# EFFECT OF EXTERNAL PUBLIC DEBT ON ECONOMIC GROWTH IN KENYA

BY

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REG: X50/76001/2012

**Research paper submitted to the School of Economics University of Nairobi in partial fulfillment of the requirements for the degree of Master of Arts in Economics.**

**November, 2013**

# DECLARATION

This research paper is my original work and has not been presented for a degree award in any other university.

Signed…….....

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

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**LIST OF ACRONYMS**

IMF : INTERNATIONAL MONETARY FUND
GDP : GROSS DOMESTIC PRODUCT
SSA : SUB-SAHARAN AFRICA
GNI : GROSS NATIONAL INCOME
GNP : GROSS NATIONAL PRODUCT
IDA : INTERNATIONAL DEVELEOPMENT AGENCY
EEC : EUROPEAN ECONOMIC COMMUNITY
EIB : EUROPEAN INVESTMENT BANK
MTDS : MEDIUM TERM DEBT STRATEGY
DSF : DEBT SUSTAINABILITY FRAMEWORK
HIPC : HEAVILY INDEBTED POOR COUNTRIES
OLS : ORDINARY LEAST SQUARES
FDI : FOREIGN DIRECT INVESTMENT
DF : DICKY-FULLER
ADF : AUGMENTED DICKY-FULLER
ARDL : AUTOREGRESSIVE DISTRIBUTED LAG

# ACKNOWLEDGEMENT

First I thank my God for His everlasting love and strength which has enabled me to complete this project. Second my sincere gratitude goes to my supervisors Dr. M. Muriithi and R. M. Kabando for dedicating much of their time to supervise and guide me in writing this research paper. It is through their guidance and constructive criticisms which improved this paper.

Acknowledgement also goes to other lecturers of the school of economics for their guidance and support throughout the course. I am indeed grateful for their material and moral support for the entire period of my studies at the University of Nairobi.

To my fellow classmates, I am highly indebted and I do appreciate you so much for the teamwork sprit which constantly inspired me throughout the course. My sincere appreciation goes to my brothers; David and Samuel for constantly encouraging me and bearing with my tight schedule to see completion of this degree.

I am grateful to my employer for understanding that a significant effort and time was essentially needed and provided me with the necessary equipment and material resources in the course of my research.

Last but not the least; I am very grateful to each and every one especially friends and colleagues who I may not have mentioned here but made contribution in one way or another towards accomplishment of this project.

## ABSTRACT

Kenya being a developing country compliments its revenue through exports of primary commodities. In attempt to add to available domestic resources, successive governments have acquired huge sums of external debt to finance national development plans. High levels of external debt in Kenya poses great challenges on the economy because large proportion of exports is devoted in servicing these debts instead of being put into domestic investment thus reducing the prospects of economic growth. The conventional view is that high levels of debt may lead to crowding out effect and also constrain the scope of counter cyclical fiscal policies which may result in higher volatility and this may adversely affect the economic performance. This study is therefore an effort to determine the effect of external public debt on economic growth in Kenya. Specifically, the study tries to answer the questions whether external debt and debt servicing payment have any significance effect on economic growth in Kenya. In doing this the study used a linear model to analyze Kenyan data from 1980 to 2011 with GDP growth rate as a function of external debt. Foreign direct investment, labor force, capital formation, domestic saving, inflation and external debt service are taken as control variables.

The result indicates that external debt and, debt servicing have negative effects on economic growth. Other factors found to affect growth negatively include, inflation, labor force and domestic savings. Capital formation and foreign direct investment as also supported in the literature have positive effects on economic growth. This study recommends improvement of the existing policies on public external debt management such as borrowing on concessional terms to minimize borrowing costs. On the other hand, to increase inflow of FDI there is need to pursue policies geared toward minimizing investor's time and costs, and elimination or reduction of administrative. Public investments on infrastructure, to an extent in which are proved to be complementary to the private investments can increase the marginal product of the private physical capital thus augmenting the growth rate of a domestic economy.

# Contents

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the study

Public debt is the sum total of external debt and domestic debt (Chowdhury, 2001). The International Monetary Fund (IMF) defines public debt as the entire stock of direct government fixed term contractual obligations to others outstanding on a particular date. These contractual obligations are either internal or external. Prudent level of borrowing can enhance economic growth through capital accumulation and productivity growth. External borrowing for productive investment creates macroeconomic stability and also provides capital inflow which has positive effects on domestic savings thus creating investment demand (Burnside, 2000). However, high levels of accumulated debt can have severe effects on the rate of investment and economic growth (Eaton, 1993).

In most cases debt is accrued due to increased government spending or due to an increase in government's budget deficit. When the government's budget is large relative to revenue, it leads to a budget deficit or a gap which has to be financed. The deficit can be financed by borrowing internally or externally or through grants. If financing the gap is done by borrowing then it becomes a debt which the government has an obligation to. Public external debt remains a subject of debate among theorists and practitioners of economics. This is because the rate of economic growth of a country must be in line with the annual rate of growth of its public debt if it is to mitigate the problems associated with accumulation of large stocks of debt (Kuria, 2003).

Public debt can influence the economy in the short-run and in the long-run. The conventional view is that debt which reflects deficit financing can stimulate aggregate demand and output in the short-run but crowds out capital and reduces national income in the long-run (Elmendorf and Mankiw 1999). High levels of debt are likely to constrain the scope of counter cyclical fiscal policies resulting in higher volatility and further lower growth (Aghion and Kharoubi, 2007).

### 1.1.1 Public debt in advanced economies

For nearly two decades, most of the European countries have experienced external public debt in excess of 100% GDP. Before the onset of the 2008 financial crisis, public debt of the Euro zone countries was about 70% of GDP on average; this was 10% higher than in the early 1990s.
Since 2007, debt ratio has increased by 10% to 60% of GDP. This increase caused countries like Spain, Portugal, Ireland and Greece experience severe difficulties in refinancing their debts (International Monetary Fund, 2010).

The financial crises of 2008 radically changed the debt situation in Europe and promoted an unprecedented and contagious public debt crisis which is still unfolding (Aghion and Kharoubi, 2007).The crisis brought the most rapid increase in global government debt since World War II (Abbas, 2010). According to International Monetary Fund (IMF 2010), between 2007 and 2011 net government debt as percentage of GDP rose from 51% to 70% in the Euro area and from 42% to 73% in the USA, 38% to 74% in the UK and 82% to 130% in Japan. Before the onset of $20^{th}$ century, the accumulation of large stocks of public debt was generally slow and occurred mainly due to wars.
According to the encyclopedia Britannica, the national debt of England was started to finance the British Participation in the war of the Grand Alliance with France during 1689-1697. In the

United States, the newly formed federal government assumed the debts of the states incurred during the American Revolution, all of which were pooled into a single debt issue of 1798. The US incurred large amounts of debts early 19th century mainly for public work improvements. In France the public debt increased substantially in 1878 as a result of public works expenditures and France's Colonial expansion (IMF, 2010).

The increase in advanced countries' external debt as result of global economic and financial crisis has led to a serious concern of debt sustainability and the economic impact. The key issue relates to the extent to which large stocks of public debts are likely to have adverse effects on capital accumulation as well as productivity thus reducing economic growth. Public debt may affect economic growth through different channels for example; long term interest rates, higher future tax distortion, a rise in inflation, uncertainty and vulnerability to crisis. If economic growth is negatively affected, fiscal sustainability issues are likely to be exacerbated which further affects fiscal adjustment efforts to reduce debts to more sustainable levels (Hamilton, 1947)

### 1.1.2 External debt and growth in sub-Saharan Africa (SSA) countries

The debt crisis of SSA countries increased rapidly following the global debt crisis that emerged early 1980s. The crisis led to over-borrowing by most developing Africa countries and increased lending by the international banks in the same period. The collapse of the world commodity prices especially petroleum also escalated the debt situation in SSA Africa (IMF, 2011). The increase in foreign borrowing that followed the debt crisis was worsened by the oil price shocks of 1973 and 1979. The oil price shock resulted in acute current account deficits in most non-oil producing less developed countries. Most countries therefore resorted to external borrowing to

cushion themselves over the problems caused by the international crisis to their balance of payments.

In the1960s, the future of most African countries looked bright. Maddison (1995), estimates of per capita GDP for a sample of countries during the first half of the century showed that Africa grew considerably more rapid than Asia. In 1960s Africa was increasingly free of colonialism, with the potential for government that would be more responsive to domestic needs. However, during the 1970s both political and economic matters in Africa deteriorated. The leadership of many African nations hardened into autocracy and dictatorship leading to a decline in economic growth. As the Africa's economies experienced a growth collapse, nations of the South Asia modestly improved their economic performance.

