THE IMPACT OF PUBLIC DEBT ON INFLATION, GDP GROWTH AND INTEREST RATES IN KENYA

BY:

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Declaration

This project is my original work and has not been submitted for a degree in any university.

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Date

This project lias been submitted for examination with my approval as university supervisor

Supervisor: Dr. Josiah Aduda

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Dedication

This work is dedicated to my mother, family and the Government of Liberia.

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Foremost, thanks to God Almighty for granting me the chance and the ability to successfully complete this study.

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LIST OF ABBREVIATIONS

CBK	Central Bank of Kenya
CLYPS	Cowan, Yeyati, Panizza and Starzenegger
DMs	Developed Markets
DSA	Debt Sustainability Analysis
EMs	Emerging Markets
GDP	Gross Domestic Product
GNP	Gross National Product
HIPCs	Heavily Indebted Poor Countries
IDA	International Development Association
IMF	International Monetary Fund
INTOSAI	International Organization of Supreme Audit Institutions
JG	Jeanne and Guscina
JP	Jaimovich and Panizza
LICs	Low Income Countries
MDRI	Multilateral Debt Relief Initiatives
OECD	Organization for Economic Cooperation and Development
SPSS	Statistical Package for Social Sciences
UK	United Kingdom
US	United States
USD	United States Dollars

Abstract

This research looks at the impact of public debt on three major economic indicators (Inflation, GDP growth and Interest rates) in Kenya. The study was conducted with the objective of finding out the relationships that exist between these variables and public debt.

The study draws upon secondary data on the mentioned variables published by the government of Kenya covering the period 1996 to 2011. Most prior researches on public debt focus on its links with single variables and sustainability issues. Findings from these studies vary across variables. Some studies show positive relationships, others negative relationships while others show mo relationships at all.

The study adopts a descriptive research design in studying the impact of public debt on inflation GDP, and interest rates in Kenya. Using three simple linear regression models, the study finds out that there is a weak positive relationship on the public debt-inflation-GDP growth link with the public debt-GDP growth link being the highest. A negative strong relationship is observed alone the public dept-interest rates link.

On a general note, the study concludes that the Public Debt-Inflation-GDP growth-Interest rates link cannot be found in a single analysis. The relationship varies across variables. While other variables show a weak relationship others portray a strong one. For instance, of the variables compared in this study public debt and interest rates show the strongest relationship. Next is the relation between public debt and GDP growth which is moderately weak; and finally public debt and GDP growth which shows the least among the three variables.

Apart from sustainability concerns, high public debt levels may directly or indirectly harm economic growth. To mitigate this situation policy makers are urged to consider tightening and streamlining new borrowings to development needs and prioritize such needs to provide a conducive macroeconomic environment.

CHAPTER ONE:
INTRODUCTION

1.1 Background to the study

In recent months the news of public debt tends to overtake the headlines of the print and electronic media as well as many business articles. As it was with the 2008 financial crisis, the spillover effect of the debt crisis which appears to be only a matter of the Euro Zone, could definitely adversely impact all developing countries. African countries are not therefore an exception to any contagion effect that may affect countries around the world. Any effort to address the problem of public debt must consider macroeconomic variables such as gross domestic product, inflation, interest rates as well as other variables that are paramount to a nation's economy (Waldron and Zampolli, 2010a).

Following the global financial crisis and the associated rise in the already high levels of public debt, concerns for fiscal sustainability remain elevated in many advanced economies. While most of these economies began already implementing fiscal consolidation, in most of them public debt-to-GDP ratios were projected to rise further in the couple of years following (Hernando, 2010).

As modem macroeconomics developed over the last half-century, most people either ignored or treated with delicacy the issue of debt. With few exceptions, the focus was on a real economic system in which nominal variables - prices or wages, and sometimes both were costly to adjust. The result, brought together brilliantly by Michael Woodford in his 2003 book, Interest and Prices is a logical framework where economic welfare depends on the ability of a central bank to stabilize inflation using its short-term nominal interest rate tool. Money, both in the form of the monetary base controlled by the central bank and as the liabilities of the banking system, is a passive by-product. With no active role for money, integrating credit in the main stream framework has proven to be difficult (Bernanke et al, 1999).

This study therefore investigates the impact that public debt bears on three of the major macroeconomic variables (GDP, Inflation and Interest rates) using Kenya as a country of focus.

1.1.4 Overview of Kenya's Public debt

Public debt remains one of the major economic policy issues confronting the governments of poor countries globally. The debt levels, particularly among the Highly Indebted Poor Countries (HLPCs), and Low-Income Countries (LICs) generally, have for a long time raised major concerns among international financial institutions and bilateral lenders, resulting in several initiatives from the developed countries and from the international financial institutions to ease the debt burden that was threatening to cripple the economies of HIPCs. The initiatives range from measures to ease the debt burden through debt rescheduling to outright debt forgiveness (Maana et al, 2008).

Table 1.0 Summary of Kenya's public Debt 1996 to 2011

	Domestic Debt in Ksh Bn		External Debt Ksh Bn	Total debt as a % of GDP
End of Aug. 2011	768.51		744.48	56
End of June	Domestic Debt	As a % of GDP	External Debt	As a % of GDP
1996	120,355	17.5	345,939	50.3
2006	357,839	22.9	431,237	27.6

Ministry of Finance (2011) indicates that as at end August 2011, public and publicly guaranteed debt stood at Kslis 1,545.20 billion or 56.0 percent of GDP. The increase of 1.2 percent over the end July 2011 position is attributed to external debt which stands at Kshs 768.51 billion from Kshs 744.48 in July. Domestic debt stock stood at USD 8.29 billion a decrease from USD 8.58 billion in July 2011. (Ministry of Finance Report, 2011)

Over the last decade plus, Kenya's public debt stock has been rising. The country's public debt increased from Ksh 466,294 million (or 67.8 percent of GDP) at the end of June 1996 to Ksh 789,076 million (50.5 percent of GDP) at the end of June 2006. In terms of debt category, domestic debt rose from Ksh 120,355 million (17.5percent of GDP) at the end of June 1996 to Ksh 357,839 million (22.9 percent of GDP) at the end of

June 2006 while external debt rose from Ksh 345,939 million (50.3 percent of GDP) to Ksh 431,237 million (27.6 percent of GDP) in the same period. Despite the rise in the stock of debt during the period, the proportion of overall debt to GDP declined due to a faster growth in GDP particularly over the period 2004 to 2007. (Ministry of Finance Report, 2007)

The composition of public debt has changed significantly with the share of domestic debt increasing from 25.8 percent of total debt at the end of June 1996 to 45.3 percent at the end of June 2006. Over the same period the proportion of external debt in total debt fell from 74.2 percent to 54.7 percent. The shift in the composition of debt during the period is attributed to reduced access to external funding from multilateral and bilateral agencies and increased domestic borrowing to close the short fall (Ministry of Finance Report, 2007).

The structure of external debt by creditor type has remained relatively unchanged over the last few years before 2006. As at end of June 2006, the leading multilateral creditor was the International Development Association (IDA) (47.4 percent of total external debt), followed by the African Development Bank Group (6 percent) and the European investment Bank (3.1 percent) while Japan (18.4 percent) was the leading bilateral creditor. The currency composition of the external debt was in Euros (34 percent), US dollars (32 percent), Japanese Yen (27 percent) and Sterling Pound (6 percent) while about 1 percent of the debt is denominated in other currencies (Ministry of Finance Report, 2007).

In May 2001, driven by the need to lower the rising cost of domestic debt borrowing, reduce refinancing risk and promote the development of Government securities market, the Government, in consultation with stakeholders through the *Market Leaders Forum* agreed to introduce longer dated Treasury Bonds to lengthen the maturity profile of the debt. This initiative led to a dramatic change in the ratio of Treasury Bills to Treasury Bonds from 74:26 at the end of May 2001 to 30:70 at the end of June 2006. In addition, the Treasury Bonds began to trade at the Nairobi Stock Exchange. In order to curb

inflationary pressures resulting from monetized borrowing through Government direct borrowing from CBK, the Central Bank of Kenya Act (Cap 491 Laws of Kenya) was amended to limit the overdraft to 5 percent of the latest Government audited revenue. (Ministry of Finance Report, 2007)

Overall public debt service declined during the past few years mainly as a result of **rescheduling** of external debts through the Paris Club and London Club. Debt service decreased from Ksh 57,487 million (39.5 percent of revenue) in the fiscal year 1995/96 to Ksh 44,320 million (14.1 percent of revenue) in the fiscal year 2005/06. However, it should be noted that over the two years prior to 2007 external debt service to commercial creditors decreased significantly following the Government's decision to suspend payments of external commercial debts pending the outcome of a special audit and investigations by the Controller & Auditor General and Kenya Anti-Corruption Commission respectively. Over the period 2000/01 to 2004/05, domestic interest payments remained relatively stable (Ministry of Finance Report, 2007).

The sharp increase in domestic interest payments in the fiscal year 2005/06 was attributed to an increase in Government domestic borrowing to mitigate the effects of drought as well as to compensate for the shortfalls in the budgeted external financing. Kenya rescheduled its bi-lateral debts three times through the Paris Club, in 1994(USD 540 million), 2000 (USD 288 million) and 2004 (USD 350 million). It also rescheduled its commercial debts in 1998 (USD 43 million) and 2001 (USD 10 million) through the London Club (Ministry of Finance Report, 2007).

Although Kenya does not qualify for debt relief under both the HIPC and Multilateral Debt Relief Initiatives (MDRI), Government policy has been to seek for deeper relief on bilateral basis by seeking debt-for development swap arrangements and debt cancellation. However, according to the results of the Debt Sustainability Analysis (DSA) carried out by the IMF in November 2003, Kenya's external debt burden indicators reveal that external debt is sustainable. The public debt figures are likely to be higher than before

due to the prevailing inflation that forced the Central Bank of Kenya to review the base rates from 14% to 18% (Ministry of Finance Report, 2007)

1.2 Statement of the Problem

As the news of debt crisis and the associated bailout initiatives continue to be the center of discussions in world economic forums, particularly the Euro Zone, others including developing countries like Kenya should be concerned of any would be contagion effect that could negatively impact the country's economy.

Owing to the reality that almost all nations finance their development projects through borrowings gives enough reason why Kenya is not an exception. This then suggests that it is now time if not too late for countries still outside the hook to exercise caution in a bid to advert the short and/or long term effect that may adversely impact their people. To tackle this emerging problem, key inacroeconomic variables such as gross domestic product (GDP), inflation, and interest rates; to name a few, must be thoroughly considered.

According to the Ministry of Finance Report (2007) Public debt continues to be a major challenge towards achievement of Millennium Development Goals. A significant proportion of the Government budget allocation is to service public debt, leaving inadequate financial resources for pro-poor development programmes. The need to strengthen public debt management is critical not only to lowering the cost of debt service to the Exchequer, but also to the development of Kenya's capital markets. Over the two years prior to 2007, the Government experienced major lapses in systems and controls related to management of external supplier credit loan contracts. In response to these shortcomings, the Government took steps to develop effective institutional and legal framework for public debt management anchored on a public debt strategy consistent with the Kenya Vision 2030. (Ministry of Finance Report, 2007)

Cecchetti et al (2011) focused on issues of risk. In particular, the optimal taxation approach tries to find the path for taxes that minimizes the total welfare loss. The public

debt management could contribute to smooth the tax burden through the changing return on debt. This argument moves towards the issuance of debt contingent on the outcome for government spending. However, in practice governments do not issue state-contingent debt, and a number of papers have looked at whether the optimal fiscal policy could be supported by conventional debt instruments. In spite of this discussion, the optimal debt structure would depend on the interaction between changes in inflation and changes in government spending and revenue, and will vary from country to country, depending on the structure of the tax system, the nature of the government's spending commitments and the different types of shocks the economy is subject to. There are however substantive empirical results pointing to a positive impact of an increase in public deficits and debt on long-term rates, though the overall evidence is by far not unanimous in this respect. Results are affected by differences in econometric models, definitions of government debt and interest rates as well as data sources, which complicate a comparison across studies. However, empirical studies often use single equation approaches, which do not account for the endogeneity of variables derived in theoretical macro-models. Some exceptions to this are Evans and Marshall (2001) and Quiang and Phillippon (2004), both looking at US data who found out that no evidence that fiscal policy shocks induce any significant interest rate response. (Cecchetti et al 2011)

Few months ago, the Kenyan currency depreciated to an alarming level. This major economic problem of course was mitigated through the intervention of the Central Bank of Kenya (CBK). Paradoxically, in the wake of the substantial strength gained by the Kenyan currency commodities prices as well as interest rates continue to rise. As a consequence, mortgage holders have begun selling their properties in many quarters of Kenya to meet payment deadlines. The question then is how does public debt impacts these rising prices and interest rates? And, to what extent does public debt impact the two variables mentioned supra as well as GDP growth? The absence of a clear study providing answers to these questions suggests a research gap. It is therefore to these questions that this study provides answers.

