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EXTERNAL PUBLIC DEBT SERVICING ʌND ECONOMIC GROWTH IN KENYA: AN EMPIRICAL ANAYSIS

BY

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DECLARATION

This research project is my original work and has never been presented for the award of a degree in any other university.

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DEDICATION

This paper is dedicated to my parents who struggled to take me to school, my fiancée Lucy Mutuma for her unrewardable and priceless gift of encouragement and support, and to my supervisors for their tireless efforts in guiding me to come up with a quality paper.

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LIST OF ACRONYMS AND ABBREVIATIONS

AERC	African Economic Research Consortium
ADB	African Development Bank
ADF	African Development Fund
BOP	Balance of Payments
CBS	Central Bureau of Statistics
GDP	Gross Domestic Product
HIPC	Highly Indebted Poor Countries
IDA	International Development Association
IMF	International Monetary Fund
LDC	Less Developed Countries
SAPs	Structural Adjustment Programmes
SSA	Sub-Saharan Africa
TOT	Terms of Trade

OPERATIONAL DEFINITION OF TERMS

Arrears: Arrears in the total debt service at the end of a period equal the arrears in total debt service at the end of the previous period plus the debt service scheduled to be paid, but minus debt service paid, in the period. Arrears are the state of a debt that remains unpaid following the date of maturity. The term is commonly used in connection with mortgages, installment payments and other obligations that are due and payable on specified dates.

Creditworthiness: Refers to a country's acceptability for further credit by virtue of its record of repayment of past debts.

Debt overhang: A situation where the debt stock of a country exceeds the country's future capacity to repay it.

Gross External Debt: The amount at any given time, of disbursed and outstanding contractual liabilities of residents of a country to non residents to repay principal, with or without interest, or to pay interest with or without principal.

Net transfers: are net flows minus interest payments of disbursement less total debt service payment.

Stocks: Relate to amounts outstanding of previous debts at any particular time.

ABSTRACT

A group of low-income countries have continued to experience difficulties in managing and servicing their relatively huge stocks of external debt. Most of these countries, including Kenya are in Sub Saharan Africa. The relatively high level of Kenya's external indebtedness, rising debt burden and inability to source sufficient external finance at favourable terms and conditions has serious implications on the country's economic performance.

This study examined the relationship between Kenya's external indebtness, debt service and her economic growth. To pursue this objective, the study used a single growth equation model estimated using Ordinary least Square (OLS) method with annual time series data covering the period 1970 - 2003.

The findings of the study indicated that Kenya's external debt is mainly official, of which a bigger proportion is from multilateral sources. External debt accumulation has been rising over the years with debt burden indicators increasing steadily in the early 1990s. A specification associated with error correction modeling (ECM) was applied. By using cointegration and error correction model, the study established both the short run and long run equilibrium. The estimated model was a single regression equation with the growth rate of Gross Domestic Product as the dependent variable and explanatory variables were savings as a ratio of GDP, stock of external debt as a ratio of GDP, debt service as a ratio of GDP, interest payment as a ratio of GDP and the annual growth rate of labour force.

The empirical results in the short run estimated model indicated that the coefficients of external debt to GDP, savings to GDP and debt service to GDP had the correct sign and significant while the coefficients of interest to GDP and growth in labour force were insignificant. In the long run estimated model, the coefficients of debt to GDP, debt service to GDP and savings to GDP were significant while the coefficient for growth in labour force and interest to GDP were insignificant. The main result of interest was the

coefficient of the external debt service ratio, which was negative and statistically significant at 5 percent level. This result showed that there was a negative relationship between GDP growth rate and external debt servicing.

The study concluded that removing the external debt constraint would not only be good for growth, but also it could directly make resources available which would foster economic growth in Kenya. Policy makers should therefore consider coming up with sound policies that will ensure that all financial inflows in the country in the form of debt or aid is effectively and productively utilized.

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

1.1.1 Evolution of debt

Foreign aid adds to the resources available for investment, augments the supply of foreign exchange to finance imports and is a major form of resource transfer from developed to developing countries (Langat, 1994).From the 1950s, deficits in current accounts were considered as normal (Were, 2001). Countries were encouraged to borrow abroad and create an environment conducive to foreign investment to boost their economic growth. Little attention was paid to the liabilities side of the current account deficits, which increased the external debts of these countries until 1982, when Mexico declared that it could not service her debts (IMF, 2001a). Since then, the issue of external debt and its servicing has been a major topic of discussion.

Since the late 1970s, third world countries, Kenya included, have experienced severe economic instability and increasing economic difficulties. These problems culminated into what is now called *debt crisis* in which a number of third world countries, which had borrowed large amounts of money from western banks and countries, were unable to meet their debt repayment obligations (Were, 2001). Some of the symptoms of the third world economic crisis include: experiencing a marked slow down in the real rate of growth, high inflation rates, rapid population increase at rates exceeding the economic growth rate and a dramatic rise in the deficits on the Balance of Payment (BOP) current account (except for major oil exporting countries).

The increase in the total current account deficits of Sub-Saharan African (SSA) countries, since 1981, is an indication of the growing problems these countries faced in financing the deficits and ultimately leading to an absolute reduction in spending on imports. For the countries which depend heavily on imports of capital goods, intermediate goods and

key commodities such as food, a fall in import volume signified that the country's domestic economic difficulties were increasing (IMF, 2001a).

Third world countries experienced significant deterioration in their Terms of Trade (TOT), that is, the ratio of price of exports to the price of imports, since the first oil crisis of 1974/1975. The adverse shifts in relative prices were caused by persistent export volume growth and given the overall deterioration in the TOT, the result was large and growing current account deficits. The maintenance of these deficits was because these countries had access to external sources of finance (Mutiso, 2001).

The debt crisis is a critical factor in retarding the achievement of sustainable development in the SSA countries. It has been and continues to be one of the biggest barriers to development in the SSA countries. External indebtness is not harmful per se nor does heavy external debt imply that the growth rate must necessarily be low (Mutiso, 2001). What is difficult for most of the SSA is debt servicing compounded by the lack of information on the magnitude and structure of this external debt.

The biggest challenge facing most of the SSA countries is how to realize an increase in the economic growth and the pace of development in order to improve the standards of living for the majority of its people, how to harness and channel the scarce productive resources to the sectors and the activities capable of promoting efficient production. The acceptable and efficient distribution of the outputs to benefit the majority of the country's population.

The evolution of the debt problems of the SSA countries can be attributed to the following factors during the 1970s (Were, 2001): Expanded access to private finance and other trade credit following the recycling of the OPEC surpluses, the oil crises of the 1970's and 1980's, deterioration of the terms of trade and lack of prudent debt management policies, high interest rate and low export growth, delayed adjustment programs and drought (Krumm, 1985), misuse of borrowed funds, corruption and poor governance and shock in the terms of trade (Brooks, 1998).

It cannot be denied that the SSA countries debt crisis is one of the major causes of the economic crisis facing these countries today. These countries are still plagued by a heavy external debt burden. The debt crisis, compounded by massive poverty and structural weaknesses of most of the economies of these countries has made the attainment of rapid and sustainable growth and development difficult (Were, 2001). It is widely recommended that the heavily-indebted countries require debt relief initiatives beyond mere rescheduling to have a turn-around in their economic performance and fight against poverty (IMF, 2001a). In the late 1990s, this understanding appears to have stirred the international community to consider deeper, broader and faster external debt relief.

Eligibility to sovereign debt relief has been based on a good track record of reforms, pursuance of sound policies and ability to translate the resources into better prospects for the poor (IMF, 2001a and IMF, 2001b). By the end of June 2001, 23 countries, 19 of them in Africa had benefited from debt service relief amounting to some $34 billion (IMF, 2001b). Despite the high level of Kenya's external indebtedness, the country has not been included in the list of beneficiaries of debt relief. It is stated that Kenya is expected to reach sustainable levels of debt without special help from the initiative (IMF, 2001a).

1.1.2 Importance of External Aid

The crucial role of capital in the production process is well known. Early post war reflections on the problems of developing countries led to the identification of insufficient capital stock as a cause of their low income. Increased savings facilitates capital accumulation. According to Lewis (1954) and Rostow (1985), the volume of savings in developing countries was too low on account of the low income and therefore domestic savings should be supplemented by foreign resources.

The macroeconomic effect of aid and commercial flows on recipients is subtle and manifests themselves with lags of varying length across sectors and countries. A consistent theme emerging from the country studies is that domestic policies determine development outcomes and as Diaz (1986) puts it in the case of Mexico, policies are, in

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the final analysis the sole responsibility of the domestic government. If the government is not committed to change, there can be no serious macroeconomic reforms.

Encouraging outward orientation is perhaps one of the more important roles that external financing has played. An outward orientation allows access to technology and markets, forces domestic producers to become efficient by confronting them with competition (Vanwijnbergen, 1986), which raises productivity and contributes to growth. Policy instruments used to bring about outward orientation include the exchange rate and reform of tariff and non tariff barriers (Vanwijnbergen, 1986). Foreign aid provides scarce foreign exchange for importation of capital goods and food imports during critical periods of shortage and this helps to maintain consumption levels of the poor. But because of the instability of capital flows, it is important to mobilize domestic resources to ensure greater stability in the rate of investment.

External borrowing permits current domestic investments if used to import goods for production. It also permits the acquisition of both public and private foreign assets that can be used for debt service payments thus relaxing the resources, output and savings constraints inherent in the economy. Foreign borrowing can also serve to induce income growth through increased domestic investments.

1.1.3 Debt and Economic Growth Rate in Kenya

Kenya's first decade after independence beginning in 1963, was one of remarkable growth and structural change with real GDP growing at an average of 7 per cent annually. Her per capita income remained positive despite high population growth rates. Its Balance of Payment (BOP) position was healthy and annual inflation rates were less than 3 per cent (Were, 2001). As shown in Table A4 in the appendix 1, the growth rate has fluctuated in response to external shocks. For example, in 1973 and 1979 the years of first and second oil shocks respectively, the growth declined from 4.3 per cent to 1.1 per cent in 1974 and from 7 per cent in 1979 to 4 per cent in 1980, the coffee boom of 1977 shows 8.8 per cent growth.

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GDP growth rate decelerated after the 1973 oil crisis averaging 4.7 per cent during the period 1973 to1980. This slow down reflected not only the impact of the oil shocks but also the emergence of structural constraints. Annual GDP growth rate (at market prices) slowed to an average of 3.7 per cent between 1980 to 1985, a period of destabilization which also included a year of political uncertainty, for example the 1982 attempted coup and the severe drought in 1984 (Were, 2001).

The overall budget deficit was reduced from 10 per cent of GDP in 1981 to 4.5 per cent in 1984 mainly through cuts in development expenditures. These measures helped to reduce inflation rate from more than 20 per cent in 1981 to 13 per cent in 1985 (Were, 2001). Despite deteriorating TOTs, the current account deficit declined from 14 per cent of GDP in 1980 to 3.7 per cent in 1985, mainly through a reduction in imports and lower economic growth. In 1986, Kenya's GDP growth of 5.5 per cent was the highest rate achieved in 1980s. The BOP position strengthened as a result of higher export volumes and improvement in the TOTs from higher coffee and lower oil prices. Current account as a share of GDP fell to 2.6 per cent (IMF, 2001a).

