DEBT-SERVICING AND ECONOMIC GROWTH IN KENYA

By

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DECLARATION

This Research Paper is my original work and has not been presented for a degree in any other university.

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This Research Paper has been submitted for examination with our approval as university supervisors.

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DEDICATION

To my lovely daughter, Wairimu.

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Abstract

Foreign debts are a priority claim on the foreign exchange earnings and international reserves. They reduce the scope for manoeuvrability for financing development and meeting balance of payments needs. Also, being part of the complex web of international economic relations and foreign policy, foreign debts have wide reaching repercussions which put the debt crisis at the top of the government's agenda.

It has been argued that debt servicing in Kenya poses a real burden on the economy since a large proportion of exports is devoted to this servicing and thus watering down the impact of growth in exports on economic growth. The need to service a large amount of external debt by an economy not strong enough to withstand the pressure can discourage both the domestic and foreign investment as well as adversely affect economic performance through crowding out effects.

Kenya's debt stock stood at US $ 5.1 billion as of December 2001, with the biggest proportion (97%) being official debt (60% multilateral and 37% bilateral) and the remaining 3% being commercial. According to the 2001 Economic Survey, the debt service as a percentage of GDP and export of goods and services stood at 4.4% and 16.5%, respectively by the end of year 2000. In spite of debt servicing consuming a large proportion of the country's resources it is argued that Kenya's debt is sustainable. This is one of the reasons why the country does not qualify for the Heavily Indebted Poor Countries (HIPC) relief. This study is therefore an effort to explore the effect of external debt-servicing on economic growth.

Specifically, the study tests the hypotheses that debt servicing has a negative effect on economic growth and that economic growth rate influences debt-servicing. In doing this, the study uses a single-equation model that has the real GDP growth rate as a function of debt servicing among other factors and later a simultaneous-equation model consisting of several structural equations. In the latter model, the aim is to test whether economic growth rate influences debt-service ratio through feed-back effects.
The study employs annual Kenyan data from 1970 to 2000 and the results of both models indicate that there is indeed a negative relationship between debt-servicing and economic growth rate. However, the results of the simultaneous equation model show a break down in the feed-back effects of economic growth rate on debt-servicing and hence the second hypothesis of the study is not confirmed.

CHAPTER ONE: INTRODUCTION

1.1   Background of the Debt Crisis in Kenya

Kenya like most Sub-Saharan African countries has been experiencing problems in its external indebtedness. The debt problem can be traced largely to Government actions, particularly in accumulating external debt for development projects. Since independence, Kenya undertook public projects in an attempt to strengthen its economy, frequently with donor support and generally with heavy use of foreign financing in the form of loans. Many of the development projects were designed to improve the domestic industry and infrastructure rather than to boost export production directly. The assumption was that the economy would grow over time and that commensurate increases in export production and reasonable export prices would allow the debt-service obligations arising from these projects to be met. This assumption was however not realised due to the two oil price shocks of 1973-74 and 1979-80 and the subsequent depression in non-oil commodities during the 1980s (Greene, 1989).

The first round of oil price increases in 1973 led to a sharp increase in prices of some primary commodities like tea, coffee, and sisal followed by a steep decline in these prices. Kenya, like most of the other affected countries responded to the initial price by sharply expanding public expenditure. Although revenues from commodity taxation increased during this period, they did not offset the cost of the spending projects. The government therefore used foreign borrowing to finance the remaining costs. When commodity prices subsequently fell, government expenditures were however not reduced commensurately, and previous borrowing was often supplemented with new loans so as to maintain the expenditure levels (Greene, 1989).

The trend toward the debt burden accelerated in the 1980s after the second oil price shock of 1979-80 and

it was inevitable that lending and its servicing could not be sustained (Commonwealth Secretariat, 1984). This led to deteriorating terms of trade and declining export earnings. With diminished export earnings and import prices by 1987 significantly above their 1980 levels, Kenya like many SSA countries found it increasingly difficult to meet its debt-service obligations while at the same time maintaining an acceptable volume of imports (Greene, 1989).

Another factor that contributed to the debt burden in the 1980s was the rise in interest rates. However, this was of less importance due to the nature of the external debt which is predominantly official. Compounding the debt-service problem was the decline in real net capital inflows, including external assistance during the 1980s (Krumm, 1985). High international interest rates have a negative impact on debt servicing efforts which exacerbates the liquidity problem faced by debtors. They precipitate outflows of private capital since the opportunity of earning high real rates of return on dollar deposits in overseas accounts encourages capital flight from developing countries. This therefore forces the government to choose between debilitating capital outflows and domestic interest rates which are at a level that chokes off investment. In addition, high inflation rates, capital controls and extensive restrictions on investment discouraged direct investment (Commonwealth Secretariat, 1984).

Besides the expansionary fiscal policy and outright borrowing for consumption during the commodity boom years in the late 1970s, the government also continued to pursue policies that weakened its external position. These included growing fiscal deficits and surging private credit demand which led to rapid monetary expansion. This in turn led to higher inflation since the currency was overvalued, exports were inhibited and parallel exchange markets formed. Exports were also inhibited by encouraging monopolistic public sector agencies (parastatals like Kenya Tea Development Agency, Coffee Board of Kenya, etc) to market crops usually by offering low producer prices as a way of meeting costs and raising government

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revenue. Producer prices thus lagged far behind inflation, thus discouraging production and promoting smuggling(Greene, 1989).

Domestic economic policies also promoted imports through overvalued currency and other measures like subsidising certain imports. In addition, tariff legislation encouraged the growth of inefficient import substitution industries by imposing high tariff rates or quantitative restrictions on imports of finished goods, while those on imported raw materials and intermediate goods were low or non-existent (Greene, 1989).

All these policies increased borrowing needs and lowered export earnings, thus reducing the ability to meet the rising debt obligations. This problem was compounded by the failure of commodity prices in 1986-87 to match the increase in import costs which only worsened the economy's terms of trade.

Another reason for the debt crisis was partly due to external factors, such as protectionism in the developed countries, and proliferation of non-tariff measures which hurt the country in terms of market access, the development of new products and the processing of raw materials domestically. Further, increases in the international interest rates and weakened dollar in the 1980s contributed to the increased external debt. In addition, Kenya like many other sub-Saharan African countries, exist on the periphery of the world's economic and financial system which accounts for a small proportion of the world's trade and offer limited investment opportunities for foreign private capital. Consequently, although Kenya and other sub-Saharan countries were accumulating debts at an alarming rate, they did not constitute a threat to the stability and well-being of the international monetary and financial system (Abbott, 1993).