1.3 Research objectives

The objective of the study is to establish the relationship between public debt and GDP, inflation and interest rates in Kenya.

1.4 Significance of the study

The study provides an understanding of the relationship between public debt and interest rates which is useful to financial institutions and borrowers in the country.

The study finds out the impact of public debt on GDP, inflation and interest rates. By these findings the government would be able to know the best and easy way to control public debt in order to avoid negative effects on the economy.

The findings of the study provides an understanding of the link between public debt and inflation, GDP growth and interest rates which would help economic analysts to assess the economic performance of the country and make informed decisions.

The results of this research are also useful to institutions of higher learning and future researchers in the area of economic development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Quite a number of studies have been done 011 public debt focusing on a number of macroeconomic variables. As for the variables considered in this proposal, the following studies have got no exhaustive literature on them.

Six different studies have been reviewed all of which to a larger extent speak to issues of public debt. The following literatures include an analysis of the future global trend of debt conducted by the research department of the Deutsche Bank in 2010. The next is a study done by (Hamilton, 1947) specifically providing a historical overview of debt accumulation; and then follows a series of other studies done by Cecchetti et al (2011), Modigliani (1961), INTOSAl Public debt committee (2003) and the Kenyan Ministry of Finance Report (2007)

2.1.1 Global Public debt trends

The single most important global trend - the public debt crisis - shows the increasing concern of the debt situation in the US, Japan and Europe, and the fear of this trend cascading into other regions looms over both developed and developing nations of the world. (Vicky Kapur, 2011)

A sustainability analysis conducted by the research department of Deutsche Bank in 2010 on Developing Markets (DMs) and Emerging Markets (Ems) projects that On a GDP-weighted basis public indebtedness in DMs will continue to rise substantially to 133% of GDP on average by 2020 (from 102% in 2010), according to baseline projections. In Emerging Markets (EMs), the debt-to-GDP ratio will fall to 35%, from around 46% in 2010. Looking at specific countries in the DM world, Japan, Greece, the US, Portugal, Italy, the UK, Ireland and France will probably have debt-to-GDP ratios of over 100% in 2020. Noticeably, Italy is the only country in this group whose debt-to-GDP ratio looks set to remain more or less at the same level as today. In Australia, Denmark, Sweden and

Belgium, debt-to-GDP ratios are forecasted to decline. In EMs, 16 out of 21 countries will probably see public debt decline over the period 2011-20. This indicates that most EM countries will not be forced to cut spending and/or hike taxes significantly. Only in five countries (Romania, the Czech Republic, Turkey, Poland and Hungary) will fiscal adjustment be necessary in order to avoid increases in the public debt burden between 2010 and 2020. Overall, the baseline scenario projections suggested that unsustainable debt dynamics, which have traditionally been perceived as an EM problem, are now increasingly becoming an issue for many DMs and not only for some smaller countries (Greece, Portugal, Ireland) but also for major economies. (Deutsche Bank Research 2010)

Before the 20th century, the accumulation of government debt was in general slow and occurred mainly in relation to wars. According to the Encyclopedia Britannica, the national debt of England was initiated 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 in 1790. Government debt, especially at local levels, was contracted to a smaller extent also for other piuposes. (Hamilton, 1947).

Cecchetti et al (2011) conducted a study on the debt and GDP of advance economies and indicate that over the past 30 years, the ratio of debt to GDP in advanced economies has risen relentlessly from 167% in 1980 to 314% today, or by an average of more than 5 percentage points of GDP per year over the last three decades. Given current policies and demographics, it is difficult to see this trend reversing any time soon. They further argue that beyond a certain level, debt is bad for growth. For government debt, the number is about 85% of GDP. For corporate debt, the threshold is closer to 90%. And for household debt, they report a threshold of around 85% of GDP, although the impact is very imprecisely estimated. (Cecchetti et al 2011)

Also Modigliani (1961) argned that the national debt is a burden for next generations, which comes in the form of a reduced flow of income from a lower stock of private capital. Apart from a direct crowding-out effect, he also pointed out to the impact on long-term interest rates, possibly in a non-linear form "if the government operation is of sizable proportions it may significantly drive up long-term interest rates since the reduction of private capital will tend to increase its marginal product" (Modigliani 1961)

INTOSAI Public debt committee (2003) warns that managers are now operating in very sophisticated and complex financial environments. A global capital market can generate numerous benefits (for example, easier access to a larger pool of capital at a lower cost, more efficient domestic capital markets and the possibility to better tailor risks using new financial instruments). However, public debt strategies can become dangerously vulnerable when faced with unforeseen events such as deteriorating private sector balance that can trigger fiscal, financial and economic crises. Economic shocks can impact on an economy's external debt and make a public debt strategy vulnerable, which in turn can impact on the overall economy and seriously deteriorate the financial condition of a government. Recent examples in emerging economies have shown that shocks can mutate into financial crises, debt management difficulties and budgetary consequences. (INTOSAI Public Debt Committee (2003)

According to the Ministry of Finance Report (2007) Public debt continues to be a major challenge towards achievement of Millennium Development Goals. A significant proportion of the Government budget allocation is to service public debt, leaving inadequate financial resources for pro-poor development programmes. The need to strengthen public debt management is critical not only to lowering the cost of debt service to the Exchequer, but also to the development of Kenya's capital markets. Over the last two years, the Government experienced major lapses in systems and controls related to management of external supplier credit loan contracts. In response to these shortcomings, the Government took steps to develop effective institutional and legal framework for public debt management anchored on a public debt strategy consistent with the Kenya Vision 2030. (Ministry of Finance Report 2007)

7 ? Review of Theories of Public Debt

In the past decades, public debt theories were centered on the contribution of debt management to the macroeconomic stabilization, in particular, whether the size and structure of the debt placed constraints to the monetary policy. However debt management neutrality relies on strong assumptions, which are unlikely to hold in practice. Alternatively, if more realistic assumption is made, it would be concluded that the level and composition of the debt are relevant. Based on that, recent models have focused more on the relationship between debt management and fiscal policy and the secondary market development.

2.2.1 The Dynamic political Economy Theory

The dynamic political economy theory of public spending, taxation, and debt builds on the well-known tax smoothing approach to fiscal policy pioneered by Barro (1979). This approach predicts that governments will use budget surpluses and deficits as a buffer to prevent tax rates from changing too sharply. Thus, governments will run deficits in times of high government spending needs and surpluses when needs are low. Underlying the approach are the assumptions that governments are benevolent, that government spending needs fluctuate over time, and that the deadweight costs of income taxes are a convex function of the tax rate. (Barro 1979).

The theory assumes that policy choices are made by a legislature comprised of representatives elected by single-member, geographically defined districts. The legislature can raise revenues in two ways: via a proportional tax on labor income and by borrowing in the capital market. Borrowing takes the form of issuing risk-free one-period bonds. The legislature can also purchase bonds and use the interest earnings to help finance future public spending if it so chooses. Public revenues are used to finance the provision of a public good that benefits all citizens and to provide targeted district-specific transfers, which are interpreted as pork-barrel spending. The value of the public good to citizens is stochastic, reflecting shocks such as wars or natural disasters. The legislature makes policy decisions by majority (or super-majority) rule and legislative policymaking in each period is modelled using the legislative bargaining approach of

Baron and Ferejohn (1989). The level of public debt acts as a state variable, creating a dynamic linkage across policymaking periods. (Barro 1979).

2.2.2 The positive Debt Theory

All governments from developed countries have positive debt. In many cases, debt is sizable relative to GDP. For example, data from the OECD (2006) shows that average central government debt in developed countries was about 50% of GDP between 1980 and 2006. In the U.S., federal government debt held by the public was $5:3 trillion by the end of the 2008 scale year, a bit over 37% of GDP. This paper proposes a theory that explains the level of debt. The key ingredients are nominal debt and an assumed lack of government commitment. The theory's empirical plausibility is evaluated by analyzing the reaction of debt and other policy variables to government expenditure shocks and comparing the results with data for the U.S. economy. In a seminal contribution, Barro (1979) argues that government debt should be used to smooth distortionary taxation over time. His theory predicts that debt only reacts to temporary variations in income or government expenditure and thus, debt levels are irrelevant for current debt issue. (OECD 2006)

In the absence of aggregate uncertainty, debt would be constant and equal to its initial level. As a result, taxes depend only on the permanent component of expenditure and the level of debt, so that taxes follow a random walk. While attractive as a normative theory, Barro's model is inconsistent with U.S. data along two important dimensions. First, debt over GDP displays mean-reversion, which suggests the existence of a fundamental long-run level of debt (Bohn, 1998).

Second, evidence from war episodes (Goldin, 1980) suggests that temporary increases in expenditure are financed with a mix of instruments, including taxes. (Goldin, 1980)

2.3 Empirical review

According to an empirical study carried out by United Nations (2008) obtaining data on the composition of public debt in developing countries is not an easy task. Jaimovich and

Panizza (2006, henceforth JP) show that most datasets do not even have good information on the level of total public debt. IMF-World Bank (2004) claim that "the perception, that domestic debt does not play an important role in low income countries, may have been partly the result of weak data availability" (United Nations 2008)

Recent attempts at collecting data on the composition of total public debt for various subsets of developing countries include Jeanne and Guscina (2006, henceforth JG), Cowan, Levy Ycyati, Panizza and Sturzenegger (2006, henceforth CLYPS), Christensen (2005), IMF (2006), and Abbas (2007). JG and CLYPS had a similar though not identical structure and report detailed data on debt levels and composition, focusing on both external and domestic debt. JG covered 19 emerging market countries and CLYPS covered 23 countries located in Latin America and the Caribbean. Both datasets aimed at covering the 1980-2004 period but had missing information for some countries in the 1980s and early 1990s. Unlike JG and CLYPS, Christensen (2005) and IMF (2006) only covered domestic debt. (United Nations 2008)

In this study the first dataset focused on a sample of 27 sub-Saharan Countries for the 1980-2000 period and the second on a sample of 66 low income countries for the 1998-2004 period. The one compiled by Abbas (2007) is by far the dataset with the largest coverage both in terms of number of countries and years (it covers 93 low income and emerging market countries for the 1975-2004 period). One problem with this dataset is that it focuses on bank holdings of domestic debt and does not capture domestic public debt held by non-banking institutions and retail investors. (United Nations 2008)
The study concluded that the choice of the optimal debt structure involves important trade-offs and, as weakness with the current system are often identified after a financial crisis starts to unravel (Krugman, 2006), policy makers should be aware of possible new vulnerabilities. Hence, crisis prevention requires detailed and prompt information on debt structure. Yet, most research and analysis focus on external borrowing and prompt and detailed information on the level and composition of domestic public debt is often not available to policymakers and analysts. This situation is made even worse by the fact that

standard debt sustainability analysis of public debt use a definition of "external" debt which does not reflect what it is supposed to measure. (Krugman, 2006)