Since 1990, there has been a sharp decline in all major macro economic performance indicators. Real GDP growth was 4.2 per cent in 1990 and fell to an all time low of -0.2 per cent in 2000, after having grown at an average of 5.0 per cent per annum in the period 1986-1990 (Table A4 in appendix 1). Investment, which averaged 23.8 per cent of GDP over 1986-90 dropped to 20.7 per cent in 1991 and below 19 per cent in 1992. External imbalances worsened as a result of the Gulf oil crisis, deteriorating TOT and the withholding of BOP support to Kenya by multilateral and bilateral agencies since late 1991. Despite the administrative efforts to restrain imports, the government accumulated external debt arrears in 1991 and 1992 and substantially reduced its reserves (Were, 2001)

At the November 1991 Consultative Group meeting, bilateral donors postponed aid pledges citing governance issues, corruption and inappropriate macro economic policies (IMF, 2001a). Multilateral donors also decided to withhold BOP support, largely because of concerns about domestic policy failures that were reflected in unsatisfactory macro

economic performance. In April 1992, the government agreed with the IMF on a framework of actions to re-establish the macroeconomic framework, but was unable to meet the agreed targets (IMF, 2001 a).

The exclusion of Kenya from the highly indebted poor countries (HIPC) debt relief initiative is likely to have been based on its poor record of reforms and economic performance rather than its ability to attain sustainable level of external debt. Kenya's external public debt indicators - debt to GNP ratio and debt to export ratio continued to increase between 1980 and 1999 (Table A1 in Appendix I). There has also been a significant net outflow of resources in form of debt service since 1980 to service the debt obligations (Table A.2 in appendix I). This implies that Kenya has been paying out more funds than it receives, there by reducing domestic resources available for development. The large burden of external debt constitutes a serious obstacle to growth and employment creation, as investment resources have to be used to meet external debt obligations.

The coffee boom of 1976/77 led to an abrupt increase in export earnings and therefore a temporary drop in the debt servicing ratio in 1978.The coffee boom was followed by the second oil crisis and a sharp deterioration in world commodity prices. As Kenya's export earnings almost stagnated, the debt – servicing ratio began to rise. This was accompanied by rising debt to GNP ratio (table A1 in the appendix I). Drought conditions in the 1980s led to food imports, which were made possible by the availability of external loan finance. Increased interest rates on international loans raised the public debt service charges substantially and the transfer of capital to foreign creditors poses serious implications on the economy.

Figure 1.1: The ratios of Kenya's Debt Burden Indicators
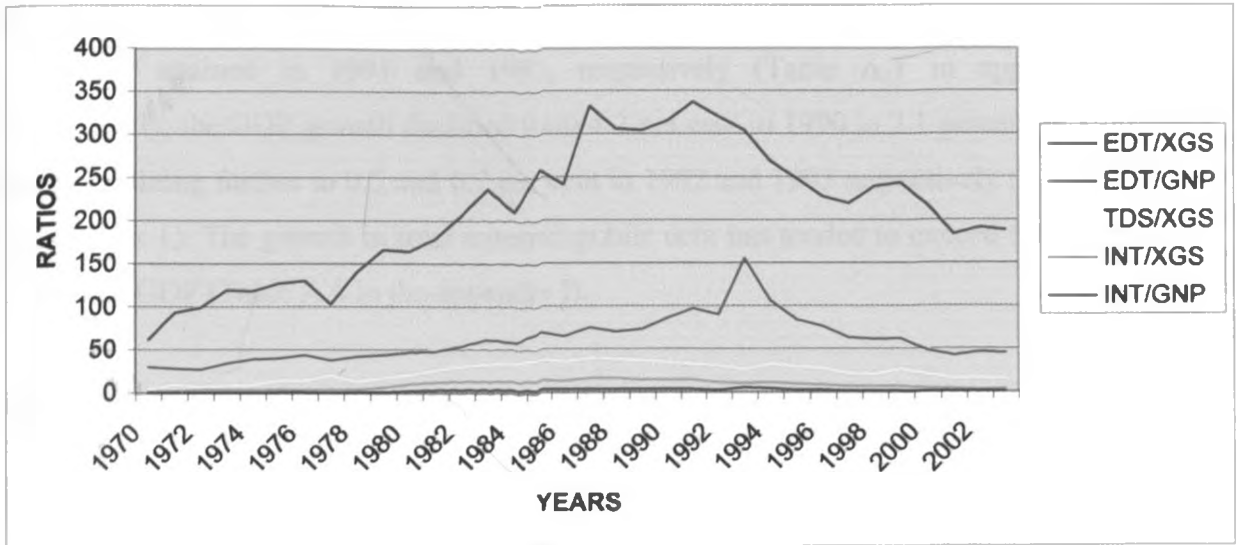
Where,

EDT/XGS- Debt to export ratio

EDT/GNP- Debt to GNP ratio.

TDS/XGS- Debt service to export ratio

INT/XGS- Interest to export ratio

INT/GNP- Interest to GNP ratio

Of the five key indicators, four of them, that is, debt to GNP ratio, debt to export ratio, debt service to export ratio and interest to export ratio have been above the critical levels. The critical values are 50 percent for debt to GNP ratio, 275 percent for debt to export ratio, 30 percent for debt service to export ratio and 20 percent for interest to export ratio and as shown in figure 1 above. Since 1982, the debt service to export ratio and the debt to GNP ratio has been above the critical levels until 1996 when the debt service ratio showed a slight decline. The debt to exports ratio has remained above the critical level from 1987 to 1993.

These indicators show that the external debt problem began to increase in the early 1980s. The significant rise in the debt burden indicators (debt to exports and debt to GNP ratios) in early 1990s coincided with a deterioration in GDP growth rates during that period. The highest debt to exports and debt to GNP ratios of 338 per cent and 156 per cent were attained in 1991 and 1993, respectively (Table A.1 in appendix 1). Concurrently, the GDP growth declined from 4.2 per cent in 1990 to 2.1 percent in 1991, before declining further to 0.5 and 0.2 per cent in 1992 and 1993 respectively (Table A.4 in appendix 1). The growth in total external public debt has tended to exceed the growth in average GDP (Table A.4 in the appendix 1).

Figure 1.2: Kenya's external debt stock, debt service and interest payment
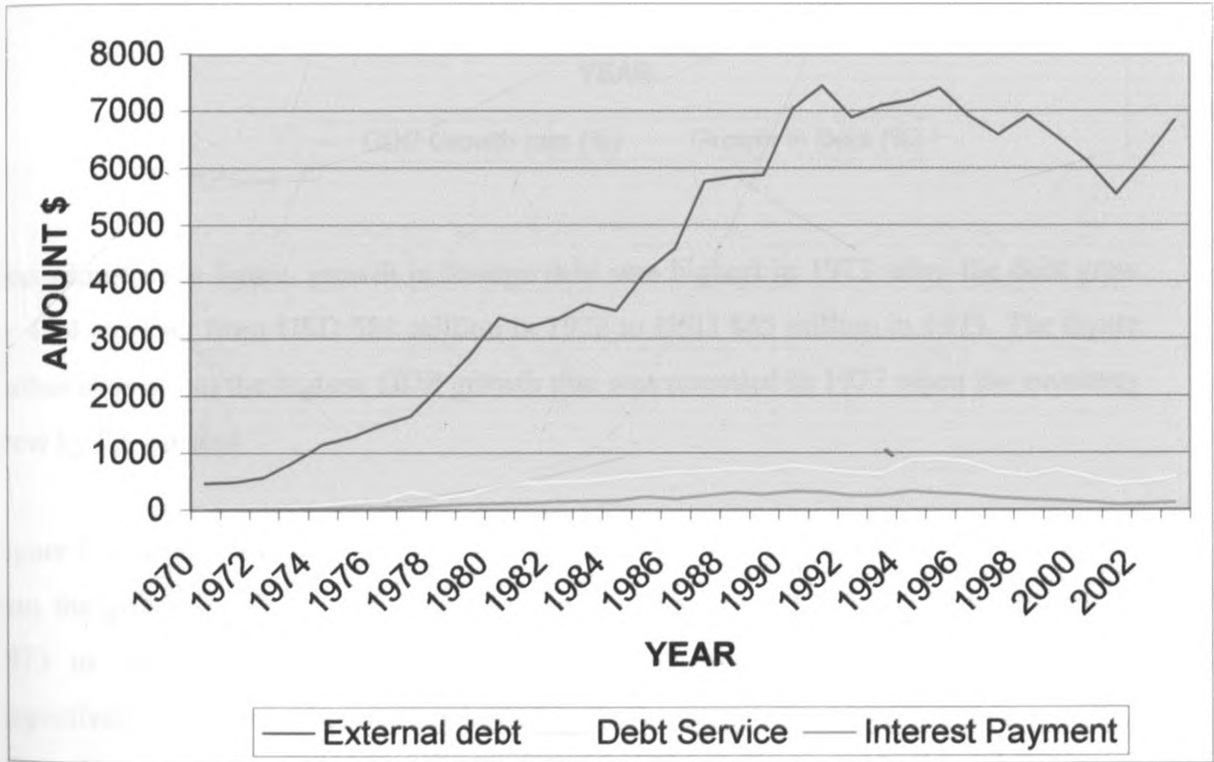
The figure shows the trends of total external debt, interest payment and debt servicing from 1970 to 2003. From the figure, the stock of foreign debt was highest in 1991 when it stood at USD 7453 million. External debt service was highest in 1995 when it was USD 901million and the interest payment was highest in 1994 when it was USD 328 million (IMF, 2001a)

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Figure1.3 below compares the growth in foreign debt and growth in GDP.

Figure1.3. Kenya's GDP Growth and Growth in Debt
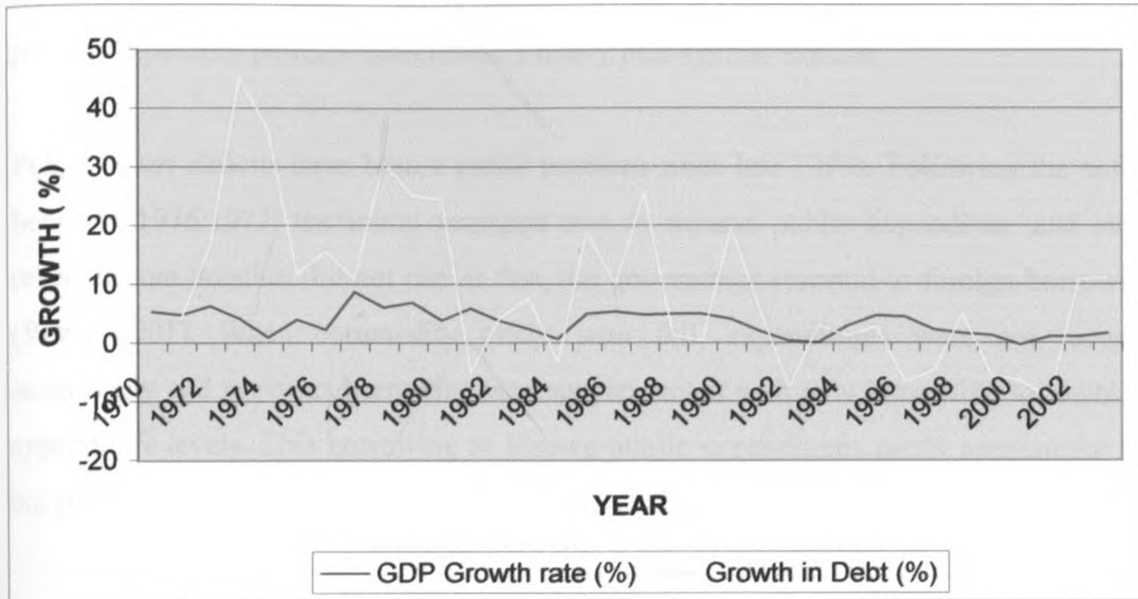
According to the figure, growth in foreign debt was highest in 1973 when the debt grew by 45.4 per cent from USD 581 million in 1972 to USD 845 million in 1973. The figure further shows that the highest GDP growth rate was recorded in 1977 when the economy grew by 8.8 percent

Figure 1.3 further shows that growth in external debt over the period has been much more than the growth in GDP. The rise in Kenya's total external indebtedness in the period 1973 to 1975 and 1978 to 1979 coincides with the first and second oil crises, respectively. The second period coincided with the 1979/1980 drought which seriously affected agricultural output necessitating food imports made available through increased borrowing. In the early 1980s, the world interest rate increased sharply as a consequence of anti-inflationary programmes in the industrialized countries. At the same time, the terms of trade deteriorated for the debtor countries as the price of raw materials fell (Were, 2001).