In 1980s aggregate per capital GDP in Sub Saharan Africa declined at almost one percent per annum. The declines were widespread and today Sub-Saharan Africa is the lowest income region in the world (Iyoha, 1994). The poor socio-economic performance of Sub-Saharan Africa is mostly attributed to domestic and external factors (IMF, 2012). According to Collier and Gunning (1999), domestic policy factors such as weak macro-economic policy have contributed to slow growth of sub-Saharan economies. Weak macro-economic policy formulation has led to inflation, unemployment, rising fiscal deficit and capital flight. The domestic macroeconomic policy problems have been exacerbated by structural weakness in the economies such as narrow and limited use of technology and heavy dependency on the export of primary commodities. Slow economic growth in sub-Saharan African can also thought to have been escalated by external factors. Exchange rate and trade policies are some of the primary cause of slow growth

in sub-Saharan Africa. Nevertheless, tariffs and quantitative restrictions have been higher in most sub-Saharan countries (IMF, 2012). The hostile international economic environment has caused a fall in primary commodity prices, declining terms of trade and interest rates, less capital flow leading to current account deficit and balance of payment deficit thus increasing public debt.

With the rising public debt and poor economic performance of the domestic economies, the debt of most SSA countries has increased tremendously and the burden has become enormous. Relative to exports and overall economic activity (measured by GNI) SSA has substantial high levels of debt (Klein, 1987). By the 1990s several SSA economies had accumulated unsustainable external debts largely from public agencies. This has presently made the burden of increasing debt in developing economies to be one of the major challenges today (Collier and Gunning, 1999).

In 1980s, sub-Saharan Africa (SSA) per capita income (measured by GNP per person) declined at an annual average rate of 2.2% while per capita private consumption went down by 14.8%. During the same period, the volumes of export were 4.3% while terms of trade fell by 9.1%. Between 1981 and 1990 the GDP growth of SSA was 1.7% in average. The decline in growth rate of Sub-Saharan Africa to negative -0.9% is a sharp contrast with East Asia's real per capita GDP growth rate of 6.3% and China's impressive growth rate of 8.2% during the same period (IMF, 2012). With the build-up of external debt and poor economic performance of SSA economies, the debt problem has rose to significant levels and the burden has become even worse (Klain, 1994).

According to statistics compiled by IMF (2013), Kenya is the second indebted country with 53% after Burundi which has 72.3%. Tanzania is ranked third while Uganda is fourth with 34% and 27% respectively. Rwanda has the lowest public debt among the five countries with 22%. Similarly Kenya is ranked second with 28.5% foreign debt service while Burundi is leading with 50%. From this analysis, public debt in Kenya is of concern because if the trend continues, it may lead to a serious debt crisis which in turn could dampen growth potential.

### 1.1.3 Kenya's debt situation

Since independence, Kenya has undertaken public development projects to improve the welfare of citizens and promote economic growth. To finance these projects the country has relied heavily on external debts, grants and foreign aid. Debt has mainly been used in Kenya to create and improve industrial and agricultural base as well as infrastructure development. It is assumed that when these conditions are improved, the economy will grow thus leading to increased exports, which is henceforth expected to yield more foreign exchange that can henceforth be used to finance such debts (Were, 2001).

Although poor governance and corruption have been blamed for economic problems, debt has equally distorted the economy and complicated macroeconomic management causing poor social and economic status for Kenya citizens (Government of Kenya, 2007). The debt problem has been exacerbated by increasing fiscal and balance of payment deficits, slow export growth, over-reliance on primary export; overvalued exchange rates and negative real interest rate have also contributed to a rise in public debt which is estimated to be 53% of GDP (Government of Kenya, 2012).

**Table 1.1: Trend in Kenya's External debt stocks, debt service and GPD**

| Year | Ext. Debt% of GDP | Debt service %GDP | GDP growth (annual %) |
|---|---|---|---|
| 1980 | 48.1 | 6.1 | 5.6 |
| 1981 | 48.6 | 7.3 | 3.8 |
| 1982 | 54.5 | 8.0 | 1.5 |
| 1983 | 62.7 | 8.9 | 1.3 |
| 1984 | 58.6 | 9.6 | 1.8 |
| 1985 | 70.6 | 10.5 | 4.3 |
| 1986 | 65.8 | 9.7 | 7.2 |
| 1987 | 75.2 | 8.9 | 5.9 |
| 1988 | 72.3 | 9.2 | 6.2 |
| 1989 | 73.4 | 8.8 | 4.7 |
| 1990 | 85.8 | 9.6 | 4.2 |
| 1991 | 95.8 | 9.2 | 1.4 |
| 1992 | 87.7 | 8.5 | -0.8 |
| 1993 | 131.9 | 11.7 | 0.6 |
| 1994 | 105.0 | 12.9 | 2.6 |
| 1995 | 83.8 | 10.4 | 4.4 |
| 1996 | 57.6 | 7.1 | 4.1 |
| 1997 | 49.9 | 5.1 | 0.5 |
| 1998 | 48.9 | 4.7 | 3.3 |
| 1999 | 51.3 | 5.5 | 2.3 |
| 2000 | 49.3 | 4.7 | 0.6 |
| 2001 | 43.4 | 3.8 | 3.8 |
| 2002 | 47.4 | 4.1 | 0.5 |
| 2003 | 47.0 | 3.9 | 2.9 |
| 2004 | 47.3 | 2.2 | 5.1 |
| 2005 | 34.6 | 2.9 | 5.9 |
| 2006 | 29.8 | 1.9 | 6.3 |
| 2007 | 27.8 | 1.7 | 7.0 |
| 2008 | 25.0 | 1.4 | 1.5 |
| 2009 | 28.1 | 1.3 | 2.7 |
| 2010 | 27.5 | 1.3 | 5.6 |
| 2011 | 30.4 | 1.3 | 4.4 |
| | | | |

*Source: World Bank database, 2012*

Table 1.1 shows that debt and debt service both as a percentage of GDP have been on higher side beginning 1980s. However, from 2000 there is a decline in both debt levels and debt service respectively. This indicates that external debt problem has been as issue of concern since 1980s. The GDP growth has been fluctuating between 5% and 7% with some years recording less than 1% growth rate. Similarly the significance rise in debt burden between 1985 and 1995 coincides with a decline in GDP growth rates.

The highest debt ratio was experienced in 1993 while lowest ratio was in 2008 which recorded 131.9% and 25% respectively. The GDP growth rates plunged into low level of 0.6% and 1.5% in 1993 and 2008 respectively. On the contrary, despite low performance in GDP growth rate, debt service remained relatively high all through. Debt service remained above 5% between 1980s and 1999. However, beginning 2000 debt service began to decline while GDP growth rate rose from as low as 0.6% in 2000 to reach 7% in 2007.

**Table 1.2: 1External Debt Service on Central Government Debt by Creditor, Ksh Million**

| **Payments** | **Multilateral** | | **Bilateral** | | **Commercial** | | **Total** | |
|---|---|---|---|---|---|---|---|---|
| | **June 2010** | **June 2011** | **June 2010** | **June 2011** | **June 2010** | **June 2011** | **June 2010** | **June 2011** |
| Principal | 8,976 | 10,062 | 8,397 | 10,958 | - | - | 17,373 | 21,020 |
| Interest | 2,672 | 3,189 | 3,386 | 3,846 | - | - | 6,238 | 7,035 |
| **Total** | **11,648** | **13,251** | **11,783** | **14,804** | **-** | **-** | **23,611** | **28,055** |

*Source: Government of Kenya, 2012*

Total external debt service on Central Government debt increased from Ksh 23,611 million in June 2010 to Ksh 28,055 million in June 2011 as shown in Table 1.2. Principal repayments

increased from Ksh 17,373 million in June 2010 to Ksh 21,020 million in June 2011 while interest payments increased from Ksh 6,238 million to Ksh 7,035 million during the period.

High levels of government debt may be harmful to growth of an economy hence debt management is very essential. The best practices on how to manage government debt are outlined by the IMF and the World Bank guidelines (2003). The IMF advocates indebted countries to have a strategy for managing debts in order to achieve its risk and cost objectives. This entails developing and maintaining an efficient debt management policies and strategies from the time of debt contraction to payments supported by effective coordination and institutional capacity

**Table 1.3: Sensitivity Analysis for Key Indicators of Public Debt as at 2011.**

| | Bench mark | 2011 |
|---|---|---|
| NPV as a % of GDP | 40 | 39 |
| Revenue | 250 | 154 |
| Debt service as % of revenue | 30 | 22 |

*Source: Government of Kenya, 2012*

Table 1.3 presents the sensitivity analysis for key indicators of public debt as at 2011. Sensitivity measures refer to simulation technique to estimate the cost and risk of a sovereign liability portfolio. The sensitivity analysis technique is incorporated in the Medium Term Debt Strategy (MTDS), and it is used to assess the government borrowing policy by evaluating the cost and risk characteristics of both the existing public debt portfolio and alterative borrowing mix. The MTDS also outlines strategies and initiatives on how to develop a vibrant domestic debt market as well as bring the debt-GDP ratio below 45%.