Cholifani (2009) carried out an empirical study on the Role of Public Domestic Debt in Economic Development for Indonesia and Emerging Market Economies. The study found out that all coefficients are statistically significant and consistent with what is expected. The role of domestic debt on economic development is important since increasing one percentage point of domestic per GDP, economic growth will improve by an average 0.159 percentage points. A one percentage point increase of domestic debt per **GDP,** economic growth will increase by 0.47 percentage point. The increase of external debt over **GDP** by one percentage point will reduce economic growth by 0.16 percentage point. (Cholifani 2009)

From the empirical work of Missale and Blanchard (1994) it is stressed out that a government faced with nominal debt has an incentive to try to inflate it away in order to decrease the debt burden, and consequently the dynamics of the debt. Of course there is a trade off, if the government uses surprise inflation to denominate the debt since in this case it will suffer a loss of reputation. This point also emerges from the well-known inflation model of Barro and Gordon (1983). The government would resist inflating away the debt if the temptation of the reward is small and the cost of reputation is high. The benefits of surprise inflation are proportional to the level of the debt, to the nominal share of the debt and the maturity of the nominal share of the debt. Missale and Blanchard (1994) make this empirical result formal through an inflation-reputation model in which they provide a relation between debt and maturity in order for the "reputation" outcome to remain in equilibrium. Since the public plays a role by forming rational expectations lor future inflation the aforementioned relation indicates the existence of a critical value of maturity that should keep uncertainty low. This model could be easily expanded not only for maturity, but also for the share of real and nominal debt. (Missale and Blanchard 1994)

2.4. Public debt and Inflation

The fact that exposure to market risk is high and that conditions for alleviating such risk are limited may pose a constraint on monetary policy. The importance of these conditions for monetary policy depends on the possible effect that a shock to the capital account (e.g. higher sovereign spreads) may have on the health of the financial system and the risk that this may pose for low and stable inflation. If the depreciation is pronounced or the pass-through effects are large, the central bank may have to increase its interest rates to keep inflation on target (Hernando, 2010).

If banks' capital is too low to absorb those losses, financial stability considerations could constrain the ability or willingness of the central bank to raise interest rates, thereby inducing higher inflation risks. Hence, the perils of a large public debt are reflected in trading off foreign exchange risk for market or inflation risks, and vice versa. Heavier reliance on domestic public financing and international reserve accumulation may reduce the economy and the public sector's foreign exchange risk, but will probably imply larger market risks. If mechanisms for alleviating suck risk are limited and the central bank tries to avoid the realization of market risks, it must assume an inflation risk. (Hernando, 2010).

2.4.1 Public Debt and GDP growth

Stephen et al (2011) have observed that at moderate levels, debt improves welfare and enhances growth. But high levels can be damaging. They therefore ask an important question which seeks to address the level of debt that can be termed as bad. For government debt, the threshold is around 85% of GDP. The immediate implication is that countries with high debt must act quickly and decisively to address their fiscal problems. 1 lie longer-term lesson is that, to build the fiscal buffer required to address extraordinary events, govermnents should keep debt well below the estimated thresholds. When corporate debt goes beyond 90% of GDP, it becomes a drag on growth. And for household debt, the threshold is reported to be around 85% of GDP, although the impact is very imprecisely estimated. (Stephen et al 2011)

Stephen et al (2011) in their study found out two things concerning public debt trends among developed economies since 1980. The first observation they made was that total **non**-financial debt as a percentage of GDP, as well as its sectoral components, have been rising steadily for much of the past three decades. Starting at a relatively modest 167% of **GDP three** decades ago, total non-financial debt has reached 314% of GDP. Of this increase, governments account for 49 percentage points, corporates for 42 percentage points, and households for the remaining 56 percentage points. They further observed that real corporate debt has risen by a factor of roughly 3 (an average annual compounded growth **rate** of 3.8%); government debt by about $4^{l}A$ times (5.1% annual rate);and household debt by 6 times (6.2% annual rate). Overall, real debt of the non-financial sector in advanced economies has been growing steadily at a rate of slightly less than $4^{l}/_{2}$% for the past 30 years. (Stephen et al 2011)

Table 2.0: Household, corporate and government debt as a percentage of nominal GDP

g S U H B H l	1980	1990	2000	2010	1980-90	1990-2000	2000-10
United States	151	"200"	198	268	49	-2	70
Japan	290	364	410	456	75	46	46
Germany	136	*l37~*	226	241	1	89	15
United Kingdom	T60~	203	223	322	43	20	99
France	160	198	243	321	37	45	78
Italy	109	180	252 "	310	71	*72*	58
Canada	236	278	293	'313	42	15	20
Australia	128	174	185	235	46	11	49
Austria	162	178	205	238	16	27	32
Belgium	T70-	*[264~*	298	356	94	34	58

Source: Stephen et al (2011)

It **can** be observed from the above table that there has been a general increase in total debt **as a** percentage of GDP. The reason given for this trend is that starting in the mid-1980s **and** continuing until the start of the recent crisis, the macroeconomic environment had grown more stable. The Great Moderation brought lower unemployment rates, lower mtlation rates and less uncertainty. Believing the world to be a safer place, borrowers borrowed more, and lenders lent more - and inflation remained low. There was also a

likely feedback here: as financial innovation improved the stability of credit supply and allowed risk to flow to those best able to bear it, it improved general economic stability (Stephen et al, 2011).

Since the mid-1990s, the substantial decline in real interest rates has made it easier to support ever higher levels of debt (Waldron and Zampolli, 2010a).

The reasons behind such reduction are controversial. The most prominent hypothesis is that low long-term interest rates are a consequence of a high preference for saving in emerging markets - a preference that arose for a variety of reasons, including a poor social safety net, ageing populations' retirement needs, and a desire for insurance alter the East Asian financial crisis of the late 1990s (Bernanke et al, 2011).

Finally, lax policies may have played a role, if not in explaining the rapid rise in debt, at least in making the level of debt higher than it would have been otherwise. Keen and Perry (2010) for instance, indicate that the preferential treatment of interest payments encourages firms to issue debt - a factor that could be behind the rising corporate indebtedness we see in some countries. It may also play a role in the rise in household debt, where generous tax relief for mortgage interest payments, along with explicit subsidies and implicit guarantees, could have played a role in expanding home ownership in some places (Akerlof and Shiller, 2010).

2.4.2 Public debt and Interest rates

Checherita & Rother (2010), argue that the relationship between government debt and economic growth is scarce. Most studies on this topic emphasize the impact of external debt and debt restructuring on growth in developing countries, while analyses across countries are virtually absent. Yet, such analyses become even more relevant, for instance euro area governments are facing mounting fiscal pressures, with public debt-to-GDP ratios soaring following the financial and economic crisis and likely to remain at elevated levels in the medium term. (Checherita & Rother 2010)

Modigliani (1961), refining contributions by Buchanan (1958) and Meade (1958), argued that the national debt is a burden for next generations, which comes in the form of a reduced flow of income from a lower stock of private capital. Apart from a direct crowding-out effect, he also pointed out to the impact on long-term interest rates, possibly in a non-linear form "if the government operation is of sizable proportions it may significantly drive up [long-term] interest rates since the reduction of private capital will tend to increase its marginal product" (p. 739). Even when the national debt is generated as a counter-cyclical measure and "in spite of the easiest possible monetary policy with the whole structure of interest rates reduced to its lowest feasible level" (p. 753), the debt increase will generally not be costless for future generations despite being advantageous to the current generation. Modigliani considered that a situation in which the gross burden of national debt may be offset in part or in total is when debt finances government expenditure that could contribute to the real income of future generations, such as productive public capital formation. (Modigliani 1961),

Diamond (1965) adds the effect of taxes on the capital stock and differentiates between public external and internal debt. He concludes that, through the impact of taxes needed to finance the interest payments, both types of public debt reduce the available lifetime consumption of taxpayers, as well as their saving, and thus the capital stock. In addition, he contends that internal debt can produce a further reduction in the capital stock arising from the substitution of government debt for physical capital in individual portfolios (Diamond 1965).

2.5 Summary of Literature Review

Before the 20th century, the accumulation of government debt was in general slow and occurred mainly in relation to wars. The situation has however changed and governments have **been** accumulating public debt much faster than before. This trend has been associated with rapid changes in interest rates, rising levels of inflation as well as decreasing GDP.

A sustainability analysis conducted by the research department of Deutsche Bank in 2010 on Developing Markets (DMs) and Emerging Markets (Ems) projects that On a GDP-weighted basis public indebtedness in DMs will continue to rise substantially to 133% of GDP on average by 2020 (from 102% in 2010), according to baseline projections. In Emerging Markets (EMs), the debt-to-GDP ratio will fall to 35%, from around 46% in 2010. (Deutsche Bank Research 2010)

Cecchetti et al (2011) conducted a study on the debt and GDP of advance economies and indicate that over the past 30 years, the ratio of debt to GDP in advanced economies has risen relentlessly from 167% in 1980 to 314% today, or by an average of more than 5 percentage points of GDP per year over the last three decades. (Cecchetti et al 2011)

Also Modigliani (1961) argued that the national debt is a burden for next generations, which comes in the form of a reduced flow of income from a lower stock of private capital. (Modigliani 1961)

INTOSAI Public debt committee (2003) warns that public debt strategies can become dangerously vulnerable when faced with unforeseen events such as deteriorating private sector balance that can trigger fiscal, financial and economic crises. (INTOSAI Public debt committee 2003)

According to the Ministry of Finance Report (2007) Public debt continues to be a major challenge towards achievement of Millennium Development Goals. A significant proportion of the Government budget allocation is to service public debt, leaving inadequate financial resources for pro-poor development programmes. (Ministry of Finance Report 2007)

In general, the studies reviewed have shown that high levels of public debt are detrimental to the economic development of a coun

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives the methodology used to conduct the study. Here the research design, sample size, the target population, sampling design, data collection and analysis, reliability and validity and ethical consideration are briefly discussed.

Research methodology is a way to systematically solve the research problem. It is a science of studying how research is done scientifically. In it, various steps that are generally adopted by a researcher in studying the research problem along with the logic behind them are studied (Yin, 1984).

3.2 Research design

According to Yin (1984), there are various types of research design depending on the classification of the study. The examples include: descriptive, analytical, predictive and exploratory research designs. This study applies descriptive research design in studying the impact of public debt on GDP, interest rates and inflation in Kenya. Descriptive research design allows the research to study the elements in their current state without necessarily making any changes to them.

3.3 Population of the study

The target population of the study includes all the figures of public debt on GDP, interest rates and inflation in Kenya since independence to date. This is where the researcher picked the sample size from. Forty nine years have elapsed since independence to date. 1 he GDP growth rates, interest rates and inflation rates from these years constitute the target population for this study.

3.4 Sample size and sampling procedures

There are two different ways to select a sample: probability sampling which means that the units are selected randomly, and non-probability sampling which means that all units

do not have the same chance to be selected. A non-probability sampling is preferred when working with small samples, such as case studies. The data for the last sixteen years that is from 1996 to 2011 were picked for the conduct of the study.

3.5 Data collection methods and procedure

The study makes use of secondary data for public debt, GDP growth, interest rates and inflation from 1996 to 2011. These data were collected from the websites of the Central Bank of Kenya, Kenyan Ministry of Finance and World Economic Outlook.

3.6 Reliability and validity

3.6.1 Validity

Validity refers to how exactly a scientific investigation is carried out and how accurate the instruments and methods are, according to the purpose of the study. The instrument is a key factor in scientific investigations that inflicts upon the purpose of the study if it is not constructed in an adequate way. To prevent this, only recognized data sources were used. The study did not use any draft and unofficial report for data collection purposes.

