

SUSTAINABILITY OF KENYA'S TOTAL PUBLIC DEBT

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DECLARATION

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

Signature.....

Date.....

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X50/64261/2013

This research paper has been submitted for examination with my approval as university supervisor.

Signature.....

Date

Dr. Elizabeth Owiti

DEDICATION

This research paper is dedicated to my parents Dr. Michael and Anne Wanga. Thank you for your love, support and prayers.

ACKNOWLEDGEMENT

All praise and honour belong to the Lord Jesus Christ for He has given me the gift of life and enabled me to finish this course.

I am sincerely grateful to my supervisor, Dr. Elizabeth Owiti for her advice and input in completing this project.

My sincere appreciation goes to my loving parents and siblings. Your prayers and support helped me complete this research paper.

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Last but not least I wish to thank the School of Economics Graduate library and the Computer lab staff who made it possible for me to get all the research material I needed. However, the views expressed in this paper are my own and do not bear the views of the named persons or institutions. I therefore bear the sole responsibility for any errors and/or omissions made in this paper.

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ABBREVIATIONS

GDP.....	Gross Domestic Product
BOP.....	Balance of Payment
CBK.....	Central Bank of Kenya
DSA.....	Debt sustainability analysis
PDV.....	Present discounted value
IMF.....	International Monetary Fund
LAPSET.....	Lamu Port-Southern Sudan-Ethiopia Transport
PVBC.....	present value budget constraint
NPG.....	No-Ponzi game
IFAD.....	International Fund for Agricultural Development
EIB.....	European Investment Bank
OPEC.....	Organization of the Petroleum Exporting Countries

ABSTRACT

This paper analyzed the sustainability of Kenya's total public debt using the present value budget constraint approach. Unit root tests were conducted to test for the stationarity of the budget balance. The country's debt was found to be stationary when two structural breaks were taken into account. Break dates were identified as 1996 and 2001. Cointegration tests were also carried out and the results indicated Kenya's total public debt was weakly sustainable. This paper also examined the uses of foreign debt and recommended that the government should increase its focus on the transport, communication and the energy sectors as these sectors have the ability to generate revenue that can be used to repay debt.

CHAPTER ONE

INTRODUCTION

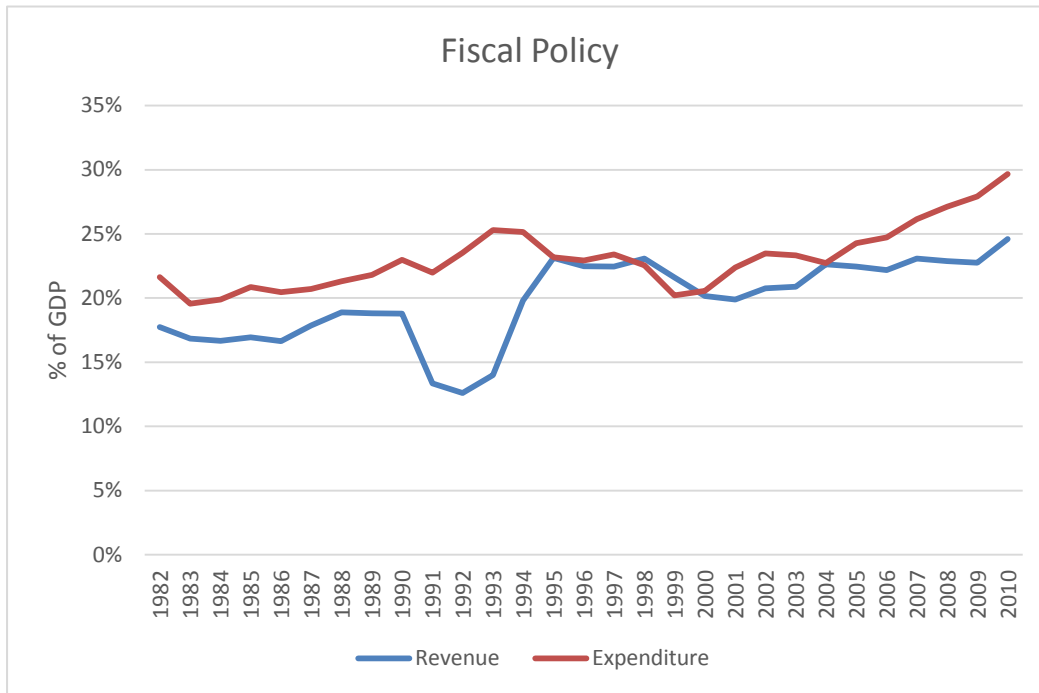
1.1 Background

Every year countries have budgets which outline their expenditure and revenue sources. A budget can be in surplus (expenditure is less than revenue), deficit (expenditure is more than revenue), or balanced (expenditure is equal to revenue). If there is a deficit, public borrowing may be used to bridge the resource gap between revenue and expenditure (Putunoi & Mutuku, 2013). When the economy is in a downturn (a general slowdown in economic activity over a period of time) Keynesian economist advocate for deficit financing in order to stimulate aggregate demand (Motley, 1987). This policy was adopted by a number of countries in the aftermath of the 2007/8 global financial crisis as data provided by Ncube & Brixiova (2013) shows that many governments increased their fiscal deficits during this period. In Africa, Ncube & Brixiova (2013) found that the fiscal deficit had increased from 1.0% of GDP in 2008 to 2.7% of GDP in 2012, in other developing countries and emerging market economies the fiscal deficit increased from 1.0% of GDP in 2008 to 2.4% of GDP in 2012, while in advanced economies it increased from 0.5% of GDP in 2008 to 3.0% of GDP in 2012.

In order to finance a budget deficit, a country can borrow from domestic and external sources. Persistent budget deficits can therefore lead to an accumulation of debt. Public debt can be defined as debt owed to both external and internal parties by governments of independent countries while external public debt is defined as debt owed to external creditors and includes both multilateral and bilateral creditors (Kenya's Public Debt Status, 2009). Some of Kenya's multilateral creditors include: the World Bank, African Development Bank, International Monetary Fund, and other international financial institutions, while Kenya's

bilateral creditors are commercial creditors and other countries. Domestic Public Debt on the other hand can be defined as debt instruments offered in the local economy such as Treasury bonds and Treasury bills (Kenya’s Public Debt Status, 2009).

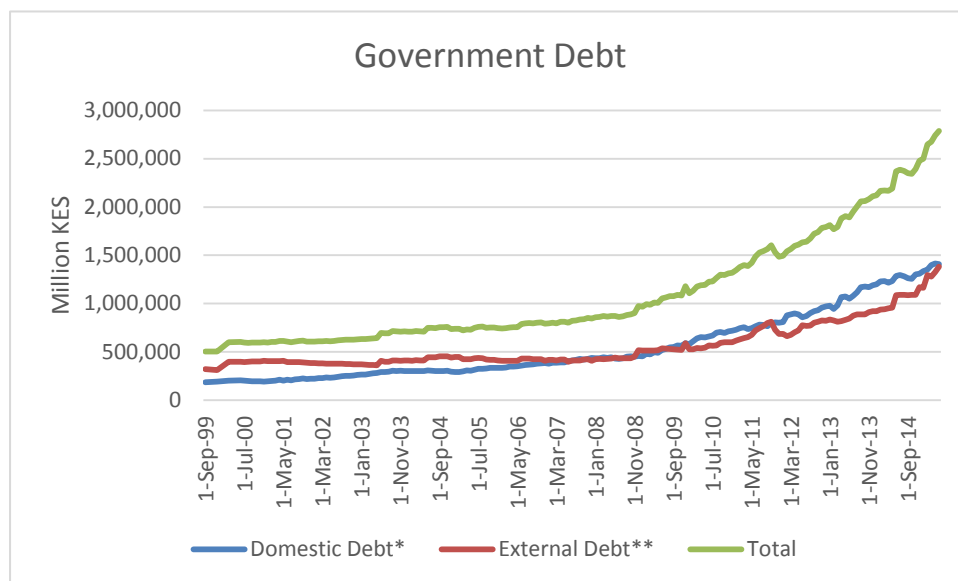
Figure 1: Kenya’s fiscal deficits



Source: World Bank (2015)

Figure 1 shows that the Kenyan government has often run budget deficits. The effect of this has been an increase in the country’s debt stock (Figure 2). The increase in debt should be considered relative to a country’s economic growth as the government’s ability to repay the debt may increase as the economy grows (Aso, 2013).

