

## External Public Debt Servicing and Economic Growth in Kenya: 1970 - 2003: An Empirical Analysis

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### Abstract

*A group of low-income countries in Sub Saharan Africa (SSA), including Kenya, have continued to experience difficulties in managing and servicing their huge stocks of external debt. The relatively high level of Kenya's external indebtedness, rising debt burden and inability to source sufficient external finance at favorable terms and conditions has serious implications on the country's economic performance. This paper examines the relationship between Kenya's external indebtedness, debt service and economic growth. The paper found out that: (a) there is a negative relationship between the GDP growth rate and external debt servicing where a one percentage-point increase in the external debt service would, on average, translate to a 0.5626 percentage point decrease in the GDP growth, ceteris paribus; (b) Savings to GDP ratio had a positive effect on GDP growth rate. One percent rise in domestic savings leads to 0.5230 percent rise in the GDP growth rate (c) There was a negative effect of external debt on the GDP growth rate where a 1 percentage point increase in the external debt stock would translate to a 0.0822 percentage point decrease in GDP growth, ceteris paribus. The study concluded that removing the external debt constraint would not only be good for growth, but also would make resources available which would foster economic growth. Policy makers should therefore consider coming up with sound debt management policies that will ensure that all financial inflows in the country in the form of debt or aid is effectively and productively utilized.*

**Keywords:** External Public debt, debt service, Gross Domestic Product & Domestic savings

### 1.0: Introduction

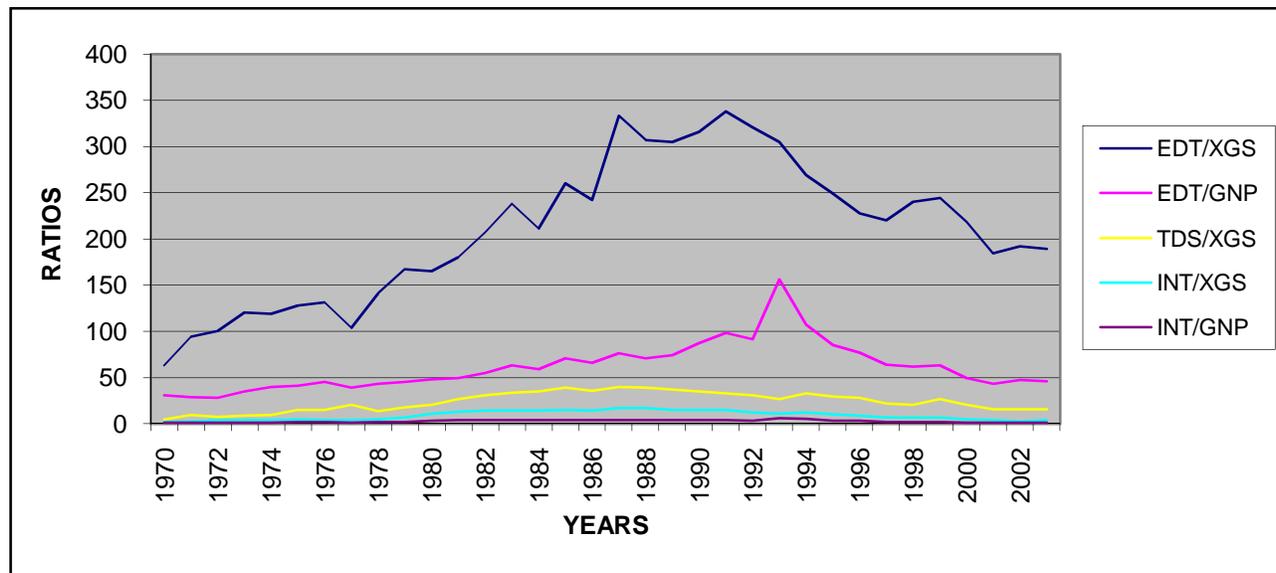
The debt crisis is a critical factor in retarding the achievement of sustainable development in the Sub Saharan African (SSA) countries. It has been and continues to be one of the biggest barriers to development in the SSA countries. External indebtedness is not harmful per se nor does heavy external debt imply that the growth rate must necessarily be low. 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 (Mutiso, 2001). 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 evolution of the debt problems of the SSA countries can be attributed to several factors during the 1970s. Some of these factors are: 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 misuse of borrowed funds, corruption and poor governance and shock in the terms of trade (Brooks, 1998).