In 2011, Kenya conducted a debt sustainability analysis under the joint World Bank-IMF Debt Sustainability Framework (DSF). The result indicated debt sustainability indicators have significantly deteriorated which projected high levels of debt accumulation over the medium term (Government of Kenya, 2012). Kenya's debt indicator has surpassed the bench mark and it is estimated at 53% of GDP according to 2012 economic survey report released by Kenya National Bureau of Statistics.

### 1.2 Statement of the problem

Kenya being a developing country compliments its revenue through exports of primary commodities. Therefore, crisis in the international prices for primary commodities posits great danger for our domestic economy. In attempt to add to available domestic resources, successive governments have acquired huge sums of external debt to finance different national development plans. Basically external debt and debt servicing payments may have negative effect on economic growth. If the essence of debt acquisition is to finance development projects, then it becomes worrisome why external debts would cause a reduction on economic growth.

For the last three decades Kenya has not been able to collect enough revenue to finance the budget and the government has relied heavily on external and domestic borrowing to finance budget deficits. The rate at which debt has increased in Kenya is important from the perspective of its economic impact. According to economic survey (2012), Kenya's public debt stood at 51% of GDP in June 2010 and at 53% of GDP in June 2011. Economic growth grew by 5.6% and 4.4% in 2010 and 2011 respectively. During the same period total exports of goods and services was 27.8% in 2010 and 29.1% of GDP. The present situation run contrary to economic

theory on the debt-growth dynamics which posits that due to deficit of capital in developing countries, a certain level of external leverage should enhance economic growth through capital accumulation and productivity growth. This is because at early stages of development countries are open to investment opportunities with high return on capital which is however dependent on the stability of the country. It is in this vein that it has become justifiable to carry out an investigation into the effect of external public debt on economic growth in Kenya.

Against this backdrop, this study seeks to address the following questions,

(i) Does external debt have any significance effect on economic growth in Kenya?

(ii) Is there a significant effect of external debt service on economic growth in Kenya?

(iii) Does the relationship between external debt and economic growth have any policy relevance?

### 1.3 Objectives of the Study

The broad objective of this study is to investigate the effect of external public debt on economic growth in Kenya.

Specific objectives;

The specific objectives of this study are in three folds, namely, to;

(i) Evaluate the effect of external public debt on economic growth in Kenya

(ii) Establish whether debt servicing payments has any significant effect on economic growth

(iii) Draw policy implications based on the findings

## 1.4 Significance of the study

The study is premised on the understanding that Kenya, like other developing countries is suffering from debt burden problem. According to Government of Kenya publications (2012), Kenya's public debt is estimated at 53% of GDP with 30% share being external debt. During the same period the economy had a GDP growth of 4.4%. Beginning the year 1990s many developing countries claimed about the debt burden problem and the international development agency (IDA) agreed to cancel their debts through Heavily Indebted Poor Countries (HIPC) programme. However, Kenya did not receive any debt relief (Mc Groarty et al, 2009). This study constructs a framework for rationalization of the impact of external debt on economic growth and it is useful for further research. The main objective of this study is to examine the effect of external public debt on economic growth of Kenya. Particularly, the question of interest is whether there is any significance effect of external debt and debt servicing payments on economic growth. In doing so the study uses augmented Solow growth linear model which has the GDP growth rate as a function of external debt among other factors to analyze time series Kenyan data over the period of thirty two years beginning 1980 to 2011.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

This chapter outlines literature review on public debt. Both theoretical and empirical literature will be discussed and at the end of the chapter an overview of literature will be given.

## 2.1Theoretical literature review

Over the years, the theory of economic growth has evolved from simplest models to complex modeling economic techniques. Many countries regardless of their social and political systems have pursued economic growth by applying different strategies that are suitable to their economic conditions. The neoclassical growth theory which has its origin from the Harrod-Domar model explains the relationship between investment, growth rate and employment in an economy. According to this theory, production capacity is proportional to capital stock.

Solow (1956) in his contribution to economic growth focused on the process of capital formation and assumed that production was a function of capital, labor and technology. He argued that if there were capital constraints growth, then capital can be substituted for labor. In this case, long run growth is determined by technological change and not by savings or investment. Saving only affects temporal growth or when the economy is moving to the long-term path. This is because the economy will experience diminishing returns as the ratio of capital per work increases. In his analysis, the long-term economic growth is possible through labor augmenting technological change and increase of capital per worker.

According to endogenous growth theory, the long run growth emanates from economic activities that create new technological knowledge. The economic growth rate is determined by the forces that are internal to the economic system especially those forces that govern the opportunities and incentives for creating technological know-how. The long run growth rate is measured by the growth rate of output per worker and it depends on the growth rate of total factor productivity. In the long run, the rate of economic growth is influenced by economic factors in the form of innovations of new products, processes and markets which results from economic activities.

Romer (1986) by adopting Arrow's (1962) learning-by doing framework argued that knowledge generation may be positively related to the scale of economic activity which is assumed to be proportional to capital accumulation. Romer points that for sustained economic growth to be realized there must be at least constant returns to productive factors. He shows that stable economic growth rate can be attained without much reliance on technological change because of increase in capital accumulation in the private economy due to external effects.

Debt and growth are closely linked. The theoretical literature between the two macroeconomic variables tends to predict a negative relationship. Growth models augmented with public agents issuing debt to finance consumption or capital goods tend to point a negative relationship between huge external debt and economic growth (Kuria, 2003). The most widely used theories that link debt and growth are the debt 'overhang' hypothesis and the liquidity constraint hypothesis.

The debt overhang theory is based on the premise that if the total amount of debt exceeds the country's repayment ability in the future, then the expected debt service of that country will be an increasing function of its output level. This implies that part of the returns gained from investing in the domestic market is taken by the foreign creditors thus discouraging domestic investments (claessens et al. 1996). In such a situation the indebted country is left with a small proportion of any increases in output and exports because part of the proceeds is used to service external debt.

The theory postulates that reducing debt obligation lead to a rise in investment and repayment capacity. When this happens, the outstanding debt is more likely to be repaid therefore reducing chances of debt default. Similarly when the effect is strong, the indebted country is said to be on the wrong side of the debt Laffer curve. Here debt Laffer describes the relationship between the level of debt and the country's repayment ability which implies that there is a maximum at which accumulation of debt promotes growth (Elbadawi *et al*. 1996). Therefore the debt overhang hypothesis predicts that if there is likelihood that in future, debt will be larger than the country's repayment ability, then the cost of servicing the debt will depress further domestic and foreign investment (Krugman, 1988, Sachs, 1990, Karafat, 2002).

The liquidity constraint hypothesis is related to 'crowding out effect' whereby debt repayment consume substantial amount of domestic resources thus reducing funds available for domestic investment and growth. A reduction in the current debt service should therefore correspond to an increase in current investment for any additional future indebtedness. If large proportion of gains from foreign capital is used in servicing external debt, very little would be available for

investment and growth. The cost of servicing the debt crowds out public investment expenditures by reducing total investment directly and complementary private expenditures indirectly (Cohen, 1993)

The conventional view of debt in the short run is that output is demand determined and high levels of public debt have positive effects on disposable income, aggregate demand and overall output. This positive effect in the short run is likely to be large when the output is far from the full capacity (Mankiw, 1999). However, things change in the long run especially if the Ricardian equivalence does not hold, the decrease in public savings due to increasing budget deficit will not be fully compensated by an increase in private savings. This will lead to a decline in national savings causing a decrease in total investment. Lower investment levels will have a negative effect on GDP because lower investment means smaller capital stock, higher interest rate low labor productivity and wages (Elmendorf and Mankiw (1999).

Sachs (1990) argued that moderate levels of public debt may promote economic growth. However, as we move to high levels of public debt, the increases of the expected tax will lead to a decline of the positive effects of public spending. This in turn will translate to decreased consumption levels and investment thus leading to lower growth rates and employment. In economic literature there is also a consensus that at lower levels of economic growth less revenue is generated and there is tendency of increases in public expenditure which leads to further increase of public debt.

Krugman (1988) defined the "debt overhang" as a situation in which a country's expected payment ability of external debt falls below the contractual value of debt. Cohens (1993) argues that there exists a non-linear impact of foreign debt on investment as suggested by Clements *et al.* (2003). Accumulation of large stocks of foreign debt can promote investment up to a certain point after which the debt overhang will show up and exert pressure on investor's willingness to provide capital. The external debt "overhang" affects economic growth through private investment because both internal and external investors are discouraged from supplying additional capital.