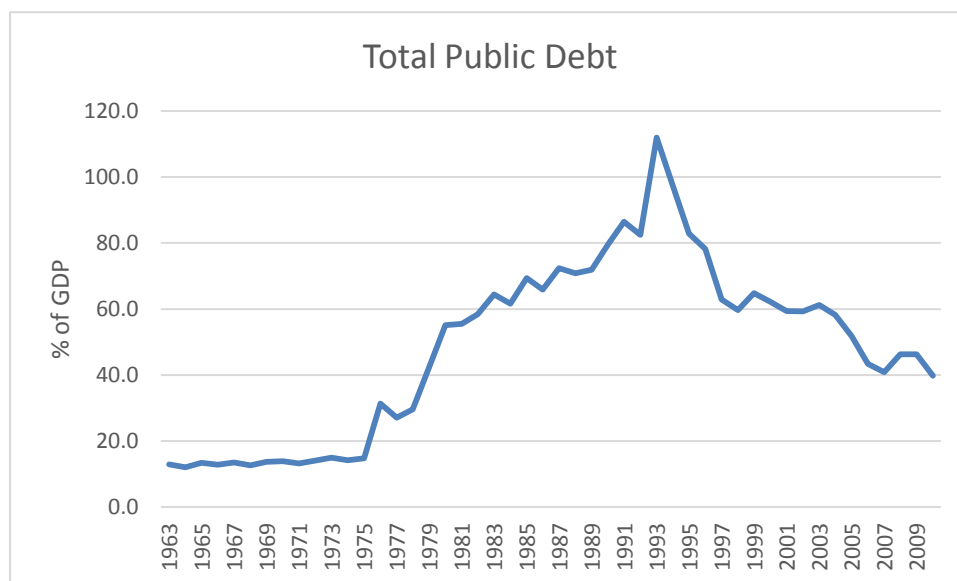
Figure 2: Government Debt



Source: CBK (2015)

Figure 3 shows how Kenya's debt to GDP ratio has grown over the years. An analysis of the evolution of Kenya's GDP and debt shows that during the period 1963 to 1973, the economy grew rapidly, as GDP growth averaged 6.5%, resulting in an increase in the country's per capita income. Meanwhile, government debt rose steadily as the government borrowed to fund land purchase, development and defense (M'Amanja & Morrissey, 2005). The increase of both debt and GDP, during this period, kept the debt to GDP ratio constant. In the 1970s, a global oil crisis created severe BOP problems for the country (Were, 2001). In order to solve the BOP problems, the government resorted to heavy external borrowing which led to a spike in the country's external debt. The economic growth rate decreased to less than 4% (Were, 2001; M'Amanja & Morrissey, 2005) and the country's debt to GDP ratio spiked.

Figure 3: Kenya's Total Public Debt



Source: World Bank (2015)

The country's situation improved in the late 1970s as the coffee boom of 1977 led to an increase in the country's export earnings, thus a temporary improvement in the country's BOP (Were, 2001). The coffee boom was followed by the second oil crisis and a slump in world commodity prices which led to a further deterioration in the country's BOP position (Were, 2001). Once again, the government turned to external debt to solve the country's BOP problem leading to an increase in the county's debt to GDP ratio (Figure 3).

During the first half of the 1980s, the country was negatively affected by various adverse external and internal shocks. These included an oil shock, drought, global recession and reduced capital inflows following the 1982 debt crisis (M'Amanja & Morrissey, 2005). In 1985 to 1990, increased tea and coffee prices (the country's major export commodities) and lower oil prices led to an acceleration of economic growth. The government adopted a pro-cyclical fiscal policy which caused the government's expenditure to increase (Were, 2001). The government's expenditure rose at a faster rate than the revenue forcing the government to

turn to debt to plug the budget deficit (Figure 2). In the early 1990s development assistance to the country steadily declined in due to poor governance and mismanagement of development assistance and public resources (Kitabire, Oumo, Mwegu, & Beckerman, 2009). These caused a debt crisis in the country and Kenya was classified as a highly indebted nation (Kenya's Public Debt Status, 2009). The economic shocks experienced by the country led to depressed GDP growth (M'Amanja & Morrissey, 2005). However, it was not all gloom and doom for the country as liberalization strategies which included exchange rate reforms, trade reforms, and financial and capital reforms, resulted in an increase in the country's exports (Kitabire, Oumo, Mwegu, & Beckerman, 2009). The growth of the export sector helped spur economic growth while earnings from exports shored up government foreign exchange reserves and helped the government service its foreign debt (Kitabire, Oumo, Mwegu, & Beckerman, 2009).

At the turn of the 21st century, debt continued on an upward trajectory but the debt to GDP ratio declined as the country's economy grew at a faster rate (Figure 3). However, in 2008 a combination of internal and external factors led to a decline in growth i.e. the post-election violence and the global financial crisis (KNBS, 2008).

Kenya's debt has continued on an upward trajectory as the country has increased borrowing in order to finance a budget deficit (figure 1 & 2). The structure of the debt has also evolved as the percentage of domestic debt increased (figure 2). During the period 1980-1990, the government mainly depended on foreign financing to bridge the budget deficit (Putunoi & Mutuku, 2013). During this time the domestic market was not well developed and international organizations were willing to lend the country money in order to promote economic growth. However in the late 1990s and early 2000, the difficulties in accessing foreign funds, mainly due to corruption issues, forced the government to increase domestic borrowing (Putunoi & Mutuku, 2013). During the period 2003-2012, the government

increased domestic borrowing and its share to finance the budget deficit gradually increased (figure 2).

1.2 Statement of the Problem

Kenya's total debt has maintained an upward momentum (Figure 2) as the government has increased its borrowing to fund its budget deficit (Figure1). An increase in public debt can negatively affect an economy as it requires the government to increase taxes in order to repay the debt and exerts upward pressure on real interest rates (Maana, Owino, & Mutai, 2008) while domestic government borrowing may crowd out investment which could reduce future output and wages (Stiglitz, 2012). In Kenya, studies have shown that the country's external debt accumulation had a negative impact on economic growth and private investment during the period 1970-1995 (Were, 2001) while during the period 1996 to 2007, an increase in domestic debt resulted in higher domestic interest payments which presented a huge burden to the budget (Maana, Owino, & Mutai, 2008).

As Kenya's debt continues to increase concerns have been raised on whether the debt is sustainable (Mwai, 2012; Nandelenga, 2010). A sustainable debt is one in which the borrower can continue to repay without an unrealistically large future correction to the balance of expenditure and income (IMF, 2002).

An unsustainable fiscal policy is undesirable as it involves a risk of a hike in the future interest rates, leading to a slowdown in economic growth and it could cause higher public spending and higher tax revenues than originally planned, a higher inflation rate and a public debt default (Agnello & Sousa, 2009; Castro & Cos, 2006). As the country's debt continues to increase concerns have been raised (Nandelenga, 2010; Mwai, 2012) on whether the government will have the ability to meet its future debt obligations i.e. is this debt sustainable? Despite the importance of a sustainable public debt, and concerns raised on the

sustainability of Kenya's public debt, few studies have carried out sustainability tests on Kenya's public debt.

The ability of the government to repay its debt may also be determined by how the government uses the borrowed funds. If funds are spent for development purposes they have the ability to increase production thus making it possible for government to repay the debt. According to (Pattillo, Poirson, & RicciI, 2002) if borrowed funds are used for productive investment and the country does not suffer from macroeconomic instability, policies that distort economic incentives, or sizable adverse shocks, economic growth should increase and allow for timely debt repayments.

It is also important to look at the purpose of borrowed funds and how the funds were spent. In Kenya, data on the purpose and use of foreign debt can be obtained from the National Treasury. Analyzing this data will give us an indication of the use of funds thus the government's ability to generate enough income to repay the debt. New lending should be geared to a country's capacity to carry debt—which in turn, depends on its ability to use these resources effectively for development and growth

1.3 Research Questions

The study aims to answer the following research questions:

- I. Is Kenya's public debt sustainable?
- II. What are the uses of foreign debt?
- III. What policy actions should be recommended for dealing with Kenya's public debt?

1.4 Objectives of the Study

The main objective of the study is to investigate the sustainability of Kenya's total public debt. The paper also aims to achieve these specific objectives:

- I. To test for public debt sustainability in Kenya.
- II. To identify the uses of foreign debt.
- III. To draw policy implications about the sustainability of Kenya's public debt.

1.5 Justification of the Study

A high and growing debt ratio is viewed as a signal of looming public insolvency (Qin , 2005). As at the end of 2014, Kenya's public debt to GDP ratio was at 52% (Central Bank of Kenya, 2014). The country has in certain occasions been unable to meet its debt obligations, the most recent case occurred in 2014 when it had to reschedule the payment of a USD 600 million syndicated loan that had been borrowed in 2011 (Altenkirch, 2014).

Kenya's debt is expected to increase as the government adopts expansionary policies to support economic growth. A number of ambitious infrastructure projects have commenced during the Jubilee administration's first 5 year term. These projects include: the standard gauge railway line, the LAPSSET project and irrigation schemes across the country (Parliamentary Budget Office, 2015). The expected increase in debt raises the need for studies on the sustainability of public debt.

The analysis on public debt in developing countries has mainly focused on external debt (Putunoi & Mutuku, 2013; Maana, Owino, & Mutai, 2008). In 1980s and 1990s, studies on Kenya's debt focused on foreign debt as domestic borrowing was low (Maana, Owino, & Mutai, 2008). In 2000 government domestic borrowing increased. Following this change in

government financing, researchers started to study the sustainability and impact of domestic debt (Maana, Owino, & Mutai, 2008; Mwai, 2012).