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The gulf crises of 1990-1991 also contributed to the heavy external borrowing. Increased protectionism policies by developed countries has tended to discriminate against the third world exports (Kenya included) thus lowering their earnings. Besides the external factors mentioned above, Kenya's external indebtedness can be partly attributed to internal factors which refers to the overly expansionary fiscal policies and highly distorted trade policies especially policies that created a heavy bias against exports.

Public sector deficits have been a major problem since late 1970s. Following the coffee boom of 1976/1977, the initial response was to expand public expenditure and since revenue from taxation did not rise as fast, the government resorted to foreign borrowing (Were, 2001). When commodity prices later fell, expenditures were not reduced accordingly and previous borrowing was supplemented with new borrowing to maintain expenditure levels. This borrowing to finance public expenditures partly account for the big rise in growth of external debt in Kenya.

The total external debt stock grew from USD 478 million in 1970 to USD 7412 Million in 1995 and declined to USD 6860 Million in 2003 (Table A2 in appendix I). The table shows that a significant rise in Kenya's external public debt corresponds to the period between 1980 and 1995 where increased borrowing was made. The 1984-1985 was the period of second oil shocks. This period (1980-1995) also registered a significant growth in debt service payments. The decline in growth of external public debt in 1988 (1.4 percent) and 1989 (0.5 percent) is partly due to debt write offs and a decline in bilateral and private debt. In 1989, Kenya's external debt amounting to USD 463 million was written off.

Although there was a dramatic build up in nominal aid flows during the 1980s, external financial support has been declining in the 1970s. And as a result the level of external indebtedness has been falling. Although Kenya may not be as heavily indebted as other HIPCs, its poor economic performance in the late 1990s and its inability to meet its debt obligations has serious implications on development and debt sustainability.

1.2 Statement of the Problem

Based on the above information, the severity of Kenya's external debt crisis cannot be underestimated. The relationship between public debt and economic growth is a major concern for policy makers. This is because a debt is supposed to add to already existing resources in an economy which should lead to greater economic performance and development. But this is not always the case in most of Sub Saharan African countries. There is little empirical work that has investigated this relationship. Furthermore there is even less evidence on the specific channels through which debt affects growth.

Although the public debt burden indicators .i.e. debt to GNP ratio, debt to export ratio, debt service ratio, and interest to export ratio showed a declining trend in the late 1990s, there are huge transfers abroad (Were, 2001). The resources that could have been allocated to consumption and investment are instead being channeled abroad through debt repayment/ servicing. This reduces the resources available for the country to engage in developmental projects and to partake in adjustment programmes aimed at increasing growth. Unless a country grows fast enough to sustain debt obligations and maintain domestic investment, indefinite external indebtedness will have very detrimental effects on the economy's growth and on the welfare of the citizens.

Kenya has relied heavily on foreign aid for its economic activities and the debt growth relationship need to be established for it would be meaningless to encourage foreign borrowing if its impact on growth is insignificant. If the debt improves growth, this implies more income, which boosts savings which in turn plays a very crucial role in growth by making investments possible.

Contrasting literature exists on the relationship between foreign aid and growth in developing countries. Some studies reveal a positive relationship for example (Gulati 1976). Other studies reveal a negative relationship for example (Steve and Hendricks 1996) and others found it impossible to establish any statistically significant correlation between aid and growth for example Mosley, Hudson and Horrel

(1996). Given these mixed results, this study sought to establish empirically the relationship between total external public debt servicing and growth in Kenya.

1.3 Research Questions

i) What is the structure and stock of Kenya's external debt?
ii) What is the relationship between Kenya's external indebtness, debt serving, domestic savings, growth in labour force and economic growth?
iii) What are the policy implications from the study?

1.4 Objectives of the study

The study examined the magnitude and structure of Kenya's external public debt and its relationship to economic growth. The specific objectives were:

(i) To examine the structure and stock of Kenya's external debt.
(ii) To analyze the relationship between Kenya's external indebtedness, debt servicing and economic growth.
(iii) To draw policy implications from research findings.

1.5 Significance of the study

The study is useful to the government policy makers in coming up with policies on debt and debt servicing which would lead to effective utilization of foreign debt/aid translating to economic development. This will signal the government's commitment to provision of conducive environment for investment in the economy.

Understanding the impact of debt servicing on economic growth is crucial to designing policies that will make foreign debts more productive. Econometric models that forecast debt service trends further into the future and with greater accuracy can be designed once this relationship is properly understood.

The findings of this study shed light on various issues affecting the debt service and hence provide direction to the government when planning and formulating policies regarding debt service.

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1.6 Scope of the Study

The study examined the relationship between the Kenya's external public debt and her economic growth between 1970-2003. The period was selected due to lack of data on the external debt, interest payment and debt servicing for the period before 1970.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, a review of the theoretical and empirical literature on external public debt and economic growth was undertaken. The chapter is divided into three parts. The first section discussed the theoretical literature relevant to this study. The second part reviewed empirical evidence, while the final part collated the findings obtained from the two sections, and came up with a synthesis of the literature.

2.2 Theoretical Literature Review

Negative impact of uncertainty on economic performance has been highlighted in recent literature especially in developing countries. On average, countries with volatile growth tend to grow less (Ramey and Ramey 1995, Elbadawi and Shmid - Hebel 1998). Infact, low and volatile growth rates are distinctive characteristics of the SSA economies since the 1960s.

When creditors are risk averse, debt crises are essentially uncertainty- induced phenomena, with negative shocks on income leading into debt-service difficulties. If creditors cut off supply of credit as a result, the debtor country will experience a rise in the shadow cost of capital, reduced investment and economic decline. Infact, default need not materialize to debt crisis to generate negative impact on the economy this is according to the debt – overhang hypothesis put forward by Krugman (1988 and 1989) and Sach (1984,1989a and 1989b).

On the other hand excessive debt stock signals the likelihood that the returns to capital will be taxed away to the creditors (Gode, 2001). Again enormous stocks of debt act as a signal of high probability of default, hence not only will investors shy away but also the country will be credit constrained.

The debt overhang theory is based on the premise that if the debt will exceed the country's repayment ability, expected debt service is likely to be an increasing function of the country's output level. Thus some of the returns from investing in the domestic economy are effectively taxed away by foreign creditors and private investment (Claessens *et al.*, 1996). Under such circumstances, the debtor country shares only partially in any increase in output and exports because a fraction of that increase will be used to service the external debt.

This theory implies that debt reduction will lead to increased investment and repayment capacity and, as a result, the portion of the debt outstanding becomes more likely to be repaid. When this effect is strong, the debtor is said to be on the "wrong side "of the debt laffer curve (Claessens *et al.*, 1996)

Uncertainty induces private savings as risk-averse seek a hedge against future bad states of the nature. However, the literature on uncertainty and debt leads to a contradicting prediction that on one hand, uncertainty deters investment and on the other rises savings. (Gode, 2001) asked the following question: "With high savings, how do we explain the fact that defaults and uncertainty are often associated, especially if international financial markets provide the insurance for risk – averse individuals"?

Uncertainty in the domestic economy makes investment unattractive for risk-averse individuals. Impact of uncertainty on consumption and savings, however depends on the level of wealth. At the same level of uncertainty, wealthy individuals will care to pay insurance, while whatever a poor individual consumes or saves depends on the current income. Further, if current income approaches the survival consumption requirements, a small amount of uncertainty causes individuals to run down their assets. An economy with a high degree of extreme poverty is vulnerable to wealth depletion and risk- averse lenders in the international financial market are less likely to extend credit to such economy.

In developing countries there is insufficient capital stock due to low income and hence low savings. As mentioned earlier, the role of increased savings in facilitating capital accumulation was advocated by Lewis (1954) and Koslow (1985). It was noted that the volume of savings in developing countries was too low on account of the low income and therefore domestic savings should be supplemented by foreign resources. This shifted the issue from whether external resources were useful to developing countries to how much was sufficient to help them realize their growth potential.

Todaro (1989) argued that the accumulation of external debt is a common phenomenon of third world countries at the stage of economic development where the supply of domestic savings was low, current account payments were high, and imports of capital goods were urgently needed to augment domestic resources. Todaro used the concept of basic transfer to explain the relationship between foreign external debt and economic growth. According to Todaro's study, basic transfer of a country is defined as the net foreign exchange inflow or outflow related to its international borrowing. It is the difference between the net capital inflows and interest payments on the existing accumulated debt. Basic transfer represents the amount of foreign exchange that a particular country is gaining or loosing each year through international capital flows. Basic transfer was expressed as:

$$Fn = d*D \text{ -------------- } (2.1)$$

Where,

Fn is the rate of increase of total external debt.

D is total accumulated external debt.

d is the percentage rate of increase in the total external debt.

However, since the interest is paid each year on the accumulated debt, transfer can therefore be represented as:

$$BT = d*D - r*d = (d-r) D \text{ ------------------- } (2.2)$$

Where BT is basic transfer, r is the average rate of interest on accumulated debt.

In equation 2.2, component $d*D$ is the net capital inflow and $r*d$ (rd) measures the total annual interest payment. The basic transfer therefore represents the amount of foreign exchange a particular country is gaining or losing each year.

Todaro argued that basic transfer will be positive if the percentage increase in debt is greater than the average rate of interest on accumulated debt and the country will be gaining foreign exchange. But if the percentage increase in debt is less than the average rate of interest on accumulated debt, the basic transfer will be negative and the nation will be losing foreign exchange. Any analysis of the evolution of and prospects for Third World debt crisis requires the examination of the various factors that cause the increase in debt and rate of interest on debt to change.

Todaro further argued that in the early stages of debt accumulation when a Less developed Country (LDC) has a relatively small total debt, the rate of increase is likely to be high, and since most of the debt accumulated debt comes from official sources, it is incurred on concessional terms and as a result the rate of interest is quite low and less than the percentage rate of change of debt. As long as the accumulating debt is used in productive development projects with rates of return in excess of the rate of interest on debt, then the additional foreign exchange from the rising debt has a positive impact on the performance of the economy.

Serious problem arises when the accumulated debt becomes very large such that its rate of increase begins to decline as the amortization rises while the sources of foreign debt switch from long term concessional terms to private short-term variable rate bank loans at market rates. This causes the rates of interest to rise, the country begins to experience severe Balance of Payment (BOP) problems as commodity prices plummet and the Terms of Trade (TOT) rapidly deteriorate with resultant loss of confidence in an LDC's ability to repay. This will lead private banks to cut off their flows of new lending and most importantly trigger flight of capital by local residents who send a huge sum of money out of the country.

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All of the four points above can combine to lower the rate of increase in total external debt and raise the average rate of interest, in the basic transfer equation with the net result being that the overall basic transfer becomes highly negative. Hence, capital will start to flow from the underdeveloped to developed world. The debt crisis then becomes a self – reinforcing phenomenon and the HIPCs are forced into a downward spiral of negative basic transfers, dwindling foreign reserves and declining development prospects.