Diamond (1965) in his theoretical contribution on the effect of taxes on the capital stock differentiated between foreign debt and domestic debt. Diamond argued that since taxes are required to finance payment of interests accrued from debts, both foreign and domestic debt tends to reduce future consumption as well as their savings thus causing a decline in capital stock. He further concludes that domestic debt can lead to further reduction in capital stock due to substitution of government debt for physical capital in individual portfolios.

Ramey and Ramey (1995) noted that large stock of public debt pose great constraints on the ability of a country to conduct counter cyclical policies thereby increasing output volatility and a reduction in economic growth. However the relationship between public debt and the country's ability to conduct counter cyclical policies is more likely to depend on composition of public debt than on the level of public debt. This gives an indication that countries with different debt composition and different monetary arrangements are likely to begin having problem at different levels of debt.

Modigliani (1961) stated that the national debt is a burden for the next generations, which come in the form of a reduced flow of income from a small stock of private capital. Apart from its effect of "crowding out" private investments, public debt also impacts negatively on long term interest rates. Modigliani noted that increase in national debt will not be costless for future generations despite being of great benefit to the current generations. In his analysis he noted that the total national debt may be offset in part or in total when the debt is used to finance government expenditure that contributes to increased real income of future generations by investing in productive public capital formation.

Meade (1958) observed long-term interest rates form one of the channels in which accumulation of huge public debt can affect growth. Higher long-term interest rates, as a result of increases in debt-financed government budget deficits can lead to crowding out of private investment thus diminishing potential output growth. Consequently, if higher public financing needs push up external debt yields, this may cause an increased net flow of funds from the private sector into the public sector which in turn lead to an increase in private interest rates and a decrease in private spending growth, both by households and firms (Elmendorf and Mankiw, 1999).

## 2.2 Empirical literature review

Kumar and Woo (2010) examined a panel of advanced and developing economies for the period 1970-2007 by regressing per capita GDP growth against lagged values of the debt –GDP ratio to address the causality issue. Their result showed that there is an inverse relationship between initial debt and the subsequent growth. They argued that an increase in 10% in the initial debt – GDP ratio leads to a decrease in annual real per capital GDP growth of 0.2% points per year.

Degefe (1992) examined the relationship between debt and growth of Ethiopia using a simple macro model derived from Taylor (1985) adjusted to capture the conditions of Ethiopian economy. The results indicated that public debt had a positive impact on economic growth in the Short run and thereafter it had a negative impact. He noted that it is not the debt which has negative impact but rather how debts were used that made the difference.

Focusing on Heavily Indebted Poor Countries (HIPC), Were (2001) analyzed the debt overhang problem in Kenya and tried to find evidence for its impact on economic growth. Using time series data from 1970-1995, this study did not find any adverse impact of debt servicing on economic growth; however, it confirmed some crowding-out effects on private investment. Furthermore, employing data from 59 developing and 24 industrial countries over a period of 1970-2002, Schclarek (2004) found no evidence that external debt may affect total factor productivity. However, he found that in case of developing countries higher growth rate is associated with a relatively lower external debt levels and this negative relationship is mainly driven by public external debt rather than private external debt.

Using a time series data for the period 1970-2007, Polly (2009) investigated the impact of public debt on public investment and economic growth in Kenya. He used a reduced form growth model augmented with debt variables. The findings indicated that the key debt indicators had been above critical levels since 1982. The empirical results also showed that debt service ratio was significant at explaining the GDP growth in Kenya. Public investment had a negative relationship with the stock of external debt expressed as a percentage of GDP and debt service ratio.

Chandra *et al*. (2009) studied the relation of real GDP growth, trade openness labor force and external debt for the period 1955-2005 for Sri Lanka using cointegration method. The result revealed that all the variables had positive effect on the real GDP growth. Cunningham (1993) examined the relationship between growth and debt in sixteen heavily indebted developing countries for the period 1971-1987 using a two-stage least square method. He found a strong negative relationship between growth and debt burden.

Iyoha (1999) investigated the debt overhang hypothesis and economic growth in Sub-Saharan African countries using a simultaneous equation model to make explicit allowance for interaction between debt and economic growth. The result showed significant debt overhang effects as well as the crowding out effects. He demonstrated that large stocks of public debt and heavy debt payment obligation had detrimental negative effects on private investment in Sub-Saharan Africa. Moreover the result confirmed huge stock of public debt reduces investment thus lowering the rate of economic growth.

Ali and Mustafa (2010) analyzed long run and short impacts of public debt on economic growth in Pakistan for the period 1970-2010. They used extended production function by measuring Gross National Product as a function of annual education expenditure (proxy of human capital), capital labor force and external debt as a percentage of GNP. They used cointegration analysis to capture the long run effects of debt on GDP. Their result indicated that external debt has a significant effect in both long run and short run while labor force negatively affects GNP in both short and long run. They also found that human capital and increases in capital formation have

positive impact on GNP in the long run and short run but the positive impact of capital is greater than that of human capital.

Ullah (2011) examined the impact of foreign aid on economic growth in Pakistan for the time period of 1972-2011 using cointegration technique. By applying Trace and Eigen statistics, the results showed that there is long run relationship between aid and economic growth. Similarly, Feeney (2010) investigated the impact of foreign aid on economic growth in New Guinea using a time series data for the period 1965 to 1999. He estimated the empirical model using the Autoregressive Distributed Lag (ARDL) approach and cointegration technique. The result showed that foreign aid had significant positive impact on economic growth.

Kamau (2001) analyzed debt servicing and economic growth in Kenya using a time series data for the period 1970-2000. The study employed a single equation model with real GDP growth rate as a function of debt servicing among other factors and simultaneous equation model consisting of several structural equations. The results from both models indicated that there is indeed a negative relationship between debt servicing and economic growth rate.

Shah and pervin (2010) by using Ordinary Least Squares (OLS) method investigated both long run and short run effects of external public debt on economic growth of Bangladesh for period 1974-2010. Their results indicated that in the long run, external debt service has a negative effect on GDP while in the short run external debt has impacts GDP positively. Their investigation also did not find evidence of debt overhang so long as there is no significant adverse effect of debt stock on GDP growth. However, they found evidence of crowding out

effect arising from the adverse effect of debt service to creditors because accumulation of debt stock led to more debt service payment.

Sajid (2004) examined the relationship between domestic savings and output in Pakistan using time series data for the period 1973 to 2003. The study used co-integration and vector error correction techniques to explore the relationship between savings and economic growth. The result suggested a bi-directional long run relationship between savings and output level. However, the results showed existence of unidirectional long run causality from public savings to output and private savings to Gross National Product (GNP). There was also evidence that the speed of adjustment in savings is stronger than that of level of output. The overall results revealed that savings contributed to higher investment and hence higher economic growth.

Babatunde and adefabi (2005) investigated the long run relationship between education and economic growth in Nigeria between 1970 and 2003 through the application of Johansen cointegration technique and Vector Error Correction methodology. The study examined two different channels through which human capital can affect long run economic growth in Nigeria. The first channel is when human capital is a direct input in the production function and the second channel is when human capital affects the technology parameter. The result indicated a positive long run relationship between education and economic growth. Their conclusion was that a well educated labour force has a significant positive influence on economic growth both as a factor in the production function and through total factor productivity.

Mwau (1984) examined the relationship between growth and inflow of foreign capital in Kenya. His analysis focused on the effects that foreign capital has on investment, foreign trade and balance of payment, money supply and economic growth. The finding showed that the proportion of gross capita formation that comes from FDI was very low in Kenya and that could possibly explain the reason as to why the extent of influence on economic growth is not very strong. However, the result indicated that capital formation was the major driver of economic growth while private capital inflows had a positive effect on the balance of payment.

Borenzstein et al. (1995) tested the effect of foreign direct investment on economic growth in a cross county regression framework using data on foreign direct flows for twenty developing countries from 1990 to 2010. Their results indicated that foreign direct investment is an important vehicle for technological improvement thus contributing relatively more to growth than domestic investment. The results also showed that FDI increases total investment in the economy and thus promoting economic growth. Similarly, Agbo (2008) examined the impact of foreign direct investment on economic growth in Nigeria for the period 1986-2007 using multiple regression models. The study used a time series data to investigate the inflow of FDI to the Nigerian economy and its implication on the economic growth. The result indicated that FDI has positive impact on the economy though its contribution to the GDP was very small within the period under review.

