just an example in a million, especially among poor African countries<sup>20</sup>. It is in line with the above story that Rothstein's definition of the quality of institution is based on the importance of 'impartiality in the exercise of governmental power' (ibid). Arne Bigsten<sup>21</sup> criticized Rothstein's definition as being narrow and proposed a broader definition, which has to do with impartiality, policy formation and efficiency. Bigsten then posits that 'it would be necessary to incorporate efficiency in Rothstein's definition because it seems odd to refer to the quality of government as impartiality, when the individual/institution implementing the policies lacks the necessary skills to work efficiently' (Bigsten's lecture slide, 2011:7)<sup>22</sup>. However Rothstein and Teorell (2005) back their definition by emphasizing that: 'partial effectiveness/efficiency is inferior to ineffective/inefficient impartiality' (page 20) and that 'impartiality principle implies and encompasses the rule of law, while the opposite is not true' (page 16).

There is no doubt that many African countries lack impartial legal structure and this explains why they also lack secure property rights. It is the lack of impartiality that foster corruption and prevents many businessmen and micro organizations from growing. Businessmen and micro firms are necessary for the development of regional markets, which is also necessary for the continent's economic development. With impartial institutions, investors and governments in African countries would enjoy the following advantages: more ease in predicting their actions; as such, they can work with lower risk and more accuracy; easy access to reliable information about the government and other investors, less corruption, discrimination, nepotism, tribalism, and the 'ultra vires' use of power by government authority; lastly, it helps solve collective action and coordination problems as disputing

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<sup>20</sup> I have observed one when I met a friend who was rich and owns a computer shop but decided not to invest in the business which subsequently collapsed, as he could not afford to bribe the tax collectors.

<sup>21</sup> A professor of economics, in the School of Business, Economic and Law. Göteborg University Sweden

<sup>22</sup> The lecture side is available on the QoG link <http://www.qog.pol.gu.se/>. accessed on 2011/07/29

parties with impartial institutions can monitor rent seeking behavior. Good institution should thus be a priority of any government if it wants to achieve economic development. Rodrik listed four different types of institutions that are necessary for long run economic growth which include; Property rights, without which a market cannot function properly as an entrepreneur is likely to have invest only in an economy in which he or she will have much control over the assets; Regulatory Institutions, this would help reduce fraud and imperfect information; Market stabilizing institutions so as to fight against inflation and financial crises; Institutions for social insurance and conflict management, this is to ensure social and insurance protection, and also possibilities to handle conflict. (Rodrik 2004).

One could observe the importance of good institutions at the macro level by analyzing the considerable level of income disparity between North and South Korea. These two countries have a similar history, culture and tradition and were among the poorest in Asia. Both also had similar levels of economic development prior to the Korean War in 1953. But after the Korean War, North Korea chose a central planning and collective ownership while South Korea chose a free market with private property rights. Presently South Korea is about 16 times richer, and also more democratic than North Korea. This could possibly be due to the fact that in South Korea, unlike the North, investors and businessmen have greater incentives to invest because they feel secured with the rule of law and property rights.

Just like North Korea, African countries in the 1960s had similar levels of economic development with South Korea. But presently North Korea and many African countries are among the poorest in the world. This is a good example to show that poor institution causes poverty and account for the considerable difference in income levels among countries in the world. With its central planning and collective ownership, corruption is rife in North Korea, just like in many African countries. Botswana is the only exception on the continent, with fairly good results from the Transparency International ratings, as it could score a corruption perception index value of more than the average 5 from transparency international<sup>23</sup>. African countries always stay at the bottom of the classification table.

Many African countries also lack market stabilizing institutions and, as such, there is little investment by businessmen since they are feared of being tax arbitrary by the government.

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<sup>23</sup> See transparency international cpi table 2010.

[http://www.transparency.org/policy\\_research/surveys\\_indices/cpi/2010/results](http://www.transparency.org/policy_research/surveys_indices/cpi/2010/results)

Presently, there is some sort of contention among development specialists on how African countries should build their institutions.

While some emphasize the importance of local knowledge in building the countries' homegrown institutions, others have emphasized the need for best practice 'blue print,' where African countries should copy same institutions as in the developed countries. This is a problematic issue because many institutional reforms in Africa have been based on the fact that there exists a single set of good institutions. African tradition and culture, most of the time, have not been taken into consideration. This could possibly explain why the institutional reforms in Africa have not been that successful so far as a saying goes 'one size does not fit all'. Alternative way in which a country could still build good institution is through political and social openness. Studies have shown that social and political openness are inversely correlated with corruption, i.e. the higher the level of integration the lower the corruption (Treisman, 2000; Torrez, 2002; Sandholtz). Charron, 2009 supported the above claim but however maintained that such a correlation is conditioned by the country level of press freedom.

As noted, poor institutions also lead to poor economic performance. How then could one measure the direct impact of institutions on economic performance? This is not easy because of the problem of endogeneity and reverse causality i.e. to say it is also possible that the rich and wealthy countries could use their money to buy these institutions. It is to this effect that Acemoglu et al (2001) has developed a source of exogenous variable (log settler mortality) to measure the direct impact of institutions on economic performance. The basis of Acemoglu et al (2001) theory is as follows: European colonizers created different kinds of colonization policies in their different colonies. In the colonies that have poor climate and diseases in which European settler mortality was high, the colonizers set up 'extractive institutions' as exemplified in Belgian Congo where King Leopold used the vast natural resource for his personal wealth and for the development of the Belgian economy. Leopold's philosophy was that, 'he wanted the colony to be exploited by imposing compulsory cultivation of cash crop that was to be sold and distributed by the state at controlled prices'<sup>24</sup>. Worst of all, the indigenous Africans in Congo were forced to pay a tax of about 60 percent of their income rate. In other areas like Northern Rhodesia, Britain collected 2,400,000 pounds in tax from the copper belt from 1930 to 1940 and returned only

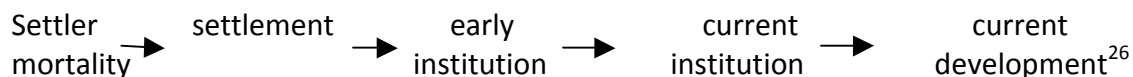
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<sup>24</sup> See Gann and Duignan (1979 pg 30) in acemoglu et al 2001



13600 pounds to the community for development<sup>25</sup>. France on his part was receiving 50 percent of the GDP from the then Dahomey (presently Benin) from 1904 to 1915.

Such extractive institutions set by the European powers where they had high settler mortality did not ensure checks and balances on the government or a secure private property right. On the other part of the globe, where the climate was temperate and similar to that of Europe, the European settlers' mortality was low, this encouraged them to settle and set up good institutions with secure private property rights, and checks and balances on the government. One could then observe that there is a correlation between European settler mortality and early institutions. These early European institutions later influenced the colonized countries' current institutions, which then have a high impact on the countries current economic performance. In order to get the direct effect of institutions on economic development, log settler mortality could be used as an instrument variable for institutions. It is important to note that log settler mortality has no direct effect on today's economic development but it has a direct effect on the colonial institution, which has persisted till today and this current institution has a direct effect on economic development. This could be summarized schematically using the arrows below.



Source (acemoglu et al 2001)

The advantage of this measure is that it helps capture some of the alternative explanations (discuss later) that determine the country's current economic performance.

Yet, the theory has been criticized on two grounds. Firstly, if we look at the average difference in the income levels between countries that have never been colonized, like Ethiopia and Japan, they are similar to those that have been colonized<sup>27</sup>. Secondly, there could be a correlation between European settler mortality and current diseases like malaria that killed the Europeans. To this effect, one could say that diseases also have a direct effect on economic development.

Acemoglu et al disproved this claim by showing that though tropical diseases like malaria were fatal to the colonizers, the indigenous people could resist them because they had

<sup>25</sup> Andrew Robert 1976 p. 193 in Acemoglu et al 2001

<sup>26</sup> Acemoglu et al (2001)

<sup>27</sup> Rodrik, Subramanian, and Trebbi, 2002

developed a strong immune system against the diseases. Before the Europeans arrived, the colonies were densely populated. This shows that diseases were not a major problem to the local population and as such could not be the main reason for Africa's low economic performance. Moreover, Curtin (1964 in Acemoglu et al: 2001) showed how numerous early European settlers in Africa died during their expedition. For example, about 50 percent of British settlers in the Freetown Province of Sierra Leone died during the first year of their settlement, while in more severe cases like Mungo Park's exploration of the River Niger in 1805, 87 percent of Europeans died during the first part of the journey and upon completion of the expedition, they all died.

A common question that has been posed by researchers is why these extractive colonial institutions have persisted over time? Why couldn't the African leaders who clamored for unity and nationalism set up good institutions as in Europe? One reason for this is because it was expensive to establish new institutions and as such many of these leaders preferred not to incur the cost. Also, even the leaders who could afford it did not know how to go about it, as they often failed to incorporate the local knowledge and tradition into the system. Moreover, the extractive institutions were now beneficial to the ruling elite as they were the ones to reap the profit after the departure of the Europeans. This was typical for small groups of elite, as they could easily share the huge profit from extracting institutions. As such, they had no incentives to set up better institutions.

Despite the evidence brought forward by Acemoglu et al (2001) and Rodrik (2004), claiming that institutions do matter in Africa's economic development, other renowned researcher have explicitly shown how institutions have little or no impact on Africa's economic performance (Gallup and Sachs 2001). In a comparative study on Africa and other developing countries with equivalent corruption and income levels, it was statistically proven that Africa's per capita economic growth per year is 3 percent lower than that of the other countries (Sachs 2005). Sachs further constructed a table showing how well governed countries in Africa have lower GDP per capita growth than poorly governed countries in Asia. (see table below)

Table 1 (extracted from Sachs 2005:191)<sup>28</sup>

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<sup>28</sup> Sachs 2005. He got the data from Transparency international, global corruption report 2004 with higher rank indicating higher level of perceived corruption.