3.6.2 Reliability

Reliability implies that a measuring instrument should be able to give reliable and stable results. If it is reliable other researchers should be able to come to the same results if they use the same method. To determine the reliability, similar data from various sources were compared across periods to determine the best. The most preferred data used for the study were data released by the government of Kenya.

3.7 Data analysis

Due to the nature of the data collected, only quantitative analysis was employed. The data were entered into Microsoft Excel program for linear regression analysis. The regression results are presented in tables and graphs. The data were analyzed using correlation analysis upon which conclusions on the findings are drawn.

3.8 Model for the study

The topic for this study contains one independent variable (Public debt) and three dependent variables (inflation, GDP and interest rates). Given the nature of the topic, three simple linear regression models are deemed appropriate for the study. The independent variable, (public debt) is denoted by Pd and the dependent variables, (Inflation, GDP and Interest rate) assume the values $Y\backslash$, Y_2 and Y_3 while their corresponding slopes assume the values pi, P2 and p_3 respectively. Each of the models was used to determine a separate relationship with public debt arranged as follows:

1. **Public Debt and Inflation**

$Y_1 = P_{„} + Pd * pi + £$

Where: Yi = Inflation rate (dependent or endogenous variable)

Pd = Public debt, (independent or exogenous variable)

Pi = Coefficient of the variable public debt (Pd)

K = constant term which is the value of inflation when other variables equal zero

£ = error term which accounts for factors not captured in the model

2. **Public debt and Gross Domestic Product (GDP)**
3. **Y2 = po + Pd*p2 + t**

Where: Y2 = Gross Domestic Product (GDP), (dependent or endogenous variable)

Pd = Public debt, (independent or exogenous variable)

P2 = Coefficient of the variable public debt (Pd)

K = constant term which is the value of inflation when other variables equal zero

£ - error term which accounts for factors not captured in the model

4. **Public Debt and Interest rates**
5. **Y3 = Po + Pd***p3 + £

Where: Y_3 = Interest rate, (dependent or endogenous variable)

Pd = Public debt, (independent or exogenous variable)

p_3 = Coefficient of the variable public debt (Pd)

K = constant term which is the value of inflation when other variables equal zero

t - eiTor term which accounts for factors not captured in the model

The study predicted two possible outcomes:

1. There is a positive relationship between the dependent variable and the independent variables.

2. There is a negative relationship between the variables.

The outcome of the predictions are presented in chapter four.

CHAPTER 4

Data Analysis and presentation

4.1 Introduction

This chapter contains analysis and presentation of data collected for the project. Data were collected on the independent variable, (public debt) and the dependent variables, (Inflation, GPD Growth and Interest rates). Most of the data on the variables were collected from the website of the Central bank of Kenya except for GDP growth rates which were obtained from data on IMF World Economic Outlook.

The data on public debt and interest rates are fiscal figures reflecting the reporting periods of the Government of Kenya. The fiscal period of the Government of Kenya runs from July of a year to June of another year. It is also important to note that the interest rates in this study reflect the weighted average lending rates of Commercial Banks in Kenya compiled by the Central Bank of Kenya (CBK). Data on inflation and GDP growth are annual figures compiled by the Central Bank of Kenya (CBK) and World economic Outlook respectively.

The data are analyzed and presented in three categories based the number of dependent variables. Each dependent variable is separately analyzed along with public debt to determine their various relationships.

The data cover sixteen fiscal periods (1996-2011). Data on public debt are separately paired with inflation, GDP growth and interest rates in tables 2.0, 3.0 and 4.0 respectively. The respective scatter plots and their corresponding regression results are indicated in tables 2.1 & 1.3 for inflation, 3.1 & 2.3 for GDP growth and 4.1 & 3.3 for interest rates.

It is also important to note that the data were analyzed using Microsoft excel regression tool. The results reflect the exact output of the analysis of data disclosed in the tables.

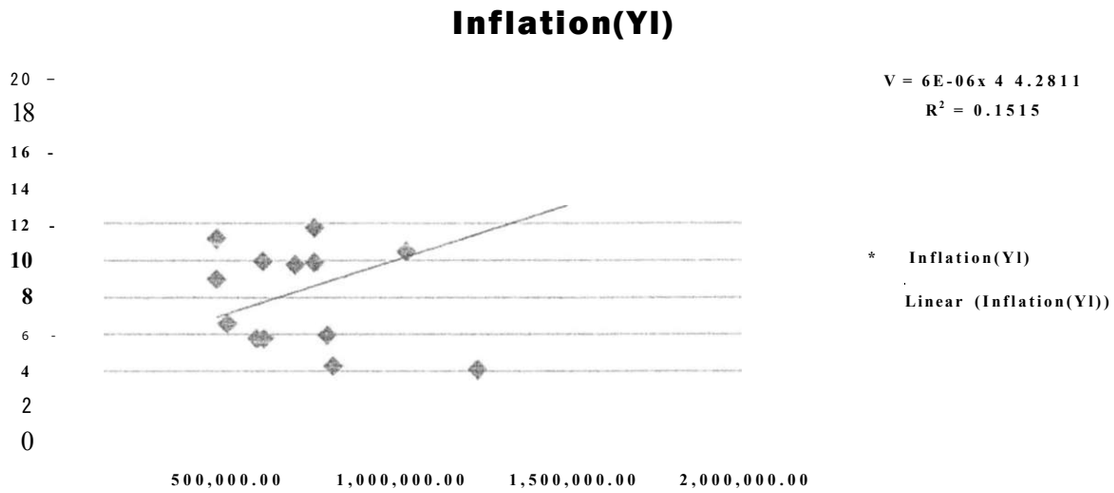
4.2 Analysis and presentation of data

4.2.1 Public Debt and Inflation

Table 2.0 Public Debt and Inflation Rates of Kenya 1996-2011		
1996	466,294.00	9
1997	466,806.00	11.2
1998	495,070.00	6.6
1999	582,097.00	5.8
2000	601,691.00	10
2001	605,791.00	5.8
2002	613,739.00	2
2003	696,430.00	9.8
2004	749,392.00	11.8
2005	750,025.00	9.9
2006	789,076.00	6
2007	805,686.00	4.3
^ 2008	870,579.00	15.1
2009	1,018,326.77	10.5
2010	1,225,719.68	4.1
2011	1,487,111.11	18

Data Source: Central Bank of Kenya & Ministry of Finance

Figure 1.0 Scatter Plot of Public Debt and Inflation



lation coefficient = **0.389171271**

Table 2.1 **Regression Results showing the Relationship between Public Debt & Inflation**

		sMIIISlS					5KESI	
Regression Statistics								
Multiple R	0.389171271							
R Square	0.151454278							
Adjusted R Square	0.09084387							
Standard Error	4.006800116							
Observations	16							
ANOVA								
	df	***SS***	***MS***	***F***	***Significance F***			
Regression (SSR)	1	40.11711463	40.11711463	2.498816	0.136254341			
Residual (SSE)	14	224.7622604	16.05444717					
Total (SST)	15	264.879375						
	Coefficients	***Standard Error***	***tStat***	***P-value***	***Lower 95%***	***Upper 95%***	***Lower 95.0%***	***Upper 95.0%***
Intercept	4.281126649	2.995526544	1.429173331	0.174887	-2.14363879	10.70589208	-2.14364	10.70589
X Variable JPd)	5.84121E-06	3.69518E-06	1.580764474	0.136254	-2.0842E-06	1.37666E-05	-2.1E-06	1.38E-05

1

[1] **Pi^s the slope and is given in ihc *"Coefficients"* column and the X Variable (Pd) row. The slope, p|_ measures the estimated change in Y| (Inflation) as a result of a one unit change in Pd (Public Debt). In the summary output table 1.1 above, inflation increases by approximately 6E-06 lor every one point increase in public debt. The intercept, Po, is given in tire "*Coefficients*" column and the "Intercept" row. The intercept p_0 is the estimated value of Y_t (inflation) when Pd (public debt) is equal to zero. Multiple R - This is the correlation coefficient which measures how well the data clusters around the regression line. The closer this value is to 1, the more "linear" the data is. That is, public debt could be used to predict inflation. The closer the value is to 0, the lesser the relationship between the variables. If it turns out that the multiple R is 0, there is no linear relationship between the variables. The correlation coefficient depicted in the summary output is 0.389171271 or 38.9%.**

R Square - This is the coefficient of determination. This measures the percentage of variation in die dependant variable that can be explained by the linear relationship between Pd and Y|. That is, how accurate the linear regression model is at predicting the inflation based on levels of public debt. The summary output in the table 1.2 above puts R^J at 0.151454278 or 15.15%

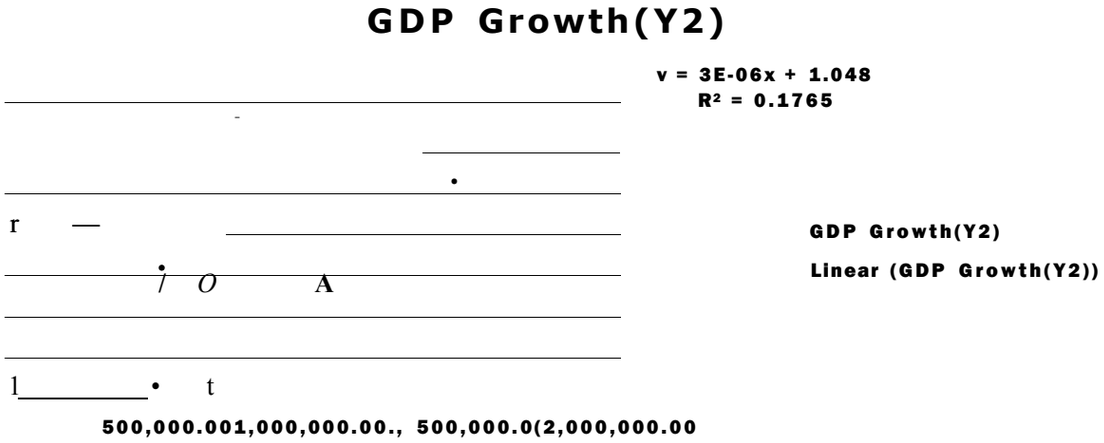
4.2.2 Public Debt and GDP Growth

Table 3.0 Public Debt and GDP Growth Rates of Kenya 1996-2011

1996	466,294.00	4
1997	466,806.00	0.2
1998	495,070.00	3.3
1999	582,097.00	2.4
2000	601,691.00	0.6
2001	605,791.00	4.7
2002	613,739.00	0.3
2003	696,430.00	2.8
2004	749,392.00	4.6
2005	750,025.00	6
2006	789,076.00	6.3
2007	805,686.00	7
2008	870,579.00	1.5
2009	1,018,326.77	2.6
2010	1,225,719.68	5.6
2011	1,487,111.11	5.3

Data Source: Central Bank of Kenya & World Economic Outlook

Figure 2.0 Scatter Plot of Public Debt and GDP Growth



l o h l o # .1 .lVnrr»*nccmn nonUo fU A l l l i n (* flirt Drtl ttf l l A f l K n A M P /'^I^Q
v. i ivwjiivjSiuu n\.juiu jiiuo in); nit i\v.iu uviiiiiip m uha.ii i uuia L/tui ot V11VI

Multiple R	0.420092							
R Square	0.176478							
Adjusted R Square	0.117655							
Standard Error	2.070655							
Observations	16							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression (SSR)	1	12.86345	12.86345	3.000144	0.10522			
Residual (SSE)	14	60.02655	4.287611					
Total (SST)	15	72.89						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.048007	1.548044	0.676988	0.509446	-2.27222	4.36823	-2.27222	4.36823
X Variable 1	3.31E-06	1.91E-06	1.732092	010522	-7.9E-07	7.4E-06	-7.9E-07	7.4E-06

2

The slope, pi, is given in the "*Coefficients"* column and the X Variable (Pd) row. The slope, Pi, measures the estimated change in Y_2 (GDP growth) as a result of a one unit change in X (Public Debt). In the summary output in table 2.1 above, GDP growth increases by approximately 3E-06 for every one point increase in public debt. The intercept, po, is given in the "*Coefficients"* column and the "Intercept" row. The intercept p_0 is the estimated value of Y_2(GDP growth) when X (public debt) is equal to zero. Thus the regression equation that defines the relationship between public debt and GDP growth is: Y_2 (GDP Grow th) = 3E-06 + 1.048 Multiple R - This is the correlation coefficient which measures how well the data clusters around the regression line. The closer this value is to 1, the more "linear' the data is. That is, public debt could be used to predict GDP growth. If this value is close to 0, there is no linear relationship between our variables. The correlation coefficient is 42%.