Cohen (1993) argues that servicing of high debt levels might cause greater obstacle on growth, and investment. Debt servicing soaks up a significant amount of the scanty government revenues thus reducing the available resources to finance public investment in infrastructure. The private

sector could also suffer financial challenges because countries that have large stock of domestic debt and undeveloped financial markets, then realizing of credit might lead to reduced savings. The negative impact of debt servicing on economic growth is due to the reduction of government expenditure resulting from debt induced liquidity constraints.

Reinhart and Rogoff (2010) examined the effect of public debt on economic growth for forty four developed and developing countries over the last hundred years. They concluded that high levels of public debt in relation to GDP of over 90% is accompanied by a lower levels of economic growth in both developed and developing countries. Consequently, in the case of developing countries external debt levels of over 60% of GDP negatively affects economic growth.

Bawa and Abdullahi (2010) examined the threshold effect of inflation on economic growth in Nigeria using a time series data for the period 1981-2009. The study used a threshold regression model developed by Khan and Senhadja (2001) and estimated a threshold inflation level of 13 percent for Nigeria. When the inflation was below the estimated threshold, it had mild effect on economic activities while above the threshold; inflation had detrimental negative effect on growth. The study also revealed that the negative and significant relationship between inflation and economic growth for inflation rates below and above threshold is robust with respect to changes in econometric methodology, additional explanatory variables and changes in data frequency.

## 2.3 Overview of literature

As a summary of the literature review the link between economic growth and public debt has not been explicitly given. Most of the literature reviews have predicted that huge debt stock has a negative effect on growth (Kumar and woo, 2010), (Iyoya, 1999), (Reinhart and Rogoff, 2010) while some findings indicate that debt has positive effects on growth (Degefe, 1992), Chandra *et a*l., 2009) Debt affects economic growth mostly through debt overhang and crowding out among effect. An increase in physical capital accumulation is seen to have positive effect on economic growth (Ali and Mustafa, 2010) as well as foreign aid (Ullah, 2011).

Foreign direct investment play an important role in promoting economic growth through increase in productivity level as indicated by Borenzstein *et al(1995)* and Agbo (2008) while a well educated labor force has a positive impact on growth both as a factor in production and through total factor productivity. Government financed budget deficits lead to an increase in the debt stock, increase in debt service obligations and increased uncertainty thereby discouraging private investment.

It can be noted from the above discussion that the effect of debt on economic growth has been looked into by various researchers for various countries but the issue of public external debt on economic growth has not resolved. There is no attempt which has been made to investigate the effect of external public debt on economic growth in Kenya. Some of the studies *inter alia* Kumar and Woo (2010), Polly (2009), Reinhart and Rogoff (2010) have analyzed the issue. Their findings were that debt in general had long been regarded to have negative relationship with economic growth; while the empirical result of Degefe (1999) showed positive relationship

between debt and economic growth. However, these studies investigated public debt in general and its impact on economic growth but did not specifically address the effect of external debt on economic growth in Kenya. In this paper we have made an attempt to investigate the effect of external public debt on economic growth using a linear model which has GDP growth rate as a function of external debt. The study will also use the other studies reviewed for the purpose of comparing the regression results for policy recommendations.

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This chapter provides the theoretical and methodological framework used to estimate the variables in attempt to meet the set objectives. It sets out the empirical models used and various tests conducted to ascertain the validity of the data and model robustness as well as stationarity.

## 3.1 Theoretical Framework

This study focuses on the effect of external public debt on economic growth in Kenya and employs a standard production function model. Cunningham (1993) used the model to investigate the relationship between economic growth and debt burden in heavily indebted countries for the period 1971 to 1986. Recent studies have focused on the export and economic growth with the framework of export-growth model on various aspects of the relationship between export and economic growth.

The model is specified as follows:

$$Y = (K, L, EDT) \quad \ldots\ldots (I)$$

Where Y, K, L and EDT are measures of GDP, capital stock, labor force and external debt respectively.

Cunningham (1993) argued that the external debt burden can be included in the production function due to its effects on the productivity of labor and capital in the same way as the

inclusion of exports in the production function. In as much as a country has significant debt burden, this will affect how labor and capital will be employed in the production function. It follows that if the gains accrued from increased productivity goes to foreign creditors and not domestic agents, then the motivation to increase the productivity of capital or labor is very minimal. The implication is that an increase in debt burden will decrease economic growth.

To investigate effect of external debt on GDP, foreign direct investment is included as a new variable in the production function since FDI play a key role in creating direct, stable and long-lasting links between economies by encouraging technological transfer and know-how. Inclusion of FDI to our model raises the output effects of changes in the resources devoted to capital accumulation. As we add FDI as a new variable, our model becomes:

$Y = (K, L, FDI, EDT)$…… (II)

Where Y, K, L, FDI, EDT are measures of GDP, capital stock, labor force, foreign direct investment and external debt respectively.

When a country has significant debt burden, the manner in which labor and capital will be exploited in the production process is likely to be influenced by the need to service that debt. In other words, if the gains accrued from productivity increases benefit foreign creditors more than domestic agents, the latter are discouraged from increasing capital or labor. For this reason we include external debt service as a separate input in the production function. Thus the model will be as follows:

Y= (*K, L, FDI, EDS, EDT*)……... (III)

Where Y, K, L, FDI, EDS, EDT are measures of GDP, capital stock, labor force, foreign direct investment, external debt service and external debt respectively.

Since economic growth is affected by other various factors, we include domestic savings, inflation in the model. Following Cunningham (1993), it is possible to treat external debt and external debt services as separate inputs in the neoclassical production function among other control variables. Therefore, model is stated as: GDP per capita is a function of labor force, physical capital, foreign direct investment, domestic savings, inflation, external debt and external debt service. Mathematically it is expressed as follows:

*Y=f (L, K, FDI, DS, INF, EDT, EDS*)……..... (IV)

**3.2 Model specification**

An assumption is made of linear relationship between public debt and growth. In this case the estimated model is specified as follows:

$$Y_t = \beta_0 + \beta_1 L_t + \beta_2 K_t + \beta_3 FDI_t + \beta_4 DS_t + \beta_5 INF_t + \beta_6 EDT_t + \beta_7 EDS_t + \varepsilon_t \text{ ……..} \quad \text{(V)}$$

Where,

$Y_t$ - GDP growth rate

$L_t$ - Labor force measured as a % of total population

$K_t$ - Physical capital measured as gross fixed capital formation as percentage of GDP

$FDI_t$ - Foreign direct investment measured as percentage of GDP

$DS_t$ - Domestic savings measured as percentage of GDP

$INF_t$ - Consumer price index measured as annual percentage

$EDT_t$ - External debt measured as percentage of export of goods, services and primary income

$EDS_t$ - External debt service measured as percentage of export of goods, services and primary income

$\varepsilon_t$ - Stochastic error term

$\beta_0$ - Constant term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, and \beta_7$ are partial coefficients of GDP per capita growth with respect to $L_t, K_t, FDI_t, DS_t, INF_t, EDT_t, EDS_t$ respectively.

Control variables are labor force, domestic savings, physical capital formation, foreign direct investment and inflation. Debt indicators are ratio of external debt to GDP and ratio of external debt service to exports.

**Table 3.1: Summary of the explanatory variables and their expected signs**

| **Explanatory Variable** | **Expected Sign** |
|---|---|
| Labor force | +ve |
| Capital formation(capital stock) | +ve |
| Foreign Direct Investment | +ve |
| Domestic savings | +ve |
| Inflation | -ve |
| External debt | -ve |
| External debt service | -ve |

### 3.3 Estimation procedures

This study applies Ordinary Least Squares (OLS)) method to analyze the data and the results. Since the data used is time series, estimation on non-stationary variables may produce spurious results with high $R^2$ and t-statistics. This study uses Dickey Fuller (DF) and Augmented Dicky-Fuller (ADF) to test stationarity of the time series data. ADF will be used as an alternative to DF incase the there is autocorrelation in the error terms which may give unbiased estimates and cannot be analyzed by DF test which assumes that the data generated is an AR(1) under the null hypothesis.

#### 3.3.1 Stationarity test

The test is to identify stationarity of the variables used. Non-stationarity has always been regarded as a problem in the empirical analysis of time series data. Working with none-stationary variables leads to spurious regression results from which subsequent influence will be meaningless. A series is said to be stationary if the moments of the series (mean, mode and kurtosis) is independent of time. Therefore, it is important to test whether the data used is stationary before carrying out any analysis. Stationarity of time series data can be determined by

either graphical method or unit root test. This study used unit root test method using Augmented Dickey Fuller (ADF) test. The ADF took care of the intercept and the possibility of the presence of residuals which were correlated.

### 3.3.2 Multicollinearity test

This test is done to determine whether there exists any relationship between the explanatory variables. This study used the correlation matrix to test for the implied relationship between the independent variables. In our case multicollinearity will be severe if the correlation coefficient is greater than 0.8.