Other external factors included the weak and sluggish performance of the world economy during the 1980s. This international recession coupled with massive falls in commodity prices hit the country hard,

resulting to export markets being lost and foreign exchange earnings falling drastically. This further constrained the ability to service the outstanding debt as well as financing urgent development work. In addition, net resource flows to Kenya declined sharply between 1982 and 1984, just when they where needed most. This was mainly due to the disappearance of private capital flows and commercial bank lending which dominated the 1970s (Abbott, 1993).

Other causes of the debt problems in most of the SSA countries like Kenya were largely due to their own measures such as; (a) unrealistic development plans with outsize and unproductive projects, (b) a top-heavy and poorly trained bureaucracy, (c) bloated public expenditure, including funding of parastatals and other state-owned enterprises, (d) weak or non-existent organisational and institutional infrastructure,(e) acute shortage of managerial and administrative skills, (f) inefficient domestic savings and low investment, (g) lack of political will to take politically unpalatable decisions, and, (h) no effective debt management strategy (Abbott, 1993).

1.2   Magnitude of the Debt Burden

Kenya's debt stock currently stands at US $ 5.1 billion with the biggest proportion (97%) being official debt (60% multilateral and 37% bilateral) and the remaining 3% being commercial[1]. Figure A1 in Appendix 1 presents Kenya's debt stock components where debt stock includes disbursed outstanding debt plus interest arrears. Most of Kenya's debt is medium or long-term in nature which is public and publicly guaranteed and comes from official creditors as earlier pointed out. The debt service as a percentage of GDP and export of goods and services stood at 4.4% and 16.5% respectively by the end of year 2000 (GOK, 2001). In spite of debt servicing consuming a large proportion of the country's resources it is still

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[1] Figures obtained from Ministry of Finance & Planning, Debt Management Division.

percentage of GDP and export of goods and services stood at 4.4% and 16.5% respectively by the end of year 2000 (GOK, 2001) . In spite of debt servicing consuming a large proportion of the country's resources it is still argued that Kenya's debt is sustainable. This is the major reason for the country not to qualify for the Highly Indebted Poor Countries (HIPC) relief.

It has been argued that debt servicing in Kenya is imposing a real burden on the economy since a large proportion of exports is devoted to this servicing and thus watering down the impact of growth in exports on economic growth. The need to service a large amount of external debt by an economy not strong enough to withstand the pressure can discourage both the domestic and foreign investment as well as adversely affect economic performance through crowding out effects.

Kenya's total debt as a percentage of GDP reached an alarming rate in the 1990s with total debt being higher than actual GDP in 1993 and 1994 as illustrated in table 1.1 below. This forced the government to reschedule for the first time its debt arrears from 1993 of about US$ 470 million[2]. The rescheduled amount was given non-ODA terms, that is, 1 year grace period and 7 years repayment period at commercial market rates based on the London Interbank Offer Rate (LIBOR).

Kenya was then faced with the problem of decline in external resource flows following a foreign aid freeze on Kenya in the 1990s. This, coupled with a decline in exports of goods and services (as shown by fig. 1.1 below) only worsened the debt service problem as shown by table 1.1 where a decline in the ratio of total debt to both exports of goods and services and to GDP is observed yet a commensurate decline is not realised in the ratio of debt service to export of goods and services. A country's ability to service external debt is evidenced by the stream of foreign exchange it earns. It is probably for this

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[2] Figures obtained from Ministry of Finance and Planning, Debt Management Division.

reason that international lenders view the ratio of a national debt to exports as an important debt burden indicator.

Table 1.1: Debt Burden Indicators for Kenya

Year	Ratio of Total Debt to Export of Goods & Services (%)	Ratio of Total Debt to GDP (%)	Ratio of Total Debt Service to Export of Goods & Services (%)
1970	...	30.9	...
1980	164.3	48.1	21.0
1990	316.0	87.3	35.4
1993	305.3	155.9	27.1
1994	269.2	106.6	32.9
1995	249.3	85.3	30.3
1996	227.9	77.4	27.8
1997	220.1	63.5	22.3
1998	240.1	61.5	21.2
1999	244.8	62.6	26.7

Source: Global Development Finance Tables - CD-Rom Version 2001

Fig. 1.1: Trends in Total Debt-Export Ratio, Net Debt Transfers & Exports
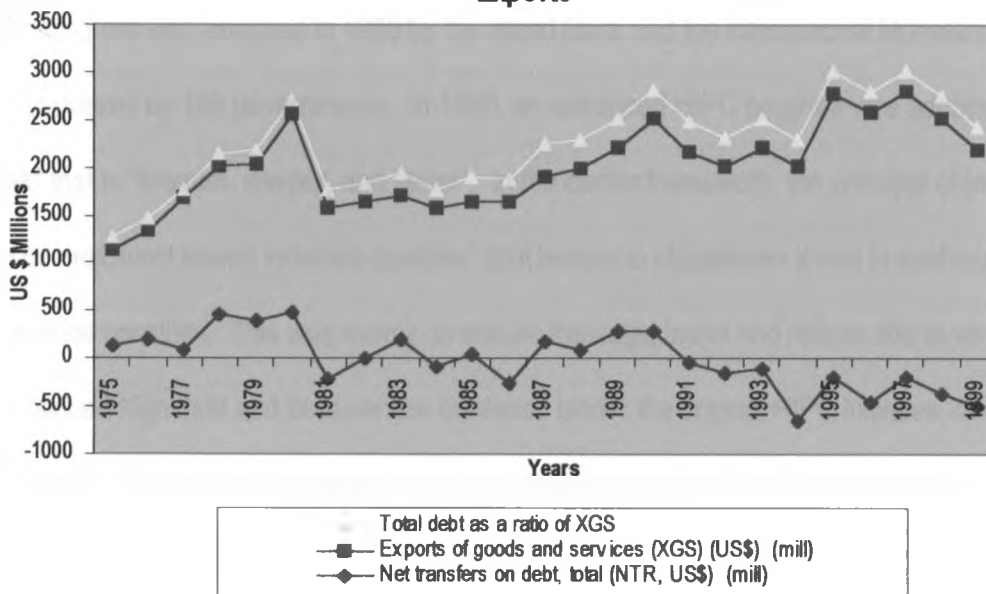
Source: Global Development Finance Tables- CD-Rom Version 2001

Over the last decade, Kenya continued to receive negative net transfers on total debt (see fig.1.1 above)

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which meant that resources were only being used to service debt and where not being replenished with others from outside. This problem coupled with others such as El-nino, droughts, power rationing, etc, only worsened the country's economic position which recorded the poorest average growth rate in its history during this time.