### 1.1: Debt and Economic Growth Rate in Kenya

Kenya's first decade after independence 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, her Balance of Payment (BOP) position was healthy and annual inflation rates were less than 3 per cent (Were, 2001). The GDP 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 GDP 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.

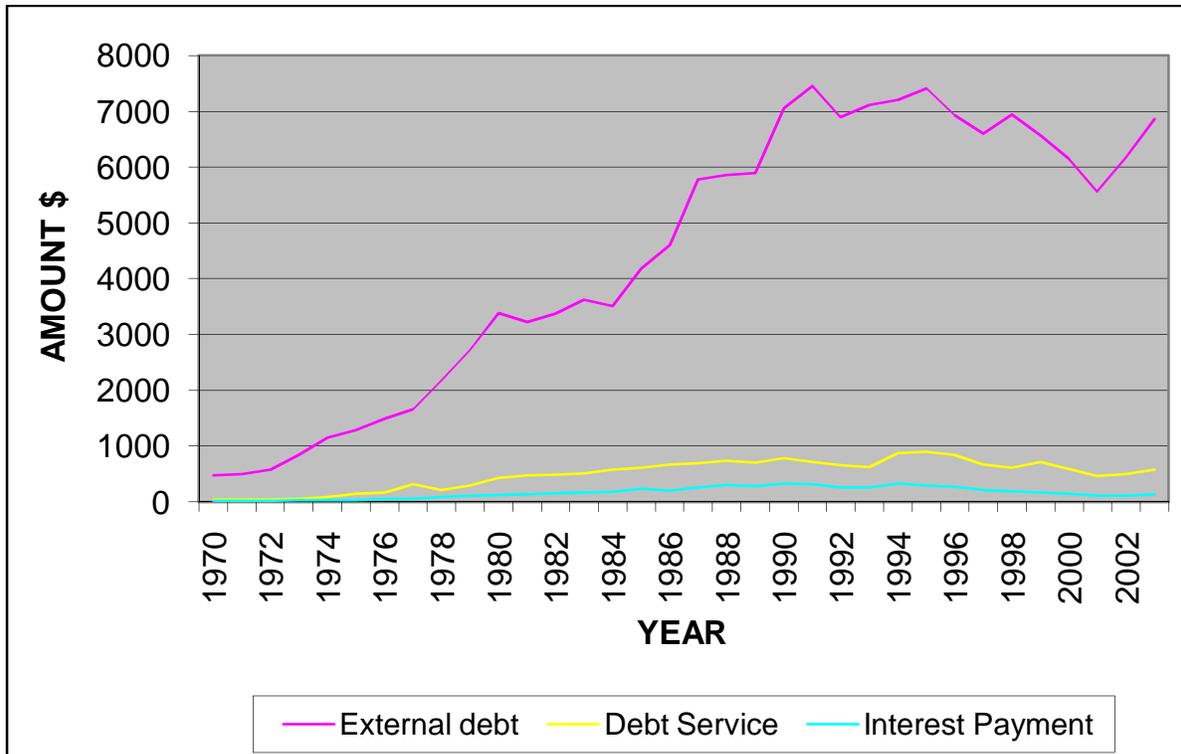
GDP growth rate decelerated after the 1973 oil crisis averaging 4.7 per cent during the period 1973 to 1980. This slow down reflected not only the impact of the oil shock but also the emergence of structural constraints. Annual GDP growth rate (at market prices) slowed to an average of 3.7 per cent between 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 reduce inflation rate from more than 20 per cent in 1981 to 13 per cent in 1985 (Were, 2001). Despite deteriorating Terms of Trade (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 rate 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. 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)