### 3.3.3 Heteroskedasticity test

This is a test for the variance of the error terms to determine whether the error term of the parameters is homogeneous. Estimating heterogeneous time series data would lead to biased standard errors and therefore inference will be adversely affected. This study used the Breusch-Pagan test for Heteroskedasticity in which the null hypothesis is that of constant variance. Accepting the null hypothesis would imply there is no heteroskedasticity in the data while rejecting the null hypothesis in favor of the alternative would mean that the data is heterogeneous meaning it does not have constant variance.

### 3.3.4 Correlation test

This is a test for serial correlation. This study used Ljung-Box Q to test for serial correction of the residuals. The null hypothesis of the Ljung-Box Q test is that there is no serial correlation. If the null hypothesis is rejected this would mean that the variable is stationary while accepting the null hypothesis would mean that the variable has unit root hence non-stationary.

### 3.3.5 Auto Regressive Conditional Heteroskedasticity test (ARCH test)

This is a lagrange multiplier test for auto regressive conditional heteroskedasticity (ARCH) in the residuals. This study used the LM test for auto regressive conditional heteroskedasticity. The null hypothesis under this test is that there is no ARCH in the residuals.

### 3.3.6 Model specification test

This test was carried out to ascertain whether there were omitted variables. This study used Ramsey RESET test to test for model misspecification. The null hypothesis for this test was that that there were no omitted variables. Accepting the null hypothesis implies there are no omitted variables hence the model is correctly specified.

### 3.3.7 Normality test

This test is done to ascertain whether the error term is normally distributed. A histogram normality test was done and showed a bell-shape while the Jarque bera chi square statistics of 0.347 with a P value 0.84 was significant implying that we do not reject the null hypothesis of normal distribution. This means that the residuals are normally distributed.

## 3.4 Data collection and problems

This study has made use of time series secondary data in the analysis for the period of thirty two years. The data was obtained from World Bank data base, Government of Kenya publications, International Financial statistics, internet just to mention a few. The measurement of external debt was faced with some practical problems. Time series data from Kenyan sources were not consistent. Similarly, publications from the World Bank and IMF were also not consistent. This study reconciled the data in use and tried as much as possible to use the most consistent and correct data to conduct the analysis.

# CHAPTER FOUR

# EMPIRICAL RESULTS AND DISCUSSION

## 4.0 Introduction

This Chapter presents the findings of the analysis using both descriptive and inferential statistics. Descriptive statistics are provided in the first section of this section while inferential statistics takes the form of the Ordinary Least Squares (OLS) regression. Before actual regression is conducted, the quality of the data is ascertained by use of various diagnostic tests which were initially discussed in the previous chapter. The chapter concludes by giving a detailed discussion of the results in relationship to the reviewed literature.

## 4.1 Descriptive Statistics and Diagnostic Test Results

### 4.1.1 Descriptive Statistics

This section provides the descriptive analysis of the data. The means, standard deviations minimum and maximum statistics are reported in the following table 4.1

**Table 4.1 Descriptive Statistics**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| GDP Growth rate | 32 | 3.477571 | 2.179846 | -0.799494 | 7.177556 |
| LF | 32 | 69.71559 | 3.161253 | 65.3 | 75.89803 |
| CF | 32 | 18.27957 | 1.690824 | 15.3879 | 21.38559 |
| FDI | 32 | 0.5468973 | 0.6079443 | 0.0047207 | 2.676694 |
| DS | 32 | 13.30982 | 5.733174 | 4.274788 | 22.55921 |
| Ext Debt | 32 | 196.7404 | 74.09245 | 89.8498 | 337.9174 |
| Ext Debt Service | 32 | 21.45888 | 11.82048 | 4.199702 | 39.76611 |
| INF | 32 | 10.31262 | 7.651621 | 0.9332055 | 41.98877 |

*Source: owner's computation*

From the Table 4.1, the GDP growth rate for Kenya has a mean of 3.48 with a standard deviation of 2.18 over a period of 32 years. From 1980 to 2011, GDP growth rate had a maximum value of 7.2 and a lowest value of -0.8. Labor force over the same period had a mean of 69.72 with a standard deviation of 3.16. This variable had a maximum of 75.9 and a minimum of 65.3 with 32 observations. Capital formation had a mean of 18.28 with a standard deviation of 1.69. With 32 observations the variable had a maximum of 21.39 and a minimum of 15.39. Foreign Direct Investments had a mean of 0.55 with a standard deviation of 0.61. It had a maximum value of 2.68 and a minimum value of 0.005 with 32 observations. Domestic savings had a mean of 13.31 with a standard deviation of 5.73. It had 32 observations whereby the minimum value was 4.27 and the highest value was 22.56. External debt had a mean of 196.74 with a standard deviation of 74.09. Out of the 32 observations, the minimum value of the exports was 89.85 and a maximum value of 337.92. External debt service had a mean of 21.46 with a standard deviation of 11.82. Out of the 32 observations, the minimum value of external debt was 4.2 and a maximum value of 39.77. Finally, inflation had a mean of 10.31 with a standard deviation of 7.65. Out of the 32 observations, the minimum value of inflation was 0.93 and a maximum value of 41.99.

As a summary statistics of table 4.1 above, it is clearly evident that the data had thirty two observations for every variable. The mean of GDP growth rate is 3.48 while debt variable had 196.74 for external debt and 21.46 for external debt service. Their respective maximums are 7.2, 337.92 and 39.77. This implies that for the period under analysis, Kenya's average uptake of debt had been very high while at the same time the average economic growth was very minimal. Similarly average debt servicing payment for the period under investigation was also very high which gave an indication that much of the resources accrued from the dismal economic growth

had been used to service the debts. Foreign direct investment had the lowest average growth of 0.55 giving an indication that FDI inflow is wanting in Kenya to subsidize domestic investment.

### 4.1.2 Diagnostic Test Results

**Table 4.2: Correlation Matrix**

| Variable | LF | CF | FDI | DS | EXT Debt | Ext Debt Service | INF |
|---|---|---|---|---|---|---|---|
| LF | 1.0000 | | | | | | |
| CF | 0.0852 | 1.0000 | | | | | |
| FDI | -0.0708 | 0.0064 | 1.0000 | | | | |
| DS | 0.7320 | 0.2051 | -0.0011 | 1.0000 | | | |
| EXT Debt | 0.6855 | 0.0853 | -0.1862 | 0.7025 | 1.0000 | | |
| Ext Debt Service | 0.7162 | 0.1042 | -0.2212 | 0.7829 | 0.7011 | 1.0000 | |
| INF | 0.3528 | -0.1929 | 0.2625 | 0.1755 | 0.0889 | 0.1229 | 1.0000 |
| INF | 0.3528 | -0.1929 | 0.2625 | 0.1755 | 0.0889 | 0.1229 | 1.0000 |

Source: Author's computation

Table 4.2 presents the results of Multicollinearity test. We tested for Multicollinearity using the Correlation Matrix. The correlation matrix shows the relationships between explanatory variables. In our case, we tested for the implied relationship between labor force, capital formation, foreign direct investment, domestic savings, external debt, external debt service and inflation. Multicollinearity will be severe if the correlation coefficient is greater than 0.8.

The results presented shows that labor force, capital formation, foreign direct investment, domestic savings, external debt, external debt service and inflation all have a correlation coefficient of less than 0.8 amongst themselves implying that there is no severe Multicollinearity.

**Table 4.3: Unit Root Test**

| | Level | | First difference | |
|---|---|---|---|---|
| Variables | **Intercept** | **Intercept + Trend** | **Intercept** | **Intercept + Trend** |
| GDP growth | -3.26532 (0.0255) | -3.2688 (0.09026) | -3.35747 (0.01253) | -4.1941 (0.0045) |
| LF | -2.58905 (0.0952) | -3.43068 (0.04734) | -2.05098 (0.2651) | -1.87339 (0.6683) |
| CF | -1.71355 (0.4244) | -1.25491 (0.8981) | -5.27219 (5.479e-006) | -4.88054 (0.0001) |
| FDI | -6.81595 (2.628e-006) | -6.93088 (1.076e-005) | -6.87762 (7.052e-010) | -6.73446 (1.408e-008) |
| DS | -1.12324 (0.6938) | -2.69907 (0.2369) | -6.08845 (1.873e-005) | -5.99428 (0.0001) |
| INF | -3.83047 (0.006597) | -3.87852 (0.02535) | -6.40549 (1.193e-008) | -6.27587 (2.367e-007) |
| Ext debt | -1.18873 (0.6665) | -3.63743 (0.02673) | -5.8024 (3.95e-005) | -5.91428 (0.0001) |
| Ext debt ser | -0.403063 (0.8967) | -3.81637 (0.02907) | -5.79883 (3.987e-005) | -5.87513 (0.0001) |

Source: author's computation

$H_0$ There is unit root; the values in the brackets are the P values

Table 4.3 presents the results of unit root test conducted for all the variables using the Augmented Dickey Fuller (ADF) test. From the results, GDP growth rate is stationary at both level and first difference while labor force is stationary in levels but not in its first difference. Capital formation is non stationary in levels but becomes stationary after first difference while foreign direct investment is stationary in levels and also in its first difference. Domestic savings is non stationary in levels but stationary in the first difference while inflation is stationary in levels and in first difference. Finally, external debt and external debt service become stationary after performing the fist difference. Therefore, for variables that are stationary after first

difference, we run the OLS regression taking into account the unit root in order to avoid spurious results.