Majority of research on sustainability has been on the sustainability of external debt (Nyongesa, Mukras, & Momanyi, 2013). Few studies have covered the sustainability of Kenya's domestic and total public debt (Nandelenga, 2010). Studies done on Kenya's debt have failed to account for structural breaks (Nandelenga, 2010; Mwai, 2012). This presents a fundamental flaw in earlier studies since according to Papadopoulos & Sidiropoulo (1999), if a structural break is not taken into account, standard unit root tests would be biased towards finding a unit root.

Previous studies on Kenya's debt sustainability have also failed to consider the issue of money printing to finance fiscal deficits. However, this is a common means of financing budget deficits in developing countries therefore debt sustainability analysis must consider the government's reliance on seigniorage (Neaime, 2004).

The country recently rebased its GDP. Since most sustainability analysis use debt to GDP ratios, the use of the new figures changes the debt to GDP figure which could ultimately change the test results. No studies have so far been carried out to assess the countries sustainability using these revised figures.

This study seeks to carry out sustainability analysis that will take into account the shortcomings of previous analysis by taking into account the presence of structural breaks and considering seigniorage as a revenue source for the government. The study will use the present value budget approach to carry out public debt sustainability test and give policy recommendations on the way forward for management of Kenya's public debt. The paper will also analyze how government has used foreign debt i.e. purpose of the funds and if projects were completed. This is an area that has not yet been covered by previous studies.

1.6 Structure of the Study

The remainder of the study is structured as follows. Chapter two reviews concepts related to debt sustainability, and gives a summary of debt sustainability studies carried out in Kenya, Africa, and other parts of the world. Chapter three focuses on establishing the framework suitable to analyze sustainability of Kenya's debt while chapter four gives the data analysis, interpretation of results and looks at the uses of foreign debt. Chapter five gives the recommendation, policy conclusion and suggestions for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Debt sustainability can be defined as a situation in which a borrower is expected to be able to continue servicing its debts without an unrealistically large future correction to the balance of income and expenditure (IMF, 2002, p.3).

The IMF definition of sustainability requires that both solvency and liquidity are met. Solvency is achieved if the present discounted value of its future and current expenditure is no greater than the present discounted value of its future and current path of income, net of any initial debt while liquidity is achieved when liquid assets and available financing are enough to roll-over or meet any maturing liabilities (IMF, 2002, p.5).

Domar (1944) definition of sustainability requires that for public debt to be sustainable, the interest rate on a government's loan should not be more than the country's economic growth rate. Sustainability can also be defined with reference to the government's budget constraint. Under this definition, for a country's debt to be sustainable, it needs to generate enough future surpluses to cover its primary deficit (Blanchard, Chouraqui, Hagemann, & Sartor, 1990). The government's budget constraint requires that the net present value of all future primary balances must be sufficient to pay back the initial debt (Blanchard, Chouraqui, Hagemann, & Sartor, 1990).

The issue of sustainability of a country's debt has been debated for many years and numerous models have been formulated to assess the sustainability of a country's public debt (Domar, 1944; Hamilton & Flavin, 1986). However, there is no consensus among economist about the correct theoretical criterion for sustainability (Sarvi, 2011).

2.2 Theoretical Literature

There are two general approaches used in assessing public debt sustainability (Bilian, 2005).

These approaches are:

a) The Domar Stability Condition

This approach is based on studies conducted by Domar (1944). It requires that for public debt to be sustainable, the debt to GDP should be, on the medium and long term, constant or decreasing. If the debt path is rising then the debt is deemed unsustainable. Therefore, for public debt to be sustainable, the interest rate for a government's loans should not be greater than the rate of growth of the economy. The model is derived from the government budget constraint:

$$D_t = (1 + r)D_{t-1} - S_t$$

where:

D_t is current public debt

D_{t-1} is the previous period public debt

r is the interest rate

S_t is the budget surplus

By rewriting the budget constraint in terms of GDP ratios, we get:

$$\frac{D_t}{Y_t} = \frac{(1 + r)D_{t-1}}{(1 + g)Y_t} - \frac{S_t}{Y_t}$$

$$d_t = \frac{(1 + r)}{(1 + g)}d_{t-1} - s_t$$

Where:

Y_t is GDP

g is the economy's growth rate

Using $\frac{(1+r)}{(1+g)} \sim 1 + r - g$ we get:

$$d_t - d_{t-1} = (r - g)d_{t-1}s_t$$

If $g-r > 0$ then debt is expected to converge to a stable d^* (sustainable), but if $g-r < 0$ then debt will increase indefinitely i.e. debt will be unsustainable.

b) The Present Value Budget Constraint Approach

This approach is builds on the studies of Hamilton & Flavin (1986) which focuses on the intertemporal budget constraint. The budget constraint is satisfied if the size of country's current public debt is covered by the present value of future surpluses.

The model is derived from the government budget constraint (Sarvi, 2011):

$$B_{t+1} = (1 + r)B_t - PB_{t+1}$$

where:

B_t is the stock of public debt

PB_t is the budget surplus

r is the interest rate

Forward substitution yields:

$$B_t = (1 + r)^{-n} B_{t+n} + \sum_{i=1}^{\infty} (1 + r)^{-i} P B_{t+i}$$

To see how debt changes as the number of periods increases we take the limit as n tend to infinity:

$$B_t = \lim_{n \rightarrow \infty} (1 + r)^{-n} B_{t+n} + \sum_{i=1}^{\infty} (1 + r)^{-i} P B_{t+i}$$

For the no Ponzi game or the transversality condition to hold:

$$\lim_{n \rightarrow \infty} (1 + r)^{-n} B_{t+n} = 0$$

But substituting the NPG condition in the previous equation, the intertemporal budget constraint becomes:

$$B_t = \sum_{i=1}^{\infty} (1 + r)^{-i} P B_{t+i}$$

2.3 Empirical Literature

Empirical literature has shown that Kenya's accumulation of external debt has affected investment and growth in the country while domestic debt has presented a burden on the budget. Were (2011) investigated the effect of external debt on economic growth in Kenya and found that external debt accumulation had a negative impact on private investment and economic growth. The paper also investigated the impact of debt servicing and found that it did not affect growth adversely but had some crowding-out effects on private investment. Maana, Owino, & Mutai (2008) investigated the impact of domestic debt on the economy

during the period 1996 - 2007. The paper found that a significant increase in domestic debt during the period presented a burden to the budget due to the resultant increase in domestic interest rates. There was also evidence of a positive but not significant effect on economic growth. However, the study failed to find any evidence of domestic debt crowding-out private sector lending.

Meanwhile, sustainability tests have been conducted on a number of countries and different results obtained. Bajo, Díaz, & Esteve (2008) examined the sustainability of US deficit using quarterly data for the period 1Q1947 to 3Q2004 using a multiple structural change approach. The study was useful in showing the importance of accounting for structural breaks. Weak sustainability was found for the whole sample period when structural breaks were not taken into account. However, when three structural breaks (1955:2, 1982:1 and 1996:1) were taken into account, the budget deficit was found to have been weakly sustainable in the period 1Q1947-1Q1955 and 2Q1955-4Q1981, strongly sustainable in the period 1Q1982-4Q1995, and in surplus during 1Q1996-3Q2004. The study showed that an analysis that did not take into account structural breaks was bias.

Reid (2013) examined the fiscal sustainability of Jamaica during the period 1980 to 2011 using the Fiscal Reaction Function method to assess the sustainability of fiscal policy in the long run. It analyzed how the government responds to changes in debt position. Under this model fiscal policy can be viewed as sustainable if the primary budget surplus responds positively to an increase in debt. This method offered a forward looking analysis thus presented results that were useful to inform policy. The paper found that the country's public debt was sustainable but that the government was inactive in managing debt. It recommended that the government should put more emphasis on stabilizing the country's debt and be proactive in managing its response to its debt. The paper failed to investigate the presence of structural breaks.

Qin et al. (2005) analyzed the sustainability of Philippines' public debt using the No Ponzi game criterion. Sustainability tests were carried out on the debt-to-GDP ratio using both historical and forecasts generated by a macro-econometric model of the Philippine economy. The use of forecasts helped make the model more forward looking. However, the forecasts also introduced an element of uncertainty which according to Wyplosz (2009) make it impossible to assess sustainability with certainty. The paper used quarterly data during the period 1994 to 2014 and found that the country's debt was unsustainable and that the government was playing a weakly feasible debt Ponzi game. The paper advised large institutional creditors to review their lending policies to ensure that their loans and accompanying provisions are carefully based on Philippines' debt sustainability in order to give the government an incentive to pursue sound macroeconomic policies. Qiu, 2010 reached the same conclusion (Philippine's debt was not sustainable) when the tax smoothing hypothesis was used to analyze the sustainability of Philippines' public debt during the period 1994 to 2007. The tax smoothing hypothesis requires the primary deficit to help to smooth out the revenues and expenditure variations so that a steady and even tax rate is maintained. The empirical method used in the paper was able to detect changes in the business cycle and it found that economic booms bring up the positive effect on the primary budget surplus. Both papers failed to test for the presence of structural breaks.

Mahmood & Rauf (2012) tested the sustainability of Pakistan's public debt during the period 1971 to 2011 using the present value of budget constraint approach and tested for structural breaks. The research found that debt during the period was unsustainable. Two structural breaks were identified for the years 1993 and 1998. However, accounting for structural breaks in the analysis made no change to the results reported without the structural changes. The research proposes a reduction in the debt servicing costs and the stock of debt.