Table 1.

## CPI and GDP per capita of some Africa and Asia countries

|                   |            | TI Corruption<br>Perception Rank | Average yearly gdp per<br>capita growth 1980- 2000 |
|-------------------|------------|----------------------------------|--|
| Sub Sahara Africa | Ghana      | 70                               | 0.3  |
|                   | Senegal    | 76                               | 0.5  |
|                   | Mali       | 78                               | -0.5   |
|                   | Malawi     | 83                               | 0.2  |
| East Asia         | India      | 83                               | 3.5  |
|                   | Pakistan   | 92                               | 2.4  |
|                   | Indonesia  | 122                              | 3.5  |
|                   | Bangladesh | 133                              | 2.0  |

Source: Sachs 2005 page 191

From the table above, one could observe that corrupt countries in East Asia (India, Pakistan, Indonesia, and Bangladesh), had a higher GDP per capita growth from 1980 to 2000 than well governed countries in Africa (Ghana, Senegal, Mali and Malawi). Such evidence opens up more avenues for investigating the continent's economic distress. If not for the much dependency on foreign aid and poor institutions, what, then, is the major cause for Africa's poor economic situation? Sachs and other researchers have been able to establish that diseases, especially malaria, are the main causes for Africa's economic distress. They emphasized that malaria affects economic performance in Africa not only due to the high mortality rate, but also as a result of the high morbidity rate, thus making the population weak and unproductive.

#### **2.4 Diseases and economic development**

The third strand that has been used by researchers to depict why Africa is lagging behind is diseases. There exist several studies on the effect of diseases on Africa's economy, with some scholars maintaining that diseases have a strong negative effect on the continent's economic development (Koran et al 1995; Tshikuka et al 1996; Gallup and Sachs 2001; Clarke et al 2001; Bloom et al 2004), and other researchers positing that diseases do not significantly lower economic development in these countries (Weil 2010; Filmer D, 2002; Biritwum et al 2000; Schellenberg et al 2003). The last group of scholars on the disease view

have emphasized that there exist a dual causation between disease and economic development at the macro levels (Sachs and Malaney 2002; Malaney et al 2004) and also the micro levels (Somi et al 2007). Malaria is one of the diseases that have been used by the above researchers in their study because of its endemic nature on the continent. With exceptions like South Africa and the northern countries on the continent, the remaining countries are malaria endemic and very poor.

The name malaria originated in the 18<sup>th</sup> century from the Italian words 'mala' which stands for bad and 'aria' which stands for air. In this era, many people thought the disease was contacted by inhaling bad air from the marshy areas. In the late 19<sup>th</sup> century however scientist discovered that malaria was a parasitic disease transmitted by mosquitoes especially the female anopheles mosquitoes that feed on the red blood cells of humans and other vertebrates. The Medilexecons Medical Dictionary defines malaria as 'an infectious disease caused by the presence of the sporozoan Plasmodium in humans or other vertebrate erythrocytes, usually transmitted from one human to another by the bite of a female anopheles mosquito that previously fed on the red blood cells of an infected person' (Medilexecons Medical Dictionary)<sup>29</sup>. The plasmodium parasites are of five types; Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae, Plasmodium ovale and Plasmodium knowlesi. Plasmodium falciparum is the fatal specie and unlike on other continents, it is common throughout Sub Saharan Africa, and responsible for almost all the reported malaria cases. In order to show the severity of malaria in Africa, I multiplied the proportion of the population with malaria, with the proportion of the population with the plasmodium falciparum (the fatal specie). This is to help me get the Fatal Malaria risk (the variable used in my regression) which is different from Malaria Risk (proportion of population living with malaria only). It is partly because of the deadly nature of the falciparum specie that malaria still kills more than any other disease (including HIV/AIDS) in Africa. Africa's warm tropical climate favors the breeding of this specie especially as it is likely to survive only in temperatures that are above 18 degrees centigrade.

Moreover, it is still the same species that is responsible for the high infant mortality rate on the continent since many children die before the age of five. Currently, about 2 to 3 million malaria deaths occur each year with about 75 percent reported in Africa, and majority of the deaths are children (Somi et al, 2007). This indirectly affects the continent's economic

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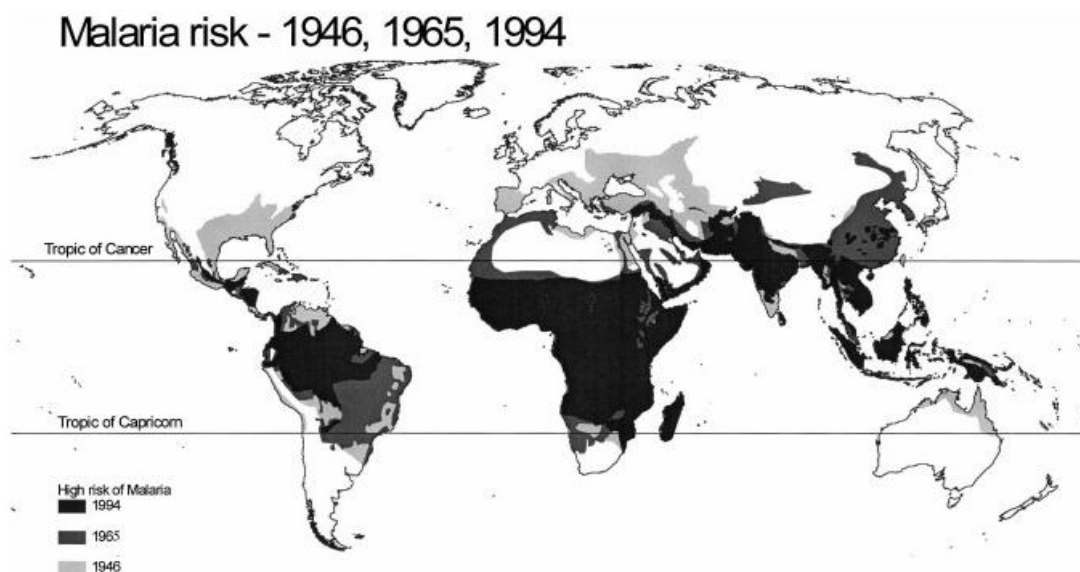
<sup>29</sup> Medilexecons medical dictionary. Follow <http://www.medilexicon.com/medicaldictionary.php?t=52387>

development, as parents would prefer giving birth to many children since they are not sure about their survival. Many children are more expensive to maintain and bring up. To this effect, in many families in tropical Africa, not all the children get the privilege to be educated because of the cost. Many of the children grow up without education and this affects the continent's economic development in the long run.

#### **2.4.1 Malaria and poverty**

A Nobel Prize winner in medicine named Weller once said that 'malarious communities are impoverished communities' (Gallup and Sachs, 2001). This seems correct because when we take a close look at Africa, those countries with a high GDP per capita are not malaria endemic (South Africa and the northern countries). The rest of the regions on the continent: east, center and west, are malaria endemic and are very poor. Figure 2<sup>30</sup> below shows countries with high malaria risk in the world in 1946, 1965, and 1994, and these countries are among the poorest. Figure 3 shows the GDP per capita of these countries

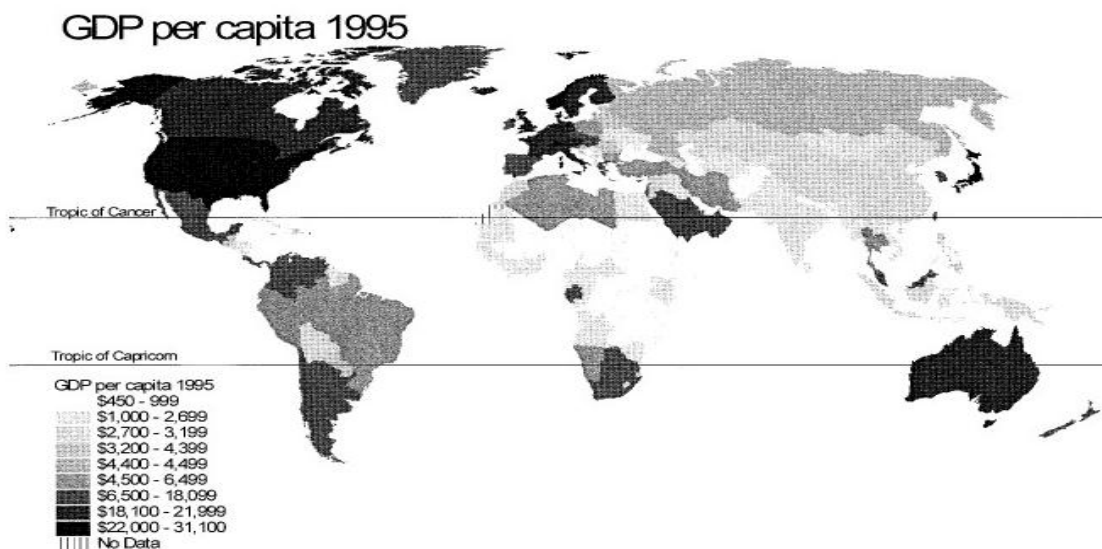
Figure2: Malaria Risk in 1946, 1965 and 1994.



Source: Sachs and Gallup (2001).

<sup>30</sup> See figures in Gallup and Sachs 2001

Figure 3: GDP per capita of countries in the world in 1995.



Source: Sachs and Gallup (2001).