**Figure 1.1: the Ratios of Kenya's Debt Burden Indicators**



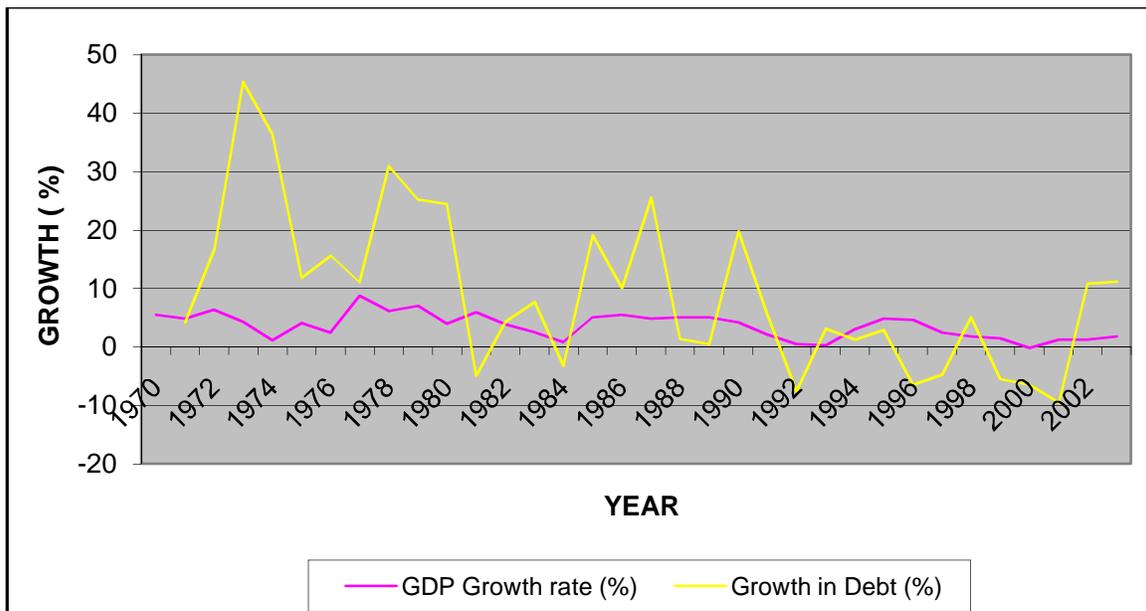
Where: EDT/XGS- Debt to export ratio; EDT/GNP- Debt to GNP ratio; TDS/XGS- Debt service to export ratio; INT/XGS- Interest to export ratio; INT/GNP- Interest to GNP ratio. Of the five key indicators, four of them .i.e. debt to GDP ratio, debt to export ratio, debt service to export ratio and interest to export ratio have been above the critical levels. The critical values are 50 percent for debt to GDP 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. 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. The growth in total external public debt has tended to exceed the growth in average GDP.

**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).

**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 world as the price of raw materials fell (Were, 2001). 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 the 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.

## 1.2: Statement of the Problem

The severity of Kenya's external debt crisis cannot be underestimated and the effects of public debt on economic growth are a major concern for policy makers. This is because 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. 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 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 GDP 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 debt 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 paper seeks to establish empirically the relationship between total external public debt and growth in Kenya. The objective of the study was to examine the structure and stock of Kenya's external debt and analyze the relationship between Kenya's external indebtedness, debt servicing and economic growth.

## 2.0: Selected 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. There is even less evidence on the specific channels through which debt affects growth. Patillo *et al.* (2002) and Patillo *et al.* (2004) 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. The study results showed 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 debt. 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. Boyce and Ndikumana (2002) investigated the determinants of capital flight from 30 SSA countries, 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 results of the study 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. 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, that is, 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. Wamuthenya (1998) did a study on aid and growth in Kenya where domestic savings, aid inflows, terms of trade, annual growth rate of labor force and an interaction between aid and policies were incorporated as explanatory variables for the growth rate of GDP. 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 resulting in retarded 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.

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 findings of the study showed that both GDP and foreign aid stimulate all categories of government expenditure and that the existence of foreign aid led to diversion of aid to expenditures other than those they were intended to finance, and 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 slowdown 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 study concluded that domestic resources proxies 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 LDCs had been negatively affected by the severe external shocks in the 1970's and early 1980's. The study analyzed the impact of the major external shocks since 1973 on the balance of payment position. The shocks included Terms of Trade (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.