1.3   Kenya's Debt Problem under the context of the HIPC Initiative

The Heavily Indebted Poor Countries (HIPC) Debt Initiative is an agreement by the international community designed to help poor countries with good policies escape from unsustainable debt by providing comprehensive debt relief. Unsustainable debt (conventionally identified when a country's ratio of debt service to exports exceed 25%) has increasingly been recognised as a constraint on the ability of poor countries to pursue sustainable development.

The HIPC program was launched in 1996 by the World Bank and the International Monetary Fund (IMF) and was endorsed by 180 governments. In 1999, an enhanced HIPC program was adopted to provide debt relief that is "broader, deeper, and faster". In the earlier framework, the principal objective was to bring the poorest, most heavily indebted countries' debt burden to sustainable levels in exchange for better policies in those countries. This was mainly to ensure that adjustment and reform efforts were not put at risk by continued high debt and debt-service burdens. Under the original HIPC Initiative, countries were eligible for HIPC relief if, after full application of traditional debt-relief mechanisms, external debt remained above defined sustainable levels[3].

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[3]   To qualify, countries also must be eligible for World Bank and IMF concessional assistance, pursue an economic reform program support by the World Bank and IMF, and face an unsustainable debt situation after the application of traditional debt mechanisms.

Table 1.2: Criterion for the HIPC Initiative Assistance

Criterion	Original HIPC (in %)	Enhanced HIPC (in %)	Kenya's Indicators after traditional relief
NPV Debt/Exports [1/]	200-250	150	114
NPV Debt/Revenue [2/]	280	250	135
Qualifying thresholds			
Export/GDP [3/]	40	30	26
Fiscal Revenue/GDP [2/3/4/]	20	15	25

Source: Ministry of Finance & Planning, Debt Management Division

[1/] Three year average of exports of goods and non-factor service

[2/] Central government revenue, excluding grants

[3/] Three year average of numerator and denominator

[4/] Fiscal year data, ending 2000/01

Table 1.2 above illustrates the criterion used for countries to qualify for the HIPC Initiative assistance. The decision point for the HIPC Initiative is arrived at by comparing results of debt sustainability analysis (after traditional relief) to HIPC sustainability targets, namely; (i) 150% of NPV of debt to exports ratio, and, (ii) 250% NPV of debt to fiscal revenue ratio (if qualifying thresholds as in the table above are met). If a country is below HIPC threshold, the country exits HIPC and if a country is above HIPC threshold, then the country is eligible for HIPC relief. As table 1.2 above indicates, Kenya is below one of the HIPC's qualifying thresholds (Export/GDP) even with the enhanced HIPC conditions, which therefore means it does not qualify for HIPC relief. It is therefore evident that Kenya does not face an unsustainable debt burden yet there is still a problem in meeting debt service payments evidenced by the recent (November 2000) rescheduling of about Ksh 23,147 million under the Paris Club by December 2001, while a further Ksh 6,258 million under the London Club is still being negotiated for rescheduling[4].

In the enhanced HIPC Initiative, major changes have been incorporated which include; (i) a comprehensive

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[4] Figures obtained from the Ministry of Finance & Planning, Debt Management Division.

and participatory poverty-reduction strategy which is to be put in place before a decision point; (ii) the poverty-reduction strategy paper and intent, to be updated annually and to be owned and developed by the country itself, following wider consultations by governments; (iii) where countries are not ready with their poverty reduction strategies, interim poverty-reduction strategies are possible; (iv) an explicit intent to integrate the HIPC debt relief with other sources of external financing to fund overall poverty-reduction strategy; and, (v) monitorable indicators of poverty reduction consistent with overall macroeconomic targets are to be developed.

Kenya seems to have taken major steps in trying to meet the above five conditions under the enhanced HIPC Initiative. But the major dilemma still remains because, although Kenya has actually managed to come up with the Poverty-Reduction Strategy Paper (PRSP 2001-2004), it still does not meet one of the HIPC's threshold criterion and hence exits the HIPC relief.

1.4   Statement of the Problem

Debt by its nature is an inter-temporal problem where a country borrows money to finance its payments deficit in the short-run but the loan has to be repaid in the long-run (Naqvi, 1988) and one way of addressing the debt problem is to look at it in terms of debt-service ratio. This ratio shows the proportion of foreign exchange earnings on current account which has to be set aside each year to meet service payments. Conventionally, a ratio of 15 per cent or over has been considered the danger point, that is, the limit beyond which debtor countries would experience severe difficulties in servicing their foreign debts while maintaining existing level of services domestically (Abbott, 1993).

Over the years, Kenya's debt service ratio has consistently been above this critical ratio (15%) and this has only led to the deterioration of the level and quality of services as a large proportion of exports is

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devoted to debt servicing and thus watering down the impact of growth in exports on economic growth. Table A2 in appendix 2 clearly illustrates this, where it is noted that despite the debt service ratio showing a downward trend, the GDP growth rate has continued to decline even to a negative level in year 2000. This downward trend in the debt service ratio can highly be attributed to the positive growth rate in exports of goods and services over the period under consideration.

This study is therefore an effort towards analysing the magnitude of the debt-service problem in Kenya and how it impacts on economic growth. In an attempt to understand this problem, this study will seek to establish whether debt servicing has a negative effect on economic growth and also, whether debt servicing is influenced by the rate at which economic growth takes place.

1.5   Objectives of the study

The general objective of this study is to provide a better understanding of the debt servicing problem and its impact on economic growth. Specifically, the study's objectives will be to:

1) analyse the impact of debt-servicing on economic growth; and,

2) evaluate the influence of economic growth on the debt-service ratio.

1.6   Hypotheses

This study will test the following two hypotheses namely;

Hypothesis 1

H_0:   Debt-servicing has a negative effect on economic growth.

H_1:   Debt-servicing has no effect on economic growth.

Hypothesis 2

H_0:   Debt-servicing is influenced by economic growth rate.

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H_1:   Debt-servicing is not influenced by economic growth rate.

1.7   Significance of the study

According to the International Monetary Fund (IMF) and the World Bank, Kenya is classified as one of the 41 Heavily Indebted Poor Countries (HIPC). However, using the HIPC's threshold criteria, Kenya's debt is not considered unsustainable and thus Kenya does not qualify for the HIPC Initiative assistance. With a high debt service ratio and yet not so high to qualify for the HIPC Initiative assistance, Kenya faces a double-edged problem. Given the current economic recession where Kenya has been experiencing very low and/or negative GDP growth rate, the debt service burden has worsened and the government has recently been forced to request for debt rescheduling.