While foreign borrowing can be highly beneficial, providing the resources necessary to promote economic growth and development has its costs. These costs have greatly outweighed the benefits for many developing countries. The main cost associated with the accumulation of a large external debt is debt servicing. As the size of the debt grows or as interest rates raise, debt service charge, which should be made with foreign currency, increases. In other words, debt – service obligations can be met only through higher export earnings, curtailed imports and/or further external borrowing.

The need for foreign resources in developing countries has been justified by the Two-gap models developed by Chenery *et al*. (1973) The basic argument of the Two-gap model is that most developing countries face either a shortage of domestic savings to match investment opportunities or a shortage of foreign exchange to finance the needed imports of capital and intermediate goods. The model assumes that the savings gap and foreign – exchange gap are unequal in magnitude and that they are independent i.e. there is no substitutability between savings and foreign exchange.

The implication is that one of the two gaps will be dominant, for example, if the savings gap is dominant, it means that the country is operating at full employment and is not using all of its foreign exchange earnings. It may have enough foreign exchange to purchase additional capital goods from abroad, but there is not enough excess domestic labour or other productive resources to carry out additional investment projects. The importation of such capital goods would only redirect domestic resources from other activities and probably lead to inflation and as a result excess foreign exchange, including foreign aid, might be spent on the importation of luxury consumption goods. Chenery *et*

al. (1973). Such a country is said to have a shortage of productive resources i.e. shortage in savings. For example, the Arab oil states during 1970s.

Most LDC's are assumed to fall into the second category where the foreign – exchange gap is dominant. They have excess productive resources and all available foreign exchange is being used for imports. The existence of complimentary domestic resources would permit them to undertake new investment projects if they had the external finance to import new capital goods and associated technical assistance. Foreign aid can therefore play a critical role in overcoming the foreign –exchange constraint and raising the real rate of economic growth.

According to Chenery *et al.* (1973), the savings constraint, starting with the identity that capital inflows, add to investible resources (domestic savings) can be written as:

$$I < F + sY \text{ where}$$
$$F - \text{-capital inflow}$$
$$sY - \text{domestic savings}$$
$$I - \text{domestic investment} \quad \text{thus:}$$

If capital inflows (F) plus domestic savings (sY) exceeds domestic investment (I) and the economy is at full capacity, a savings gap exists.

The foreign exchange gap - if a LDC investment has a marginal import (MI) share and marginal propensity to import out of a unit of GNP (M2). The foreign – exchange gap can be written as: $(M1-M2) I + M2 - E <= F$ (Hollis *et al.* 1973) Where E is the exogenous level of exports.

Therefore, the external assistance is assumed to facilitate and accelerate the process of development by generating additional domestic savings as a result of the higher growth rates that is presumed would be induced. Eventually it is hoped that the need for concessional aid will disappear as local resources become sufficient to make development self-sustaining.

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Chenery *et al.* (1973) concluded that financial assistance needs to be supplemented by technical assistance in the form of high level worker transfers to ensure that aid funds are used most efficiently to generate economic growth. The amount of aid should be determined by the country's absorptive capacity i.e. its ability to use aid funds productively.

The existence of a large debt does not necessarily signify a problem for the debtor countries, which use their borrowed resources effectively for development purposes. Instead, a small debt could be a heavy burden on a country, which uses funds for consumption and inefficient investment.

The debt burden of a country inevitably imposes a number of constraints on its growth prospects. The burden of principal and interest payments for instance drains the nations' resources and curtails the possible expenditure of resource on other productive ventures. This is even more constraining considering that the incomes from which debts are to be serviced is very little. This gives rise to three macro economic problems, first, earning foreign exchange, second, finding extra budget resources for debt servicing and third, adjusting to a reduction in spendable resources.

The question that needs to be answered is whether the large debt burden in Third World countries is one of the factors contributing to the weak economic performance and the uneven pace of economic reforms in these countries.

Krugman (1989) defined debt overhang as a situation in which the expected repayment on foreign debt falls short of the contractual value of the debt and showed that there is a limit at which accumulated debt stimulates investment and growth.

2.3 Empirical Literature Review

Although the relationship between public debt and economic growth is a major concern for policy makers, and the general public, there is little empirical work investigating this relationship. Furthermore, there is even less evidence on the specific channels through which debt affects growth.

A recent exception to this lack of empirical evidence is the work by Patillo *et al.* (2002) and Patillo *et al.* (2004), which empirically studied the relationship between total external debt and growth rate of GDP for developing countries. They used a data set consisting of a panel of 59 developing countries and 24 industrial countries. They used this model in investigating the relationship.

$$Y_{i,t} = aX_{i,t} + bD_{i,t} + n_i + h_t + e_{i,t} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.3)$$

Where $Y_{i,t}$ is the dependent variable, $X_{i,t}$ represents the set of explanatory variables, $D_{i,t}$ is the debt variable, n_i is an unobserved country-specific effect, h_t is an observed time – specific effect, $e_{i,t}$ is the error term, and the subscripts i and t represent country and time period respectively.

When estimating equation (2.3), Patillo *et al* (2004) used four different dependent variables, namely the growth rate per capita, total factor productivity growth rate, the capital accumulation growth rate per capita and private savings rate. The reason for estimating equation (2.3) for each of these four dependent variables is to study the relationship between debt and growth.

Patillo *et al.* (2004) concluded that there is a negative nonlinear relationship in the form of an inverted- U shape curve, between total external debt and growth in developing countries. At low levels of total external debt, it affects growth positively, but this relationship becomes negative at high levels of it. The specific turning points are 35-40 per cent for the debt-to- GDP ratio and 160-170 percent for the debt-to-exports ratio.

The study suggested that the channels through which total external debt affects economic growth are total factor productivity and capital accumulation. Other previous empirical studies on the non linear effects of debt on growth include Elbadawi *et al* (1996).

Most of the empirical studies include total external debt, policy, growth and other exogenous explanatory variables. Majority of the studies find one or more debt variables to be negatively correlated with economic growth. For example, Borensztin (1990) found that debt overhang had an adverse effect and reduced investment through crowding out effect.

Griffin (1970) and Griffin and Enos (1970) have argued that aid can harm growth by a combination of savings displacement and increase in the incremental capital to output ratio as a result of the lower productivity of aid to financed investment. Aid might be used to finance capital intensive projects and could even encourage corrupt government policies. Similarly, Borensztin (1990) argued that the debt overhang crisis is a situation in which the debtor country benefits very little from the returns on any additional investment because of the debt service obligation. These authors provide empirical evidence that supports a negative relationship between external debt and economic growth.

Sachs (1984) suggested that the amount of money borrowed was determined by the LDC government in order to maximize the growth rate of the economy with investments as the control variable. Sachs admitted the possibility that some of the external borrowing did not materialize in higher capital accumulation particularly because of political reasons, but Sachs (1984) did not perceive that as a danger to the ability of LDC to repay after some adjustment period.

Boyce and Ndikumana (2002) investigated the determinants of capital flight from 30 SSA, including 24 countries classified as severely indebted low-income countries, for the period 1970-1996. The estimates of capital were obtained using a modified version of the residual method, which is based on the difference between inflows of foreign exchange and the recorded use of foreign exchange. The model used was as follows:

$$KF_{it} = \Delta DEBTADJ_{it} + DFI_{it} - (CA_{it} + \Delta RES_{it}) + MISINV_{it} \dots\dots\dots\dots\dots (2.4)$$

Where $\Delta DEBTADJ_{it}$ is the change in the country's stock of external debt (adjusted for cross-currency exchange rate fluctuations); DFI is the net direct foreign investment; CA is the current account deficits; ΔRES_{it} is the change in the stock of international reserves; and MISINV is the net trade misinvoicing.

The econometric analysis on the above model revealed that external borrowing was positively and significantly related to capital flight, suggesting that to a large extent capital flight is *debt-fueled*. For every dollar of external borrowing in the region, roughly 80 cents flowed back as capital flight in the same year. Capital flight also exhibited a high degree of persistence in the sense that past capital flight is correlated with current and future capital flight. The growth rate differential between the African country and its OECD trading partners was negatively related to capital flight.

Mwau (1998) analyzed the impact of foreign capital inflows on the Kenyan economy. The study examined the effects of foreign inflows on investment, foreign trade and hence the Balance of Payment in Kenya. The paper estimated five equations .i.e. Total investment equation, imports equation, exports equation, money base equation and rate of growth of GDP equation.

The results indicated that foreign capital inflows have some stimulatory effects on domestic investment, with small effects on growth. The study also found that ignoring outflows consequent on investment, aid, illicit transfers, and private capital inflows have positive effects on BOP while public capital inflows had a negative effect. The study further noted that this effect could be negative if the study considered other outflows. Both inflows, that is, private and public had a positive effect on money supply and public capital inflows have a negative effect on inflation while private capital inflows had a positive effect.

Wamuthenya (1998) did a study on aid and growth in Kenya where domestic savings, aid inflows, terms of trade, annual growth rate of labour force and an interaction between aid and policies were incorporated as explanatory variables for the growth rate of GDP.

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The model used was

$$GDPG = B_0 + B_1(SAVGDP) + B_2(AIDGDP) + B_3(TOT) + B_4(GLF) + B_5(PV) + B_6(D84) +$$

$$B_7(PV.AIDGDP) + e_4 \dotfill (2.5)$$

Where SAVGDP is savings as a percentage of GDP

AIDGDP is aid as a percentage of GDP

TOT   is Terms of trade

GLF   is annual growth rate in labour

PV   is policy variable

D84   a dummy variable to capture 1984 drought

PV.AIDGDP is an interaction term between aid policies

The study concluded that domestic savings affects growth positively and poor policies affect growth negatively. Therefore, effectiveness of aid on growth increases in the presence of good or sound economic policies.

Debt service payments reduce export earnings and other resources and therefore retard growth. According to Elbadawi, *et al* (1996), these debt burden indicators also affected growth indirectly through their impact on public sector expenditures. For most of LDCs, debt financing is the only means available for mobilizing capital inflows. They can borrow from foreign private banks in developed countries to finance their growing financial needs but high foreign borrowing attracts high interest rate which is a burden to development.

Elbadawi *et al.* (1996) identified three direct channels in which indebtedness in the SSA works against growth; current debt inflows as a ratio of GDP, past debt accumulation which captures the debt overhang and thus prevents growth, and debt service ratio to capture the crowding out effects. The study found that debt accumulation deters growth while debt stock spurs growth. The results also showed that the debt burden has led to fiscal distress as manifested by severely compressed budgets.

The scope of debt overhang is much wider in that the effects of debt do not only affect investment in physical capital but any activity that involve incurring costs up front for the sake of increased output in the future. Such activities include investment in human capital that consists of education, health and in technology acquisition, whose effects on growth may be even stronger with time. Debt overhang discourages private investment depending on how the government is expected to raise the resources needed to finance external debt service and whether private and public investment is required.

Langat (1994) did a study on the impact of foreign aid on public expenditure in Kenya for the period 1974-1992. The study attempted to analyze whether foreign aid provided for development expenditure is fungible, whether it reduces tax effort to the government and the impact of total foreign aid and macroeconomic reforms on public expenditure. The study further estimated the structural model made of three equations:

$$DEX_{it} = f(GDP_t, FA_{it}, OFA_{it}, D) \dotfill (2.6)$$
$$REX_t = f(GDP_t, TFA_t, D) \dotfill (2.7)$$
$$TAX_t = f(GDP_t, TFA_t, D) \dotfill (2.8)$$

Where

DEX_{it} = Development expenditure for the ith ministry in year t

REX_t = Total government recurrent expenditure in the year t.

TAX_t = Total tax revenue in the year t

GDP_t = current price Gross Domestic Product in year t.

FA_{it} = Foreign aid (Grants) earmarked for the ith ministry in year t

OFA_{it} = other foreign aid (grants) to other government ministries than the ith ministry

TFA = Total foreign aid in Kenya in year t.