From the figures above, one could observe that the malarious countries are found in the tropics and the sub tropics and they fall among those with the lowest GDP per capita. Gallup and Sachs (2001) showed that 35 out of the 44 malaria endemic countries in the world are from Africa. In 1995, the GDP per capita of these countries was approximately 5 times lower than those of non malarious countries, i.e. \$1526 for malarious countries and \$8268 for non malarious countries. In terms of growth rate similar ratio (1:5) was also observed from 1965 to 1990. That is to say malaria endemic countries had growth of about 5 times lower than that of non malarious countries (malarious countries 0.4% a year and non malarious countries 2.3% per year).<sup>31</sup> Furthermore a close look at the 1995 GDP per capita income ranking, would reveal that 41 of the 44 malaria endemic countries are in the bottom (with the exceptions being Gabon, Oman and the Philippines which get much of their income from oil), and the top 30 richest countries with GDP per capita are non malarious.

#### **2.4.2 Direction of causation**

Does malaria cause poverty or is it a consequence of poverty? This is a difficult question to answer because many diseases are caused by poverty. For example, cholera and diarrhea are common in Africa because many governments lack the financial means to provide pipe born

<sup>31</sup> Data of gdp growth during this period were taken from Penn World Table in Sachs and Gallup 2001.

water. This implies that poverty can also cause diseases, and as such some scholars have maintained that poverty causes poor health (Nayaran, 1997).

It has also been observed that malaria has been eradicated in many parts of the world. Many rich countries have been able to use their wealth to eradicate malaria either by using treated bed nets and/or insecticides. Many poor countries were unable to afford the malaria prevention means and this explains why they are now endemic. This still shows that poverty causes malaria. However it has been observed that malaria control is highly affected by climate, ecology, and the vector parasite, and there are some high income countries like the United Arab Emirate, and Oman that still suffer from high malaria prevalence rate.

Malaria has been successfully eradicated mostly in the temperate region and this can be attributed to the absence of tough malaria vectors. 'Vectorial capacity is a measure of efficiency with which mosquitoes carry malaria from one human to another'(Gallup and Sach 1998 pg 4, 2001).

The most efficient vector type *Anopheles gambiae* is found only in sub Saharan Africa, and this region still has the highest number of *Plasmodium falciparum*, which is said to be the most deadly. That is why, unlike in the temperate region, malaria control in the tropics, during the past decades, has not yielded much success.

A good example in which much money has been used to eradicate malaria in Africa with little success was in the district of Garki, where the malaria transmission rate was so high. It was observed that in the rainy season, each person will be bitten about 174 times per night by the most deadly vector *Anopheles gambiae*. The World Health Organization and the Nigerian Government spent \$6 million in providing free mosquito spray and insecticide-treated bed nets so as to eradicate malaria in this district. Though the WHO mission in Garki was successful in terms of reducing the rate of mosquito bites, the entire control process was unsuccessful because of the vectorial capacity of the mosquito (Sachs, 2005). To this effect there was less meaningful change in the rate of parasite found in the villagers. The example above clearly shows that malaria is not a result of poverty because if similar project was carried out in the temperate region, the malaria would have possibly been eradicated due to the less effective vector *Anopheles* mosquito. To conclude, it is likely that malaria causes poverty in Africa because of the presence of the most efficient vector type and the deadly *Plasmodium falciparum*, which are difficult to control. 'The geographical specificity of malaria, the wide biological variation in the capacity of mosquito vectors, the inability to

control malaria in Africa under experimental conditions, and the persistence of fatal blood diseases as a defense all point to a causation from malaria to poverty, not vice versa' (Gallup and Sachs 1998:6, 2001:6)<sup>32</sup>

### **2.4.3 Calculating the economic burden of malaria**

The macro and micro economic approaches have been used recently by researchers to estimate the economic burden of malaria in malaria endemic countries. It is rather surprising that the two approaches provide a big differential result as estimation from the former (macro) showed that malaria could account for a reduction of up to half of the GDP per capita of some malaria endemic countries while the latter (micro) estimation revealed that the disease cost could only account for one percent of the GDP per capita of the malarious countries (Gallup and Sachs 2001). The microeconomic approach (base on individual household estimation and aggregating the results), though having a lower national impact, has shown that the effect of malaria is so huge and burdensome to the poor, as its costs of prevention and treatment do affect a significant portion of the annual income of the agricultural household (example is the Chandibai story in section 2.1). This notwithstanding, the macroeconomic estimations (based on cross country regressions) still have a significant impact on long term economic growth and development (Mc Carthy, 2000; Gallup and Sachs, 2001). This difference between the micro and macro implies there are some external factors that make the cost of the diseases greater than the direct impact on individuals and household (Malaney and Sachs, 2002). First, let me touch on the three conventional microeconomic costs of malaria.

### **2.4.4 The Cost of Illness approach (COI)**

This is the most frequently used approach to estimate the economic burden of malaria and it measures the direct and indirect cost of the illness. The direct cost is further subdivided into private and non private medical care cost (Malaney, Andrew, and Sachs, 2005). The private medical costs are those incurred on prevention, diagnosis and treatment. Other expenses such as the cost of doctors' consultation fees, anti malaria drugs and medical transportation are also included. A good example from the story in section 2.1, when Chandibai sold out her farmland and agricultural shop just to pay for the treatment cost. That story is a clear evidence of how malaria directly causes poverty. On the other hand, non private medical

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<sup>32</sup> Sachs and Galup 2001. The economic Burden of Malaria.



cost entails government expenditure on the prevention and treatment of the diseases, such as government expenditure on the malaria vector control and research.

Indirect cost of the diseases has to do with a drop in productivity as a result of mortality and morbidity and is calculated by estimating the income that will be forgone as a result of death (mortality) or the person's inability to work when he/she is sick (morbidity). For example, a person suffering from malaria will not be unable to supply productive labor (Weil, 2010). Considering Chandibai's story again (section 2.1), when her husband fell sick at the beginning, the shop and farmlands were temporarily abandoned because there was no one to look after them. As a result of that, there was a huge loss in productivity. It has also been proven that healthier children have lower absenteeism in school and more cognitive functioning than children who are suffering from malaria. In calculating the cost of the diseases, the standard formula, using the cost of illness method, is

COI = Private Medical Costs + Non- Private Medical Costs + Foregone Income + Pain and Suffering (Malaney et al, 2005)<sup>33</sup>

The problem with the above formula is that it includes 'pain and suffering', which is really difficult to measure and, as such, it is practically excluded in many calculations. Yet pain and suffering can be included indirectly by estimating how much a house hold will spend in avoiding the diseases (*Willingness to Pay Approach WTP*)

#### **2.4.5 The Production Function Approach**

This approach differs from the above types in that it measures the productive capacity of malaria patients before and after they were infected. It is likely that many patients return to work without recovering fully, which results in less productivity than when they were not infected. For example, a healthy person, who has suffered from chronic anemia, would be less productive either mentally or physically than some other person, who has never had anemia (Weil, 2010). Also, cerebral malaria has been reported to have long term damaging effects on the individual even after complete treatment and such a person is likely to offer low output at work.

Another example was a study conducted in India with two groups: 'A' and 'B'. Group 'A' consisted of members that have not been infected with malaria and group 'B' consisted of members that have been affected but treated. Comparing the production capacity showed that, group B could clear only 40 percent as much cropland as group A. However, a similar

<sup>33</sup> <http://www.paecon.net/PAEReview/issue31/MalaneySpielmanSachs31.htm>

study was carried out in Cameroon to estimate the effect of parasitemia on rice production and no difference was found (Audibert 1986).

The above three approaches do not necessarily explain all the costs that malaria might have at the national level. External costs that might affect the national level (macro without the micro conventional level realizing) are:

- Malaria may reduce foreign trade and investment. Many International investors will not be willing to invest in malaria endemic countries for fear of being infected. The tourist industry in malarious countries could easily collapse as many tourists would prefer travelling to malaria free zone. This aspect would affect the country's long term economic development. Though some investors may be ready to invest in controlling the disease, it is usually costly and this still discourages the investors.
- Malaria also affects local trade, as many of the local traders will not be willing to travel to endemic areas. This is going to prohibit the development of regional markets, which are essential for economic growth
- Malaria also affects the demographic structure of a country. Many malarious countries do have high mortality and high fertility rates. This is detrimental, especially to the women, as they spend a greater part of their lives bearing children instead of working. Women in many African countries are uneducated because of the fear that they would provide no economic return to the community.
- Malaria reduces human and physical capital. Because of the economic burden of the disease, many households will find it difficult to save and invest in both physical and human capital. School attendance and performance are greatly affected by the disease. School absenteeism is not uncommon in many malaria countries. Moreover, it has been shown that parasitemic children perform worse than non parasitemic children. Children delivered by malaria infected pregnant women have been observed to have lower cognitive performance than those delivered by non infected pregnant women.

### 3: ALTERNATIVE EXPLANATIONS TO AFRICA'S POVERTY.

Not only the above three explanatory strands could explain the causes of Africa's poor economic performance and the considerable income variation among the states. There are several other explanations, which include: the continent's long history of slavery and slave trade, the psychological impact of colonialism, culture and tradition of the people, civil war, unfair trade policies, the dependency theory, legal origin, and ethno linguistic fractionalization. These theories have been put forward by different researchers to explain why many African countries are lagging behind.

#### **3.1 Slave Trade**

Slavery and slave trade were at their peak in pre colonial Africa (7<sup>th</sup> – 19<sup>th</sup> century). In this era, about 18 million Africans were sold into slavery in the Arab slave trade that was mainly focused in the Middle East, and North Africa. In addition to this, there was also the Trans-Atlantic slave trade, which required the transportation of slaves by European traders from West and Central Africa via the Atlantic Ocean to North and South America, where they were forced to work as laborers in the plantations. About nine million Africans were transported to America as slaves during this period. Gemery and Hogendorn (1979) and Manning (1981) maintained that Africa's involvement in slavery and slave trade caused a drastic decrease in population over the past centuries. Many young energetic males were exported out of the continent and this resulted in an imbalance of sex ratio with more females than males. Depopulation in this era also meant a reduction of labor, which could have facilitated industrialization and supported the existing capital at the time. The result of this was a decline in capital accumulation and long run economic growth (Inikori 1992). Mohamed Shaibu Abdulai, a Ghanaian historian and lawyer by profession, maintained that 'slave trade in Ghana stopped the process of the coming of an agrarian revolution and also an industrial revolution, because industrialization is a prerequisite of stable food production'<sup>34</sup>. He thus sees slave trade to have a very long term effect on Africa's economy.