Past empirical studies on debt in Kenya have not addressed the issue of debt-servicing specifically and usually tend to deal with effects of debt in general. Given that one of the criteria for the HIPC Initiative assistance is whether a country's debt is sustainable [which considers the Net Present Value (NPV) of debt to exports and to revenues], debt-serving is increasingly becoming important. This is because, NPV of debt is calculated by discounting the sum of future debt obligations (principal and interest) at market rate of interest.

In an effort to bridge this information gap, this study will provide useful insights on the effects of debt-serving on the much needed economic growth and examine whether Kenya might end up qualifying for the HIPC Initiative relief (if the current downward trend in growth rate continues and thus lead to a decline in exports) or indeed an improved growth rate could ease the debt-servicing burden.

CHAPTER TWO: LITERATURE REVIEW

2.1 Theoretical Literature

Traditionally, a country's foreign debts were regarded as contractual international financial obligations which had to be met in full and on time. If a country could not meet its service payments, it was assumed it had mismanaged its economic and financial affairs. Debt relief was only invoked in special and compelling circumstances, and was limited to critical cases, for example, when the alternative was default on existing claims (Abbott, 1993).

Krugman (1992) while analysing debt forgiveness argues that potential repayment by a country is not independent of its debt burden. When a country's obligations exceed the amount it is likely to be able to pay, these obligations act like a high marginal tax rate on the country, and if it succeeds in doing better than expected, the main benefits will accrue to its creditors and not the country itself. He further notes that debtor country will therefore be discouraged doing well at two levels. First, the government will be less willing to take measures to improve economic performance if the benefits are likely to go to foreign creditors in any case. Second, the burden of the national debt will fall on domestic residents through taxation, and importantly, through taxation of capital so that the debt overhang acts as a deterrent to investment.

Krugman uses the following debt-relief Laffer curve to further illustrate the relationship between debt and expected repayments.

Fig 2.1:   The Debt-Relief Laffer Curve
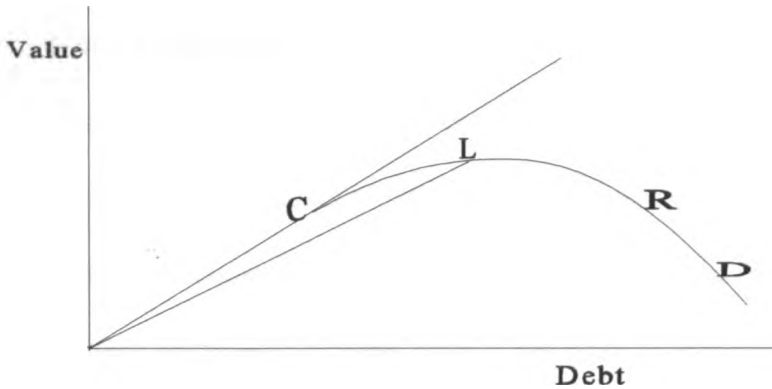
A confrontational and disorderly default may reduce the actual receipts to a creditor below what could have been obtained if debt had earlier been reduced to a level that could have been paid. The upshoot of these negative effects is that the higher the external debt of a country, the larger the probability of non-payment, and thus the greater the subjective discount on that debt. In his analysis to show the relationship between debt and expected payment Krugman uses the curve CD in fig 2.1 above, where the horizontal axis represents the nominal value of a country's debt and the vertical axis is the actual expected payments. At low levels of debt, nominal claims may be expected to be fully repaid so that the outcome lies along the 45° line. At higher levels of debt however, the possibility of non-payment grows, so that the expected payment traces out a curve that falls increasingly below the 45° line. At point L, the ratio of expected payment to nominal debt may be measured by the slope of a ray from the origin.

The curve DRLC is the debt relief Laffer curve which illustrates that just as governments may sometimes actually increase tax revenue by reducing tax rates, creditors may sometimes increase expected payment by forgiving part of a country's debt. In both cases, the proposition that less is more depends on the initial extreme situation, whether of taxes that provide extreme disincentives or of debt burden that is crippling in its effect on economic growth. Krugman believes that the small debtor countries are on the downward

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sloping side of the debt-relief Laffer curve.

Seriux andSamy (2001) argue that the dominant paradigm in the literature relating to the potential negative effect of a heavy external foreign debt burden on growth is the debt overhang hypothesis. According to the narrow (or traditional) version, private economic agents in a debtor country (and potential foreign investors) see a very high debt burden as a future tax on the return to capital. The heavy debt burden means that the government will have to increase taxes in the future to finance the high debt service payments, and this will in turn lower the after-tax return on capital and reduce the incentive to invest. Lower investment will then lead to slower growth.

The broader approach argues that the future high debt-servicing costs implied by the higher external debt, might increase the likelihood that the government will engage in inflationary financing and/or prompt a currency depreciation/devaluation because of excess demand for foreign currency created by debt servicing needs. Administrative costs of government efforts to seek debt rescheduling and related uncertainties about future debt profile can also weaken administrative capacity and create further uncertainty (Hjertholm et al, 1998). These uncertainties about the future dampen the incentive to invest and result in low investment and slow growth as well.

A heavy external debt burden can also have an effect on growth through the external account. For countries with non-traded currencies like Kenya, external debt service payments require the purchase of foreign currency that must be earned from exports or capital inflows, or by drawing down reserves. In the absence of substantial reserves, buoyant exports, or sizeable capital inflows, higher debt service payments mean reduced import capacity. This may result in reduced imported inputs for production and hence reduced output. Import compression may also lead to a reduction in imports of capital goods which may

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in turn lead to lower investment and thus slower growth (Ndulu, 1991).

Output growth can also be reduced by a heavy debt burden through its effect on human capital development. The demands of debt service payments on the government budget may not only crowd-out public investment but may also crowd out social investment spending. This may result to reduced spending on education, health and other sectors of the economy. This will likely result in a slower rate of increase in human capital which will in turn lead to slow output growth as evidenced by endogenous growth models which treat human capital as a major determinant of output (Seriux and Samy, 2001).

Greene (1989) suggests a number of alternative ways to reduce SSA countries' debt service obligations. He argues that some of the measures would represent major departures from current practice and would require substantially more foreign assistance from bilateral donors, which might not be forthcoming. He proposes measures to reduce both official and commercial debt but for the purposes of this study, focus will only be on reviewing proposals made towards reducing official debt since commercial debt in Kenya only accounts for about 3% of total debt.