### 3.0: Methodology

This paper adopted an improvement of Mbaku's (1993) model used to test the relationship between foreign aid and economic growth. The study estimated equation 3.6 in order to analyze the relationship between Kenya's external indebtedness, debt servicing and economic growth.

$$\text{GDGP} = b_0 + b_1 (\text{SAVGDP}) + b_2 (\text{EDTGDGP}) + b_3 (\text{TDSGDP}) + b_4 (\text{INTGDGP}) + b_5 (\text{GLF}) + b_6 (\text{D84}) + e_4 \dots \dots \dots (3.6)$$

Where,  $b_0$  is the constant term,  $b_1$ - $b_6$  are the coefficients,  $e_t$  is the error term,  $D84$  is a dummy variable to capture 1984 drought.

### **3.1 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. It was measured as 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. 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 loans extended to the country as a proportion of the country's GDP.

#### **Total Debt Service as a Proportion of GDP (TDSGDP)**

This is a measure of how a country was able to service its external debts. If the rate of exportation 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/ institution 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 Labor Force (GLF)**

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

### **3.2 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 labor force. The data was obtained from Central Bank of Kenya, World Bank publications and statistical abstracts published by Kenya National Bureau of Statistics.

### **3.3 Estimation techniques and Time Series Properties of data**

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 stationary 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 stationary. 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 non-stationary series were themselves stationary, then it was accepted that the  $I(1)$  series was co integrated and the residuals taken from the co integrating regression were valid and built into an Error Correction Model (ECM). An ECM was a restricted auto regression 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 behavior 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 stationary lose 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.

#### 4.0: Study Results

##### 4.1: 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, as shown in table A2 in the 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 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.

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

**Figure 4 .1 External debt as a Ratio of GDP**

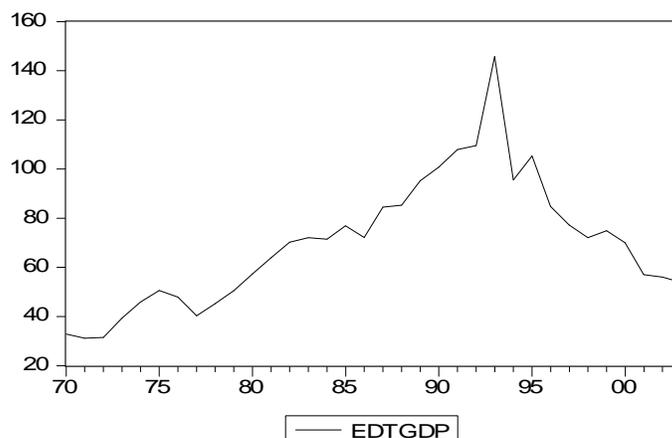


Figure 4.1 shows that debt as ratio of GDP has been increasing over the period until 1993 when it started to decline. The increment for debt as a ratio of GDP is higher compared to the increments of external debt service as ratio of GDP. Figure 4.2 below graphs the external debt servicing as ratio of GDP.

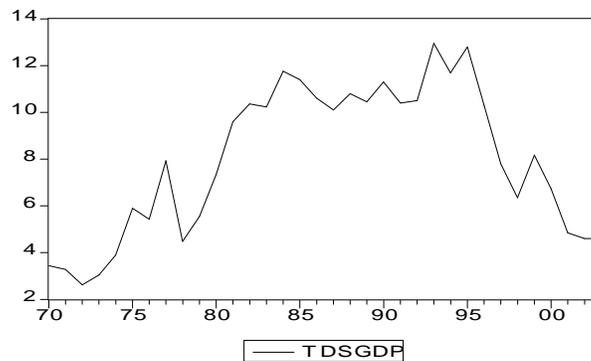
**Figure 4.2: Total debt Service as a Ratio of GDP**

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 labor are shown in appendix II. The Jarque-Bera statistics test was used to test normality of the series. It utilized 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 labor 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 labor 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 highlight 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 labor	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 labor 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

Augmented Dickey-Fuller (ADF) tests were used to test for stationary 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 stationary 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 stationary using the ADF test. The results of co integrating regression are given below in Table 4.3.