Pattnaik, Misra, & Prakash (2004) assessed the sustainability of India's public debt. The paper used four different approaches to establish whether India's public debt was sustainable namely: Domar stability condition, sustainability indicators, Present Value Budget Constraint, and the model based approach. The paper found that debt was weakly sustainable under the Domar stability condition and the model based approach, unsustainable under when the Present Value Budget Constraint and the sustainability indicators were used. The analysis showed that different models can produce different results.

Taye (2011) analyzed the sustainability of Botswana's debt using the fiscal policy path method. The method used helped to track the dynamic path of the debt over time and examined the impact of other crucial magnitudes (domestic debt, the monetary sector and inflation) in gauging the trajectories of debt sustainability. There was an element of uncertainty because of the complexity of the model which called for a number of assumptions, for instance a constant rate of international investment flows. The paper concluded that Botswana's debt was sustainable.

Ndoricimpa (2014) studied the fiscal sustainability of Kenya, Burundi, Uganda, Rwanda, and Tanzania during the period 1985-2012 using the model developed by Hakkio & Rush (1991). The paper used the Gregory and Hansen and Hatemi-J tests which account for structural breaks to test for fiscal sustainability. The study found that there were structural breaks in Kenya and Burundi which affected the relationship between government spending and government revenue. The study found that fiscal deficits in the EAC Countries were sustainable further tests found that for the fiscal deficits for Kenya, Tanzania Burundi, and Uganda were weakly sustainable.

Sirengo (2005) investigated Kenya's fiscal sustainability using the Croce & Juan-Rumon model. The model estimates the government's fiscal reaction function that is used to maintain the primary surplus within target levels to ensure that debt will not explode. The paper also

analyzed the effects of shocks on both the primary surplus and debt process through simulations. This offered a forward looking perspective to fiscal sustainability. The paper used quarterly data for the 1st quarter of 1996 to 4th quarter of 2004. The findings from the simulations showed that the country was susceptible to adverse shocks which could worsen the primary balance and lead to build up of debt.

Mwai (2012) analyzed the sustainability of Kenya's domestic debt using annual time series secondary data for the period 1980 to 2011. The test found that the NPG condition was violated due to the presence of unit roots thus Kenya's public domestic debt does not satisfy the condition for strong sustainability. This result may be attributed to the presence of structural breaks which the paper failed to take into account. However, the study also concluded that domestic debt was weakly sustainable due to results of cointegration tests, performed on series of revenue and expenditure and debt and deficit, which showed that there was a long run relationship between the variables. The presence of unit roots could be attributed to the failure of the paper to account for structural breaks. The paper failed to consider how printing of money to finance the fiscal deficit affects debt sustainability.

Nyongesa, Mukras, & Momanyi (2013) analyzed the sustainability of Kenya's current account during the period 1970 to 2012. The paper used the intertemporal budget constraint model and carried out stationary and co integration tests on revenue and government debt to ascertain the current account sustainability. The results from the stationarity analysis implied that external debt was sustainable but the cointegration analysis indicated that the current account balance may not be sustainable in the long run. The focus of the paper was on the current account thus the analysis did not give an indication of the sustainability of total public debt. Analyzing one part of the debt fails to give the whole picture therefore the conclusion that the external debt was sustainable can be misleading since according to Maana, Owino, & Mutai (2008), during the period 2006 to 2007, government was servicing external debt using

domestic debt. This implies that a consideration of the total debt could have indicated that the government was running a Ponzi scheme which violates the sustainability condition.

Nandelenga (2010) analyzed Kenya's debt sustainability and optimal debt that can enhance a 10% economic growth as projected in Vision 2030. The paper used the present value budget constraint to empirically analyze the sustainability of the debt and simulation was used to determine the optimal debt to achieve a 10% GDP growth rate. The paper found that debt was sustainable and 35.2% was the optimal debt level to achieve a 10% GDP growth rate. The presence of unit roots indicated that debt was non-stationary but since revenue and expenditure were cointegrated, the paper concluded that debt was sustainable. The paper failed to investigate the presence structural breaks.

IMF (2011) assessed the sustainability of Kenya's public debt using its debt sustainability analysis (DSA) method. DSA involves preparing a baseline scenario based on a set of policy and economic assumptions, alternative policy scenarios, and sensitivity analysis with respect to policy and economic assumptions. However, due to several policy and economic assumption that were made, the analysis has some element of uncertainty. According to Wyplosz (2009), DSA is an imprecise guide to policy since it can only provide possibilities. The analysis found that Kenya's debt was sustainable and projected that the present value of public debt to GDP ratio would edge down from 40% of GDP in 2013 to 39% of GDP by 2018 and 19% of GDP in 2033.

2.4 Overview of Literature

From the above literature review, it is clear that an accumulation of debt can have negative effects on a country's economy. Assessing the sustainability of a country's debt is useful as it

should guide policy on debt. A debt sustainability analysis, therefore, becomes an important issue to be considered before a country decides to increase its debt.

A country whose debt is found to be unsustainable is advised to change its macroeconomic policies as with the current policy it will be unable to meet future debt obligations. There are different methods to analyze the sustainability of a country's debt. Using a different approach to analyze the sustainability of a country's debt may have an impact on the results obtained (Pattnaik et al, 2004). The inclusion of structural breaks may change the sustainability results that were originally obtained when structural breaks were not taken into account (Bajo, Díaz, & Esteve, 2008).

There is need to analyze the sustainability of Kenya's total debt as an analysis on only external or only domestic debt could be misleading as the government could be using one source of debt to service the other source of debt therefore the studies carried out by Mwai (2012) and Nyongesa et al (2013) do not offer a complete picture of the country's debt and should not be used to inform Kenya's policy on debt. Meanwhile studies that actually cover total debt have their shortcomings as Nandelenga (2010) and Sirengo (2005) failed to consider the impact of structural breaks when analyzing the sustainability of debt. This paper seeks to fill this gap by analyzing the sustainability of Kenya's debt using the present value budget approach which will consider the stationarity of debt and will account for structural breaks. The paper will also take into account the fact that money printing is sometimes used by the government to finance the fiscal deficit. This has been ignored by previous studies.

CHAPTER THREE

METHODOLOGY

3.1 Theoretical Framework

The research study adopts the present value budget constraint (PVBC) approach to assess the sustainability of Kenya's public debt. The papers adopt this method because of its ability to investigate whether the government is playing a Ponzi game. A Ponzi game is a system in which returns to the principal of previous investors is paid by new investment by subsequent investors therefore in the case of debt; the government pays the interest by issuing new debt (Sarvi, 2011). The paper will carry out sustainability tests to investigate whether the no-Ponzi game condition holds.

The model starts with the government budget constraint (Sarvi, 2011):

$$B_{t+1} = (1 + r)B_t - PB_{t+1} \dots \dots \dots (1)$$

Where:

B_t is total public debt

r is the real interest rate

PB_t is the budget balance

The budget balance is the difference between government revenue and expenditure. It will be negative when it represents a deficit and positive when it represents a surplus.

The equation can be rewritten as:

$$B_t = \frac{B_{t+1}}{(1+r)^1} + \frac{PB_{t+2}}{(1+r)^1} \dots \dots \dots (2)$$

$$B_t = \frac{B_{t+2}}{(1+r)^2} + \frac{PB_{t+2}}{(1+r)^2} + \frac{PB_t}{(1+r)^1} \dots \dots \dots (3)$$

Therefore:

$$B_t = \frac{B_{t+1}}{(1+r)^n} + \sum_{i=1}^n \frac{PB_{t+i}}{(1+r)^i} \dots \dots \dots (4)$$

Taking the limits as n tends to infinity (Sarvi, 2011)

$$B_t = \sum_{i=1}^{\infty} \frac{PB_{t+i}}{(1+r)^i} + \lim_{n \rightarrow \infty} \frac{B_{t+n}}{(1+r)^n} \dots \dots \dots (5)$$

A crucial assumption behind the inter-temporal budget constraint is the no-Ponzi-game condition (Sarvi, 2011):

$$\lim_{r \rightarrow \infty} \frac{B_{t+n}}{(1+r)^n} = 0 \dots \dots \dots (6)$$

Substituting the no-Ponzi-game condition into equation (5) we get the inter-temporal budget constraint:

$$B_t = \sum_{i=1}^{\infty} \frac{PB_{t+i}}{(1+r)^i} \dots \dots \dots (7)$$

The inter-temporal budget constraint requires that the present value of the flow of budget balances must be equal to the present stock of net debt. Under this condition the government cannot play a Ponzi game.

Testing the no-Ponzi-game condition in equation (6) requires testing for the stationarity of the budget balance.