#### **3.2 Psychological impact of colonialism**

Frantz Fanon<sup>35</sup>, on his part claimed that the domination of a foreign power over Africa was responsible for the poor economy. He believed the impact was psychological because the

<sup>34</sup> <http://www.modernghana.com/news/133590/1/slaverys-long-effects-on-africa.html>

<sup>35</sup> Lives from 1925-1961, was a psychiatrist, and revolutionary. He became an Algerian during the country liberation struggle and struggle and he inspired anti colonialism in Africa.

colonizers would always claim to be superior and the natives inferior, even after decolonization. It is in line with this philosophy that there still exists a school of thought which still considers Africans as primitive due to their culture and tradition. This school of thought claims that African cultural and traditional practices impair socioeconomic development and that is why the continent is lagging behind. Many Africans have unconsciously accepted the claim that a foreigner (white man) is better than other Africans as it is not uncommon to see an African bending over backward to help a foreigner (white man), while at the same time refusing to embrace a new idea from his brother<sup>36</sup>. However, some African scholars have condemned foreign values and ideologies, and emphasized that development program will not be effective in Africa unless planners and policy makers take into consideration the culture and tradition of the indigenous African people (Njoh, 2006). Njoh shows how African cultures and values constitute a strong pillar for the continent's socioeconomic development. He touched on many African traditions like the land tenure system, the family, medication (healing system), gender, governance and administration, and showed how Africans have effectively used them to tackle problems and foster development.

### **3.3 Civil war**

Africa is the most conflict prone region in the world and as such has recorded the highest number of civil wars. African nationalists like Nkrumah, in Ghana; and Lumumba, in Congo; who fought for their countries' independence in the early 1960s, later faced serious problems in building the state as they were highly fractionalized. In many of these African countries, there existed more than a hundred ethnic groups and each of these group started fighting for power. Coup d'états, insurgencies, ethnic cleansing, and even genocides are not uncommon on the continent. These were the challenges that many African leaders were faced with, and, as such, instead of pursuing long term development strategies like their colleagues in Asia and South America, many of them concentrated more on looking for means to combat their political opponents. Money that could have been invested in the agricultural and semi manufacturing industries, was diverted to the purchase of ammunitions and other war equipment. Nafziger (2006) posits that the negative per capita growth of African countries in the 1970s and 1980s, and the stagnation in the 1990s, were due to the increase in the number of internal conflicts on the continent. Paul Collier

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<sup>36</sup> <http://www.africanexecutive.com/modules/magazine/articles.php?article=4269>

maintained that a typical civil war would cost about four times the annual GDP in a conflict country. He used the current growth rate for a typical war country, like the Democratic Republic of Congo, to show that the country will need fifty years of peace to have a similar income level as in the 1960s (Collier2007). But just like many other African countries, it is rather unfortunate that they have been caught in a vicious cycle, because the poorer a country is the more likely it is to experience a civil war and once a country experiences civil war, it is more likely to have more civil war, which will result in poverty.

Paul Collier also maintained that it is as a result of the high level of ethnic heterogeneity on the continent that it is difficult for reforms to be implemented. Poor policies, especially those that impede development, persist in Africa because the different ethnic groups find it difficult to collectively make decisions, as there is often distrust between these disparate groups. Some policy makers share a similar view that civil war heavily affects Africa's economic development (Collier and Hoeffler, 2004; Miguel et al, 2004). Collier and Hoeffler, in their study, used the 'greed' and 'grievance' variables to explain the causes of civil war. They maintained that poverty, low economic growth and strong dependence on natural resources for rent seeking activities were responsible for the civil wars in many African countries. Other researchers (Fearon and Laitin, 2003) showed that the variables (poverty, slow growth, and strong dependence of natural resources) were proxies for institutional development that may lead to war.

### **3.4 Geography**

Using geography to depict why African countries are performing poorly, a renowned World Bank economist (Paul Collier) posits that slow development is due to the fact that the majority of the African population is concentrated in the interior of the continent, which is landlocked and where resource scarce. In his literature entitled *Africa: Geography and growth* (2006), he classifies African countries in three categories, i.e. coastline countries that are resource poor, resource poor countries that are landlocked, and resource rich countries that are either landlocked or coastline. In this classification, coastline resource scarce countries have the highest growth rate (even higher than coastal resource rich countries), while landlocked resource poor countries have the lowest growth rate (unfortunately this is where many African countries fall). Jeffery Sachs underpins this view in one of his papers by showing how distance from the coast is strongly correlated with GDP per capita.

### **3.5 Dependency theory**

Another theory that has been used by development specialists and policy makers to explain the continent's poor economic performance is the dependency theory. Proponents of this theory emphasized that Africa is poor because it has to suffer at the expense of the developed countries. The principle behind this theory is that resources flow from the poor (periphery) to the rich (core) countries at the expense of the former (Vernengo, 2004)<sup>37</sup>. This is how the basics of the theory go: peripheral countries provide cheap raw material, abundant labor, and obsolete technology for the market of the core countries, without which it will be impossible for the latter to enjoy high standards of living. In return, the core countries create a state of dependency through means like the media, economic sanction, military and foreign aid, etc, in which the peripheral countries have to stick to the interest of the former. Thus proponents of this theory emphasized that the poor countries are suffering not because they are not integrated in the global system but because of the methods in which they are integrated. Apart from the dependency theory, there are other development theories that have depicted how economic development could be attained in the poor countries<sup>38</sup>.

### **3.6 Unfair Trade Policies:**

Despite the proliferation of world trade agreement signed between African countries and the rest of the world, Africa is reported to have very low trade rate. This is due to the protectionism measures Western countries are implementing on their industries. These protectionism measures have made it impossible for Africa to trade on agricultural products and other resources in which they have comparative advantage. For example in 2005, members of the OECD (Organization of Economic Cooperation and Development) spent about \$300 billion in subsidizing their local agricultural sector. The amount the US used in subsidizing its cotton sector (\$4billion) each year is more than gross domestic product of many African countries that heavily rely on cotton exportation. Through the Common Agricultural Policies in Europe, EU uses about halve of it budget for agriculture and this

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<sup>37</sup> [http://www.econ.utah.edu/activities/papers/2004\\_06.pdf](http://www.econ.utah.edu/activities/papers/2004_06.pdf)

<sup>38</sup> These includes; the modernization theory in which the advocates maintained that development in Africa could be attained by the Africans following the process of development that were used by the developed countries; the world system theory, similar to the dependency theory in which the periphery and the core were further split to the semi periphery where the core exploits the semi periphery and the semi periphery exploits the periphery; the state theory in which great emphasis is place on the strength and autonomy of the state in the past.

results to 35 percent increase of its farmer income. The sugar industry alone in EU gets approximately \$2.7billion each year as subsidies and this has hurt enormously African countries like Ethiopia and Malawi whose primary export product is sugar (Moyo 2009). It is because of these protective measures taken by the West that the entire Africa's agricultural sector is weak. It is estimated that developing countries lose as much as 1000 billion dollar each year because of the protectionism policies adopted by the developed countries (O'Brien, 2010:153). About 500 billion dollar of the lose goes to the African countries (Moyo 2009).

### ***3.7 Ethno linguistic fractionalization***

Pre-colonial Africa had as many as ten thousand different states (Meridith, Martin 2006), ranging from small tribes and clans based on family groups, such as the San people in Southern Africa, to big kingdoms and empires such as the Yoruba in West Africa and the Bantu in Central and Southern Africa. Many of these pre-colonial groups and states had pre institutional arrangements with some form of government. When the African map was artificially carved out by the Europeans in 1884, the pre-colonial boundary was not respected, and as such the newly formed sates were highly fractionalized. Studies have shown that heterogeneous states have difficulties in collectively taking decisions which can foster development (Collier, 2007). As such, highly fractionalized countries tend to have lower GDP per capita than homogenous countries. Unfortunately, African countries are highly fractionalized.

## **4. METHODOLOGY AND DATA DESCRIPTION.**

The main objective of this paper is to show which of the three explanatory variables (malaria, institutions and foreign aid) has the highest adverse impact on Africa's level of economic development (GDP per capita). I do this by entering my data into the Statistical Package for Social Science (SPSS). First, i run simple linear regression with each of the predicting variable separately so as to observe their impact on the dependent variable. I then run multiple linear regressions (running all explanatory variables simultaneously); and by comparing their p values, coefficients, and R square, I could identify which variable has the highest adverse impact.

Before, proceeding to give a description of the measures of the dependent and explanatory variables, below is a presentation of their descriptive statistic

Table 2:  
Descriptive Statistics of GDP per capita and explanatory variables.

|   | N  | Minimum | Maximum | Mean    | Std. Deviation |
|---|----|---------|---------|---------|----------------|
| GDP per Capita as % to the United States. | 36 | 1,20    | 41,20   | 7,2806  | 8,13566        |
| Log Settler Mortality                     | 27 | 2,74    | 7,99    | 5,3922  | 1,30636        |
| % of foreign aid of GNI                   | 35 | ,30     | 30,50   | 10,8246 | 8,18226        |
| Fatal Malaria Risk                        | 36 | ,00     | 1,00    | ,7301   | ,38506         |
| Valid N (listwise)                        | 27 |         |         |         |                |

#### **4.1 The dependent variable**

In order to measure the level of economic development for the African counties, I used the GDP per capita of countries from the study of Jones I. Charles and Peter (2010)<sup>39</sup>. In their study, they listed the GDP per capita of many countries including those from Africa as a percentage to that of the United States. For example in 2000, Mauritius was the African country with the highest GDP per capita, which stood at 40.2 percent of the US value while Somalia had the lowest GDP per capita which was just 1.2 percent of the US value. They calculated the values from the Penn World Tables version 6.3. I therefore used the percentage of each country's GDP per capita to that of the United State. The values range from 1.2 to 40.2 with lower values indicating low economic development and higher values indicating high economic development (GDP per capita).