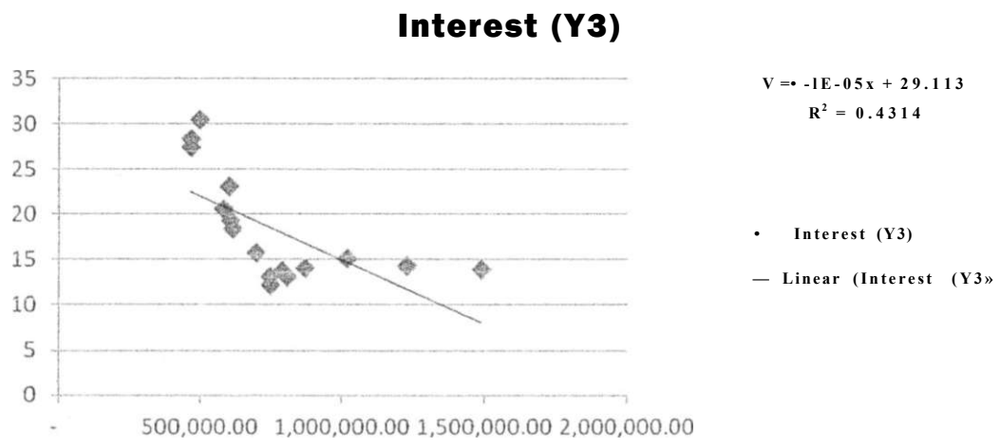
R Square - This is the coefficient of determination. This measures the percentage of variation in the dependant variable that can be explained by the linear relationship between x and y. That is, how accurate the linear regression model is at predicting the GDP growth based on levels of public debt. The summary output in the table 2 1 above puts R^2 at 0.17678.

4.2.3 Public Debt and Interest Rates

1 Table 4.0 Public Debt and Average Lending Interest Rates of Kenya 1996-		
1996	466,294.00	28.34
1997	466,806.00	27.49
1998	495,070.00	30.46
1999	582,097.00	20.7
2000	601,691.00	23.11
2001	605,791.00	19.26
2002	613,739.00	18.38
2003	696,430.00	15.73
2004	749,392.00	12.17
2005	750,025.00	13.09
2006	789,076.00	13.79
2007	805,686.00	13.14
2008	870,579.00	14.06
2009	1,018,326.77	15.09
2010	1,225,719.68	14.39
2011	1,487,111.11	13.91

Data Source: Central Bank of Kenya

Figure 3.0 Scatter plot of Public Debt and Interest Rates



Correlation coefficient = **-0.656787659**

Table 4.1 Regression results showing the relationship between Public Debt & Interest

Regression Statistics								
Multiple R	0.656788							
Rj^uare	0.43137							
Adjusted R S^uare^	0.390754							
Standard Error	4.700891							
Observations	16							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression (SSR)	1	234.6976	234.6976	10.62058	0.00571			
Residual (SSE)	14	309.3773	22.09838					
Total (SSI)	15	544.0749						
	Coefficients	*Standard Error*	*tStat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	29.11331	3.514436	8.283919	9.1E-07	21.57559	36.65102	21.57559	36.65102
X Variable 1	-1.4E-05	4.34E-06	-3.25892	0.00571	-2.3E-05	-4.8E-06	-2.3E-05	-4.8E-06

3

The slope, Pi, is given in the *"Coefficients"* column and the X Variable (Pd) row. The slope, measures the estimated change in Y_3 (Interest rates) as a result of a one unit change in X (Public Debt), hi the summary output table 3.1 above, interest rates (lending) decreases by approximately -1E-05 for every one point increase in public debt. The intercept, $|3_0$, is given in the "*Coefficients*" column and the "Intercept" row. The intercept Po is the estimated value of Yj (interest rates) when X (public debt) is equal to zero. Thus the regression equation that defines the relationship between public debt and lending interest rates is: Yj (Interest rates) = -1E-05x + 29.113 Multiple R - This is the correlation coefficient which measures how well the data clusters around the regression line. The closer this value is to 1, the more "linear" the data is. That is, we could use public debt to predict interest rates. If this value is close to 0 there is no linear relationship between our variables. The correlation coefficient is -65.7%. R Square - This is the coefficient of determination. This measures the percentage of variation in the dependant variable that can be explained by the linear relationship betw een x and y. That is, how accurate the linear regression model is at predicting the inllation based on levels of public debt The summary output in the table 1.2 above puts R^2 at 0.4314.

4.3 Summary and Interpretation of Findings

4.3.1 Public debt and Inflation

The study notes that there is a weak positive relation between public debt and inflation. As depicted in table 2.1, the correlation coefficient which measures the linearity of the variables is 0.3891 or 38.9%. The coefficient of determination which measures the strength of the relationship between the variables is 0.1515 or 15.15% implying that of all the variations in inflation; only 15.15% is attributed to public debt while the remaining 84.85% is explained by variables outside this study.

To prove whether or not there is a linear relationship between public debt and inflation, a hypothesis test is conducted. In this case if there is no linear relationship between public debt and the inflation under the null hypothesis (Ho), pi is equal to zero. On the other hand if a linear relationship exists, under the alternative hypothesis (Hi), pi is not equal to zero. To do this, a t-test is conducted.

Doing a t-test at 95% level confidence with (n-2) degree of freedom, it is found that the critical values were 2.145 and -2.145. The sample test statistic is given in the "t-stat" column and the X variable (Pd) row as approximately 1.58 in table 1.2 above. This means that in order to reject the null hypothesis the sample test statistics must be greater or equal to 2.145 in favor of positive relationship or less or equal to -2.145 in favor of a negative relationship.

Since $1.58 < 2.145$, the study fails to reject the null hypothesis implying that there is a weak linear relationship between the public debt and inflation.

The strength of this relationship can be analyzed using the correlation coefficient and coefficient of determination. In the output above, it is observed that the correlation coefficient and coefficient of determination (multiple R and R square) are approximately 38.9% and 15.15% respectively. This leads to the conclusion that public debt has no significant influence on inflation.

4.3.2 Public Debt and GDP growth

The study done on public debt and GDP growth reveals a positive moderate relationship. The summary output in table 3.1 puts the multiple R otherwise known as correlation coefficient at 0.42009 implying that linearity between the variables can be measured by 42%. The coefficient of determination is 0.1764 or 17.56% suggesting that of all the variations in GDP growth only 17.56% can be explained by public debt while the rest is attributed to other factors.

To prove whether or not there is a linear relationship between public debt and GDP growth, a hypothesis test is conducted. In this case if there is no linear relationship between the dependent and the independent variables under the null hypothesis (Ho), (3i is equal to zero. On the other hand if a linear relationship exists, under the alternative hypothesis (Hi), pi is not equal to zero. To do this, a t-test is conducted.

Doing a t-test at 95% level confidence with (n-2) degree of freedom, it is found that the critical values were 2.145 and -2.145. The sample test statistic is given in the "t-stat" column and the X variable (Pd) row as approximately 1.732 in table 2.1 above. This means that in order to reject the null hypothesis the sample test statistics must be greater or equal to 2.145 in favor of positive relationship or less or equal to -2.145 in favor of a negative relationship.

Since 1.732 < 2.145, the study fails to reject the null hypothesis implying that there is a positive moderate (not very weak) linear relationship between the public debt and GDP growth. The strength of this relationship can be analyzed using the correlation coefficient and coefficient of determination. In the output above, it is observed that the correlation coefficient and coefficient of determination (multiple R and R square) are approximately 42% and 17.7% respectively. This leads to the conclusion that there is no significant relationship between public and GDP growth.

4.3.3 Public Debt and Interest Rates

The study shows that there is strong negative relationship with public debt and interest rates. The correlation coefficient measures up to -65.7% implying that there is a strong negative linear relationship between the variables. The coefficient of determination is 43.14%. This means that 43.14% of the variations in lending interest rates can be explained by changes in public debt while the remaining 56.86% is attributed to other variables.

To prove whether or not there is a linear relationship between public debt and interest rates, a hypothesis test is conducted. In this case if there is no linear relationship between the dependent and the independent variables under the null hypothesis (Flo), PI is equal to zero. On the other hand if a linear relationship exists, under the alternative hypothesis (Hi), (3i is not equal to zero. To do this, a t-test conducted.

Doing a t-test at 95% level confidence with (n-2) degree of freedom, it is found that the critical values are 2.145 and -2.145. The sample test statistic is given in the "t-stat" column and the X variable (Pd) row as approximately 1.58 in table 1.2 above. This means that in order to reject the null hypothesis the sample test statistics must be greater or equal to 2.145 in favor of positive relationship or less or equal to -2.145 in favor of a negative relationship.

Since -3.2589 < -2.145, the study rejects the null hypothesis implying that there is sufficient evidence to establish that there is a linear relationship between public debt and interest rates.

The strength of this relationship can be analyzed using the correlation coefficient and coefficient of determination. In the output above, it is observed that the correlation coefficient and coefficient of determination (multiple R and R square) are approximately -65.7% and 43.14% respectively. This leads to the conclusion that there is a significant negative relationship between public and interest rates.

CHAPTER 5

Summary, Conclusion and Recommendation

5.1 Summary

This study has investigated the impact of public debt on three major economic indicators; (inflation, GDP growth and interest rates) in Kenya. The investigation was prompted by the rising concerns about public debt levels and its impact on both developed and developing economies around the world. As it was in the case of the 2008 financial crisis which many economies believed was just a problem of Western nations but later had a disastrous spillover effect on all economies, so is the case of this new debt problem emanating from the Euro-Zone. Fears that such crisis could degenerate into another global crisis have grasped many nations. It is against this background that this study was embarked upon to investigate the influence that public debt has on the economy of Kenya and help policy makers, academicians, students and researchers understand the relationship between public debt and the three variables considered in the study.

A number of literatures relative to this study have been reviewed to help the researcher gain an insight of past studies on public debt. However, none of such literatures conclusively discussed the three variables investigated in this study. Six different studies have been reviewed all of which to a larger extent speak to issues of public debt. Such literatures include an analysis of the future global trend of debt conducted by the research department of the Deutsche Bank in 2010. The next is a study done by (Hamilton, 1947) specifically providing a historical overview of debt accumulation; and then follows a series of other studies done by Cecchetti et al (2011), Modigliani (1961), 1NTOSAI Public debt committee (2003) and the Kenyan Ministry of Finance Report (2007). All conclusions reached in these studies and reports point to the adverse effect of debt on the general economy.

The study adopted a descriptive research design in studying the impact of public debt on GDP, interest rates and inflation in Kenya. Descriptive research design allows the research to study the elements in their current state without necessarily making any

changes to them. The data used for the study captured all the figures of public debt on GDP, interest rates and inflation in Kenya from the fiscal period June 1996 to June 2011 implying that a number of sixteen periods were observed. The data were analyzed using the Microsoft Excel data analysis tool and presented in tables, and graphs. The study was done using three simple regression models each being used to establish its relationship with the independent variable (public debt).

The study found out a weak positive relationship between public debt and inflation. The correlation coefficient and the coefficient of determination are 38.9% and 15.15% respectively. This suggests that the relationship between public debt and inflation is determined by 38.9% and that of all the variations in inflation; only 15.15% is attributed to variations in public debt while the remaining 84.85% is explained by variables outside this study.