Taking into account the use of seigniorage to finance the budget deficit, equation (7) can be rewritten as (Neaime, 2004):

$$B_t = \sum_{i=1}^{\infty} \frac{R_{t+i}}{(1+r)^i} + \sum_{i=1}^{\infty} \frac{\Delta m_{t+i}}{P_{t+i}} - \sum_{i=1}^{\infty} \frac{G_{t+i}}{(1+r)^i} \dots \dots \dots (8)$$

Where:

Δm is the change in stock of high power money

P is the consumer price index

R is government revenue

G is government expenditure

3.2 Model Assumptions

The assumptions of the model are:

- 1) Government does not repay its debt by issuing new debt i.e. the government is not playing a Ponzi game. Unit root tests are carried out to test this assumption. If the budget deficit is found to be stationary then this assumption is not violated and debt is sustainable.
- 2) The past is a reliable guide to the future i.e. the processes generating deficits and debt will continue into the future. This assumption will enable us to use historical data to make predictions of the future. To test this assumption, we run cointegration tests, that fail to account for structural breaks, on government revenue and expenditure and if the variables are cointegrated, then there are no structural breaks and the present value constraint will continue to hold (Papadopoulos & Sidiropoulos, 1999).

3.3 Unit Root Tests

Unit root test are conducted to investigate the stationarity of the budget deficit. If the deficit is non-stationary then it means that the it is growing without bound over time therefore subsequent debt will grow without bound rendering debt unsustainable (Neaime, 2004). This will violate the NPG constraint.

A stationary deficit means that over time, the series is reverting to a certain mean which is close to zero (Neaime, 2004). The presence of unit roots indicates that debt is non-stationary thus debt is unsustainable (Trehan & Walsh, 1991). According to Trehan and Walsh (1991), if the budget deficit is stationary (i.e. integrated of order zero) then it satisfies the sufficient condition to conclude that fiscal policy is sustainable.

The study carried out the following unit root tests:

1. Augmented Dickey-Fuller Tests (ADF) and Phillips-Perron (PP)

These are commonly used unit root tests that have an implicit assumption of a linear time series (Baum, 2004). Both the ADF and PP unit root tests do not account for structural breaks and therefore, a break in the series could be confused for a unit root

thus a conclusion may be drawn that debt is non-stationarity when it is in fact stationary (Baum, 2005). A structural break in the series means that a shock would have a permanent effect on the long-run level of debt and the budget balance (Glynn, Perera, & Verma, 2007).

2. Zivot-Andrews Test

The Zivot-Andrews test accounts for an endogenous break by utilizing the full sample and using a different dummy variable for the possible break date which is chosen where the ADF t-statistics is at a minimum (Glynn, Perera, & Verma, 2007). Therefore, the Zivot-Andrew's test overcomes the weakness of the ADF and PP test by accounting for one endogenous structural break. The test only captures the single most significant break in the series. In the presence of multiple structural breaks, this tests may confuse a break in the series as evidence of non-stationarity (Baum, 2005).

3. Clemente-Montañés – Reyes Test

Considering only one endogenous break may be insufficient and could lead a wrong conclusion in a case where more than one break exist (Baum, 2005). The Clemente-Montañés – Reyes test allows for two structural breaks in the mean of the series. This test offer two models which considers two different forms of structural breaks (Baum, 2005):

- a) An additive outliers (AO) model, which captures a sudden change in the mean of the series
- b) An innovational outliers (IO) model, which allows for gradual changes in the mean of the series.

According to Baum (2004), if the estimates of the Clemente-Montanes-Reyes unit root tests provide evidence of significant additive or innovational outliers in the time series, the results derived from Zivot-Andrews, ADF and PP tests are doubtful, as this is evidence that the model excluding structural breaks is misspecified.

The paper used the above four tests to test for stationarity of the country's budget deficit.

3.4 Cointegration Analysis

If the two series contain a unit root then there is need to search for the long run relationship between them (Hakkio & Rush, 1991). If such a relationship exists, the government is not

spending without bound and is taking into account the revenue it is generating therefore it will not borrow to cover its expenses and debt will not grow without bounds (Neaime, 2004). For the government's inter-temporal budget constraint to hold, the revenue and expenditure must be cointegrated (Hakkio & Rush, 1991). If the variables of interest are cointegrated of order 1 then Kenya's public debt is sustainable even though the series are non-stationary.

The cointegration relationship is defined as:

$$R_t = \mu + \beta G_t + \varepsilon_t \dots \dots \dots (9)$$

The Johansen cointegration test is widely used because of its ability to check for higher level cointegration relationship between variables, as opposed to earlier tests i.e. Engle Granger, which only addressed the first level cointegration relationship (Baum, 2005). The paper used this test to test for cointegration between revenue and expenditure.

Quintos (1995) differentiates between strong and weak sustainability. Debt is weakly sustainable if $0 < \beta < 1$, strongly sustainable if $\beta = 1$ and not sustainable if $\beta \leq 0$.

3.5 Data Types and Sources

The study used annual time series data for the period 1981-2014. The study used secondary data from the Central Bank of Kenya and Annual Statistical Abstracts from Kenya National Bureau of Statistics (KNBS). The values of debt, budget deficit, revenue and expenditure used will be relative to GDP because as economies grow over time, it becomes more useful to calculate sustainability in terms of ratios of GDP as the government's capacity to repay its debt is likely to increase (Blanchard, Chouraqui, Hagemann, & Sartor, 1990).

To investigate the uses of Kenya's external debt, the paper analyzed data from the Treasury's external public debt register.

3.6 Definition of variables

The variables used to carry out sustainability tests are:

- 1) **Government debt to GDP ratio:** This is the sum of both domestic and foreign government debt divided by the country's GDP.
- 2) **Government expenditure to GDP ratio:** This is total government expenditure which includes both recurrent and development and interest payment on government debt divided by the country's GDP.
- 3) **Government revenue to GDP ratio:** This is the government revenue collected from all revenue generating sources in the country including seigniorage and grants divided by the country's GDP.
- 4) **GDP:** This is the gross domestic product of Kenya in nominal values.
- 5) **Budget balance to GDP ratio:** This is the difference between government revenue to GDP ratio and expenditure to GDP ratio.

CHAPTER FOUR

RESEARCH FINDINGS

This chapter presents the descriptive statistics of data, normality tests, and the empirical research findings obtained using that STATA statistical package. The analysis used the GDP ratios of debt, revenue, expenditure and the budget balance as Blanchard, Chouraqui, Hagemann, & Sartor (1990) stated that it is more useful to calculate sustainability in terms of ratios of GDP as the government's capacity to repay its debt is likely to increase as the economy grows.

4.1 Descriptive Statistics and Normality tests

Table 4.1 below shows the descriptive statistics for the data on sustainability of Kenya's debt. The statistics computed include measures of central tendency such as the mean, median, skewness and kurtosis. Skewness is a measure of the direction and degree of asymmetry of a given distribution around its mean, while kurtosis measures the peaking and flattening of the distribution tail (Cisar & Cisar, 2010). For a normal distribution skewness should be 0 while the kurtosis should be 3. A positive kurtosis indicates a relatively peaked distribution while if the kurtosis is negative kurtosis the distribution will be relatively flat (Cisar & Cisar, 2010).

Table 1: Presentation of Descriptive Statistics

Variable	Debt/GDP	Revenue/GDP	Expenditure/GDP	Budget balance/GDP
Observations	34	34	34	34
Mean	0.5991235	0.4377512	0.4660025	-0.0398367
Median	0.5893922	0.4133391	0.4169604	-0.0390388
Mean-Median	0.0097313	0.0244121	0.0490421	-0.0007979
Skewness	0.9404836	1.945347	1.278808	0.7127356
Kurtosis	4.250787	7.385322	3.911023	5.593088

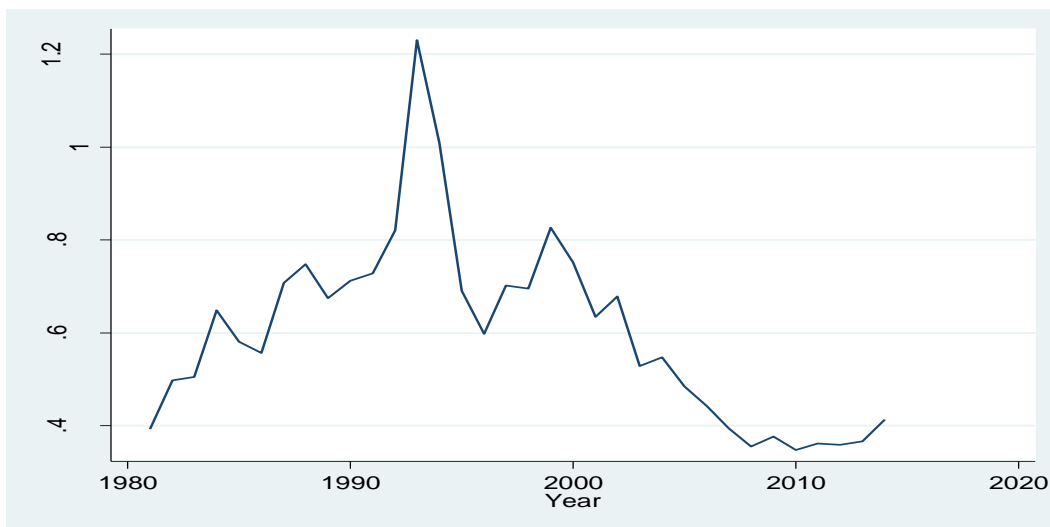
Table 4.1 shows that the ratios of debt, expenditure, and the budget balance to GDP are normally distributed since the differences of the mean and median are equal to zero. The

distribution is positively skewed while the values from kurtosis indicate that the ratios of debt, revenue, expenditure, and the budget balance to GDP peak over time.