#### **4.2 The independent variables**

In measuring my first independent variable fatal malaria risk, I used data from the Quality of Government (QoG) code book. In order to measure the fatal malaria risk, measurement for the malaria risk must first be obtained. It shall then be multiplied with the proportion of the malaria case that involve plasmodium falciparum. The QoG codebook measures the former variable (malaria risk) by first 'combining the 1994 World Health Organization world map of malaria risk with the map of the world population'<sup>40</sup>. In doing so, it was possible to get the proportion of each country's population that lives with the risk of malaria transmission (Sachs 2003). This is important because, unlike other regions with a high proportion of less deadly malaria cases (plasmodium vivax, malariae, and ovale), Africa has the highest

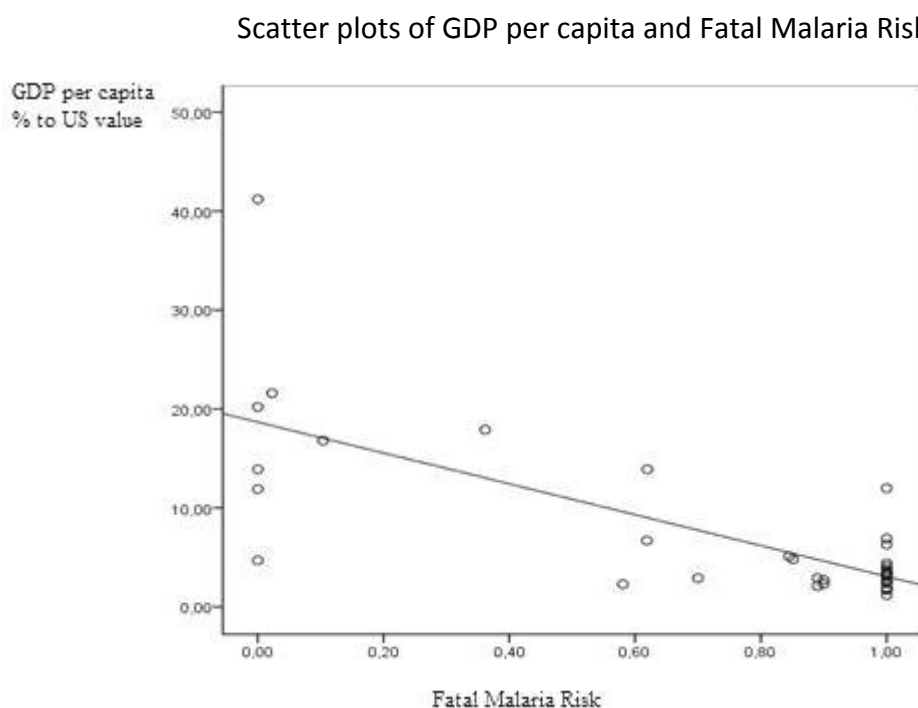
<sup>39</sup> Beyond GDP? Welfare accross countries and Time.

<sup>40</sup> [http://www.qog.pol.gu.se/data/QoG\\_Codebook\\_v6Apr11.pdf](http://www.qog.pol.gu.se/data/QoG_Codebook_v6Apr11.pdf)



proportion of deadly malaria cases (*P. falciparum*). The values range from 0 to 1 with zero implying no malaria risk and 1 indicating the highest malaria risk. With the exception of Algeria, Tunisia, Egypt, Lesotho, South Africa, Botswana, and Mauritius Island, all the other African countries are malaria endemic. The figure below will show a scatter plot of how GDP per capita varies with fatal malaria risk

Figure 4a:



One can observe from the scatter plot above that the slope is negative, implying there exist a negative correlation between fatal malaria and GDP per capita. This is confirmed in my results in the next section as the coefficient for the fatal malaria is negative.

An alternative and robust measure of the malaria risk has been provided by Kiszewski et Al (2004), in which they used malaria ecology (ME) as an instrument variable for malaria risk. In constructing this instrument they take into account other factors as the mosquito abundance, vector type, and the temperature. They emphasized the use of temperature in constructing the malaria ecology instrument because the life cycle of the sporogony parasite depends on high temperature. Moreover species like the plasmodium falciparum in the infected human need higher temperature to develop than the other species. This explains why malaria is more common in the tropics and subtropics. Also though all malaria cases are transmitted by the anopheles specie mosquito, the specie type in Africa fed mostly on human unlike those in temperate that feed mostly on cattle. The human-biting vector

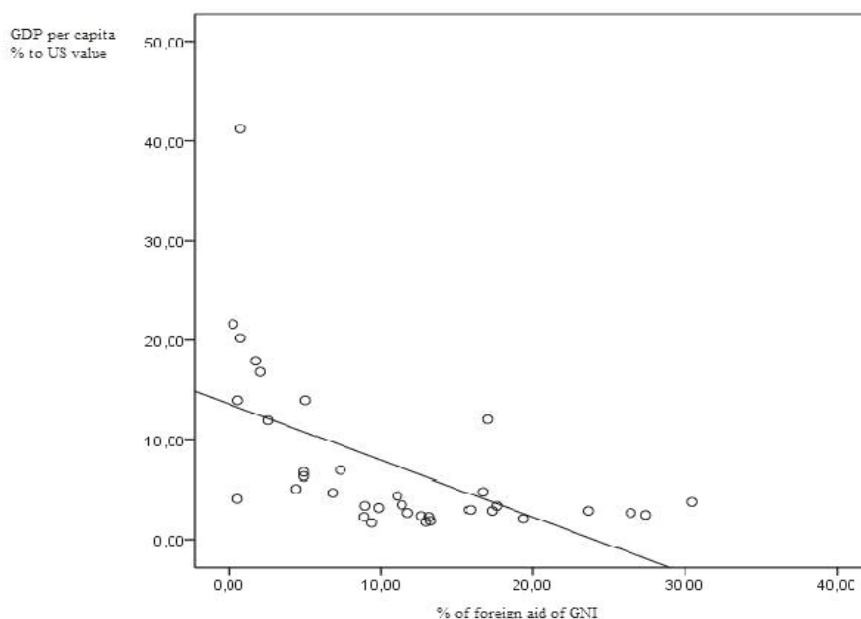
increases the transmission rate of the diseases especially in Africa: taking biological property and climatic factor in consideration, malaria ecology is exogenous to public health intervention and economic conditions (kiszewski et al 2004; Sachs 2003). However in my regression I still use Fatal Malaria Risk because with the information provided by kiszewski and Sachs in their literature, one would doubt the possibility of malaria ecology not to be influenced by human intervention and as such not a good instrument (Rodrik et al 2004)

In measuring my second independent variable foreign aid, I used the net Official Development Assistant received (as percentage of the Gross National Income) of the countries. I got the data from the World Bank development indicators. 'ODA consists of disbursement of loans made on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients' (World Bank development indicators)<sup>41</sup>. For DAC to consider a loan concessional, it must have a minimum grant element of 25 percent using a 10 percent discount rate. An alternative to this measure is one that has been developed by Burnside and Dollar called the Effective Development Assistant EDA which differ from ODA because it does not take into consideration the concessional treatment offered by ODA and also it excludes technical assistance. I used ODA instead of EDA in my regression because of the concessional loan treatment described above. In constructing the data, the average is taken over a five-year period (from 1996 – 2000) for each country. I believe this will help solve the problem of reverse causality since it is likely countries with lower GDP per capita that receive more foreign aid. For example, if I had used the country's net ODA, and GDP per capita in the same year, it could possibly have been that it is the very poor countries that receive much foreign aid, and not the much foreign aid that causes poverty. In order to limit this endogenous effect, I decided to use an average of the ODA value within five years (1996 – 2000). The values range from 0 to 30.5, with lower values indicating low dependency on foreign aid and higher values showing more dependency on foreign aid. For example, between those years in Africa, Algeria had the lowest percentage of foreign aid with regard to GNI, with just 0.3%, while Mozambique scored the highest with 30.5%. Figure 4b below shows a scatter plot of foreign aid

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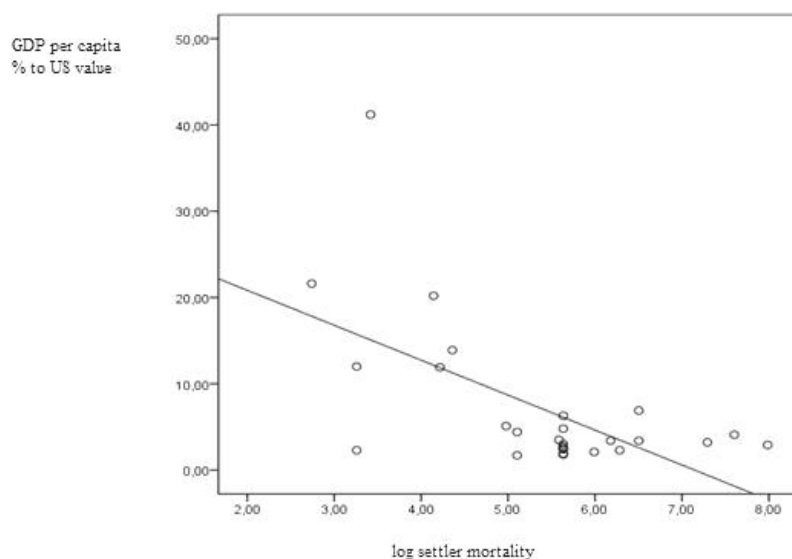
<sup>41</sup> <http://data.worldbank.org/indicator/DT.ODA.ODAT.GN.ZS?display=graph>

Figure 4b Scatter plot of GDP per capita and foreign aid



To measure institutional quality, I got data from Acemoglu et al (2001) in which they used log settler mortality of Europeans during colonialism as an instrument of institution in determining economic development. These authors purport that in areas where Europeans had a high mortality rate, they established extractive institutions with no secure property rights, while in areas with low mortality rates, Europeans settled and established good institutions with secure property rights. They then used European log settler mortality as an instrument to institutional quality. This measure is advantageous for the institutional measures of economic development because it solves both the problems of omitted variables having the possibility of affecting GDP per capita, and also that of reverse causality (because, using direct institutional measures, rich states could possibly use their money to buy high quality institutions but using the instrument log settler mortality, there is no direct link between settler mortality and economic development but there does exist a relationship between log settler mortality and institutions). The values range from 0 to 10 with lower values indicating good institutions and higher values indicating poor institutions. South Africa has the lowest log settler mortality (best institution) of 2.74 while Mali and Gambia score the highest value of 7.99 and 7.49 respectively (poor institution). Below is a scatter plot of log settler mortality.