The first proposed measure is to provide assistance to low income countries in meeting their debt-service obligations to international organisations. This proposal would be applicable to Kenya, where debt to international organisations represents a large proportion of its total debt (about 62% in 1998)[5]. One possibility proposed is for donors to raise additional funds to allow international organisations to replace the existing loans with loans offering more concessional terms. This would make it easier to fulfill their debt-service obligations. To increase the chance of loan repayment, access to softer loans could be

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[5] Figure calculated from Economic Survey, 2001 page 86.

conditioned on implementation of satisfactory economic measures/programmes as s now the case for the use of IMF resources. The second option proposed is to create a new international facility charged with buying the outstanding debt owed to international organisations, and then replacing existing debt-service obligations with new loans on more concessional terms.

2.2   Empirical Literature

Debt-service payments are the most visible and immediate measure of the cost in foreign exchange of the debt crisis. Basically, these payments are determined by such factors as (a) the terms and conditions of past loans; and (b) the average terms of new loans and past debt consolidation exercises (Abbott, 1993). The growing problem of the debt burden and its impact on economic growth especially for the Heavily Indebted Poor Countries (HIPCs) has attracted considerable attention in the literature. Some of this literature is highlighted below.

Ajayi (1991), while studying the macroeconomic approach to external debt for the Nigerian case used a debt-cum-growth model. Through simulations he analysed the effect of different interest rates on the contraction/expansion of external debt where he found that variations in interest rates had little effect on debt burden and debt service capacity. Empirical results indicated that doubling of interest rates from 4% to 8% had the same effect on the growth of GDP (that is, only 0.19% GDP growth rate being lost).

Similar results were also obtained by Osei (1995) while investigating how far external indebtedness would affect future growth in the case of Ghana. He also used a debt-cum-growth model where empirical results showed that varying the rate of interest had little impact on income growth, trade balance and the debt burden. Osei's study however, seems to have ignored the impact of debt servicing on growth which is the intended research topic.

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Mbire and Atingi (1997) carried out a study on debt sustainability in Uganda where they focused on how debt affects the growth prospects of a debtor country. They also used a debt-cum-growth model similar to that used by Ajayi (1991) with the simulations using different interest rates chosen to conform with those that were being implemented by the Ugandan government in its external debt strategy. The simulation results indicated that Uganda could not be able to sustain debt that attracted interest rates of more than 7% (which was the highest rate chosen in the simulation) per annum with a growth rate of more than 2% per annum on average. The argument was that such an arrangement would only permit a real growth rate of only 2% per annum and given that the per annum population growth rate was slightly more than 2%, then there would be zero or negative growth in real per capita incomes. The simulations showed that low interest rates attract higher rates of economic growth as greater resource transfer is permitted for every level of external debt growth rate.

Mbire and Atingi also used the Cohen model to determine the trade deficit that is feasible for the debt stock- export ratio to be kept from rising. Results for both the Cohen and the debt-cum-growth models were then compared for the period 1993-2000. Both models showed that Uganda was in a position to run a trade deficit within the period 1993-2000 of up to 6% of GDP on its current account, while maintaining a constant debt-export ratio. They attributed this to a debt strategy the Ugandan government was pursing then which greatly reduced the interest rate of loans contracted and further decreased the overall size of the debt through restructuring and debt reduction techniques. In contrast to Osei's (1995) study, their study showed that GDP growth rate decreased with increases in interest rates. Debt-GDP ratio increased with increases in interest rates, while resource transfer tended to be negative for high interest rate, thus indicating a higher debt burden.

The above three studies all seem to have concentrated on only one aspect of debt servicing problems, that

of interest rates. Varying of interest rates could be of less importance to the current study where focus is on external debt in Kenya which is mainly official and on concessional terms.

Degefe (1992) carried out a study to gauge the relationship between the external debt and growth for the Ethiopian economy. He used an open macro model with the idea that a country's rate of economic growth must at least match the annual rate of growth of external debt so as to avoid debt-servicing problems. The empirical results showed that external capital contributed positively to growth between 1964 to 1977 and negatively thereafter. Degefe notes however that foreign debt had nothing to do with the negative results and that the problem was how well the foreign debt was used. He concludes this by analysing two regime periods (pre-revolution and post-revolution periods) which give different economic performance results, despite the presence of external debt. Degefe's study provides some policy implications that are useful for the current study.

Seriux and Samy (2001) in their analysis to determine the relationship between debt and growth for 53 low income countries estimated three equations namely, an investment equation, a human capital growth equation and a growth equation. In all the three equations, debt to revenue and debt service-to revenue ratios were used as some of the explanatory variables. Debt-to-revenue ratio was used to indicate the debt overhang disincentive effect while the debt service-to revenue ratio represented the crowding out effect. The three equations were however respecified to include debt to export and debt service to export ratios instead of debt to revenue and debt service to revenue ratios, respectively. The debt to export ratio was used to incorporate the broader view of the debt overhang while the debt service to export ratio captured the import compression effect.

Empirical results on this study indicated that crowding out effects appeared to work mostly on the quality

rather than the rate of investment. There was also evidence for import compression effect both in terms of its effect on the rate of investments and the output directly. Support for a human development effect acting through the government budget was found but only on the higher end (Secondary education) and not on primary education. Support for an investment response to human capital development was however found to be mixed. This study will provide useful comparison of results (especially for the investment and growth equations) to the current study. It will also provide some insights in the explanation of the results to be obtained in the current study.

Dijikstra and Hermes (2001), used panel data for 104 Less Developed Countries (LDCs) to investigate the relationship between the uncertainty of debt service and economic growth, with particular reference to the HIPCs. In all their regressions, the dependent variable was real GDP per capita growth rate, and proxies for uncertainty were introduced, to measure the unanticipated or unexpected instability of the variables related to debt service and resource flows/transfers. The empirical results indicated that uncertainty of debt servicing had a negative impact on economic growth of HIPCs, but not for the LDCs in general. This study particularly hypothesised that it is the problem of uncertainty of debt service rather than the level of external debt as such, that may compromise economic growth, and the outcomes of their empirical analysis supports this. Although this study concentrates mainly on uncertainty of debt service and not the level of the external debt, its results will provide useful insights in the analysis and interpretation of results to be obtained in the current study.