4.1 Graphical Presentation of Descriptive Statistics

Figure 4 shows Kenya's debt to GDP ratio is currently at a historical low having decreased from a peak of 123% in 1993. This could lead one to assume that Kenya's debt is currently at a sustainable level. In the next section, sustainability tests are carried out on Kenya's total public debt to test this assumption.

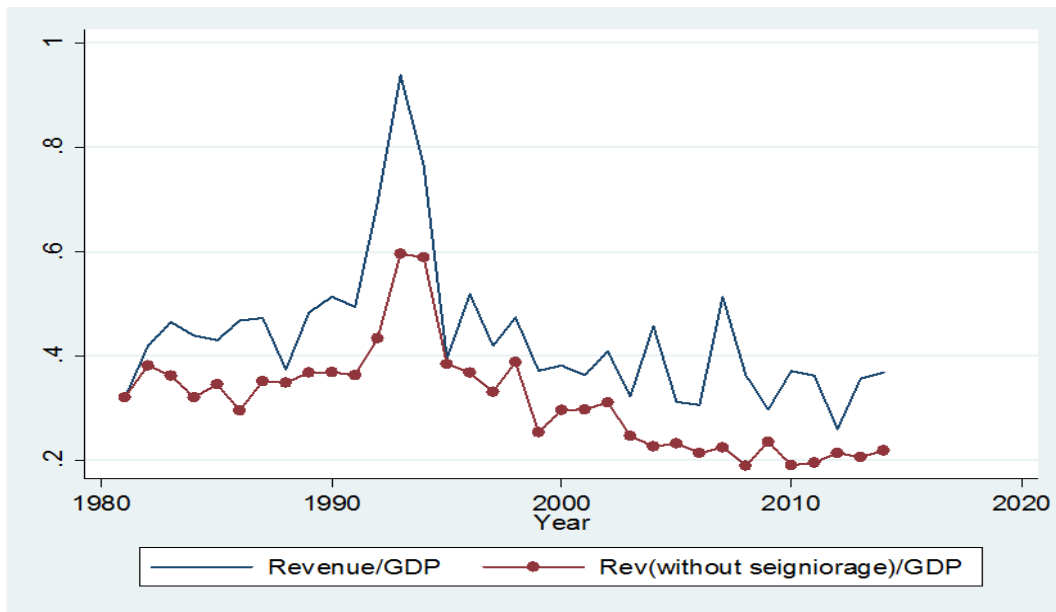
Figure 4: Kenya's debt to GDP ratio



Source: (KNBS, 1981-2015)

Figure 5 show the difference between government revenue with seigniorage and without seigniorage. It can be seen that seigniorage revenue has historically played an important role in increasing the government's total revenue. Seigniorage revenue peaked between 1991 and 1993 which coincides with Kenya's first multiparty elections in 1992. It is possible that the government printed money to finance this elections hence the spike in seigniorage revenue.

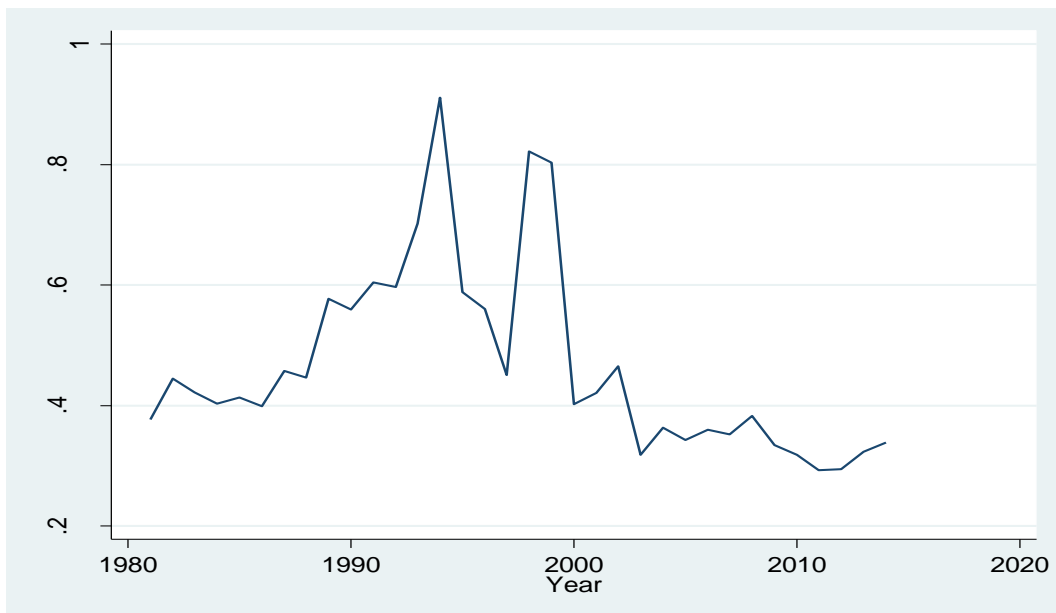
Figure 5: Kenya's revenue to GDP ratio



Source: (KNBS, 1981-2015)

Figure 6 shows that Kenya's expenditure as a percentage of GDP has generally been trending downwards since 2000. This could be attributed to the country's strong economic growth which has increased at a faster rate than the increase in government expenditure.

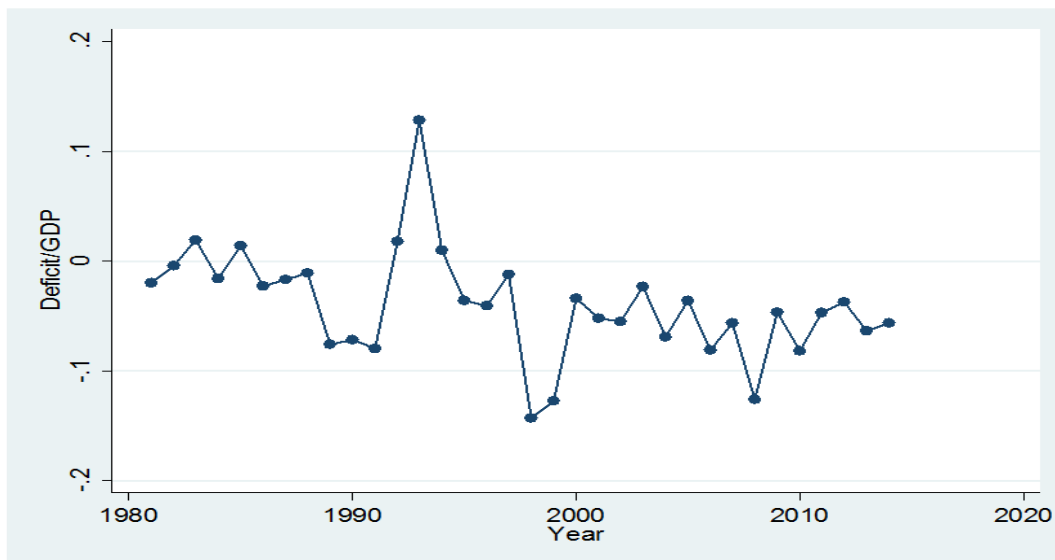
Figure 6: Kenya's expenditure to GDP ratio



Source: (KNBS, 1981-2015)

Figure 7 shows that the government has persistently ran budget deficits save for the early 1980s and in 1993. The huge surplus in 1993 may be attributed to an increase in seigniorage revenue.

Figure 7: Kenya's deficit to GDP ratio



Source: (KNBS, 1981-2015)

4.2 Testing for Stationarity

To determine the sustainability of Kenya's public debt we test for stationarity of the budget balance. Unit root tests are carried out to test the stationarity of the budget balance as a percentage of GDP.

4.2.1 ADF and PP Tests

The ADF and PP tests are performed to determine whether the budget balance as a percentage of GDP is stationary. The hypotheses to be tested are:

H_0 : the series is non-stationary

H_1 : the series is stationary

The results of the ADF and PP tests are shown in table 2. Based on these results, we fail to reject the null hypothesis of the presence of unit root tests and conclude that debt is non-

stationary. This conclusion may be attributed to the failure of ADF and PP tests to account for structural breaks.

Table 2: ADF and PP Test

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
ADF	-3.910	-3.696	-2.978	-2.62
PP	-3.830	-3.696	-2.978	-2.62

Using unit root tests that account for structural breaks has two advantages (Glynn, Perera, & Verma, 2007):

1. It prevents yielding a test result which is biased towards accepting the presence of a unit root
2. It identifies when a structural break occurred. This provides valuable information for analyzing whether a structural break on a certain variable is associated with a particular event.

4.2.2 Zivot Andrews Test

The Zivot Andrews tests takes into account the presence of one structural break in the series.

The hypotheses to be tested are:

H_0 : the series is non-stationary

H_1 : the series is stationary

Zivot-Andrews unit root test are conducted for the budget balance to GDP ratio allowing for one structural break in the intercept, trend, or both intercept and trend. The test results are shown in table 3.