**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 labor force	-17.305	-0.940
Interest/GDP	0.46	0.626
Drought 1984	-0.057	-2.941
Adjusted R <sup>2</sup>		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 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 labor 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<sup>2</sup>) was high (0.7936), meaning that the power of the variables; (savings/GDP, external debt/GDP, growth in labor 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 stationary 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 labor 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 labor 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 1 and 5 percent level. Interests as a ratio of GDP and growth in labor 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 feedback of approximately 59 percent of the previous year's disequilibrium from the long run domestic savings, labor 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 labor 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 labor 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 -0.5626 was obtained for debt service ratio.

Hence, a one percentage-point increase in the external debt service would, on average, translate to a 0.5626 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 0.5230 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 -0.0822 is obtained for external debt. This implies that a 1 percentage point increase in the external debt stock would, on average, translate to a 0.0822 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) and Mwau (1998), Griffin and Enos (1970). The coefficient of the variable growth in labor force was negative and insignificant though its coefficient was expected to be positive. This implies that growth in labor 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.

## **5.0: 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 labor 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 labor 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 suggest 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 conditionalities 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 labor force impacted negatively to economic growth. Due to poor economic performance, the economy was not able to absorb all the labor 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 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 give 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 \$)**

<b>Year</b>	<b>External Debt</b>	<b>Debt Service</b>	<b>Interest Payment</b>
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**

<b>Year</b>	<b>EDT/ GDP</b>	<b>TDS/GDP</b>	<b>INT/GDP</b>	<b>GLF</b>	<b>SAVGDP</b>
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.

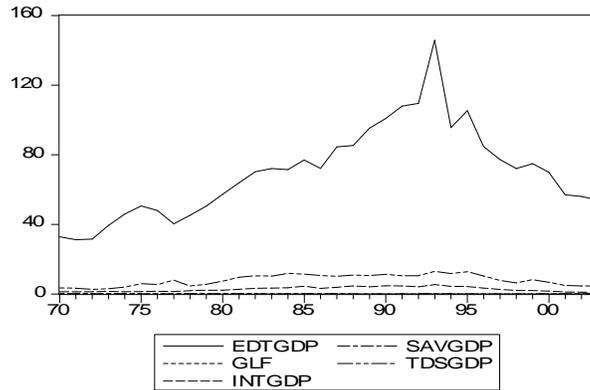
**Table A.4: Kenya's GDP growth and growth in debt (%)**

<b>Year</b>	<b>GDP Growth Rate (%)</b>	<b>Growth in Debt (%)</b>
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

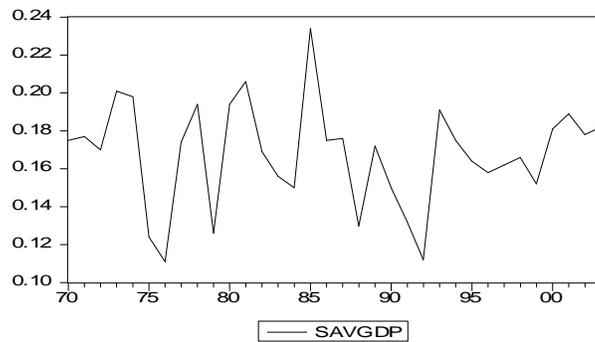
Source: World Debt Tables, Global Development Finance (Various issues), the World Bank, Washington DC, 1988.

**Appendix II: Graphs of the Variable**

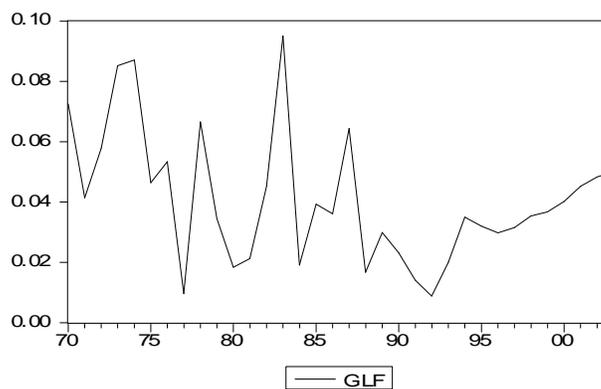
**Figure 1: Trends in all the variables**



**Figure 2: Trends in Savings as a Ratio of GDP**



**Figure 3: Trends in Labor 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 labor 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)

**Appendix IV****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**

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