The study done on public debt and GDP growth reveals a moderate positive weak relationship. The summary output in table 2.1 puts the multiple R otherwise known as correlation coefficient at 0.42009 implying that linearity between the variables can be measured by 42%. The coefficient of determination is 0.1764 or 17.56% suggesting that of all the variations in GDP growth only 17.56% can be explained by public debt while the rest is attributed to other factors.

The study on public debt interest rates shows a strong negative relationship. The correlation coefficient measures up to -65.7% implying that there is a strong negative linear relationship between the two variables. The coefficient of determination is 43.14%. This means that 43.14% of the variations in lending interest rates can be explained by changes in public debt while the remaining 56.86% is attributed to other variables.

5.2 Conclusion

As noted in the analysis done in chapter 4, the relationship between public debt and the variables considered in this study varies across variables. It was noted that the relationship between public debt and inflation is 38.9% with an explanatory strength of 15.15%. This finding partly supports the 2006 study of Kwon, Lavern and Robinson who investigated the relationship among public debt, money supply and inflation. They concluded that the relationship between public debt and inflation holds strongly in some indebted developing countries and weakly in other developing countries. The correlation coefficient 38.9% implies that the relationship between public debt and inflation in Kenya is weak.

This finding is further backed by the prediction of Sergeant and Wallace (1981) in their study "Unpleasant Monetarist Arithmetic" that an increase in public debt is typically inflationary in countries with large public debts. Kenya has been classified as one of the Highly Indebted Poor Countries (HIPCs). The past years have been characterized by an increase in public debt that it has claimed the attention of government and other policy makers in Kenya.

The study on the relationship between public debt and GDP growth found out a moderately weak relationship of 42% with an explanatory strength of 17.56% suggesting that debt impacts economic growth in a way, but not significantly. This finding supports the conclusion reached by Stephen et all (2011) who found out that public debt improves economic growth at moderate levels; but warn that high level debt can have a future damaging effect.

On interest rates, it is established that public debt has negative relationship with interests with a correlation coefficient of-65.7% and an explanatory power of 43.14%. Reason for this kind of relationship can be backed by the observation noted by Glenn and Habbard who found out that despite a substantial body of empirical analysis, answer with respect to relationship between public debt and interest rates is mixed. While many studies

suggest, at most, a single-digit rise in the interest rate when government debt increases by one percent of GDP, others estimate either much larger effects or find no effect. Comparing results across studies is complicated by differences in economic models, definitions of "government debf' and "interest rates," econometric approaches, and sources of data.

The findings in this study 011 the debt-inflation-GDP-interest rates link could shed further light 011 the effect of fiscal policy on economic growth to the extent that public debt growth affects the variables directly.

On a general note, the study concludes that the Public Debt-Inflation-GDP growth-Interest rates link cannot be found in a single analysis. The relationship varies across variables. While other variables show a weak relationship others portray a strong one. For instance, of the variables compared in this study public debt and interest rates show the strongest relationship. Next is the relation between public debt and GDP growth which is moderately weak; and finally public debt and GDP growth which shows the least among the three variables.

5.3 Policy Recommendation

Historically public debt levels in Kenya have been increasing over the years. From 1996 to 2011 aggregate public debt levels have been reported on an incremental level (see table2.0). Policy makers are therefore urged to take keen note of this continuous rise in public debt and how it adversely impacts major economic variables to advert any future problem.

When debt piles up to an unsustainable level, the impact is explained by macroeconomic indicators like the variables considered in this study. Such impact translates into the daily lives of the citizenry. This condition tempts government to consider several options such as seeking default, debt waiver, increase taxes or inflate it away. On a side note, the last option, inflation is not a viable option for successful public debt reduction. Inflation can only have a short-term effect as its impact on debt works via surprise increases in the price level. Once borrowers expect further inflation increases, this will be priced in yield expectations and thus burden public finances. Moreover, such policies risk "unanchoring" inflation expectations and thus contributing to macroeconomic instability. From an institutional point of view, central bank independence would risk being undermined, possibly bringing down the credibility of domestic governance structures with it.

In addition to the above, the following are necessary measures that would help mitigate the potential crisis.

First, major debt reductions are mainly driven by decisive and lasting (rather than timid and short-lived) fiscal consolidation efforts focused on reducing government expenditure. Government/policy makers should therefore put in place lasting debt sustainability measures.

Second, robust real GDP growth also increases the likelihood of a major debt reduction because it helps countries to grow their way out of indebtedness. Between 1996 and 2011, Kenya highest GDP growth rate was experienced in 2007 with a growth rate of 7%. In 2011, the rate dropped to 5.3%. With growth rate projected at 6.1% in 2012, it is only

expedient that key players in the economy work harder to meet or even exceed the projected target.

Apart from sustainability concerns, high public debt levels may directly or indirectly harm economic growth. To mitigate this situation policy makers are urged to consider tightening and streamlining new borrowings to development needs and prioritize such needs to provide a conducive macroeconomic environment.

5.4 Limitations of the study

The results of a study can most times be vigorously supported based on the amount of sample size used. The targeted population for this study was all figures 011 public debt, inflation, GDP growth, and interest rates in Kenya since independence to 2011. The researcher was constrained to use only sixteen years which reflect the most available and easily accessible data on the variables. It is possible that there might have been a stronger relationship across the variables if the sample size were increased beyond sixteen years.

It is easy to compare the results of similar studies and draw conclusion 011 a current study. Unfortunately, of all the literatures reviewed for this study, none of directly discuss the topic of this both in and out of Kenya. This makes matters difficult in explaining the results of this study and comparing it across related literatures.

The study of public debt in general is difficult especially when the determination of interest rates is involved. Public debt involves domestic and external borrowings both of which have different interest rates. This study only considers lending rates of commercial banks in Kenya. As such, findings 011 the relationship between public debt and interest rates are limited to the extent that they do not reflect external borrowing rates.

Correlation/relationship research has its own limitation owing to the fact that it merely demonstrates that one or more variables can be predicted from other variable(s). It only demonstrates that two variables are associated. However two variables can be associated without there being any casual relationship. Thus one cannot make a casual conclusion from correlation findings because alternative findings from many findings cannot be ruled out.

5.5 Suggestions for further studies

Further research could be usefully undertaken in several areas. The link between domestic debt and these variables could generate a result more appealing to drive policy decisions on public debt. It is therefore suggested that further research be done to establish the relationship between Kenya Domestic Debt as a single factor devoid of external debt to establish how it relates to the factors (variables) discussed in this study.

Secondly, this study only focused on determination of the relationships between public debt and inflation, GDP and interest rates. It did not establish the causes of such relationships. Therefore it is suggested that further research be done to establish the causes of the relationship found in this study.

Thirdly, public debt has become a rising concern in recent time. Such concern is not necessarily the figure of debt itself but the future adverse economic impact that it could have on the general economy. Studying just three variables can only do little. It is therefore suggested that research be done to consider other variables including exchange rates, Gross national product, Foreign Direct Investment that will eventually lead to sound economic policies on government debt.

Fourthly, in an effort to curb the crisis studies must cut across many sectors. Investigating the degree to which government borrowing might be offset by private domestic saving or inflows of foreign saving or both is a good topic for future research as well.

Lastly, this study is done on Kenya, future researchers are urged to duplicate similar study on other countries. Duplicating the study across counUies might yield some interesting results that would help students, academicians and policy makers alike.

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APPENDIX I: Data on Kenya Public Debt

Appendix I-A: Kenya Public Debt Stock Ksh Millions (1996-2006)

		Jun-97		Jun-99	Jim -00	"I ill' • I AT			Jun04 [1]	Jun05
EXTERNAL	3 45,939	307,729	3 23,339	407,792	395,564	393,978	377,748	4 07,053	443,157	434,453
Bilateral	127,753	114,084	1 08,256	1 47,937	138,553	132,269	129,973	1 42,593	162,914	157,669
Multilateral	187,812	163,802	1 79,276	2 20,192	230,662	228,497	2 22,452	2 33,829	260,658	255,784
Commercial Banks	28,996	2 6,302	3 4,915	35,799	2 4,867	29,423	24,031	3,597	2,912	1,776
Export Credit	1,378	3,540	8 92	3,864	1,481	3,789	1,292	27,034	16,674	1 9,224
(As a % of GDP)	5 0.3 4	2.2 3	9.9 5	5.1	50.9	40.7	36 8 3	9.2	36.6	32.2
(As a % of total debt)	74.2 6	5.9 6	5.3 7	0.1 6	5.7	65.0	61.5	5 8.4	59.1	57.9
DOMESTIC	1 20,355	159,077	1 71,730	174,305	206,127	211,813	235,991	2 89,377	306,235	315,573
(As a % of GDP)	1 7.5	2 1.8	2 1.2	2 3.6	26.5	21.9	23.0	2 7.9	25.3	23.4
(As a % of total debt)	2 5.8	3 4.1	3 4.7	2 9.9	34.3	35.0	38.5	4 1.6	40.9	42.1
GRAND TOTAL	4 66,294	466,806	4 95,070	582,097	601,691	605,791	613,739	6 96,430	749,392	750,025
(As a % of GDP)	6 7.8	6 4.0	6 1.1	7 8.7	77.4	62.6	59.8	6 7.1	62.0	55.6

Appendix I-B: Kenya's Public Debt Stock Ksh Million (2006-2008)

EXTERNAL				
Bilateral	154,877	141,706	153,201	11,495
Multilateral	255,550	240,259	268,223	27,964
Commercial Banks	1,274	574	-	(574)
Export Credit	19,536	18,427	18,543	116
Sub-Total	431,237	400,966	439,967	39,001
(As a % of GDP)	27.9	21.7	21.1	(0.6)
(As a % of total debt)	54.7	49.5	50.5	1.0
DOMESTIC (Gross)				
Banks	190,762	222,985	225,656	2,671
Central bank	41,289	36,182	35,548	(634)
Commercial Banks	149,473	186,802	190,108	3,306
Non-banks	162,029	180,614	202,130	21,516
Non-bank Financial Institutions	1,400	1,084	11,177	10,093
Other Non-bank Sources	160,629	179,530	190,953	11,423
Non-residents	5,047	1,091	2,826	1,735
Sub-Total	357,839	404,690	430,612	25,922
(As a % of GDP)	23.2	22.1	20.8	(1.3)
(As a % of total debt)	45.3	50.5	49.5	(1.0)
GRAND TOTAL	789,076	805,686	870.579	64.893
(As a % of GDP)	51.1	43.8	41.9	

Source: Treasury <£ Central Bank of Kenya

Appendix I-C: Kenya Monthly Public Debt Ksh Millions (Sept. 1999-Jan 2012)

(shillings million)			
	PUBLIC DEBT		
FISCAL YEAR	Domestic Debt*	External Debt**	Total
Sep-99	183,417.00	320,137.00	503,554.00
Dec-99	190,300.00	311,953.00	502,253.00
Mar-00	201,463.22	396,800.00	598,263.22
Jun-00	206,127.00	395,694.00	601,821.00
Jul-00	202,362.00	394,667.37	597,029.37
Aug-00	196,584.00	395,710.06	592,294.06
Sep-00	195,520.00	399,798.72	595,318.72
Oct-OO	195,564.00	400,203.03	595,767.03
Nov-00	195,906.00	400,714.45	596,620.45
Dec-00	192,665.30	405,355.31	598,020.61
Jan-01	193,332.95	403,645.68	596,978.63
Feb-01	199,537.27	402,555.40	602,092.67
Mar-01	200,622.58	403,373.54	603,996.12
Apr-01	210,581.44	402,308.31	612,889.75
May-01	202,880.88	408,100.64	610,981.52
Jun-01	211,812.60	393,978.00	605,790.60
Jul-01	205,012.00	393,491.36	598,503.36
Aug-01	214,767.00	392,335.83	607,102.83
Sep-01	219,165.00	392,052.74	611,217.74
Oct-Ol	225,952.00	389,276.05	615,228.05
Nov-01	217,524.00	386,971.92	604,495.92
Dec-01	221,984.00	384,302.58	606,286.58
Jan-02	222,711.00	382,302.84	605,013.84
Feb-02	227,581.00	381,497.47	609,078.47
Mar-02	229,167.00	380,169.06	609,336.06
Apr-02	233,149.00	378,475.98	611,624.98
May-02	231,773.00	378,594.34	610,367.34
Jun-02	235,991.00	377,748.00	613,739.00
Jul-02	242,102.05	376,712.94	618,814.99
Aug-02	247,168.98	376,868.51	624,037.49
Sep-02	250,808.60	375,034.19	625,842.79
0ct-02	251,196.67	373,140.09	624,336.76
Nov-02	255,192.66	371,334.71	626,527.37
Dec-02	259,828.23	369,729.83	629,558.06
Jan-03	263,986.33	369,051.09	633,037.42
Feb-03	264,193.21	367,469.40	631,662.61
Mar-03	270,716.28	364,904.26	635,620.54