**Table 4.4: Breusch-Pagan test for Heteroskedasticity**

Variables: fitted values of GDP growth rate

| | | | | | |
|---|---|---|---|---|---|
| Chi2 (9) | = | 5.090557 | | Prob > chi2 | = 0.826344 |

Ho: Constant variance

The result from the Breusch-Pagan test for Heteroskedasticity as shown in table 4.4 had a Chi square of 5.09 with a P value of 0.83 implying that we do not reject the null hypothesis of constant variance. This implies that the variance of the error term is constant and that there is no Heteroskedasticity in the data.

**Table 4.5: LM test for autoregressive conditional Heteroskedasticity (ARCH)**

| lags(p) | chi2 | Df | Prob > chi2 |
|---|---|---|---|
| **1** | 0.762642 | 1 | 0.382503 |

H0: no ARCH effects H1: ARCH (p) disturbance

Further we tested for Auto-Regressive Conditional Heteroskedasticity (ARCH) using the LM test for ARCH as shown in table 4.5. The test result reports a Chi Square of 0.76 with a P value of 0.38 implying we do not reject the null hypothesis. In this test the null hypothesis is that there is no ARCH effect. This means that we do not have a problem of Auto-Regressive Conditional Heteroskedasticity.

**Table 4.6: 1Test for Autocorrelation**

Ljung-Box Q test for autocorrelation

| lags(p) | chi2 | Df | Prob > chi2 |
|---|---|---|---|
| **1** | 0.359396 | 1 | 0.0549 |

H0: no serial correlation

We tested for autocorrelation using the Ljung-Box Q. The test results are presented in table4.6 whereby the Chi Square is 0.36 with a P value of 0.0549 implying the acceptance of the alternative hypothesis of the presence of first order serial autocorrelation. This implies that there is autocorrelation since the chi-square is 0.36 is statistically significant with a p value of 0.0549. This implies that one of the OLS assumptions of no autocorrelation is violated. This problem of autocorrelation is accounted for by reporting robust standard errors in the regression results as indicated in table 4.8.

**Table 4.7: Test for Model Misspecification**

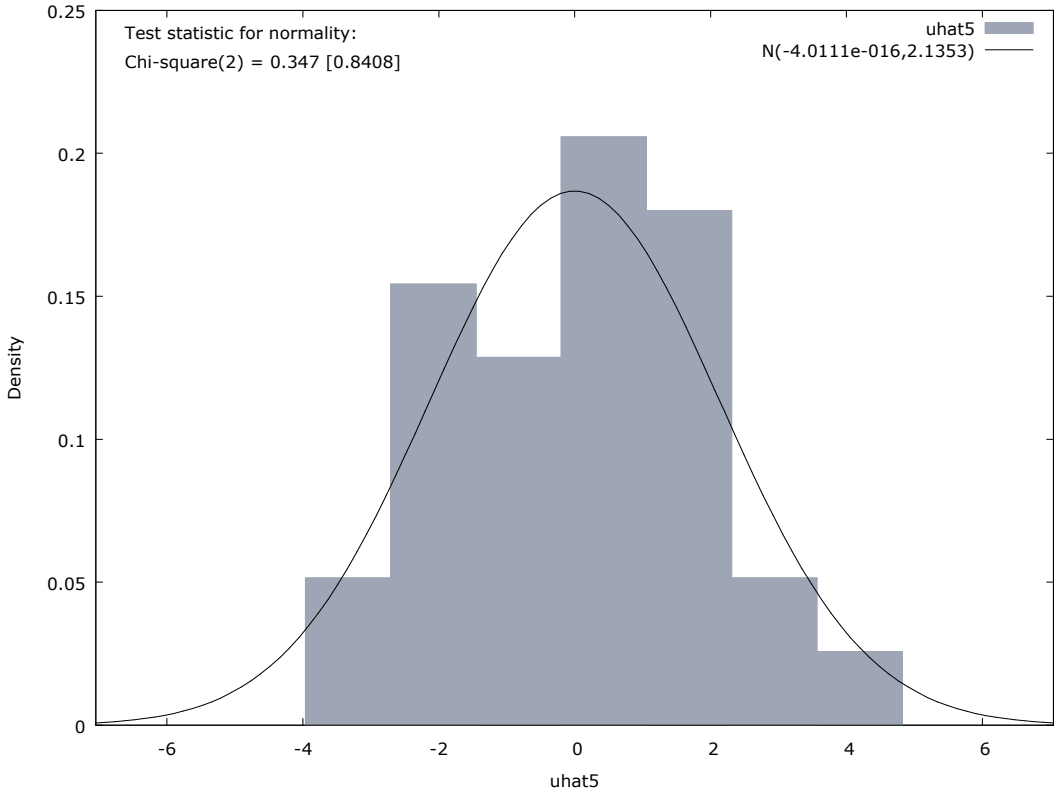
Ramsey RESET test using powers of the independent variables

| | |
|---|---|
| F(2,19) = 0.575889 | Prob > F = 0.572 |

Ho: Model has no omitted variables

Table 4.7 presents a test for model misspecification using the Ramsey RESET test. The result reports an F statistic of 0.58 with a P value of 0.572 implying that we do not reject the null hypothesis of no omitted variables hence the model is correctly specified.

**Figure 4.1: Normality Test**




Test for null hypothesis of normal distribution:

Chi-square (2) = 0.347 with p-value 0.8407

We performed a test for normality as reported in figure 4.1. The results show a Chi Square of 0.347 with a P value of 0.84 implying that we do not reject the null hypothesis of normal distribution.

### 4.2 Regression Results

Having conducted the diagnostic tests to test for violation of OLS assumptions and for stationarity we regress GDP growth rate on the labor force, first difference of capital formation, foreign direct investment, first difference of domestic savings, inflation rate, first difference of external debt and its square, first difference of external debt service and its square. Since one of the OLS assumptions of no autocorrelation is violated, we account for this violation by reporting robust standard errors. The regression results are presented in Table 4.8.

**Table 4.8: Regression results**

The Dependent Variable is GDP growth rate

| **Variable** | **Coefficient.** | **Robust Std. Error.** | **t-Statistic** | **p>t** |
|---|---|---|---|---|
| **LF** | 0.00258923 | 0.139212 | 0.01860 | 0.9853 |
| **CF** | 0.507928 | 0.273577 | 1.857 | 0.0775 * |
| **FDI** | 0.967407 | 0.406597 | 2.379 | 0.0269 ** |
| **DS** | -0.147978 | 0.104128 | -1.421 | 0.1700 |
| **INF** | -0.0273496 | 0.0895760 | -0.3053 | 0.7631 |
| **Ext debt** | -0.0981464 | 0.0349680 | -2.807 | 0.0106 ** |
| **Ext debt serve** | - 0.0774622 | 0.255684 | - 0.3030 | 0.7649 |
| | | | | |
| | | | | |
| **Constant** | 2.80055 | 8.94936 | 0.3129 | 0.7574 |
| | | | | |

**, ** and *** denotes 10%, 5% and 1% levels of significance*
*Source: Owner's computation*

R-squared = 0.328942, Adjusted R-squared = 0.041346, F (9, 21) = 4.606467, P-value (F) = 0.001881

Table 4.8 presents the OLS regression results, where the F statistic is 4.61 with a P value of 0.002 implying that the independent variables, that is, labor force, capital formation, foreign direct investment, domestic savings, external debt, external debt service and inflation jointly determines the dependent variable, GDP growth.