Figure 4c: Scatter plot of GDP per capita and log settler mortality



Other forms of institutional measures are:

- The Corruption Perception Index from Transparency International. Transparency International is a global civil society and non partisan organization that measure a country's degree of corruption as perceived by businessmen, and the general public. The corruption perception index has values ranging from 0 to 10, with higher scores indicating a low level of corruption and lower scores indicating a high level of corruption. For example, according to the 2010 ranking, Botswana was the least corrupt country in Africa with a CPI value of 5.8 and Somalia was the most corrupt, with a CPI value of 1.1. However, I did not include this measure in my regression because of its endogenous effect, i.e., African countries may have poor institutions because they lack the financial means to maintain it.
- Institutions can still be measured using expropriation risk from the Political Risk Service (Knack and Keefer, 1995; Acemoglu et al, 2001). Rodrik et al (2004) did institutional measurement by using the World Bank rule of law index.

#### **4.3 Control Variables**

Several studies have shown that there is a strong and robust relationship between legal origin and economic development (la portal et al, 2008; Beck Thorsten, 2002). Countries with common law origin have been said to have good institutions and higher growth rates than countries with the civil law origin. Since almost all African countries were colonized and

either had common law or civil law, legal origin need not be overlooked as it could likely affect the continent's economic development. It is to this effect that I included legal origin in my regression as a control variable.

My second control variable is ethno linguistic fractionalization. Studies have shown that countries with many ethnic and religious groups have lower GDP per capita than countries with fewer ethnic and religious groups (Alesina et al, 2003). I got each country's level of heterogeneity from Alesina et al. The values range from 0 to 1 with lower scores indicating less fractionalization and higher scores indicating more fractionalization. For example, the least fractionalized state is Swaziland with a value of 0.03 and the highest fractionalized state is Uganda with value of 0.93. I do not include some of the alternative explanations discussed above in my regression because I believe their effect on the result would be meaningless since they affect the entire continent equally, and as such are not useful in explaining why there is variation in income level among the countries. For example regarding 'the impact of colonialism', all the African countries were colonized in the same era (the only exception is Ethiopia and Liberia)<sup>42</sup>. Regarding civil war, all the countries have been one time in history highly affected by civil war. Also, slavery and slave trade were practice throughout the continent. Moreover I feel it is useless adding slavery in my empirical finding, because the practice has been abolished over two hundred years ago, yet economic development in the continent is low.

## 5. RESULTS

In order to see which of the variables affects GDP per capita the most, I ran multiple cross country regression with all the above variables. I divided the results into three approaches: approach 1, which is a simple linear regression, where I ran my explanatory variables separately; approach 2, which is a multiple linear regression in which I ran my three explanatory variables simultaneously; and approach 3 which is still a multiple linear regression but I include the control variables ie simultaneously ran all explanatory variables. Approach 1: In this approach I performed simple linear regression (running each of the predicting variables separately and combine the result in table 3a). This approach is thus a combination of separate sub approaches of fatal malaria, foreign aid, log settler mortality,

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<sup>42</sup> Ethiopia was the only African country that resisted colonialism in the late 18<sup>th</sup> century by defeating Italy that unilaterally proclaimed a protectorate on Ethiopia, in the battle of Adwa in 1896. However Ethiopia lost its sovereignty to Italy between 1935 – 1940. Liberia was never colonized.

and the control variables (legal origin and ethno linguistic fractionalization). The F tests for all three separate explanatory variables are statistically significant and this makes the three sub approaches to be significant (the F test value for malaria is 0.000, foreign aid is 0.000, and log settler mortality is 0.001).<sup>43</sup> Also the R square of fatal malaria, foreign aid and log settler mortality are 0.56, 0.32, and 0.37 respectively. This shows that 56% of the variance of African countries' GDP per capita is accounted for by malaria sub approach, 32% is accounted for by the sub approach of foreign aid, and 37% is due to the log settler mortality sub approach. The P values for the three separate sub approaches (malaria, foreign aid and institutions) are significant because they are all lower than 0.05. As such all three predicting variables in this approach highly adversely affects GDP per capita. The unstandardized coefficient for malaria is (-15.5). This implies a country with a one unit increase in malaria, will result to a 15.5 unit decrease in GDP per capita. For institution, a unit increase in log settler mortality (poor institution) will lead to a 4.0 unit decrease in GDP per capita. And for foreign aid, a unit increase leads to a 0.5 unit decrease in GDP per capita. I compared the data this way because I ran each sub approach separately, and summarized in table 3a below (see appendix 'A' for detail result). I use the standardized coefficient in comparing the result when I run the explanatory variable simultaneously (like in table 3b and 3c). Still with table 3a, I separately included the two control variables (legal origin and ethno linguistic fractionalization). I observed that the sub approach for ethno linguistic fractionalization is significant to determine GDP per capita (perhaps due to similar reason as the three main explanatory variables: look at the P value, R square). But the sub approach for legal origin is not significant as not only the P value is 0.99 but also the R square is 0.00 which implies that 0% of legal origin account for the variation in GDP per capita in that sub approach. Table 3a below gives a summary of all separate sub approaches in approach 1. See detailed results in appendix A

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<sup>43</sup> See appendix A for detail.

Table 3a:

Approach 1: The separate effect of fatal malaria, foreign aid and institutions on GDP per cap.

|                  | Unstandardized coefficient | Standardized coefficient | Robust standard error | R SQUARE |
|------------------|----------------------------|--------------------------|-----------------------|----------|
| DV(GDP per Ca)   |                            |                          |                       |          |
| Fatal Malaria    | -15.5***                   | -0.71                    | 2.3                   | 0.56     |
| %of aid of GNI   | -0.56***                   | -0.56                    | 0.14                  | 0.32     |
| Log settler mort | -4.0***                    | -0.61                    | 1.1                   | 0.37     |
| Legal origin     | -0.04                      | -0.002                   | 2.8                   | 0.00     |
| Ethno ling frac. | -13.8**                    | -0.4                     | 5.3                   | 0.16     |
| Constant         |                            |                          |                       |          |

N/B \*p<.1 \*\* p<.01 \*\*\*p<.001.

In approach 2, I performed multiple linear regression (running all explanatory variables simultaneously but excluding the control variable) to see which of them greatly affects GDP per capita. The approach has an R square of 0.64. This implies that about 64% of the variability of Africa's countries GDP per capita is accounted for by the three explanatory variables (malaria, institution and foreign aid). Malaria has the lowest P value of 0.008, thus statistically significant while foreign aid and institution have P values above 0.05, (i.e. 0.5 and 0.3 respectively) and thus both are less significant. Since I have simultaneously run more than one explanatory variable in this approach, I instead use the standardized coefficient to compare their relative strength. In this approach, malaria has the highest standardized coefficient of 0.62. This implies that, if foreign aid and institution are held constant, one standard deviation increase in malaria will result in 0.62 standard deviation decrease in African countries' GDP per capita. Also one standard deviation increase in log settler mortality (poor institution) will lead to 0.15 decrease in the African countries' GDP per capita if malaria and foreign aid are held constant. And lastly, when malaria and institution are held constant, one standard deviation increase in foreign aid will culminate in a 0.13 decrease in GDP per capita. See table 3b below for a summary of this approach (detailed results in appendix B). It is quite clear in this approach that malaria has the highest adverse impact on the continent's GDP per capita. From figure 1 in section 2, one could observe that there is a

linear correlation among the predicting variables (multicollinearity). In order to be sure that the above result is valid I included the multicollinearity check in my regression (see results in appendix D). From the check, it is clear that none of my explanatory variables (malaria, foreign aid, and institution) has a neither a 'Tolerance' value below 0.1, nor a VIH value above 10. For example malaria has the lowest tolerance value of 0.38 (which is above the minimum value of 0.1). This tolerance value of malaria tells us that up to 38% of the variance in malaria in determining GDP per capita can neither be predicted by log settler mortality nor foreign aid. Log settler mortality has the highest 'tolerance value of 0.58 and this means 58% of the variance in institution is not predicted by malaria or foreign aid. The variance inflation factor (VIF) value is  $1/\text{tolerance}$ .