D = dummy variable to capture the impact of macroeconomic reforms done by the Government to restructure public expenditure after 1980 (SAPs)

The findings of the study showed that both GDP and foreign aid stimulate all categories of government expenditure and that the existence of foreign aid fungibility led to diversion of aid to expenditures other than those they were intended to finance, and

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availability of foreign aid did not reduce recurrent expenditure but led to reduction in the development expenditure.

Cohen's (1993) results on the correlation between developing countries (LDCs) debt and investment in the 1980s showed that the level of stock of debt did not appear to have much power to explain the slow down of investment in developing countries during the 1980's, it was the actual flows of net transfers that matters. The study found that the actual servicing of debt 'crowded out' investments. The study further found that a surprise fall of investment below its predicted level was not significantly correlated with debt stock. These results suggested that debt crisis was not the cause of low investment observed in most LDCs in 1980s.

Mbaku (1993) estimated a model based on the neoclassical production function to test for the relationship between foreign aid and economic growth in Cameroon using time series data for the period 1971- 1990. The following three equations were estimated using Ordinary Least square (OLS).

$$GDPG = a + b\,(IY) + c\,(POPG) + e_1 \qquad\qquad 2.1$$
$$GDPG = B_0 + B_1\,(SY) + B_2\,(AIDGDP) + B_3\,(POPG) + e_2 \qquad 2.2$$
$$GDPG = B_0 + B_1\,(SY) + B_2\,(GRNGDP) + B_3\,(POPG) + B_4\,(TECHGDP) + B_5\,(LOANSGDP) + e_3 \qquad 2.3$$

Where,

GDPG = Annual growth rate of real GDP

IY = Investment GDP ratio

POPG = Annual population growth rate

SY = Savings GDP ratio

AIDGDP= Amount of official development assistance as a proportion of GDP

LOANGDP = Loans as a proportion of GDP.

GRNGDP = Grants as a proportion of GDP.

TECHGDP = Technological cooperation grants as a proportion of GDP.

e_1 to e_3 are error terms.

a, B_0 are autonomous terms.

The total foreign aid disbursed as a percentage of GDP (AIDGDP) was further decomposed into grants as a percentage of GDP (GRTGDP) and loans as a percentage of GDP (LOANGDP) and technological cooperation grants as a percentage of GDP. Mbaku concluded that domestic resources proxied by savings as a proportion of GDP had a positive significance and stronger impact on economic growth in Cameroon, than foreign resources which revealed negative and insignificant impact on economic growth.

Nunnekamp (1986) when analyzing the underlying factors which may have caused the foreign debt situation in many LDCs, hypothesized that economic prospects in non developing countries had been negatively affected by the severe external shocks in the 1970's and early 1980's. To test this hypothesis, the study analyzed the impact of the major external shocks since 1973 on the balance of payment position. The shocks included TOT shocks, the oil price shocks, the real world market demand and rising interest shocks. The results indicated that the combined effects of the external shocks on BOP did not play a decisive role in explaining the debt problems. Instead domestic policies in borrowing countries such as rising budget deficits, domestic trade policies and monetary policy were found to be important variables in explaining the debt problem i.e. Self imposed debt crisis.

2.4 Overview of the Literature

The literature review seems to suggest that there are a number of ways of linking external debt to economic growth. From the literature there are studies that encourage foreign debt, for example, Gulati, (1998) and those that are against foreign debt, for example, Patillo et al. (2004). Contrasting literature exists on the relationship between foreign aid and growth in developing countries. Some studies reveal a positive relationship, for example Mbaku, (1993). Other studies reveal a negative relationship, for example, Griffin and Enos 1970) and others found it impossible to establish any statistically significant correlation between aid and growth, for example, Mosley, Hudson and Horrel (1996).

There also appears to be a disagreement on the channels through which foreign debt affects growth. According to Patillo *et al*. (2004) the channels include total factor productivity and capital accumulation while Borensztin (1990) only debt overhang affects economic growth, Elbadawi *et al*. (1996) identified current debt inflows as a ratio of GDP, debt overhang and debt service ratio.

Most of the studies reviewed above, support the existence of negative impact of external debt on economic growth. This implies that while foreign resource inflows may initially contribute to the growth of economy, excessive dependence on this source can retard investment and therefore retard economic growth.

This study adopts Mbaku's (1993) model using a time series data for Kenya to test the relationship between external debt servicing and economic growth. The study modifies Mbaku's model to better fit the Kenyan scenario. The model used is more comprehensive than Mbaku's as it captures the effects of debt stock, debt service, savings and interest payment on economic growth and also includes a dummy variable to capture the 1984 drought. The model therefore has more channels through which foreign debt works against economic growth in Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the model specification and methodology employed to examine the relationship between the Kenya's external public debt and her economic growth. A theoretical framework for the study is first outlined, followed by the specification of the empirical model. The variables used in the study are explained, including sources of data and diagnostic tests employed.

3.2 Theoretical Framework

The model adopted in this study is an improvement of Mbaku's (1993) model used to test the relationship between foreign aid and economic growth. It is based on a production function given by the following series of equations.

$$Y = F(K, L) \quad \text{...} \quad (3.1)$$

Where,

Y is Gross Domestic product.

K is Capital

L is labour and

$F_k > 0, \ F_l > 0, \ F_{kk} < 0, \ F_{ll} < 0$

By taking total differential of equation 3.1 and dividing both sides by Y and rearranging the terms and letting $d_k/d_t = $ INVGDP (Net domestic investment), results in equation 3.2 below.

$$GDPG = a + b\,(INVGDP) + c\,(GLF) \quad \text{.........................} \quad (3.2)$$

Where,

GDPG = Annual growth rate of the real GDP

a = Intercept term.

INVGDP = ratio of investment to GDP

b = Coefficient of marginal propensity to invest.

GLF = Annual growth rate of labour force.

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c = Coefficient of GLF which measures the contribution of labour to GDP

  (Marginal Propensity of labour)

By adding the error term e_1 to equation 3.2 gives equation 3.3

$$GDPG = a + b\ (INVGDP) + c\ (GLF) + e_1 \quad\text{.............................}\quad (3.3)$$

The term INVGDP can be replaced by its sources of finance including domestic savings as a ratio of GDP (SAVGDP) and foreign savings proxied by foreign aid expressed in terms of external public debt as a proportion GDP (AIDGDP). The term (AIDGDP) is added to equation 3.3 above to get equation 3. 4

$$GDPG = a_0 + a_1\ (SAVGDP) + a_2\ (AIDGDP) + a_3\ (GLF) + e_2 \quad\text{.....................}\quad (3.4)$$

Where a_0 is a constant term, a1-a3 are the coefficients and e_2 is the error term.

The variable AIDGDP can further be decomposed into stock of external public debt as a percentage of GDP (EDTGDP) and total debt service as a percentage of GDP (TDSGDP) to capture the crowding out effect. These two will help to capture the individual impacts of growth in the Kenyan economy.

The modification produces equation 3.5 below.

$$GDPG = b_0 + b_1\ (SAVGDP) + b_2\ (EDTGDP) + b_3\ (TDSGDP) + b_4\ (GLF) + e_3 \quad\text{...........}\quad (3.5)$$

Where $b_1\text{.....}b_4$ are the coefficients, b_0 is the constant term while e_3 is the error term. The equations 3.3 and 3.4 are Mbaku's estimatable equations.

Mbaku's model captured the effects of aid on GDP but fails to capture the effects that debt servicing has on economic growth. Mbaku failed to decompose external aid as a proportion of GDP (AIDGDP) into stock of debt as a ratio of GDP (EDTGDP) and debt service as a ratio of GDP (TDSGDP) which includes interest payment. The model adopted in this study will decompose Mbaku's AIDGDP into EDTGDP, TDSGDP and INTGDP and analyze the effects of each on economic growth.

3.3 Model specification

The specification of equation (3.5) entails institutional framework governing government decision-making, so that a structural model might be preferable (Shepsle, 1979).

Following Dollar and Burnside (1997), this study modifies equation 3.5 to include a 1984 drought represented by dummy variable D84 to get equation 3.6.

$$GDPG=b_0+b_1 (SAVGDP) +b_2 (EDTGDP) +b_3 (TDSGDP) +b_4 (INTGDP) +b_5 (GLF)$$
$$+b_6 (D84) +e_4……………………..…………………………….. (3.6)$$

Where,

b_0 is the constant term.

b_1-b_6 are the coefficients.

e_4 is the error term.

D84 is a dummy variable to capture 1984 drought.

3.4 Definition and measurement of variables

Annual growth rate of Gross Domestic Product (GDPG)

This was the dependent variable. It is an economic indicator that measures the value of all goods and services produced in an economy in a given period of time usually one year. This measure was preferred because it showed the effects of external debt on the economy. It was measured a percentage change in the value of goods and services from the previous year.

Savings as a proportion of GDP (SAVGDP)

This measured the impact of domestic savings on economic growth. Domestic savings was expected to have a positive effect on the economy. Savings was measured by the total domestic savings as a ratio of GDP.

External debt as a proportion of GDP (EDTGDP)

This is the official development assistant from development partners. It can either be unilateral or bilateral and in the form of either grants or loan. A higher official development assistant (ODA) should increase resources available for investment and hence increase economic growth. Foreign aid was measured in terms of total amounts of grants and loans extended to the country as a proportion of the country's GDP.

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Total Debt service as a proportion of GDP (TDSGDP)

This is a measure of how a country was able to service its external debt. If the rate of exporting is higher than the rate of importation, debt servicing is said to be sustainable. Debt servicing was expected to impact negatively on economic growth. Debt servicing was measured by the total government expenditure on debt servicing as proportion of GDP.

Interest as a proportion of GDP (INTGDP)

Interest is the amount paid by a government to the lending government as a compensation for the loans advanced. Interest is paid as part of the debt service but this paper was able to separate the interest and principal payment. Interest payment was expected to reduce economic growth and it was measured by the total government expenditure on interest as a proportion of GDP.

Growth in labour force (GLF)

Labour force is the country's population that is able to work. Annual growth rate in labour was expected to have a positive impact on the economy because with high work force there would be high production in the economy.

3.5 Data type and Sources

Time series data was used for analysis in this study. The data consisted of yearly observations of total stock of public debt, external debt servicing, interest payment, domestic savings and growth in labour force. These data were obtained from Central Bank of Kenya, World Bank publications and statistical abstracts published by Kenya National Bureau of Statistics.

3.6 Estimation techniques and Time Series Properties of data

The model in equation 3.6 was estimated using ordinary least squares (OLS) estimation method. A specification associated with error correction modeling (ECM) was applied to capture long-run equilibrium after the variables were differenced to make them stationary. By using cointegration and error correction model, the study established both the short run and long run equilibrium. The appropriate tests for stationarity of all the variables were performed to avoid spurious regression results. The variables were not stationary at levels. They were differenced once to achieve their stationarity.

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Cointegration test for series with higher order of integration was performed using Augmented Dickey Fuller (ADF) test to the residuals of the statistic cointegration (long-run) regression.

It was likely that there existed a long run relationship between debt servicing and economic growth in Kenya. If the residuals from the linear combination of nonstationary series were themselves stationary, then it was accepted that the 1(1) series was cointegrated and the residuals taken from the cointegrating regression were valid and built into an Error Correction Model (ECM). An ECM was a restricted autoregression that had cointegration restrictions built into the specification, so that it could be used in cointegrating non-stationary time series at levels. It restricted the long-run behaviour of the endogenous variables to converge to their cointegrating relationships, and at the same time allowing for short-run dynamics. The cointegrating term showed the speed with which short-term deviations were corrected gradually towards the long-run equilibrium. This study applied the Augmented Dickey Fuller (ADF) test to the residuals of the statistic cointegration (long-run) regression rather than the levels of the series, since it was believed that variables differenced to achieve their stationarity loose their long-run relationship.