Apr-03	276,083.44	363,605.43	639,688.88
May-03	280,928.98	361,731.20	642,660.18
Jiin-03	289,376.97	407,053.00	696,429.97
Jul-03	292,277.47	398,532.85	690,810.32
Aug-03	295,494.51	397,991.28	693,485.79
Sep-03	303,252.05	411,067.00	714,319.05
0ct-03	301,918.96	409,359.85	711,278.82
Nov-03	303,548.41	406,592.25	710,140.65
Dec-03	301,190.58	410,149.00	711,339.58
Jaii-04	299,701.26	409,158.26	708,859.52
Feb-04	300,907.92	407,417.62	708,325.54
Mar-04	302,023.58	412,036.08	714,059.66
Apr-04	301,177.37	409,950.33	711,127.70
May-04	299,347.29	408,547.54	707,894.83
Jun-04	306,234.66	443,157.43	749,392.09
Jul-04	303,462.12	444,611.00	748,073.12
Aug-04	301,678.34	444,460.66	746,138.99
Sep-04	299,745.58	454,438.56	754,184.14
0ct-04	301,541.30	454,539.95	756,081.25
Nov-04	302,543.91	454,664.42	757,208.33
Dec-04	295,374.44	439,992.95	735,367.39
Jan-05	291,222.66	446,226.13	737,448.80
Feb-05	292,227.33	445,544.58	737,771.91
Mar-05	296,330.22	424,857.08	721,187.30
Apr-05	307,160.62	424,345.69	731,506.31
May-05	304,975.65	423,476.45	728,452.10
Jun-05	315,572.50	433,975.65	749,548.15
Jul-05	324,027.42	435,399.90	759,427.32
Aug-05	325,380.53	434,850.69	760,231.23
Sep-05	328,799.98	418,860.33	747,660.31
0ct-05	332,725.65	418,417.49	751,143.14
Nov-05	333,501.48	417,897.89	751,399.38
Dec-05	335,001.89	408,601.92	743,603.81
Jan-06	333,950.84	407,544.63	741,495.47
Feb-06	338,613.23	407,132.44	745,745.67
Mar-06	346,064.04	407,003.71	753,067.75
Apr-06	348,220.36	406,531.77	754,752.13
May-06	349,489.93	406,493.69	755,983.63
Jim-06	357,838.95	431,236.83	789,075.78
Jul-06	364,835.71	430,667.84	795,503.56
Aug-06	367,963.31	431,095.63	799,058.94
Sep-06	371,591.47	422,647.93	794,239.41
0ct-06	375,524.02	424,414.09	799,938.11
Nov-06	381,034.85	424,933.07	805,967.92

Dec-06	385,121.22	407,742.55	792,863.77
Jan-07	378,127.61	417,467.73	795,595.34
Feb-07	385,824.93	416,510.41	802,335.34
Mar-07	386,287.74	409,055.74	795,343.48
Apr-07	390,491.89	420,265.23	810,757.12
May-07	390,795.61	419,743.45	810,539.06
Jun-07	404,706.35	396,564.00	801,270.35
Jul-07	410,229.01	410,512.75	820,742.75
Aug-07	415,915.04	409,066.12	824,981.16
Sep-07	426,821.36	408,680.79	835,502.14
0ct-07	418,488.14	419,738.84	838,226.84
Nov-07	426,062.44	424,243.21	850,267.95
Dec-07	438,059.11	406,923.00	844,981.50
Jan-08	432,183.90	424,205.02	856,389.02
Feb-08	434,621.39	425,976.18	860,530.79
Mar-08	444,736.37	425,086.89	869,835.82
Apr-08	437,870.94	425,992.78	863,850.94
May-08	442,684.75	429,644.66	872,329.41
Jun-08	430,611.73	439,967.00	870,578.73
Jul-08	428,148.13	432,808.95	860,957.07
Aug-08	433,489.36	433,670.73	867,160.09
Sep-08	449,333.84	432,954.02	882,287.86
0ct-08	454,685.97	434,487.59	889,173.56
Nov-08	451,392.10	450,248.35	901,640.45
Dec-08	456,227.91	516,671.33	972,899.25
Jan-09	454,266.44	512,475.65	966,742.10
Feb-09	478,896.43	514,635.34	993,531.77
Mar-09	474,749.81	513,623.00	988,372.81
Apr-09	497,450.16	511,981.59	1,009,431.75
May-09	489,234.39	517,929.10	1,007,163.49
Jun-09	518,346.15	535,143.70	1,018,326.77
Jul-09	530,400.97	532,144.51	1,062,545.48
Aug-09	547,182.36	530,075.39	1,077,257.75
Sep-09	550,613.80	524,982.60	1,075,596.40
0ct-09	567,125.13	523,899.66	1,091,024.79
Nov-09	562,926.79	521,232.48	1,084,159.26
Dcc-09	588.930.27	588,970.31	1,177,940.63
Jan-10	580,105.38	525,552.75	1,105,658.13
Feb-10	607,490.27	525,369.18	1,132,859.45
Mar-10	639,679.75	538,157.99	1,177,837.74
Apr-10	653,383.30	537,424.84	1,190,808.14
May-10	650,261.96	541,976.71	1,192,238.67
Jun-10	660,267.68	565,452.00	1,225,719.68
Jul-10	667,803.42	562,941.95	1,230,745.37

Aug-10	698,047.35	566,166.88	1,264,214.23
Sep-10	704,702.77	594,223.00	1,298,925.77
Oct-10	696,132.65	598,080.46	1,294,213.11
Nov-10	711,448.98	599,251.46	1,310,700.44
Dec-10	720,207.97^	599,930.46	**1,320,138.43**
Jan-11	730,197.77	615,604.98	1,329,724.65
Feb-11	746,670.28	630,400.03	1,377,070.31
Mar-11	754,048.10	642,847.92	1,396,896.02
Apr-11	735,460.06	652,675.73	1,388,135.79
May-11	746,574.73	675,887.12	1,422,461.85
Jun-11	764,222.80	722,888.31	1,487,111.11
Jul-11	781,713.03	744,486.60	1,526,199.63
Aug-11	776,852.60	768,510.85	1,545,363.45
Sep-11	764,274.59	799,834.03	1,564,108.62
Oct-11	795,207.19	810,011.60	1,605,218.79
Nov-11	803,894.34	728,645.25	1,532,539.59
Dec-11	799,621.24	685,607.92	**1,485,229.16**
Jan-12**	809,278.11		
"Domestic debt is reported on gross basis.			
^Includes public and publicly guaranteed foreign currency loans			
Source: Treasury and Central Bank of Kenya			

Appendix III

Data on Kenya Inflation rates

	BASE February 2009=100	
		ANNUAL INFLATION RATE
YEAR	ANNUAL WEIGHTED AVERAGE INDEX	
1961	0.91	
1962	0.94	3.9
1963	0.97	2.7
1964	1.00	2.1
1965	1.03	3.5
1966	1.05	2.6
1967	1.08	2.6
1968	1.11	2.4
1969	1.13	1.6
1970	1.22	7.5
1971	1.25	3.7
1972	1.32	5.4
1973	1.44	8.9
1974	1.68	16.3
1975	1.97	17.8
1976	2.17	10.0
1977	2.45	12.7
1978	2.76	12.6
1979	2.99	8.4
1980	3.37	12.8
1981	3.79	12.6
1982	4.64	22.3
1983	5.32	14.6
1984	5.80	9.1
1985	6.43	10.8
1986	7.11	10.5
1987	7.73	8.7
1988	8.68	12.3
1989	9.84	13.5
1990	11.4	15.8

1991	13.64	19.6
1992	17.36	27.3
1993	25.35	46.0
1994	32.65	28.8
1995	33.17	1.6
1996	36.15	9.0
1997	40.21	11.2
1998	42.85	6.6
1999	45.37	5.8
2000	49.89	10
2001	52.75	5.8
2002	53.79	2.0
2003	59.06	9.8
2004	66.03	11.8
2005	72.57	9.9
2006	76.95	6.0
2007	80.24	4.3
2008	92.36	15.1
2009	102.09	10.5
2010	106.26	4.1
Source: Treasury and Central Bank of Kenya		

Appendix III

Data on Kenya interest rates (Lending rates were used).

1991	JUL	13.50	12.97	16.71	16.15
	AUG	13.59	13.24	16.42	13.79
	SEP	13.49	13.10	17.26	16.95
	OCT	13.47	13.30	17.78	17.53
	NOV	13.70	13.37	17.94	18.00
	DEC	13.73	13.22	17.87	17.91
1992	JAN	13.71	13.18	17.13	15.05
	FEB	13.83	13.30	17.61	16.37
	MAR	13.85	13.45	18.12	18.47
	APR	13.76	13.38	17.37	15.30
	MAY	13.66	13.16	18.53	18.81
	JUN	13.65	13.43	18.54	18.70
	JUL	13.61	13.50	18.68	18.95
	AUG	13.61	13.40	18.62	19.02
	SEP	13.81	13.47	18.95	19.07
	OCT	14.23	13.41	19.47	19.73
	NOV	14.29	13.28	19.15	19.64
	DEC	14.39	13.23	19.51	19.76
1993	JAN	14.24	13.15	19.57	19.75
	FEB	14.25	13.28	19.70	19.86
	MAR	14.45	13.19	19.82	19.96
	APR	15.32	14.38	20.77	21.35
	MAY	15.49	13.34	24.16	24.20
	JUN	17.28	13.43	24.51	25.28
	JUL	18.47	14.22	25.45	26.73
	AUG	22.51	14.81	26.37	27.73
	SEP	23.03	15.45	27.04	28.27
	OCT	23.04	16.51	30.06	32.23
	NOV	23.43	17.28	30.81	32.86
	DEC	22.36	17.37	31.64	33.50
1994	JAN	23.27	18.62	32.18	33.31
	FEB	20.84	18.40	32.16	33.24
	MAR	19.98	17.46	30.68	32.62
	APR	18.61	18.00	32.28	33.28
	MAY	17.76	17.44	30.97	32.30
	JUN	17.42	16.11	31.49	33.17
	JUL	16.69	15.07	32.17	32.94
	AUG	16.67	15.07	32.18	32.94