Were (2001) in a study done on Kenya assesses the impact of indebtedness on both private investment and economic growth. In her study, she estimates both the investment and growth equations where debt-service to export ratio is used as one of the explanatory variables to capture the crowding out effect. Although the empirical results indicated that a rise in debt service ratio negatively affected private

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investment, the coefficient was statistically not significant even at the 10% level. A rather surprising result for this study was the positive effect of debt-service ratio on economic growth with highly significant coefficients, which seems to contradict the economic theory. It is ironical for the study to show that debt-service has negative effect on private investment while at the same time it has a positive effect on growth, yet economic theory indicates that private investments do enter the economic growth function with a positive relationship. This study however, provides a challenge to the current study which also aims at establishing the impact of debt-service ratio on economic growth.

Hansen (2001) carried out a study to analyse the impact of aid and external debt on growth and investment. He used data from 54 developing countries where the empirical results showed that initial stock of external debt has a negative impact on growth as predicted by debt overhang theories. Contrary to Were's (2001) results, Hansen finds a significant negative influence of debt-service on growth. His study shows that a 10% increase in debt-service ratio, as experienced by the average Highly Indebted Countries (HICs), implies a drop in the growth rate of about 1%. Unlike most debt-investment studies, which mainly use private investment as the dependent variable, Hansen uses the impact of debt and aid on gross domestic investment. The argument here is that the result in the debt-investment regressions shows that public and private investments are complimentary and so change in the dependent variable should not change the conclusion. Based on empirical results, Hansen's study concludes that aid and debt stock have no impact on investment whereas there is a significant crowding- out effect from the debt-service. This (Hansen's) study will be useful in the comparison of results with the current study.

Metwally and Tamaschke (1994) employed a simultaneous model in analysing the impact of heavy foreign debt burdens on economic development in three countries in North Africa. Their study first tested a single equation to find the effect of debt-servicing on economic development and later developed a simultaneous

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equation model with four equations to test the same. They argued that it is better to use a simultaneous rather than a single equation model to analyse the relationship between debt-servicing and economic development so as to capture the feedback effects. In both models, the debt-servicing coefficient is negative and statistically significant for all the three countries, at 1% level. The empirical results from the simultaneous model showed that accelerated growth in exports reduces the debt-service ratio. This is supported by the fact that as the stock of debt piles up and interest rates rise, a larger proportion of the country's total exports of goods and services will be put aside for debt-servicing. The results also suggested that improvements in the balance of current accounts increases in the inflow of direct private investment while accelerated growth in domestic savings contributed towards reducing the external debt. Another conclusion from the empirical results of their study was that high economic growth and high interest margins assist in attracting private direct investment.

The current study will benefit from the above (Metwally and Tamaschke) study in both the model application and also in the analysis of the regression results.

2.3   Literature Overview

Most econometric models of creditworthiness and debt-servicing problems typically include variables such as the debt-service ratio and the debt to GDP ratio as "determinants" of debt-serving problems. While these variables may be rough indicators of the likelihood of encountering debt problems, they are typically not the true underlying "causal" factors (Cuddington, 1989). In an attempt to address the causal factors, the current study will employ the simultaneous equation model (used by Metwally and Tamaschke) which improves the understanding of how debt-servicing is a problem to the economy through the various linkages represented by the system of equations in the model.

In Kenya, very few empirical work exists on the relationship between debt-servicing and economic growth. In most of the studies done in Kenya and elsewhere, emphasis has mainly been on the impact of debt-servicing and/or debt on economic growth and not on the impact of economic growth on debt-servicing. In a recent study done on Kenya by Were (2001), empirical results indicated a positive relationship between debt-servicing and economic growth and the coefficients were highly significant. This however seems to contradict economic theory. The current study is therefore geared towards establishing whether what economic theory provides on this relationship also holds for the Kenyan case and given that the study will use a simultaneous equation model, a dual relationship between debt-servicing and economic growth will also be established.

CHAPTER THREE: METHODOLOGY

3.1 Model description

3.1.1 Model 1

This study adopts a simultaneous equations model used by Metwally and Tamaschke (1994) in their analysis of the foreign debt problem of North African countries. The study first tests the hypothesis that debt-servicing has a negative effect on economic growth by testing the following single-equation model:

$$GGDP_t = a_0 + a_1 DA_t + a_2 GEXP_t + a_3 DSR_t + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

where,

$GGDP_t$ = rate of growth of real GDP in period t

DA_t = rate of growth of real domestic absorption (private consumption plus investment plus government expenditure) in period t

$GEXP_t$ = rate of growth of exports of goods and services in period t

DSR_t = the debt-service ratio (interest plus principal payments) as a percentage of exports in period t

μ_t = error term

For estimation purposes, domestic absorption is diaggregated into the three variables so that equation (1) is respecified as follows:

$$GGDP_t = a_0 + a_1 GPC_t + a_2 GPI_t + a_3 GGOV_t + a_4 GEXP_t + a_5 DSR_t + \mu_t \dots\dots\dots\dots\dots\dots\dots(2)$$

where,

GPC = Growth in Private consumption

GPI = Growth in private investment

GGOV = Growth in government expenditure (both recurrent and development expenditure)

It is expected that the rate of growth in domestic absorption(disaggregated into the three variables above) and exports would have a favourable effect on economic growth.[6] If debt-servicing has an adverse effect on economic growth, the coefficient a_5 will be expected to be negative and statistically significant.

3.1.2 Model 2

This study goes further to hypothesise that the debt-service ratio does not only affect economic growth but is also influenced by the rate at which growth takes place. This is mainly for two reasons. First, economies which enjoy relatively higher rates of growth succeed in attracting foreign investment. Capital inflow at substantial rates will reduce the need for borrowing. Since the volume of resources devoted to debt servicing is positively related to the size of the debt, economic growth will, through its impact on capital inflow, reduce the debt-service ratio. Secondly, accelerated growth results in increasing incomes, and hence domestic savings. This will in turn reduce the need for foreign borrowing to finance investment projects. The slow-down in growth of the stock of debt will result in a reduction in the debt-service ratio.

The above suggests that in order to capture the feedback effects, the relationships between debt-servicing and economic growth should be analysed using a simultaneous, rather than a single equation model. The study will therefore employ the following simultaneous equation model:

$$GGDP_t = a_0 + a_1 GPC_t + a_2 GPI_t + a_3 GGOV_t + a_4 GEXP_t + a_5 DSR_t + \mu_t \dots\dots\dots(3)$$

$$DSR_t = \beta_0 + \beta_1 ETDS_t + \beta_2 IRFD_t + \beta_3 GEXP_t + \mu_{2t} \dots\dots\dots(4)$$

$$ETDS_t = \lambda_0 + \lambda_1 GFDI_t + \lambda_2 BOP_t + \lambda_3 GRS_t + \mu_{3t} \dots\dots\dots(5)$$

$$GFDI_t = \delta_0 + \delta_1 GGDP_t + \delta_2 DIDR_t + \mu_{4t} \dots\dots\dots(6)$$

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[6] The extent of the impact of the rate of growth in domestic absorption will depend on leakages to imports.