Diagnostic tests were performed to indicate model inadequacy or failure. A series of diagnostic tests performed indicated whether any of the assumptions required for OLS to be the best linear unbiased estimator (BLUE) was violated. Diagnostic tests therefore played an important role in the model evaluation stage of this study. The diagnostic tests performed included serial correlation test for autocorrelation residuals, the White test for Heteroscedasticity errors, normality test for the distribution of the residuals and the Ramsey Reset test for the regression specification.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents analysis of the empirical results of the study. The chapter is divided into the structure of and composition of Kenya's external debt, the trending of the variables and descriptive statistics, which gives the normality tests of the series among other statistics. The time series properties of the variables then follow. Finally, regression results and diagnostic tests are presented.

4.2 The Kenya's structure and composition of external debt

A greater proportion of Kenya's external debt consists of official debts. From 1980s, multilateral debts constitute a major proportion of the total debt stock. The multilateral aid is in the form of concessional loans. Since early 1990s, the proportion of concessional debt has been raising from 20 per cent in 1979 to 34 per cent in 1989 and to 63 per cent in 1999 respectively(Table A2 in appendix 1). This has given Kenya the advantage of contracting loans on soft terms. The main lenders have been the World Bank and International Development Association (IDA). The other multilateral creditors are the International Monetary Fund (IMF), African Development Bank (ADB) and African Development Fund (ADF). The World Bank and IDA are concerned mainly with project lending, while IMF is mainly concerned with policy- based lending .i.e. budget support. Bilateral lenders include Japan, USA, Germany, France and Britain who have written off substantial amount owed to them (IMF, 2001b)

In 1989, multilateral debt was 37 per cent of the total public debt compared to bilateral debt, which was 18 per cent. The share of multilateral debt increased moderately in 1980s due to large disbursements of adjustment lending from the World Bank.

Private debt has remained relatively low over the years, the highest percentage of private debt as a proportion of total debt within the period is 25 per cent. Long-term public debt constitutes a major proportion of total public debt outstanding. Long-term overall debt

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can further be broken down into public and publicly guaranteed and private non-guaranteed debt. A greater proportion of long-term overall debt outstanding is contracted by the public sector and the main debtors are Central government, the Central Bank of Kenya and Parastatals. The composition of public debt has changed significantly with the share of domestic debt increasing and at the same time proportion of external debt decreasing. This is because of reduced access to external funding from multilateral and bilateral agencies and increased domestic borrowing to close the shortfall.

Before discussing time series properties of the variables, their trends were first analyzed.

Figure 4.1 below graphs the stock of external debt as a ratio of GDP.

Figure 4 .1 External debt as a Ratio of GDP
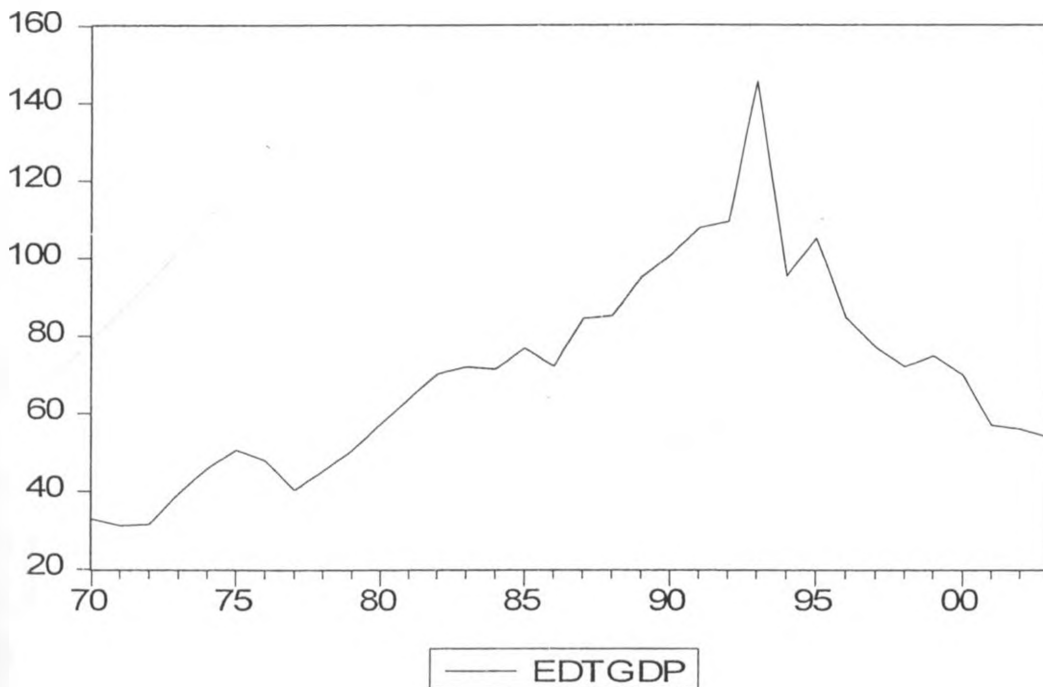
Figure 4.1 shows that debt as ratio of GDP has been increasing over the study period until 1993 when it started to decline. The increment for debt as a ratio of GDP is higher compared to the increments of external debt service as ratio of GDP.

Figure 4.2 below graphs the external debt servicing as ratio of GDP.

Figure 4.2: Total debt Service as a ratio of GD.'
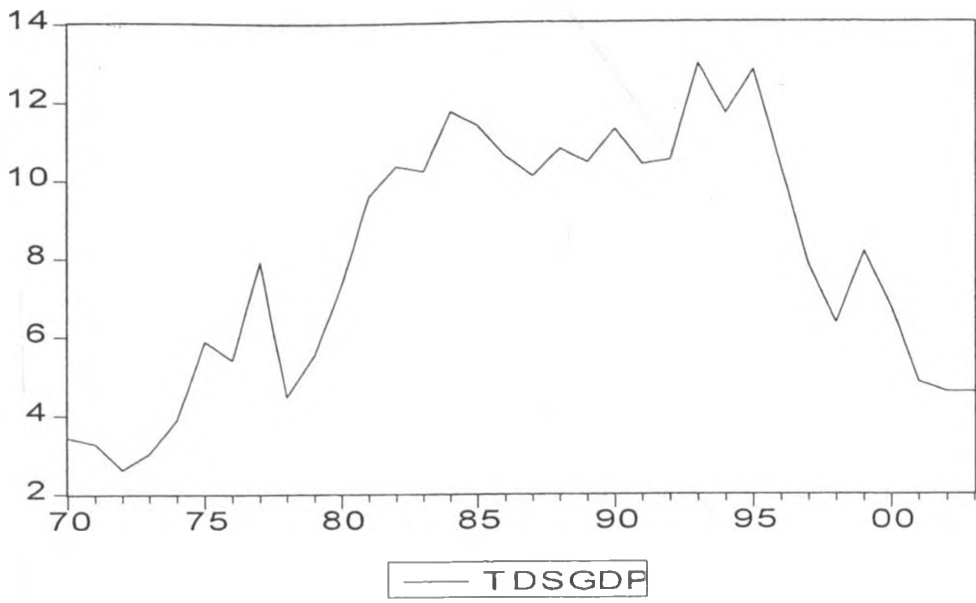
Figure 4.2 show that external debt servicing has been fluctuating over the study period until 1996 when the stock of debt and the debt servicing started to decline. The figures for other independent variables: savings as a ratio of GDP, interest as a ratio of GDP, and the annual growth rate of labour are shown in appendix II.

It was important to examine if the data exhibited normality. The Jarque-Bera statistics test was used to test normality of the series. It utilised the mean based coefficients of skewness and kurtosis to check normality of variables used. Skewness was the tilt in the distribution and was expected to be -2 and +2 range for normally distributed series, Kurtosis was expected to be within -3 and +3 range if the data were normally distributed. Where the probability value was less than Jarque-Bera Chi-square at the 5 per cent level of significance, the null hypothesis was not rejected. Table 4.1 below gives the summary of the descriptive statistics of the data used in this study.

Table 4.1 Summary of descriptive statistics

	Debt/GDP	Growth in labour force	Interest/ GDP	Savings/ GDP	Debt service/GDP
Mean	69.862	0.041	2.710	0.168	7.978
Median	70.845	0.036	2.375	0.173	8.050
Maximum	145.780	0.095	5.400	0.234	12.950
Minimum	31.200	0.009	1.000	0.111	2.620
Std. Dev.	26.099	0.022	1.348	0.028	3.181
Skewness	0.675	0.782	0.323	-0.226	-0.174
Kurtosis	3.403	3.063	1.683	3.041	1.635
Jarque-Bera	2.810	3.475	3.049	0.291	2.813
Probability	0.245	0.176	0.218	0.864	0.245
Observations	34	34	34	34	34

The normality test showed that external debt as a ratio of GDP, external debt servicing as ratio of GDP, domestic savings as ratio of GDP, growth in labour force and interest as a ratio of GDP were all normally distributed.

The descriptive statistics guided on which of the equations was more able to yield better results and highlighted on possible problems to encounter. However, there was need to supplement the statistics by more incisive quantitative analysis such as the correlation matrix. The correlation matrix was an important indicator that tested the linear relationship between the explanatory variables. The matrix also helped to determine the strength of the variables in the model, that is, which variable best explained the relationship between real growth of GDP and its determinants. This was important and helped in deciding which variable(s) to drop from the equation. Table 4.2 presents the correlation matrix of the variables at levels.

Table 4.2 Correlation matrix at levels

	Debt/GDP	Growth in labour	Interest/ GDP	Savings/ GDP	Debt service/GDP
Debt/GDP	1.000				
Growth in labour	-0.507	1.000			
Interest/ GDP	0.283	-0.454	1.000		
Savings/ GDP	-0.172	0.270	-0.139	1.000	
Debt service/GDP	0.248	-0.542	0.214	-0.124	1.000

Table 4.2 above shows that there was positive correlation between external debt as a ratio of GDP, interest as a ratio of GDP and debt service as a ratio of GDP. Only growth in labour force and savings as ratio of GDP were negatively correlated to debt as a ratio of GDP. The result reflects the expected output.

4.3 Econometric Results

4.3.1 Time series properties

The first step was to test for stationarity of the variables. Augmented Dickey-Fuller (ADF) tests were used to test for stationarity of the series. The results of the test for all the series are presented in the Table A1 in the appendix III.

The tests showed that all variables were stationary after first differencing. The next step was to establish whether the non-stationary variables at levels were co integrated. Differencing of variables to achieve stationarity would have led to loss of long-run properties.

The concept of co integration implies that if there was a long-run relationship between two or more non-stationary variables, deviations from this long run path were stationary. To establish this, the Engel-Granger two step procedures were used. This was done by generating residuals from the long-run equation of the non-stationary variables, which were then tested for stationarity using the ADF test. The results of co integrating regression are given below in Table 4.3.

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Table 4.3: Cointegrating Regression Results

Variable	Coefficient	t-statistic
Constant	5.563	2.210
Savings/GDP	5.711	0.458
External debt/GDP	-0.091	-3.815
Debt service/GDP	0.524	2.599
Growth in labour force	-17.305	-0.940
Interest/GDP	0.46	0.626
Drought 1984	-0.057	-2.941
Adjusted R^2		0.794
Standard Error		1.887
Durbin Watson statistic		1.120
Akaike info criterion		2.243
Schwarz criterion		2.467
F- statistic		9.135
Prob (f-statistic)		0.000

All the variables had the same order of integration. The co integrating regression was performed to find out whether the variables had a long-run relationship. Savings as a ratio of GDP, external debt as ratio of GDP, debt service as a ratio of GDP, growth in labour force and interest as a ratio of GDP were regressed on growth rate of GDP.