Table 3: Zivot-Andrews Test

	Min t-Statistic	Break date	1% Critical Value	5% Critical Value	10% Critical Value
Break in intercept	-3.557	2002	-5.34	-4.8	-4.58
Break in trend	-3.004	1999	-4.93	-4.42	-4.11
Break in both	-3.709	2002	-5.57	-5.08	-4.82

We fail to reject the null hypothesis and conclude that the budget balance is non-stationary. However, it is possible that we fail to reject the null hypothesis because there is more than one break in the series.

4.2.3 Clemente, Montañés & Reyes Test

The Clemente, Montañés & Reyes test accounts for two breaks in the series. The test is performed on the budget balance to GDP ratio.

The hypothesis to be tested:

H_0 : Presence of unit roots with structural breaks

H_1 : No unit roots with structural breaks

Table 4: Clemente, Montañés & Reyes Test

	t-Statistic	Break date	5% Critical Value
Additive Outliers (AO)	-4.842	1995, 2001	-5.490
Innovational Outliers (IO)	-8.526	1996, 2001	-5.490

We fail to reject the null hypothesis for the AO but we reject the null hypothesis for the IO and conclude that there are no unit roots implying that the budget balance to GDP ratio is stationary. From these results we conclude that there are two gradual changes in the mean series and Kenya's budget deficit is stationary.

From the unit root tests conducted above, the paper found that Kenya's debt was stationary when two structural breaks (1996 and 2001) which allow for gradual changes in the budget deficit were taken into account. Therefore, the budget balance is bounded hence Kenya's debt is bounded rendering debt sustainable implying that the NPG constraint is not violated.

4.3 Testing for Cointegration

The existence of a cointegration relationship between government revenue and expenditure indicates that the budget deficit is bounded therefore debt is bounded implying that the no

Ponzi game condition holds therefore country's debt is stationary. The Johansen cointegration equation takes the following:

$$R_t = \beta_1 + \beta_2 G_t + \sum_{i=1}^k \delta_i \Delta G_{t-i} + \varepsilon_t$$

Where:

Δ is the first-difference operator

β_i, δ_i , are constant parameters;

ε_t is a stationary stochastic process.

The results of the Johansen cointegration tests are shown in table 5. The null hypothesis of no cointegrating relation can be rejected at 5% level of significance since the trace statistic is greater than the 5% critical value, while the null hypothesis of existence of one cointegrating relation cannot be rejected at 5% level of significance. We can conclude that the revenue to GDP ratio and the expenditure to GDP ratio are cointegrated. From this we can conclude that the country's debt is sustainable and the second assumption of the model is not violated.

Table 5: Johansen Cointegration Tests

Maximum rank	Lower limit	Eigen Value	Trace Statistic	5% Critical Value
0	48.467952		17.9537	15.41
1	55.942144	0.37321	3.0053*	3.76
2	57.444785	0.08964		

The cointegration regression in equation (9) takes the form:

$$R_t = 0.17 + 0.56G_t + \varepsilon_t$$

Based on Quintos (1995) differentiation between strong and weak sustainability, we can conclude that Kenya's debt is weakly sustainable since $\beta=0.56$. The equation indicates that for each Ksh1 increase in expenditure, revenue rises by Ksh0.56.

4.4 Uses of Foreign Debt

Table 6 show that 45% of Kenya’s debt is owed to foreigners. The huge proportion of external debt exposes the country to volatility in the global currency markets. A depreciation of the Kenyan shilling against any of currencies below would increase the country’s debt burden. Therefore, it would be important for the Central Bank to main a stable currency so that Kenya’s debt burden is not affected by currency volatility.

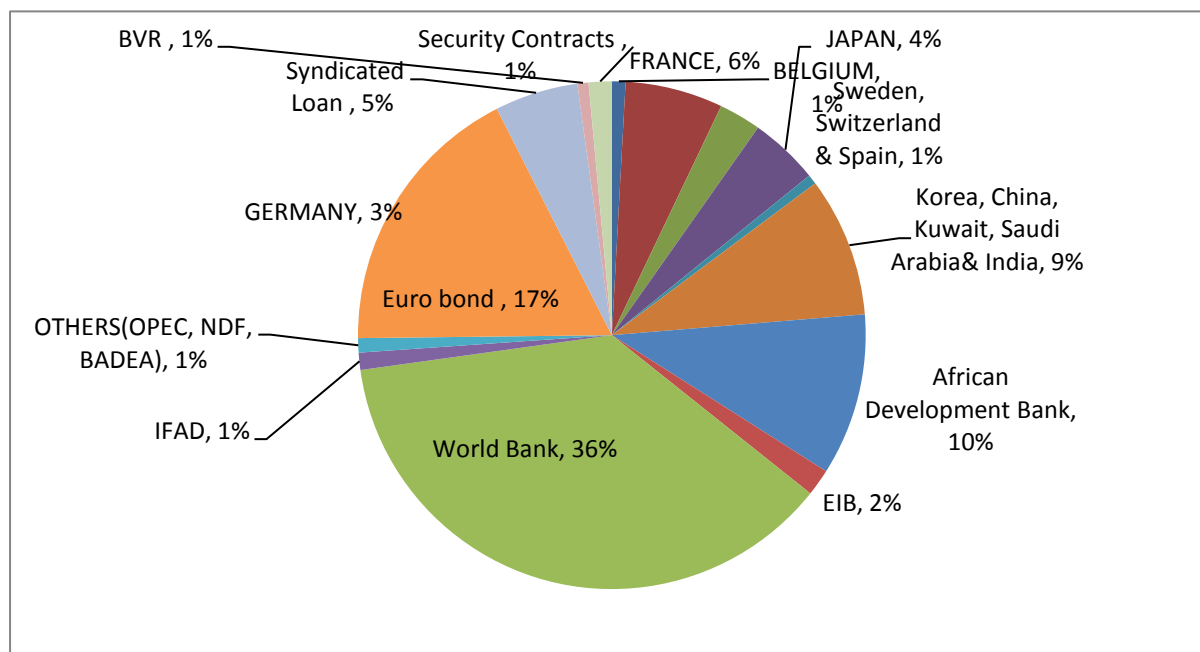
Table 6: The Structure of Kenya’s Total Public Debt

	Amount Outstanding (KES)
External loans	
Pound Sterling Loans	1,562,078,440
US Dollar Loans	756,131,902,567
Euro Loans	146,013,017,726
Other Currencies	104,374,771,116
Sub total	1,008,081,769,850
Internal loans	
Pre-1997 Govt. O.D. Debt	28,273,000,000
Treasury Bonds	914,762,401,934
Short Term Borrowing	299,406,150,000
Sub total	1,242,441,551,934
TOTAL DEBT	2,250,523,321,784

Source: (Kenya National Treasury, 2012)

Figure 8 shows the structure the country’s external debt. Multinational organizations hold 51% of Kenya’s debt, with the World Bank being the largest institutional lender. This is positive for the country as multinational organizations lend to the government at low interest rates which has historically been at an average of 1% (Kenya National Treasury, 2012)

Figure 8: Structure of Public and Publicly Guaranteed External Debt



Source: National Treasury, Kenya (2014)

Table 7 shows the cumulative allocation of Kenya’s debt since 1979. It can be seen that the country has paid a lot of attention to the social protection and urban development sector. Most of the funds that have gone to this sector are from the World Bank, whose main goal is to end extreme poverty and promote shared prosperity (World Bank, 2008). This shows that the World Bank tends to promote its goals when it lends to a country. The effect of this could be positive if the country receiving the funds is able to use them effectively to alleviate poverty but negative if the country does not share in the World Bank’s vision and the projects that the Bank funds do not meet their objectives.

This may be the case in Kenya as despite the huge allocation to the social protection and urban development sector, the poverty levels in the country have registered a minimal decrease (from 47% of Kenya’s living below the poverty line in 1981 to 42% in 2008) while the national consumption decile ratio, a measure of inequality, rose from 13 to 19 between 1997 and 2006 (World Bank, 1995; World Bank, 2008). It would seem that the projects that were funded did not sufficiently meet their desired objectives. Given nature of most poverty alleviation programs, it is possible that the funds needed to repay this debt would have to be sourced from other sources. However, urbanization in the country could have benefited from the huge allocation to the sector as the number of urban centers across the country has increased over the years. The increase in the government’s revenues could partly be attributed to increased urbanization as an increase the urban population raises the government’s ability

to collect revenue from both direct (more workers in the formal sector) and indirect taxes. The government's revenues may continue to increase as the country's new devolved system of government may increase the level of urbanization in the country if governors are able to effectively use the money allocated to them.