Endogenous Variables

$GGDP_t$ = Rate of growth of GDP (valued at constant prices) in period t

DSR_t = The debt-service ratio in period t

$ETDS_t$ = Stock of total external debt as a percentage of GDP in period t

$GFDI_t$ = Growth in foreign direct investment in period t (in real terms)

Predetermined Variables

GPC_t = Growth in Private consumption in period t

GPI_t = Growth in private investment in period t

$GGOV_t$ = Growth in government expenditure (both recurrent and development expenditure) in

period t

$GEXP_t$ = Rate of growth of exports of goods and services in period t

$IRFD_t$ = Interest rate on foreign debt in period t

BOP_t = Ratio of total credit to total debit in the balance of payments in period t

$DIDR_t$ = Difference between domestic interest rates and international rates in period t

GRS_t = Rate of growth of real savings in period t

NB: All figures are expressed in real terms.

3.2   Model Application

Equation (3) is the same as the single equation model and it shows that economic growth depends on

growth in domestic absorption, growth in exports of goods and services, and the debt-service ratio.

Equation (4) suggests that the debt-service ratio is determined by the stock of debt, interest rates on

outstanding debt and growth in exports. Equation (5) examines the relationship between the stock of debt,

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capital inflow, improvement in the current account of the country's balance of payments and growth in domestic savings. Finally, equation (6) shows that the equity capital will be determined by economic growth and interest rate differentials.

Expected signs of Coefficients for the Model Variables

Equation	Coefficients' expected signs	Explanation
(3)	a_1, a_2, a_3 and a_4 to be (+) and a_5 (-)	growth in domestic absorption(disaggregated into the three variables) and exports are positively related to economic growth while debt-servicing has adverse effect on economic growth.
(4)	both β_1 & β_2(+) and β_3 (-)	other things being equal, an increase in debt and in interest rates will result in an increase in debt-service ratio. However, an increase in exports will result to decrease in debt-service ratio.
(5)	all coefficients (-)	an increase in direct private foreign investment, an improvement in the balance of the current account and an increase in domestic savings will all reduce the need to borrow.
(6)	both coefficients (+)	countries which enjoy a higher economic growth rate and offer high rates of return are expected to attract more direct investment.

3.3   Estimation Method

The single equation model is tested using the Ordinary Least Squares (OLS) method. In the second model, it is noted that the system of equations is complete since it contains as many equations as the endogenous variables. Applying the rank and order conditions of identification, it can be observed that every equation is over-identified. It is therefore reasonable to use the Three-Stage Least Squares (3SLS) regression method [which is the two-stage least squares (2SLS) version of the Seemingly Unrelated Regression (SUR) method] to estimate.   The study also carries out some unit root tests such as the Dickey Fuller (DF)and Augmented Dickey Fuller (ADF) tests so as to test for stationarity of the time series data.

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3.4 Data Sources

The study employs secondary data on Kenya which will be obtained from Government of Kenya publications, Central Bank of Kenya's publications, International Financial Statistics (IFS) published by IMF, and Global Development Finance (GDF) published by the World Bank.

3.5 Scope and Possible Limitations

The study analyses the impact of external debt on economic growth in Kenya and is based on data covering the period 1970 to 2000.

It is not always clear on whether data on debt service payments presented in various sources represents scheduled (ex ante) or actual (ex post) payments. Due to problems of data coverage and reliability(the range and variety of debts to be serviced, for example) it is not always possible to determine whether payments due were met in full, which debts were serviced, in what proportions, etc. In many instances, scheduled payments due have been used as a proxy for payments actually made. The divergence between ex ante and ex post payments in the case of SSA countries is very substantial (Abbott, 1993). Accurate figures on debt service payments may therefore not be possible to obtain and this could be a limitation in the analysis.

Another limitation related to the data is that different sources of data seem to have different figures for the same variable and the same period. Reconciliation of these figures is done in the study.

CHAPTER FOUR: RESEARCH FINDINGS

This study uses E-Views(Version 3.1) econometrics computer package to analyse and estimate the data for both models. Model 1(Single Equation model) uses OLS regression method while the second simultaneous equation model employs the Three-Stage Least Squares (3SLS) method.

4.1   Estimation Results of the Single Equation Model

4.1.1   Stationarity Tests

Since the study employs time series data, it is important to carry out unit root test to test for stationarity of the data as most macro-economic time series data are non-stationary. Estimating non-stationary variables at their levels is likely to yield spurious results and no inference can be made since statistical tests such as the F-distribution and the t-distribution are invalid. There are several tests for stationarity such as the Dickey-Fuller test, Augmented Dickey-Fuller (ADF) test, Phillip Peron test, among others.

The ADF approach controls for higher-order correlation by adding lagged difference terms of the dependent variable y to the right-hand side of the regression:

$$\Delta y_t = \mu + \lambda y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \ldots\ldots\ldots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t$$

This augmented specification is then used to test: $H_o : \lambda = 0$, $H_1: \lambda < 0$ in this regression. The asymptotic distribution of the t-statistic on λ is independent of the number of lagged first differences included in the ADF regression. This study therefore uses the Augmented Dickey-Fuller test to test for stationarity and results are as follows:

Table 4.1: Stationarity Test Results at Levels

Variable	GGDP	GPI	GPC	GGOV	GEXP	DSR
ADF Test Statistic*	-3.621154	-3.990887	-4.042697	-3.892388	-4.051818	-0.906356
1% Critical Value	-3.6752	-3.6752	-3.6752	-3.6752	-3.6752	-3.6752
5% Critical Value	-2.9665	-2.9665	-2.9665	-2.9665	-2.9665	-2.9665

* If the absolute ADF test statistic is less than the absolute critical values, then we do not reject the null hypothesis of non-stationarity.

Table 4.1 above shows that GPI, GPC, GGOV and GEXP are all stationary at the 1% critical value while GGDP is stationary at the 5% critical value. However, DSR is not stationary even at the 5% critical value and hence the need to difference to make it stationary.

Table 4.2: Stationarity Test Results at First Difference for DSR

ADF Test Statistic	-4.828073	1%	Critical Value*	-3.6852
		5%	Critical Value	-2.9705

* If the absolute ADF test statistic is less than the absolute critical values, then we do not reject the null hypothesis of non-stationarity.