The coefficient for savings as a ratio of GDP was positive and insignificant at both 1 and 5 percent, the coefficient for growth in labour force was negative and insignificant at 1 and 5 percent. The coefficient for external debt as a ratio of GDP was negative and significant at 1 and 5 percent but it was expected to be positive. The coefficient for debt service as a ratio of GDP was positive and significant at both 1 percent and 5 percent and the coefficient of interest as a ratio of GDP was positive and insignificant at 10 percent, 5 percent and 1 percent.

The coefficients of determination (R^2) was high (0.7936), meaning that the power of the variables; (savings/GDP, external debt/GDP, growth in labour force, Interest as a ratio of GDP, and debt service/GDP) to explain changes in the growth of GDP was high. The coefficient for 1984 drought was negative and significant at 5 per cent implying that the 1984 drought significantly reduced growth during that period.

To check whether the variables were cointegrated, residuals from the above co integration regression were derived. The table A1 in the appendix IV reports the stationarity test for the residuals of the co-integrating regression.

The residuals were found to be stationary at 1 percent levels of significance. The residuals became the error correction term and consequently, an error correction formulation was adopted.

4.3.2 Error Correction Modeling

After accepting cointegration, the next step was to re-specify equation (3.6) in the model to include the error correction term (ECM). This term captured the long run relationship. It reflected attempts to correct deviations from the long run equilibrium and its coefficient was interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to the growth in GDP. The results of the error correction model are presented in Table 4.4 below.

Table 4.4: Error correction model

Variable	Coefficient	t-Statistic
Constant	0.413	2.340
External debt/GDP	-0.802	-2.622
Interest/GDP	0.46	0.626
Debt service/GDP	0.563	2.516
Error correction term	-0.585	-3.599
Savings/GDP	0.523	2.136
Growth in labour force	-14.047	-0.539
Drought 1984	-0.028	-2.132
Adjusted R-squared		0.641
Durbin-Watson stat		1.893
Akaike info criterion		3.913
Schwarz criterion		2.095
F-statistics		9.135
P- value of F-statistics		0.000

The coefficients of the variables are very important in the analysis of the data. The coefficients of variables represent percentage change in the dependent variables as result of percentage change in the independent variables. The coefficients of determination (adjusted R^2) was 0.6413, meaning that 64.13 percent variations in the GDP growth were explained by debt as a ratio of GDP, savings as a ratio of GDP, interest payment as a ratio of GDP, growth in labour force and debt service as ratio of GDP. The F-statistic was 9.135 and statistically significance at 1 percent, meaning that all the independent variables considered together, explained the dependent variable. The coefficients of external debt as a ratio of GDP, savings as a ratio of GDP and debt service as a ratio of GDP was statistically significance at 1and 5 percent level. Interest as a ratio of GDP and growth in labour force had the correct signs but were statistically insignificant at both 1 and 5 percent

The coefficient for the error correction term was well defined and had the expected negative sign and significant at 1 percent showing a feed back of approximately 59 percent of the previous year's disequilibrium from the long run domestic savings, labour force, external debt, debt service, GDP growth rates and interest payments. The coefficient for the 1984 drought remained negative at 5 percent as expected.

A unit increase in the ratio of external debt to GDP leads to a 0.802 decline in GDP growth rate while a unit increase in the ratio of total debt service to GDP leads to an increase of 0.562 in GDP growth rate. This is contrary to a priori expectations where a unit increase in debt service should lead to a decrease in GDP growth. The speed of adjustment coefficient is -0.585 and this tells us that about 60 percent of the disequilibrium in GDP growth rate in one period is corrected in the next period.

4.3.3 Diagnostic Tests

Before embarking on the discussion of the regression results, the error correction model was subjected to number of diagnostic tests in order to evaluate its validity. These were: the LM-autocorrelation, which supplement the Durbin Watson statistics, the ARCH (Autoregressive conditional heteroscedasticity) which detects the problem of

heteroscedasticity and the Ramsey RESET test for specification of the regression. The diagnostic tests utilized the F-statistics distribution. A summary of these tests is shown in the table A1 in the appendix V.

4.3.4 Discussion of Regression Results

In the short-run estimated model, the coefficients of external debt to GDP, savings to GDP and debt service to GDP had the correct sign and significant while the coefficients of interest to GDP and growth in labour force were insignificant. In the long run estimated model, the coefficients of debt to GDP, debt service to GDP and savings to GDP were significant while the coefficient for growth in labour force and interest to GDP were insignificant. The main result of interest was the coefficient of the external debt service ratio, which was negative and statistically significant. A partial effect of -0.563 was obtained for debt service ratio. Hence, a one percentage-point increase in the external debt service would, on average, translate to a 0.563 percentage point decrease in the GDP growth, ceteris paribus. This result showed that there was a negative relationship between GDP growth rate and external debt servicing. This agrees with the study by Elbadawi, *et al.* (1996), Cohen (1993) and Borensztin (1990)

Savings to GDP had a positive effect on GDP growth rate. A 1 percent rise in domestic savings leads to 0.523 percent rise in the GDP growth rate. This was expected because an increase in domestic savings implies availability of more investment resources in the economy which leads to an increased GDP growth rate. With the increased investment more employment is created, demand in the economy increases; production goes up and as a result, the government collects more revenue. This agrees with Wamuthenya (1998) and Mbaku (1993) results.

There was a negative effect of external debt on the GDP growth rate. A partial effect of -0.082 is obtained for external debt. This implies that a 1 percentage point increase in the external debt stock would, on average, translate to a 0.082 percentage point decrease in the growth rate of GDP, *ceteris paribus*. This was the expected result. Increase in external debt stock contributes to a decline in the GDP growth instead of spurring growth

in the economy. This result agrees with the results of Patillo *et al.* (2004), Mwau (1998), Griffin and Enos (1970).

The coefficient of the variable growth in labour force was negative and insignificant though its coefficient was expected to be positive. This implies that growth in labour force has not been important in explaining growth for the period under study in Kenya. This agreed with Wamuthenya (1998) results.

The coefficient of the error correction term included in the estimated model to capture the long-run dynamics between the cointegrating series was well defined, had the expected negative sign and statistically significant at 5 percent. It indicated a rapid response of GDP growth rates to deviations from long run relationship with each of the variables. In particular, negative deviations from the stationary relationship are corrected by increases in GDP growth rates. The study showed a feedback of approximately 58.5 per cent from actual growth in the previous year to equilibrium rate of GDP growth rate. This is high and implies that the deviations from the long run equilibrium path were almost corrected in one period. This agreed with earlier results by Wamuthenya (1998) who obtained speed of adjustment of 62 percent.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Summary

The study provided evidence on the empirical relationship between debt servicing and economic growth rate in Kenya using 33-year time series data. Using OLS estimation method, a single equation was estimated with the growth rate of GDP being the dependent variable and explanatory variables being external debt stock as a ratio of GDP, the external debt service as a ratio of GDP, domestic savings as a proportion of GDP, growth in labour force and interest payment as a proportion of GDP. A specification associated with error correction modeling was applied to capture long-run equilibrium after the variables were differenced to make them stationary. By using cointegration and error correction model, the study established both the short run and long run equilibrium.

5.2 Conclusion

Both in the short-run and long run models, the coefficients of external debt stock as a proportion of GDP, external debt servicing as a ratio of GDP and savings as a ratio of GDP had the correct sign and significant while the coefficient for growth in labour force and interest as a ratio of GDP had the correct sign but insignificant.

The study found that the external debt service impacts negatively on economic growth. The finding in this study suggested that removing the external debt constraint would not only be good for growth, as other studies have discovered, but also it could directly contribute resources which would be vital in enhancing economic growth in the country.

5.3 Policy implications

The study results suggested that removing the external debt constraint would not only be good for growth, but also it could directly make resources available which would foster economic growth in the country. Though the country didn't qualify for debt relief initiative, there is need for the government to continue negotiating for debt relief. Thus, Policy makers should consider coming up with sound policies that will ensure that all

financial inflows in the country in the form of debt or aid is effectively and productively utilized.

Domestic savings leads to increased economic growth. The government should therefore come up with policies which will encourage domestic savings rather than relying more in foreign borrowing, which is unpredictable and usually comes with conditions attached to it. For the government to encourage domestic savings and reduce the impact of external debt in the economy, it should strive to come up with sound economic policies, for example, avoiding high inflation rates by practicing sound monetary policies in order to promote domestic savings, providing the right incentives to save, such as strengthening financial institutions and keeping interest rates on savings attractive in order to encourage savings. The government should also ensure that most savings are invested in carefully evaluated projects, for example, projects related to infrastructure development and those with high rates of return rather than those with lower rates of return. The government should also ensure that most of the savings are channeled to investments rather than servicing debts which can be reduced through sound fiscal disciplines.

From the regression results, the growth in labour force impacted negatively to economic growth. Due to poor economic performance, the economy was not able to absorb all the labour force in its job market. The high levels of unemployment in the economy affected negatively the growth in economy. For the government to ensure high levels of employment in the economy, it should come up with policies which ensures conducive environment for investments in the country. The government should also ensure that its human resource is highly trained to adopt the dynamics of information technology in the economy.

Proper macroeconomic management of the economy, as a whole, is important since it determines the volume and servicing of external debt, as well as the credit rating. The availability of external finance should be consistent with a policy framework that is credibly maintained (fiscal stance, exchange rate policy, interest rate policy, pricing policy.). It is important to create credibility including political will in order to spur investor confidence for both local and foreign investments. Commitment to re-building

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credibility is a key challenge for Kenya. Another challenge to the government remains that of ensuring efficiency in delivery of services and increased productivity of public investments. More has to be done to revamp the economy to a higher, sustainable growth path. In the long run, foreign savings should supplement but not replace domestic savings.

5.4 Limitations of the study and Areas for further research

While various sources where the study's data was drawn may yield meaningful data, it is worth pointing out that the quality of this data differs across various sources. A major limitation of the study was the problem concerning the data in the Kenyan economy, which lacks relevance and reliability. Different data sources gave different data for the same variable. To maintain consistency, the study relied on data published by the government press.

The independent variables debt to GDP, savings to GDP, debt service to GDP and interest to GDP in the growth function are not the only variables that affect the economic growth. Many other variables have been omitted in the model for example social factors, political factors and financial intermediation. Hence there is need to do further research incorporating all factors that have an impact on economic growth. There is need to do further research on the impact of external debt servicing on the poor also a research to establish whether external debt servicing contributes to poverty in Kenya?

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APPENDICES

Appendix I: Raw and Refined Data
Table A.1: The ratios of Kenya's Debt Burden Indicators

Year	EDT/XGS	EDT/GNP	TDS/XGS	INT/XGS	INT/GNP
1970	63	31	5	2	1
1971	94	29	10	3	1
1972	100	28	8	4	1
1973	120	35	9	4	1
1974	119	40	10	4	1
1975	128	41	15	5	2
1976	131	45	15	4	2
1977	104	39	21	4	1
1978	141	43	14	5	2
1979	167	45	18	7	2
1980	165	48	21	11	3
1981	180	49	27	13	4
1982	207	55	31	14	4
1983	238	63	34	14	4
1984	211	59	35	14	4
1985	260	71	39	15	4
1986	242	66	36	14	4
1987	333	76	40	17	4
1988	307	71	39	17	4
1989	305	74	37	15	4
1990	316	87	35	15	4
1991	338	98	33	15	4
1992	321	91	31	12	3
1993	305	156	27	11	6
1994	269	107	33	12	5
1995	249	85	30	10	3
1996	228	77	28	9	3
1997	220	64	22	7	2
1998	240	62	21	7	2
1999	244	63	27	7	2
2000	218	49	21	5	1
2001	184	43	16	4	1
2002	192	47	16	3	1
2003	189	46	16	4	1

Source: World Debt Tables, Global Development Finance (Various issues), the
   • World Bank, Washington DC, 1988.