Table 7: Cumulative External Debt Allocation since 1979

SECTOR	USD
Social protection & Urban development	109,134,341,532
Transport and Communication	5,943,120,723
Energy	2,172,279,348
Agriculture	1,185,949,902
Water and sanitation	986,277,598
Industrialization	796,079,518
Education	471,691,604
Public Administration	401,631,429
Finance	365,586,943
Health Sector	328,715,133
Unclassified	3,608,102,238

Source: (Kenya National Treasury, 2012)

The transport & communication and the energy sectors receive the second and third largest allocations. Although the allocation to these sectors is only 5% and 2% of the allocation to the social protection and urban development sector, the focus on these sectors seems to be a step in the right direction as these sectors could help increase industrialization in the country as lower transport, communication, and energy cost could attract investment in the manufacturing sector. The industrial sector has also received a huge portion of the external loans as the government has used this money to develop the country's export processing zones, support small and medium enterprises, and rural industrialization (Kenya National Treasury, 2012). An increase in industries in the country could lead to higher employment, economic growth and the government revenues. A large portion of loans used in the transport, communication and the energy sectors tends to be used for development of infrastructure as roads are built and power generating equipment are bought. This type of investment tends to generate revenue that the government can use to repay the loans borrowed.

Industrialization seems to be a key driver of growth as analysts have named industrialization policies that aimed to promote manufacturing and service sector exports as the core of the

Asian countries' growth strategy (Bloom, Sachs, Collier, & Udry, 1998). If the government continues to focus on this sector, the country's economic growth may register a rapid increase and the revenues generated may be used to repay the country's debt.

The Agricultural sector has historically received the fourth largest allocation. However, production has remained low as its contribution to GDP has decreased from 33% in 1981 to 26% in 2014 (Central Bank of Kenya, 2014). This could be attributed to the high level of small scale farming carried out across the country. Data from Kenya's Statistical abstracts show that the value of marketed products from small scale farms has increased from 56% in 1980 to 73% in 2014 indicating that the country is slowly moving away from large scale farming. Large scale farming is more productive therefore; this shift could be detrimental to the country's food production. A change to commercial agriculture could help drive growth in this sector and increase the government's revenue.

CHAPTER FIVE

CONCLUSION AND POLICY RECOMMENDATIONS

The study aimed at investigating the sustainability of Kenya's total public debt. Having carried out sustainability tests in the previous section and finding out that the country's debt was sustainable; this section is dedicated to exploring the policy implications of the findings from data analysis, the research limitations, conclusions, and suggesting areas for further research.

5.1 Summary

The sustainability of Kenya's public debt is a source of concern. The country's debt in absolute terms has rapidly increased over the years which have raised concerns over whether or not the country's debt is sustainable. Debt sustainability requires the borrower to be able to continue servicing its debts without an unrealistically large future correction to the balance of expenditure and income (IMF, 2002). This paper carried out sustainability tests for Kenya's debt to GDP ratio.

The Zivot Andrews and Clemente, Montañés & Reyes test which account for structural breaks. The country's debt was found to be stationary when two structural breaks were taken into account. Previous studies carried out on Kenya's debt had found that the country's debt was not stationary (Mwai, 2012; Nandelenga, 2010). Their results may be attributed to the failure to account for structural breaks and seigniorage revenue.

Two break dates were identified i.e. 1996 and 2001. The 1996 break date correspond with the period of structural adjustment programs that the Kenyan government implemented while 2001 was the year before the end of the KANU government's 40 year rule.

Cointegration tests were also carried out and the results indicated debt was sustainable as revenue and expenditure were cointegrated. Kenya's debt was found to be weakly sustainable i.e. for each Ksh1 increase in expenditure, revenue rises by Ksh0.56. From the results the study concluded that the country's public debt was sustainable.

The paper also found that the largest share of foreign debt had been allocated to the social protection and urban development sector this could be attributed to the focus of the World Bank, Kenya's largest lender, on this sector. Despite the high allocation to this sector, the level of inequality and poverty had registered a minimal improvement. The paper also found that the transport and communication and the energy sector had received the second and third

largest allocations. These were viewed as positive developments as they could lead to increased industrialization in the country.

5.2 Conclusions

Previous studies done on the sustainability of Kenya's public debt had failed to account for structural breaks and the government's use of seigniorage revenue thus they had concluded that Kenya's debt was non-stationary. This study carried out unit root test that accounted for structural breaks and concluded that the country's debt was stationary thus sustainable. Cointegration tests confirmed the sustainability of debt. Kenya's debt was found to be weakly sustainable.

The paper also looked at the uses of foreign debt. The paper found that the government had focused the social protection and urban development sectors and that this sector was unlikely to generate enough revenue to repay debt. However, transportation & communication and energy sectors are expected to drive growth in the future thus they could lead increase in government revenue.

5.3 Policy Recommendations

The sustainability tests conducted in this paper indicate that Kenya's total public debt is sustainable. This shows that the government is not playing a Ponzi game and there is therefore no need for alarm over the current debt levels. However, since the debt was found to be weakly sustainable there is need for the government to review its fiscal policy as in the event of a major shock, the country's debt may move to unsustainable levels.

Seigniorage revenue was included in the analysis and could be one of the main reasons for the conclusion that country's debt is sustainable. Although the government's use of seigniorage has helped increase revenue thus reduced the government's borrowing pressure, printing money can negatively affect an economy as it imposes a tax on the population of a country thereby reducing consumption i.e. exerts upward pressure on inflation. The government should consider reducing its reliance on seigniorage as it could negatively affect the domestic economy.

The government should increase its focus on the transport and communication and energy sectors as these could help increase the country's economic growth in the future. Targets should also be set for the funds that go to the social protection and urban development sector to ensure that the funds meet their desired objectives.

5.4 Limitation of the Study

The study did not carry out a dynamic analysis of debt which would have been useful in predicting the future path of public debt.

5.5 Area of Further Research

This study covered Kenya's total public debt. An analysis of the sustainability of the country's total debt (both public and private) could be pursued. A dynamic analysis of the country's debt may also prove to be useful as it would offer a more forward looking concept.

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APPENDIX

Table A1: Raw Data

Year	Revenue/GDP	Expenditure/GDP	Deficit/GDP	Debt/GDP	Rev(without seigniorage)/GDP
1981	0.319007	0.376894	-0.01981	0.393119	0.320047
1982	0.4188	0.444895	-0.00408	0.497836	0.381507
1983	0.464613	0.42194	0.019293	0.505664	0.362081
1984	0.438395	0.402953	-0.01625	0.648736	0.319971
1985	0.42988	0.413065	0.014246	0.580692	0.345392
1986	0.467424	0.398589	-0.02307	0.55651	0.295302
1987	0.472575	0.457145	-0.0168	0.707733	0.350785
1988	0.373353	0.446564	-0.01078	0.747673	0.347815
1989	0.483034	0.57714	-0.07589	0.67463	0.367657
1990	0.513219	0.559649	-0.07175	0.712481	0.368927
1991	0.49423	0.604747	-0.07997	0.727869	0.36306
1992	0.693984	0.597144	0.017799	0.820841	0.433914
1993	0.938413	0.701743	0.128367	1.229593	0.595365
1994	0.764681	0.910863	0.009845	1.008807	0.589076
1995	0.394906	0.588017	-0.03618	0.690852	0.384408
1996	0.517693	0.559959	-0.04092	0.598093	0.367408
1997	0.419044	0.450329	-0.01203	0.702341	0.330524
1998	0.47322	0.82152	-0.14293	0.695206	0.387592
1999	0.371567	0.8036	-0.12726	0.826034	0.253516
2000	0.381611	0.40218	-0.03374	0.751474	0.296199
2001	0.362639	0.420855	-0.05218	0.634834	0.29642
2002	0.407878	0.464796	-0.0552	0.678661	0.310442
2003	0.322427	0.318432	-0.02344	0.52916	0.24619
2004	0.456791	0.36318	-0.06917	0.547738	0.226217
2005	0.311688	0.3431	-0.03625	0.485128	0.231598
2006	0.305202	0.359841	-0.08117	0.442817	0.213217
2007	0.512999	0.351637	-0.05649	0.394402	0.223883
2008	0.362462	0.382719	-0.12618	0.355047	0.189454
2009	0.297034	0.334127	-0.04663	0.376692	0.235009
2010	0.370724	0.318304	-0.08172	0.348061	0.19022
2011	0.361346	0.292672	-0.04688	0.361693	0.195015
2012	0.258537	0.294031	-0.03716	0.359654	0.213204
2013	0.356391	0.32328	-0.06374	0.366268	0.205954
2014	0.367772	0.338173	-0.05632	0.413857	0.218504

Breusch-Godfrey LM test for autocorrelation

lags (p)	chi2	df	Prob > chi2
1	2.124	1	0.1450
2	5.354	2	0.0688
3	8.699	3	0.0336
4	13.826	4	0.0079
5	14.008	5	0.0156
7	14.033	7	0.0506
8	14.734	8	0.0645
10	15.658	10	0.1099

H0: no serial correlation

Prais-Winsten AR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs =	34
Model	.102349481	2	.05117474	F(2, 31) =	4.51
Residual	.35163792	31	.011343159	Prob > F =	0.0191
Total	.453987401	33	.013757194	R-squared =	0.2254
				Adj R-squared =	0.1755
				Root MSE =	.1065

debtgdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
revenuegdp	.2718479	.1023181	2.66	0.012	.0631686 .4805271
expendituregdp	.2263754	.3255064	0.70	0.492	-.4374992 .89025
_cons	.3430722	.131086	2.62	0.014	.0757206 .6104239
rho	.7634125				

Durbin-Watson statistic (original) 1.668779

Durbin-Watson statistic (transformed) 2.123098