Table 3b:

## Approach 2 : Running all three independent variables simultaneously

|                  | Unstandardized coefficient | Standardized coefficient | Robust standard error | R SQUARE |
|------------------|----------------------------|--------------------------|-----------------------|----------|
| DV(GDP per Ca)   |                            |                          |                       |          |
| Fatal Malaria    | -13.9***                   | -0.62                    | 4.6                   | 0.64     |
| %of aid of GNI   | -1.2                       | -0.13                    | 0.23                  | 0.64     |
| Log settler mort | -1.0                       | -0.15                    | 1.10                  | 0.64     |
| constant         | 25.5***                    | - - -                    | 4.7                   | 0.64     |
|                  |                            |                          |                       |          |

N/B \* $p < .1$  \*\*  $p < .01$  \*\*\* $p < .001$

In approach 3, I ran all explanatory variables (including the control variable) simultaneously. With this approach, malaria still has the highest adverse impact on African countries' economy as it was the only variable with a significant P value of 0.01. The other explanatory variables are insignificant with their P values higher than 0.05. With the alternative variables held constant in this approach, one standard deviation increase in malaria will lead to 0.72 standard deviation decrease in the various countries GDP per capita. See table 3c for summary (appendix 3 for detailed results). I also checked for the multicollinearity effects, and using similar explanation like in approach 2 above, the effect was found to be minimal. (See appendix E)



Table 3c:

Approach 3: Running all explanatory variables (including control ones) simultaneously

|                  | Unstandardized coefficient | Standardized coefficient | Robust standard error | R SQUARE |
|------------------|----------------------------|--------------------------|-----------------------|----------|
| DV(GDP per Ca)   |                            |                          |                       |          |
| Fatal Malaria    | -16.0***                   | -0.72                    | 5.8                   | 0.7      |
| %of aid of GNI   | -0.13                      | -0.11                    | 0.2                   | 0.7      |
| Log settler mort | -1.6                       | -0.23                    | 1.1                   | 0.7      |
| Legal origin     | 6.8                        | 0.12                     | 2.3                   | 0.7      |
| Ethno ling frac. | 2.8                        | 0.19                     | 6.5                   | 0.7      |
| constant         | 21.7***                    | -----                    | 7.5                   |          |

N/B \*p<.1 \*\* p<.01 \*\*\*p<.001.

Approach 2 and 3 illustrate that disease, (malaria) is the main cause of Africa's poor economy performance because many of the countries are malaria endemic. The few countries that are not endemic (even with poor institutions) have high GDP per capita and this is why malaria still best explains the considerable variation in income among the African countries. For example malaria endemic countries like Ghana, Burkina Faso, Senegal, Tanzania, Madagascar, with good institutional quality are still having lower GDP per capita than non endemic countries like Algeria, Libya, Tunisia, Swaziland and Egypt, with poor institutional quality. According to the 2009 CPI index, Ghana, Burkina Faso, and Senegal scored 3.9, 3.5 and 3.4 respectively which is quite higher than those of Tunisia (Egypt (2.8), Algeria (3.2) and Swaziland (3.3). Yet the GDP per capita (as a percentage to that of the US) for Ghana and Senegal were only 3.4 and 4.4 percent respectively, which is lower than those of non endemic countries like Algeria, Swaziland, and Egypt with values of 13.9, 16.8, and 11.9 respectively.

In other countries like Botswana, and South Africa, with very high GDP per capita on the continent, much credit has been given to their good institutional quality. I, however maintain that though they have good institutions, these countries are not malaria endemic. Perhaps both good institutions and low malaria levels can better explain their high level of development in Africa. For other malaria endemic countries like Equatorial Guinea, Angola and Gabon with high GDP per capita, I still maintain that these countries are rich perhaps

because of huge income they get from the sales of oil. These countries are all members of the Organization of Oil Exporting Countries (OPEC) and are among the top oil exporters in Africa. My empirical result thus supports the Sachs' view that malaria is the main cause for Africa's low economic performance. In order to improve on the economy and living standard of the Africans, Sachs further called on the International community to collectively cooperate and increase the amount of foreign aid supply to the continent.

With the exception of Nigeria, I realized that all the other poor endemic countries are more aid dependent than the rich non malarious countries. Though it is difficult to identify the direction of causation between foreign aid and economic development, one could observe, from the result in model 1, that foreign aid negatively affects GDP per capita. In model 1 of the regression, 32 percent of the variability of Africa's GDP is accounted for by the foreign aid sub model, and a unit increase in foreign aid leads to a 0.5 unit decrease in the continent's economic development (GDP per capita). This can also be backed by my theoretical discussion in section 2.1, on how foreign aid affects African countries' economy, i.e., breeds corruption, weaken the middle class, causes Dutch the diseases, etc. Due to these adverse effects, I suggest that serious consideration needs to be taken by the donors prior to any aid provision to the recipients. Since donor coordination could mitigate the above adverse effects, I, therefore, call on donor countries to coordinate their action in aid provision. Moreover, I will call on these donor countries to incorporate in their action a new form of aid to Africa, which I will refer to as 'educational and industrial aid'. This form of aid is of utmost importance because it will give the Africans the the much needed technological skills for contemporary development

## **6. CONCLUSION**

This thesis has explicitly shown, theoretically and empirically, that all three strands: malaria, quality of institutions, and foreign aid are the causes of Africa's low economic performance, and also account for the difference in income levels among African states. I would, therefore, like to maintain that all three strands need to be taken into consideration, and none should be underestimated in the continent's poverty alleviation program. However, because diseases (malaria) had the highest negative adverse impact on the continent's economy, I, therefore, call on International Organizations, NGOs and Civil Society

Organizations to incorporate disease control as a major priority in their development programs in Africa. This is an important phenomenon that needs not be overlooked because besides malaria, Africa is endemic to many other diseases. Because of the high mortality and morbidity rate on the continent caused by malaria, economic development has been highly impaired both directly (cost of treating and preventing the diseases) and indirectly (as many children drop out from school to look after the sick, and even those who continue schooling tend to have low cognitive functioning and less productivity).

Since controlling malaria is an efficacious means of alleviating poverty and fostering economic development in Africa, the government of Cameroon, alongside STM studio, and other private organizations have worked collectively to bring Africa's top musicians together in order to release an album entitled 'Malaria No More Cameroon,'<sup>44</sup> which is currently hitting the airwaves in the country. Since this approach is the best means to disseminate information about the severity of the disease, I call on Western pop and rock singers not only to use 'live aid concerts' to raise money and fight poverty in Africa but also to sing about the diseases as their colleagues in Cameroon are doing. I also call on other African countries to emulate the example in Cameroon because the music will at least sensitize the indigenous people on how to prevent the disease. As far as disease control is concerned, it was a good move by the African Heads of State to have assembled in Abuja, Nigeria, in April 2000, in a special summit called 'the African summit on Roll Back Malaria'. During the summit, insecticide-treated bed nets were to be distributed to at least 60 percent of the African population, targeting especially pregnant women and children below 5 years<sup>45</sup>. The approach, by which African leaders have resolved to implement the Roll Back Malaria program, has brought much controversy as they relied heavily on Foreign Aid from the donor community. These donor countries assist Africa by providing money, free mosquito nets and medication. Though this helps to improve on the situation, it has been criticized by many researchers recently, perhaps due to the direct disadvantages of foreign aid. However, as discussed earlier, it could be the lack of donor coordination among the aid donors that makes aid seem not to be working. I, therefore, call on all the donor countries to coordinate both their actions and the actions of the recipient countries prior to any aid provision. Lastly,

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<sup>44</sup> Follow the link <http://www.youtube.com/watch?v=sLSIE93xBYI> to watch the clip.

<sup>45</sup> Roll Back Malaria Cabinet Project, 2000. *The African Summit on Roll Back Malaria, Abuja, Nigeria*. Geneva: World Health Organization.

I call on all the donors to incorporate a new form of aid, which I will term ‘industrial and educational aid’ to Africa.

I believe this kind of aid would be beneficial to the poorest especially, because if African countries could improve on their technological and industrial sectors, such as has health care, education and transport even those with zero income will benefit. Let look at China for example, its GDP per capita is 4393USD<sup>46</sup> and is similar to that of many African countries, yet China is threatening to become a world giant in the nearest future. Even though China’s GDP per capita is low, it has good technological and industrial skills and as such it could provide social amenities like good health, roads, and education at very cheap cost to all its citizens. This explains why I posit that an African country like Equatorial Guinea with very high GDP per capita of 20,200USD still remain poorer than China with a GDP per capita of only \$4393. The point I am trying to make above is that donor countries should not only think Africans are dying of diseases, hunger and poverty because they do not have enough money. Perhaps capital is important but I think the most important aspect donors should start looking at is Africa’s insufficient ‘technological and industrial’ skills. That is why I am calling on the donors from the developed world to redefine the form of aid to Africa by changing from the provision of ‘money’ to the provision of ‘industrial and technical’ aid. With industrial and technical knowhow, African countries will be able to provide social amenities like good healthcare, and quality education to its citizens. Improvement in healthcare will lead to a reduction in diseases, which stands out as the main cause for the continent’s low economic performance.

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<sup>46</sup> [World Development Indicators database, World Bank](#). Accessed on April 15, 2011.