Table A.2: Kenya's External debt stock, debt service and Interest Payments (Million $)

Year	External Debt	Debt Service	Interest Payment
1970	478	50	19
1971	498	52	21
1972	581	48	24
1973	845	65	31
1974	1153	98	33
1975	1290	151	35
1976	1493	169	48
1977	1659	326	58
1978	2174	216	89
1979	2721	299	116
1980	3386	434	127
1981	3228	485	134
1982	3368	497	153
1983	3628	515	169
1984	3512	578	176
1985	4181	621	238
1986	4604	677	206
1987	5783	691	257
1988	5862	738	312
1989	5890	709	280
1990	7058	791	331
1991	7453	719	318
1992	6898	661	259
1993	7111	632	264
1994	7202	881	328
1995	7412	901	299
1996	6931	844	277
1997	6603	669	221
1998	6943	612	191
1999	6562	716	175
2000	6145	591	142
2001	5561	474	108
2002	6169	504	111
2003	6860	583	131

Source: World Debt Tables, Global Development Finance (Various issues), the World Bank, Washington DC, 1988.

Table A.3: Kenya's External Debt, Total Debt service and Interest Payment as a Ratio of GDP

Year	EDT/ GDP	TDS/GDP	INT/GDP	GLF	SAVGDP
1970	32.85	3.44	1.3	0.0725	0.175
1971	31.20	3.28	1.3	0.0414	0.177
1972	31.50	2.62	1.3	0.0578	0.170
1973	39.40	3.04	1.45	0.0852	0.201
1974	45.90	3.89	1.30	0.0871	0.198
1975	50.60	5.90	1.37	0.0464	0.124
1976	47.90	5.43	1.54	0.0534	0.111
1977	40.33	7.93	1.40	0.0096	0.174
1978	45.20	4.48	1.85	0.0666	0.194
1979	50.50	5.55	2.15	0.0345	0.126
1980	57.35	7.34	2.15	0.0184	0.194
1981	63.94	9.60	2.65	0.0212	0.206
1982	70.24	10.36	3.20	0.0452	0.169
1983	72.06	10.23	3.35	0.0951	0.156
1984	71.45	11.76	3.58	0.0191	0.150
1985	76.94	11.40	4.40	0.0393	0.234
1986	72.18	10.61	3.20	0.0361	0.175
1987	84.50	10.10	3.80	0.0644	0.176
1988	85.29	10.80	4.60	0.0167	0.1298
1989	95.20	10.45	4.10	0.0299	0.172
1990	100.80	11.30	4.73	0.0231	0.150
1991	107.95	10.40	4.60	0.0141	0.132
1992	109.56	10.50	4.10	0.0088	0.112
1993	145.78	12.95	5.40	0.0200	0.191
1994	95.53	11.69	4.35	0.0350	0.175
1995	105.30	12.80	4.25	0.0320	0.164
1996	84.80	10.30	3.40	0.0298	0.158
1997	77.20	7.80	2.60	0.0315	0.162
1998	72.05	6.35	2.00	0.0354	0.166
1999	74.90	8.17	2.00	0.0367	0.152
2000	70.00	6.73	1.60	0.0402	0.181
2001	57.00	4.85	1.10	0.0452	0.189
2002	56.00	4.60	1.00	0.0483	0.178
2003	53.90	4.60	1.03	0.0501	0.182

Source: World Debt Tables, Global Development Finance (Various issues), the World Bank, Washington DC, 1988.

Table A.4: Kenya's GDP growth and growth in debt (%)

Year	GDP Growth Rate (%)	Growth in Debt (%)
1970	5.5	-
1971	4.9	4.2
1972	6.4	16.7
1973	4.3	45.4
1974	1.1	36.5
1975	4.1	11.9
1976	2.4	15.7
1977	8.8	11.1
1978	6.2	31.0
1979	7.0	25.2
1980	4.0	24.5
1981	6.0	-4.9
1982	3.9	4.3
1983	2.5	7.7
1984	0.8	-3.2
1985	5.1	19.1
1986	5.5	10.1
1987	4.9	25.6
1988	5.1	1.4
1989	5.1	0.5
1990	4.2	19.8
1991	2.1	5.6
1992	0.5	-7.5
1993	0.2	3.1
1994	3.0	1.3
1995	4.8	2.9
1996	4.6	-6.5
1997	2.4	-4.7
1998	1.8	5.1
1999	1.4	-5.5
2000	-0.2	-6.4
2001	1.2	-9.5
2002	1.2	10.9
2003	1.8	11.2

Source: World Debt Tables, Global Development Finance (Various issues), the
World Bank, Washington DC, 1988.,

Appendix II: Graphs of the Variable
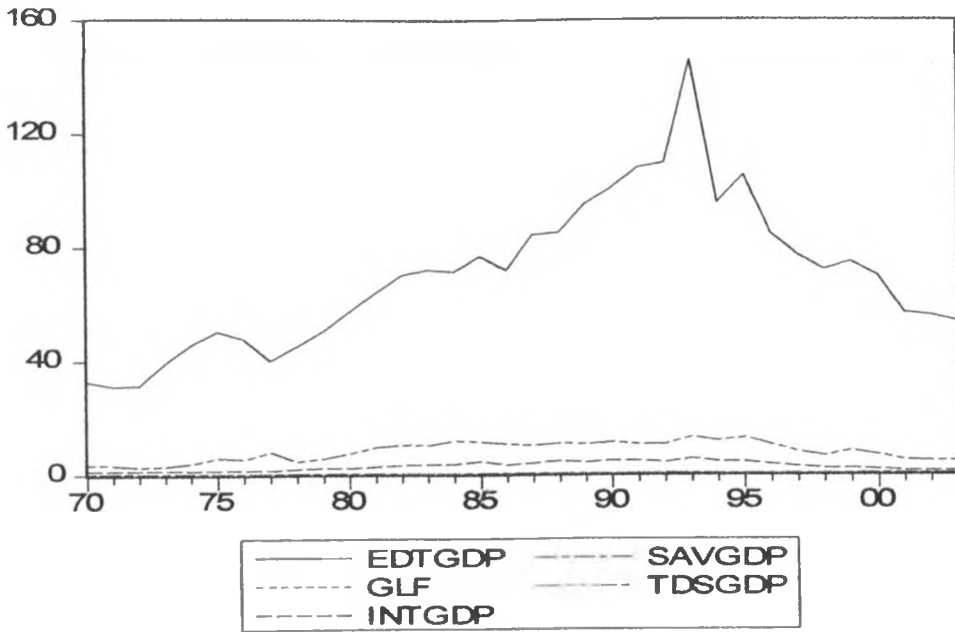
Figure A1: Trends in all the variables
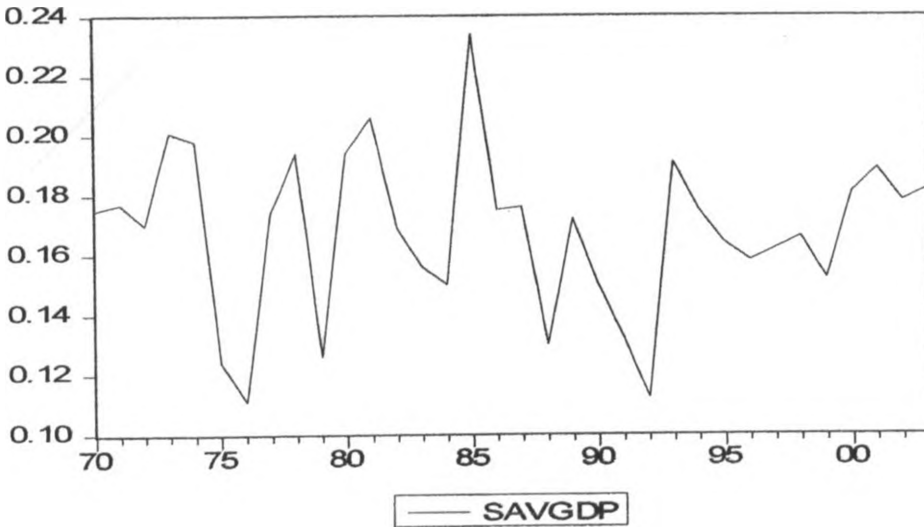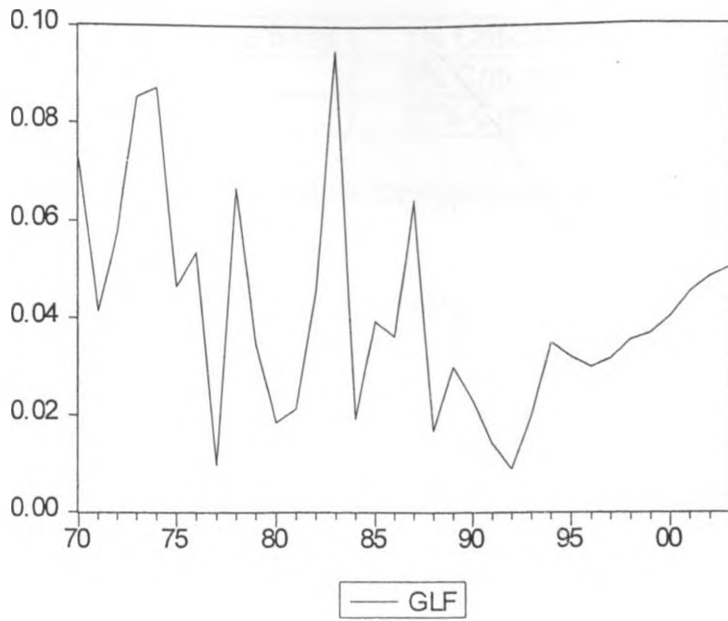

Figure A2: Trends in savings as a ratio of GDP

Figure A3: Trends in labour force growth

Appendix III: Unit Root Tests
Table A5: Unit root tests

VARIABLE	ADF	CRITICAL VALUE 1%	CRITICAL VALUE 5%	ORDER OF INTEGRATION
External debt/GDP	-8.0396***	-3.6496	-2.9558	1(1)
GDPG	- 4.339984***	-3.6496	-2.9558	1(1)
Growth in labour force	- 4.147569***	-3.6496	-2.9558	1(1)
External debt servicing/GDP	- 6.121453***	-3.6496	-2.9558	1(1)
Interest/GDP	- 4.589936***	-3.6496	-2.9558	1(1)
Savings/GDP	- 5.858088***	-3.6496	-2.9558	1(1)

Table A6: Unit root test of the error correction term

ADF Test	-3.5728	1% Critical Value*	-2.6344
		5% Critical Value	-1.9517
		10% Critical Value	-1.6211

* Mackinnon critical values for rejection of hypothesis of a unit root.

Appendix V
Table A7: Diagnostic tests results

Ramsey RESET Test			
F-statistic	2.3456	Probability	0.4513
Log likelihood ratio	5.6751	Probability	0.2812
White Heteroscedasticity Test			
F-statistic	7.0743	Probability	0.7869
Obs*R-squared	33.7368	Probability	0.7788
ARCH Test			
F-statistic	0.1545	Probability	0.8575
Obs*R-squared	0.3374	Probability	0.8447
Breusch-Godfrey serial Correlation			
F-statistic	0.3472	Probability	0.6742
Obs*R-squared	1.5761	Probability	0.5123