	SEP	16.76	14.97	31.37	32.66
	OCT	15.11	13.90	29.21	29.76
	NOV	14.05	12.40	25.96	26.98
	DEC	13.05	12.15	25.91	26.87
1995	JAN	12.20	12.16	25.24	26.03
	FEB	12.08	11.81	24.09	24.00
	MAR	11.30	11.66	23.61	23.33
	APR	10.83	9.21	23.32	22.78
	MAY	9.81	9.08	23.09	22.61
	JUN	10.13	9.31	23.32	23.08
	JUL	10.32	9.07	22.96	23.04
	AUG	11.90	8.96	24.72	24.64
	SEP	11.80	9.22	26.19	25.91
	OCT	11.97	9.13	26.43	26.44
	NOV	12.46	9.26	28.38	28.57
	DEC	12.77	9.49	28.99	29.23
1996	JAN	13.33	9.64	27.81	27.94
	FEB	13.62	9.70	27.79	27.97
	MAR	13.89	10.18	28.06	28.42
	APR	14.23	10.06	27.99	28.53
	MAY	14.19	10.65	28.06	28.39
	JUN	14.17	10.74	28.34	28.54
	JUL	14.05	10.67	28.15	27.87
	AUG	13.90	10.55	28.17	27.99
	SEP	14.28	10.74	28.44	28.12
	OCT	14.19	10.78	28.78	28.91
	NOV	14.29	10.97	28.70	28.87
	DEC	14.65	11.22	28.58	28.90
1997	JAN	14.54	10.91	28.81	28.71
	FEB	14.47	10.87	28.60	28.43
	MAR	14.33	10.88	28.57	28.46
	APR	14.24	10.99	28.57	28.16
	MAY	14.95	12.43	27.26	28.78
	JUN	13.89	10.59	27.49	28.52
	JUL	14.11	10.79	26.86	27.72
	AUG	14.06	10.82	26.48	27.37
	SEP	14.53	10.71	28.21	28.96
	OCT	15.21	10.92	29.07	29.66
	NOV	15.88	10.19	29.80	30.25
	DEC	16.02	9.73	29.85	30.40
1998	JAN	15.94	9.77	29.81	30.43
	FEB	15.88	9.77	29.90	30.43
	MAR	15.89	9.80	30.20	30.81
	APR	18.37	10.81	30.41	29.28

	MAY	17.85	11.23	30.54	30.69
	JUN	16.87	12.27	30.46	30.74
	JUL	16.67	11.56	30.37	30.69
	AUG	16.35	10.81	29.77	30.59
	SEP	15.96	10.46	29.08	29.76
	OCT	15.39	9.74	28.99	29.58
	NOV	14.67	9.57	28.19	28.84
	DEC	12.99	7.96	26.16	26.66
1999	JAN	11.25	6.54	23.67	23.88
	FEB	9.66	5.93	22.83	22.94
	MAR	8.93	5.49	21.36	21.07
	APR	8.18	5.14	20.90	20.90
	MAY	7.55	4.52	20.86	20.81
	JUN	7.83	4.57	20.70	20.86
	JUL	7.65	5.15	21.12	21.02
	AUG	7.79	4.81	21.93	21.95
	SEP	8.44	5.35	22.45	22.48
	OCT	9.10	5.72	23.12	23.14
	NOV	9.48	6.04	24.43	24.79
	DEC	9.74	6.15	25.19	25.58
2000	JAN	10.38	6.42	25.14	25.91
	FEB	9.17	6.04	25.39	25.67
	MAR	8.01	5.14	23.76	24.09
	APR	7.61	5.30	23.44	24.00
	MAY	7.21	4.77	23.40	23.93
	JUN	7.01	4.89	23.11	22.86
	JUL	6.67	4.71	22.39	22.09
	AUG	6.26	4.53	21.23	20.93
	SEP	6.22	4.36	20.57	20.58 I
	OCT	6.22	4.31	20.22	19.94
	NOV	6.20	4.36	19.79	20.10
	DEC	6.22	4.51	19.60	19.73
2001	JAN	6.54	4.67	20.27	20.18
	FEB	6.55	4.63	20.13	20.48
	MAR	6.92	4.66	20.19	20.12
	APR	6.58	4.64	19.56	19.89
	MAY	6.44	4.42	19.20	19.52
	JUN	6.36	4.39	19.26	19.65
	JUL	6.22	4.34	19.71	19.98
	AUG	6.24	4.43	19.54	19.71
	SEP	6.27	4.89	19.44	19.63
	OCT	6.21	4.37	19.77	19.80
	NOV	5.87	4.35	19.44	19.83
	DEC	5.70	4.40	19.49	20.04

2002	JAN	**5.72**	**4.42**	**19.30**
	FEB	**5.52**	**3.54**	**19.18**
	MAR	**5.42**	**3.71**	18. 86
	APR	**5.48**	**4.12**	**18.69**
	MAY	**5.31**	**4.02**	**18.54**
	JUN	**5.21**	**4.00**	**18.38**
	JUL	**5.08**	**3.89**	18. 12
	AUG	**4.99**	**3.74**	18.12
	SEP	**4.80**	**3.53**	**18.14**
	OCT	**4.66**	**3.79**	**18.34**
	NOV	**4.75**	**3.81**	**18.05**
	DEC	**4.75**	**3.47**	**18.34**
2003	JAN	**4.68**	**3.41**	**19.02**
	FEB	**4.40**	**3.42**	**18.83**
	MAR	**3.99**	**3.28**	**18.49**
	APR	**4.06**	**3.27**	**18.57**
	MAY	**3.71**	**3.14**	**18.52**
	JUN	**4.84**	**3.07**	**15.73**
	JUL	**4.49**	**1.79**	**15.30**
	AUG	**3.37**	**1.72**	**14.81**
	SEP	**3.07**	**1.44**	**14.82**
	OCT	**3.13**	**1.43**	**14.75**
	NOV	**3.32**	**1.44**	**14.07**
	DEC	**3.29**	**1.38**	**13.47**
2004	JAN	**3.12**	1. 22	**13.48**
	FEB	**2.47**	**1.47**	**13.01**
	MAR	**2.32**	**1.30**	**13.12**
	APR	**1.96**	**1.24**	**12.67**
	MAY	2.22	**1.15**	**12.55**
	JUN	2.20	**1.15**	**12.17**
	JUL	**2.25**	1. 10	**12.31**
	AUG	2.26	1.08	**12.19**
	SEP	**2.63**	**1.03**	**12.27**
	OCT	**2.33**	**1.07**	**12.39**
	NOV	2.66	**1.30**	**11.97**
	DEC	**2.77**	**0.98**	**12.25**
2005	JAN	**3.08**	**0.97**	**12. 12**
	FEB	**3.47**	**0.96**	**12.35**
	MAR	**3.75**	**0.98**	**12.84**
	APR	**3.91**	**1. 10**	**13.12**
	MAY	**4.05**	**1.07**	**13.11**
	JUN	**4.21**	**1.24**	**13.09**
	JUL	**4.14**	**1.30**	**13.09**
	AUG	**4.30**	**1.30**	**13.03**

	SEP	4.35	1.34	12.83	13.50	
	OCT	4.43	1.32	12.97	13.56	
	NOV	4.50	1.37	12.93	13.33	
	DEC	4.52	1.38	13.16	13.67	
2006	JAN	4.48	1.33	13.20	13.81	J
	FEB	4.48	1.36	13.27	13.34	J
	MAR	4.28	1.34	13.33	13.26	J
	APR	4.35	1.33	13.51	13.81	
	MAY	4.36	1.31	13.95	14.02	
	J UN	4.35	1.27	13.79	13.78	
	JUL	4.31	1.32	13.72	13.48	
	AUG	4.08	1.41	13.64	13.43	
	SEP	4.04	1.36	13.54	13.42	
	OCT	4.11	1.35	14.01	13.94	
	NOV	4.15	1.37	13.93	13.96	
	DEC	4.11	1.35	13.74	13.91	
2007	JAN	4.35	1.42	13.78	14.11	
	FEB	4.21	1.41	13.64	14.05	
	MAR	4.19	1.43	13.56	13.95	
	APR	4.11	1.35	13.33	13.26	
	MAY	4.14	1.57	13.38	13.35	
	JUN	4.18	1.54	13.14	13.20	
	JUL	4.33	1.65	13.29	13.34	
	AUG	4.31	1.60	13.04	13.39	
	SEP	4.34	1.67	12.87	13.26	
	OCT	4.27	1.64	13.24	13.29	
	NOV	4.33	1.65	13.39	13.43	
	DEC	4.32	1.67	13.32	12.96	
2008	JAN	4.37	1.72	13.78	13.41	
	FEB	4.37	1.70	13.84	13.26	
	MAR	4.43	1.72	14.06	13.48	
	APR	4.41	1.71	13.91	13.46	
	MAY	4.45	1.71	14.01	13.53	
	JUN	4.48	1.70	14.06	13.30	
	JUL	4.54	1.67	13.90	13.46	
	AUG	4.65	1.68	13.66	13.11	
	SEP	4.62	1.73	13.66	13.43	
	OCT	4.65	1.74	14.12	13.91	
	NOV	4.86	1.61	14.33	13.85	
	DEC	4.89	1.65	14.87	14.39	
2009	JAN	5.19	2.10	14.78	13.84	
	FEB	5.23	2.13	14.67	13.46	
	MAR	5.09	1.90	14.87	13.78	
	APR	5.12	1.91	14.71	13.66	

	MAY	5.10	1.67	14.85	14.13
	JUN	5.28	2.08	15.09	14.41
	JUL	5.09	1.67	14.79	13.^4
	AUG	5.00	1.65	14.76	13.90
	SEP	5.05	1.65	14.74	13.76
	OCT	5.03	1.85	14.78	14.03
	NOV	5.06	1.71	14.85	14.24
	DEC	4.84	1.73	14.76	14.13
2010	JAN	5.00	1.75	14.98	14.25
	FEB	4.89	1.81	14.98	14.25
	MAR	4.74	1.81	14.80	13.59
	APR	4.49	1.85	14.58	14.50
	MAY	4.58	1.76	14.46	14.38
	JUN	4.45	1.75	14.39	14.23
	JUL	3.85	1.55	14.29	14.03
	AUG	3.74	1.50	14.18	13.97
	SEP	3.53	1.47	13.98	13.81
	OCT	3.58	1.46	13.85	13.64
	NOV	3.54	1.40	13.95	13.77
	DEC	3.59	1.45	13.87	13.69
2011	JAN	3.43	1.25	14.03	13.93
	FEB	3.41	1.41	13.92	13.65
	MAR	3.47	1.37	13.92	13.60
	APR	3.47	1.38	13.92	13.68
	MAY	3.51	1.38	13.88	13.72
	JUN	3.68	1.37	13.91	13.59
	JULY	3.85	1.37	14.14	13.89
	AUG	4.07	1.37	14.32	14.28
	SEP	4.21	1.35	14.79	14.64
	OCT	4.83	1.33	15.21	14.87
	NOV	5.75	1.41	18.51	18.67
	DEC	6.99	1.59	20.04	20.20
2012	JAN	7.66	1.62	19.54	20.38
	FEB	8.01	1.69	20.28	20.53
	MAR				
1/ 1 he weights correspond to each bank's market share in either					
deposit liability in the case of deposit interest rates or c)ans and					
advances in the case of lending rates.					
Source: Central Bank of Kenya					

Appendix III

Data on Kenya GDP, current prices, billion $US

	Kenya		
	GDP, current prices, billion $I S	**GDP, current PPP dollars, bin.**	**Real GDP Growth, %**
1990	12.2	25.7	4.1
[l991	11.5	27.0	1.3
1992	11.3	27.3	-1.1
1993	7.9	27.9	-0.1
1994	9.4	29.2	2.5
1995	11.9	31.1	4.3
1996	12.0	33.0	4.0
1997	13.3	33.6	0.2
[1998	13.8	35.2	3.3
1999	12.9	36.5	2.4
2000	12.3	37.5	0.6
2001	13.1	40.2	4.7
2002	13.2	41.0	0.3
2003	15.0	43.0	2.8
2004	16.1	44.9	4.6
2005	18.7	48.0	6.0
2006	22.5	52.6	6.3
2007	27.2	58.0	7.0
2008	30.0	60.1	1.5
2009	30.6	62.4	2.6
2010	32.1	66.6	5.6
2011	36.1	71.6	5.3
2012]	40.6	76.8	6.1

Source: World Economic Outlook, September 2011