The regression result indicated that the measure of goodness of fit, the R squared is 0.33 and the Adjusted R squared is 0.041 implying that 33 percent of the variations in GDP growth rate are explained by the independent variables; labor force, capital formation, foreign direct investment, domestic savings, external debt, external debt service and inflation. From the regression results, it is evident that labor force, domestic savings, inflation and external debt service are all statistically insignificant in determining GDP growth rate. However, capital formation, foreign direct investment and external debt are statistically significant in explaining GDP growth rate in Kenya. Specifically, capital formation has a coefficient of 0.51 and is statistically significant at 10 percent level of significant. This implies that, holding other factors constant, a one unit change in capital formation would lead to about 0.51 unit increases in GDP growth rate in Kenya. Further, foreign direct investment has a coefficient of 0.97 and is statistically significant at 5 percent level of significance. This implies that a one unit change in foreign direct investment would lead to 0.97 unit increase in the GDP growth rate ceteris Paribas.

On the other hand, external debt has a coefficient of -0.098 with a p value of 0.0106 which is statistically significant at 5 percent level of significance. This means that, holding other factors constant, a one unit increase in external debt in Kenya would lead to about 0.098 decreases in the GDP growth rate. Similarly debt servicing as a percentage of exports has a negative but

significant effect on GDP growth rate. A unit increase in debt servicing payment would reduce GDP growth rate by 0.077 ceteris Paribas.

### 4.3 Discussion of the results

Results reported in Table 4.8 indicated that external debt has negative effect on economic growth. This is because high ratio of external debt as percentage of GDP leads to a reduction of economic growth rate. The results show that one percent increase in external debt as percentage of GDP will lead to 0.098 decreases in GDP growth rate in Kenya. These results confirm to the theoretical assertion that when the government is faced with the problem of heavy debt burden it will have to increase taxes in the future to finance the high debt service payments. Similarly, increase in taxes would lead to a reduced after tax return on capital and a reduced incentive to invest. Lower investment leads to slower growth (Krugman, 1987 and 1985; Sachs, 1984 and 1986).

However in the long run servicing of principal and interest payment consumes a significant portion of foreign exchange earnings and reserves thus making it difficult to launch new investment projects. This implies that an increase in external debt leads to lower economic growth. The findings were consistent with the empirical literature by Ali and Mustafa (2010) who found a negative relationship between debt and growth on a study of the long run and short run impacts of external debt on economic growth in Pakistan. The results also supports the empirical findings of Were (2001) on a study of the debt overhang problem in Kenya. However, the results are contrary with the findings of Degefe (1992) and Shar and Pervin (2010) whose empirical results indicates that external debt has a positive effect on economic growth. Their findings suggest that increase in external debt leads to increase in GDP.

Similarly, debt service payment has negative effect. This seems to support the findings of Cohen (1993) and Kamau (2001) whose empirical findings indicated negative effect of external debt servicing in their analysis of debt servicing and economic growth in Kenya. The portfolio of external debt of Kenya is mainly accumulated multilateral and bilateral loans, which accounts for about 95% of total debt. These loans take long time to implement returns from infrastructure sector meaning that debt service payments are derived from other sectors.

The results also indicated a positive relationship between capital formation and economic growth. This is in line with the theoretical assertion that capital is a key factor of production hence it is positively associated to economic growth. Since capital is one of the major determinants of GDP, therefore, according to estimation it reports the positive effect on economic growth. On this estimates a one percent increase in capital would lead to 0.51 percent increase in GDP growth rate in Kenya.

Labor force showed negative effect on economic growth; whereas the study expected positive effect of labor force. It can be argued that Kenya is labor abundant country and therefore more unskilled labor with low productivity is unlikely to cause increase in levels of output. In addition agriculture being the largest sector in Kenya suffers from disguised unemployment; many people who belong to this sector seem to be actively involved in economic activities but with little marginal productivity. For this reason labor force was negatively related to economic growth. These results are a contrary to Chandra et al. (2009) whose empirical finding showed positive effect of labor force on economic growth for Sri Lanka.

The results also indicated a positive effect of foreign direct investment on economic growth as expected. This can be explained to be true because FDI is an important vehicle for technological improvement thus contributing more relatively to growth. FDI increases total investment in the economy thus improving economic performance. From the analysis FDI has a coefficient of 0.97 implying that a one unit change in foreign direct investment would lead to 0.97 unit increase in the GDP growth rate ceteris Paribas. This is in line with the finding of Borenzstein (1995) on his analysis of effect of foreign direct investment on economic growth for twenty developing countries from 1990 to 2010.

Domestic savings and inflation showed negative effects on economic growth whereas we expected domestic savings to impact economic growth positively while inflation conforms to our expectation. The negative effect of inflation agree to what Bawa and Abdullahi (2010) found in their empirical analysis of the threshold effect of inflation on economic growth in Nigeria using a time series data for the period 1981-2009. Therefore inflation causes detrimental effect on economic growth. The negative effect of saving on economic growth is in contrary to what Sajid (2004) found when investigating the relationship between domestic savings and output in Pakistan using time series data for the period 1973 to 2003. His empirical results showed a strong positive effect of domestic saving on economic growth. The reason why the results for this study is negative as far as savings are concerned could possibly because of slow pace of turning savings into meaningful investments which can spur economic growth rate. Accumulation of savings however much cannot cause economy to grow unless the savings are put into productive investments.

# CHAPTER FIVE

# RECOMMENDATIONS, CONCLUSIONS, LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

## 5.0 Introduction

This chapter presents policy recommendations, conclusions, limitations and suggestions for further research. Section 5.1 provides policy recommendations while section 5.2 gives conclusions. Section 5.3 presents limitations and suggestions for further research.

## 5.1 Policy recommendations

This study aimed at investigating the effects of external public debt on economic growth in Kenya. The regression results have indicated that external debt has a negative effect on growth implying an increase in external debt worsens the performance of economy in Kenya.

The coefficients of debt variables are negative and quite significant. For this reason government need to pursue policies that are geared towards reducing the debt stock in order to reduce this effect on growth. There is need for improvement of policies on external debt so as to have a reversal of the negative effect of debt on growth.

Countries that are heavily indebted like Kenya need to articulate strategies meant to reduce debt stock and problems associated with debt service. Debt relief strategies used by Sub-Saharan countries some of which Kenya can adopt include debt rescheduling, reduction in debt servicing and debt restructuring. The government should pay more attention to the debt management profile particularly for its expenditure items. The government should put borrowed funds into productive projects and programmes which can improve the economy.

Moreover the government should establish a transparency of loan cycle that covers the activities for project identification, appraisal and approval, loan negotiations and contracting, loan disbursements, project implementation monitoring and evaluation as well as loan repayment. Finally, the government should provide a policy framework that is credibly creating an environment that will encourage investors' confidence for both local and foreign to invest in the country.

The variables capital formation and foreign direct investment have strong and positive effects than other variables, it is important for the government to strengthen measures geared toward creating conducive environment for investment and much focus of the policies should be on the inflow of foreign direct investment (FDI), while the inflow of debts should be minimized. In this case the government should do everything possible not to crowd out private investment through increased domestic borrowing to finance fiscal deficits. Consequently in order to increase investment to the levels required to spur growth, policies that encourage savings need to be adopted as this would promote domestic investment. Additionally there is dire need of close monitoring and consistent debt management strategies to avoid misutilization of external debt.

## 5.2 Conclusions

This study has used a linear model to analyze the effect of external debt on economic growth in Kenya over the period 1980 t0 2011, considering GDP as a function of external debt among other factors. The empirical results revealed that external debt exerts a negative impact on economic growth; clearly indicating that higher external debt discourages economic growth. Capital formation, a key factor of production has positive effect on economic growth. This is an indication that capital investment has a lot of potential in accelerating the speed of economic growth. Foreign direct investment positively affects economic growth signaling that substantial inflow of foreign capital can speed up the growth process. Labor force indicated the negative effect on economic growth implying that more unskilled labor with low productivity is unlikely to increase the level of output in the country. Similarly domestic savings and inflation showed the negative effects on economic growth implying that if the accumulated savings are put into productive investments mere savings of can spur economic growth. Inflation on the other hand would have detrimental effects on output.

## 5.3 Limitations of the study and suggestions for further research

The study of external debt is a very interesting and wide in coverage. Because of data coverage and reliability, the range and the types of debts and their services, for example, it was not possible to determine which one were long term and which were short term debts. Also it was not possible to determine whether payments due for various debts were fully met and in what proportion. It was not possible to obtain accurate figures on debt and debt service payments because different sources of data had different figures for the same variable and the same period, and this was a limitation in the analysis.

For further research, the following areas are put forward which this paper did not manage to cover possibly due to the mentioned limitations. First there is need to do an investigation on debt sustainability for Kenya so as to find out whether debts are sustainable or not. This will provide a strong ground for Kenya to decide whether to ask for debt forgiveness or not. Another area of study would be the effect of external debt on private investments. This will be important because it will offer some information to policy makers to decide whether it would be appropriate to re-schedule debt to minimize use of resources for debt service payment and use much of the available resources for domestic investment.

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