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## 7. APPENDICES

### APPENDIX A

#### REGRESSION OUTPUT FOR MALARIA

| Model Summary |  |                   |          |                   |                            |
|---------------|--|-------------------|----------|-------------------|----------------------------|
| Model         |  | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1             |  | ,751 <sup>a</sup> | ,565     | ,552              | 5,44633                    |

a. Predictors: (Constant), Fatal Malaria Risk

#### ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 1308,091       | 1  | 1308,091    | 44,099 | ,000 <sup>a</sup> |
|       | Residual   | 1008,525       | 34 | 29,663      |        |                   |
|       | Total      | 2316,616       | 35 |             |        |                   |

a. Predictors: (Constant), Fatal Malaria Risk

b. Dependent Variable: jp\_gdp

#### Coefficients<sup>a</sup>

| Model |                    | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|--------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                    | B                           | Std. Error | Beta                      |        |      |
|       |                    | 1                           | (Constant) | 18,925                    |        |      |
|       | Fatal Malaria Risk | -15,539                     | 2,340      | -,751                     | -6,641 | ,000 |

a. Dependent Variable: jp\_gdp

## REGRESSION OUTPUT FOR FOREIGN AID

| Model Summary |                   |          |                   |                            |  |
|---------------|-------------------|----------|-------------------|----------------------------|--|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |  |
| 1             | ,563 <sup>a</sup> | ,317     | ,296              | 6,86767                    |  |

a. Predictors: (Constant), net\_oda

ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 1308,091       | 1  | 1308,091    | 44,099 | ,000 <sup>a</sup> |
|       | Residual   | 1008,525       | 34 | 29,663      |        |                   |
|       | Total      | 2316,616       | 35 |             |        |                   |

a. Predictors: (Constant), Fatal Malaria Risk

b. Dependent Variable: jp\_gdp

Coefficients<sup>a</sup>

| Model |         | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|---------|-----------------------------|------------|---------------------------|--------|------|
|       |         | B                           | Std. Error | Beta                      |        |      |
|       |         | 1                           | (Constant) | 13,551                    |        |      |
|       | net_oda | -,563                       | ,144       | -,563                     | -3,913 | ,000 |

a. Dependent Variable: jp\_gdp

## REGRESSION OUTPUT FOR LOG SETTLER MORTALITY

| Model Summary |                   |          |                   |                            |  |
|---------------|-------------------|----------|-------------------|----------------------------|--|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |  |
| 1             | ,607 <sup>a</sup> | ,369     | ,343              | 7,05680                    |  |

a. Predictors: (Constant), Log Settler Mortality

ANOVA<sup>b</sup>

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 727,238        | 1  | 727,238     | 14,604 | ,001 <sup>a</sup> |
|       | Residual   | 1244,961       | 25 | 49,798      |        |                   |
|       | Total      | 1972,199       | 26 |             |        |                   |

a. Predictors: (Constant), Log Settler Mortality

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 727,238        | 1  | 727,238     | 14,604 | ,001 <sup>a</sup> |
|       | Residual   | 1244,961       | 25 | 49,798      |        |                   |
|       | Total      | 1972,199       | 26 |             |        |                   |

a. Predictors: (Constant), Log Settler Mortality

b. Dependent Variable: jp\_gdp

**Coefficients<sup>a</sup>**

| Model |                       | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|-----------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                       | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)            | 28,922                      | 5,872      |                           | 4,926  | ,000 |
|       | Log Settler Mortality | -4,048                      | 1,059      | -,607                     | -3,821 | ,001 |

a. Dependent Variable: jp\_gdp

**REGRESSION OUTPUT FOR LEGAL ORIGIN**

| <b>Model Summary</b> |                   |          |                   |                            |  |
|----------------------|-------------------|----------|-------------------|----------------------------|--|
| Model                | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |  |
| 1                    | ,002 <sup>a</sup> | ,000     | -,029             | 8,25442                    |  |

a. Predictors: (Constant), ht\_colonial

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F    | Sig.              |
|-------|------------|----------------|----|-------------|------|-------------------|
| 1     | Regression | ,012           | 1  | ,012        | ,000 | ,989 <sup>a</sup> |
|       | Residual   | 2316,604       | 34 | 68,135      |      |                   |
|       | Total      | 2316,616       | 35 |             |      |                   |

a. Predictors: (Constant), ht\_colonial

b. Dependent Variable: jp\_gdp

**Coefficients<sup>a</sup>**

| Model |             | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|-------|-------------|-----------------------------|------------|---------------------------|-------|------|
|       |             | B                           | Std. Error | Beta                      |       |      |
| 1     | (Constant)  | 7,337                       | 4,429      |                           | 1,656 | ,107 |
|       | ht_colonial | -,037                       | 2,756      | -,002                     | -,013 | ,989 |

a. Dependent Variable: jp\_gdp

**REGRESSION OUTPUT FOR ETHNO LINGUISTIC FRAC.**

| Model Summary |                   |          |                   |                            |  |
|---------------|-------------------|----------|-------------------|----------------------------|--|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |  |
| 1             | ,412 <sup>a</sup> | ,169     | ,144              | 7,59356                    |  |

a. Predictors: (Constant), al\_ethni

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F     | Sig.              |
|-------|------------|----------------|----|-------------|-------|-------------------|
| 1     | Regression | 388,249        | 1  | 388,249     | 6,733 | ,014 <sup>a</sup> |
|       | Residual   | 1902,852       | 33 | 57,662      |       |                   |
|       | Total      | 2291,102       | 34 |             |       |                   |

a. Predictors: (Constant), al\_ethni

b. Dependent Variable: jp\_gdp

**Coefficients<sup>a</sup>**

| Model |            | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|------------|-----------------------------|------------|---------------------------|--------|------|
|       |            | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant) | 16,159                      | 3,603      |                           | 4,485  | ,000 |
|       | al_ethni   | -13,826                     | 5,328      | -,412                     | -2,595 | ,014 |

a. Dependent Variable: jp\_gdp

**APPENDIX B**

| Model Summary |                   |          |                   |                            |  |
|---------------|-------------------|----------|-------------------|----------------------------|--|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |  |
| 1             | ,804 <sup>a</sup> | ,646     | ,600              | 5,50631                    |  |

a. Predictors: (Constant), Log Settler Mortality, net\_oda, Fatal Malaria Risk

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 1274,851       | 3  | 424,950     | 14,016 | ,000 <sup>a</sup> |
|       | Residual   | 697,347        | 23 | 30,319      |        |                   |
|       | Total      | 1972,199       | 26 |             |        |                   |

a. Predictors: (Constant), Log Settler Mortality, net\_oda, Fatal Malaria Risk

b. Dependent Variable: jp\_gdp

**Coefficients<sup>a</sup>**

| Model |                       | Unstandardized Coefficients |            | Standardized | t      | Sig. |
|-------|-----------------------|-----------------------------|------------|--------------|--------|------|
|       |                       | B                           | Std. Error | Coefficients |        |      |
|       |                       |                             |            | Beta         |        |      |
| 1     | (Constant)            | 24,877                      | 4,813      |              | 5,169  | ,000 |
|       | Fatal Malaria Risk    | -13,930                     | 4,765      | -,624        | -2,924 | ,008 |
|       | net_oda               | -,128                       | ,213       | -,101        | -,602  | ,553 |
|       | Log Settler Mortality | -1,018                      | 1,135      | -,153        | -,897  | ,379 |

a. Dependent Variable: jp\_gdp

## APPENDIX C

**Model Summary**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | ,858 <sup>a</sup> | ,736     | ,670              | 5,07133                    |

a. Predictors: (Constant), al\_ethni, net\_oda, ht\_colonial, Log Settler Mortality, Fatal Malaria Risk

**ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F      | Sig.              |
|-------|------------|----------------|----|-------------|--------|-------------------|
| 1     | Regression | 1433,978       | 5  | 286,796     | 11,151 | ,000 <sup>a</sup> |
|       | Residual   | 514,368        | 20 | 25,718      |        |                   |
|       | Total      | 1948,346       | 25 |             |        |                   |

a. Predictors: (Constant), al\_ethni, net\_oda, ht\_colonial, Log Settler Mortality, Fatal Malaria Risk

b. Dependent Variable: jp\_gdp

**Coefficients<sup>a</sup>**

| Model |                       | Unstandardized Coefficients |            | Standardized | t      | Sig. |
|-------|-----------------------|-----------------------------|------------|--------------|--------|------|
|       |                       | B                           | Std. Error | Coefficients |        |      |
|       |                       |                             |            | Beta         |        |      |
| 1     | (Constant)            | 21,203                      | 7,481      |              | 2,834  | ,010 |
|       | Fatal Malaria Risk    | -16,171                     | 5,822      | -,719        | -2,777 | ,012 |
|       | net_oda               | -,121                       | ,220       | -,096        | -,550  | ,588 |
|       | Log Settler Mortality | -1,660                      | 1,097      | -,237        | -1,513 | ,146 |
|       | ht_colonial           | 2,757                       | 2,297      | ,152         | 1,200  | ,244 |
|       | al_ethni              | 6,901                       | 6,457      | ,186         | 1,069  | ,298 |

a. Dependent Variable: jp\_gdp

| Model |                       | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. | Collinearity Statistics |       |
|-------|-----------------------|-----------------------------|------------|---------------------------|--------|------|-------------------------|-------|
|       |                       | B                           | Std. Error | Beta                      |        |      | Tolerance               | VIF   |
| 1     | (Constant)            | 25,715                      | 4,720      |                           | 5,448  | ,000 |                         |       |
|       | Fatal Malaria Risk    | -13,333                     | 4,522      | -,592                     | -2,948 | ,007 | ,379                    | 2,636 |
|       | net_oda               | -,151                       | ,208       | -,119                     | -,727  | ,475 | ,569                    | 1,758 |
|       | Log Settler Mortality | -1,241                      | 1,084      | -,186                     | -1,145 | ,264 | ,579                    | 1,728 |

## APPENDIX E

| Model |                       | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. | Collinearity Statistics |       |
|-------|-----------------------|-----------------------------|------------|---------------------------|--------|------|-------------------------|-------|
|       |                       | B                           | Std. Error | Beta                      |        |      | Tolerance               | VIF   |
| 1     | (Constant)            | 21,203                      | 7,481      |                           | 2,834  | ,010 |                         |       |
|       | Fatal Malaria Risk    | -16,171                     | 5,822      | -,719                     | -2,777 | ,012 | ,197                    | 5,074 |
|       | net_oda               | -,121                       | ,220       | -,096                     | -,550  | ,588 | ,431                    | 2,319 |
|       | Log Settler Mortality | -1,660                      | 1,097      | -,237                     | -1,513 | ,146 | ,539                    | 1,855 |
|       | ht_colonial           | 2,757                       | 2,297      | ,152                      | 1,200  | ,244 | ,828                    | 1,207 |
|       | al_ethni              | 6,901                       | 6,457      | ,186                      | 1,069  | ,298 | ,436                    | 2,294 |