Table 4.2 above shows that the ADF test statistics are significant at 1% critical value and therefore we can reject the null hypothesis of non-stationarity. Since DSR is stationary with the first difference, we can conclude that it is integrated of order one($I \sim I(1)$).

4.1.2 Correlation of the Variables

Table 4.3: Correlation Matrix of the Single Equation Variables at Levels

	GGDP	GGOV	GPC	GPI	GEXP	DSR
GGDP	1	0.304	0.779	0.545	0.301	-0.102
GGOV	0.304	1	0.123	0.004	0.484	-0.334
GPC	0.779	0.123	1	0.546	-0.160	0.0806
GPI	0.545	0.0047	0.546	1	-0.081	-0.0373
GEXP	0.301	0.484	-0.160	-0.081	1	-0.363
DSR	-0.102	-0.334	0.081	-0.0373	-0.363	1

Table 4.3 above shows that there is negative correlation between economic growth rate (GGDP) and debt-service ratio(DSR) though relatively low. The negative correlation however conforms with the hypotheses in chapter one of this study.

4.1.3   Cointegration Analysis

The aim of this analysis is to test whether if variables are integrated of the same order, a linear combination of the variables will also be integrated of the same order or lower. The idea behind cointegration analysis is that although macro-economic variables tend to trend up and down over time, groups of variables may drift together. If there is some tendency for some linear relationships to hold amongst a set of variables over long periods of time, then this analysis helps to discover it.

The stationarity test above(table 4.2) shows that the non-stationary variable (DSR) is integrated of order one at its first difference and therefore we can now test for cointegration using the Engle-Granger two step method. The first step is to estimate a cointegrating regression and the second step is to test for stationarity of the residuals derived from the cointegrating equation. The cointegrating equation will test the relationship between GGDP and DSR. Once the single equation model is estimated, the residuals are stored as ECM and are then tested for stationarity at levels. The cointegration results using the Engle-Granger two step method are presented in table 4.4 below.

Table 4.4: ADF Unit Root Test for the ECM

ADF Test Statistic	-3.745037	1% Critical Value*	-3.6852
		5% Critical Value	-2.9705

A further test for cointegration is carried out and this is the Johansen Cointegration test. Results of this test are presented in table 4.5 below.

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Table 4.5: Johansen Cointegration Test

Sample: 1970 2000
Test assumption: Linear deterministic trend in the data
Series: GGDP GPC GPI GEXP GGOV DSR
Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.878277	145.2171	94.15	103.18	None **
0.674153	84.14285	68.52	76.07	At most 1 **
0.556006	51.62439	47.21	54.46	At most 2 *
0.400206	28.07802	29.68	35.65	At most 3
0.351711	13.25414	15.41	20.04	At most 4
0.023344	0.685011	3.76	6.65	At most 5

*(**) denotes rejection of the hypothesis at 5% (1%) significance level
L.R. test indicates 3 cointegrating equation(s) at 5% significance level

The results from table 4.4 indicate that the ADF test statistic is significant at the 1% level and therefore we do not accept the null hypothesis of non-stationarity. This therefore confirms that the variables are cointegrated. The Johansen cointegration test illustrated by table 4.5 also confirms cointegration at the 5% level of significance. This therefore implies that the relationship between the endogenous and exogenous variables is most efficiently represented by an error-correction model (Engle and Granger, 1987).

4.1.4   Error-Correction Modelling

The results above show that there is cointegration in the single equation model which therefore confirms the hypothesis that debt service ratio has long-run effects on economic growth. Differencing the series above can solve the problem of non-stationarity but this could lead to the loss of the long-run information in the data which is crucial in the theoretical model. To capture both the short-run and long-run effects in the model, we need to estimate an error correction term (ECM) variable lagged once in the set of the non-stationary explanatory variable which is differenced once. It is expected that the sign of the coefficient of the ECM to be negative and significant. This coefficient represents the speed adjustment in the short-run

to the long-run solution.

Since cointegration is confirmed, the residual is then used as an error correction term (ECM) in the dynamic model. The model is therefore re-parameterised into an error correction model as follows:

$$\Delta GGDP_t = \alpha_0 + \alpha_1 \Delta GPI_t + \alpha_2 \Delta GPC_t + \alpha_3 \Delta GGOV_t + \alpha_4 \Delta GEXP_t + \alpha_5 \Delta DSR_t + \alpha_6 ECM_{t-1} + Z_t .....(7)$$

where,

ECM_{t-1} is the error correction term lagged one period, and

Z_t is a white noise process error term.

The above model is then re-parameterised in an autoregressive form of order K(AR(K)) in order to capture dynamics which are not instantaneous. The over-parameterised model is then expressed as follows:

$$\Delta GGDP_t = \alpha_0 + \alpha_1 \sum \Delta GPI_t + \alpha_2 \sum \Delta GPC_t + \alpha_3 \sum \Delta GGOV_t + \alpha_4 \sum \Delta GEXP_t + \alpha_5 \sum \Delta DSR_t + \alpha_6 ECM_{t-1}$$

$$+ Z_t ....(8)$$

The general model is estimated to include up to three lags with DSR taking the predicted values as opposed to actual for better results. Estimation results of this over-parameterised model are presented in table 4.6 below.

Table 4.6: Results of the Over- Parameterised (General) Model

Dependent Variable: GGDP
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GGOV	0.039702	0.027009	1.469945	0.2015
GGOV(-1)	-0.018186	0.035063	-0.518668	0.6261
GGOV(-2)	0.045171	0.041152	1.097656	0.3224
GGOV(-3)	0.040501	0.027884	1.452444	0.2061
GPC	0.712194	0.148766	4.787333	0.0049
GPC(-1)	0.012140	0.216546	0.056063	0.9575
GPC(-2)	0.157532	0.166348	0.946999	0.3871
GPC(-3)	-0.083019	0.262771	-0.315935	0.7648
GPI	0.162519	0.127310	1.276569	0.2578
GPI(-1)	-0.062926	0.188680	-0.333507	0.7523
GPI(-2)	-0.152915	0.132674	-1.152564	0.3012
GPI(-3)	0.025206	0.130746	0.192786	0.8547
GEXP	0.001661	0.189044	0.008784	0.9933
GEXP(-1)	-0.193624	0.229427	-0.843947	0.4372
GEXP(-2)	0.015624	0.175919	0.088811	0.9327
GEXP(-3)	-0.029906	0.134772	-0.221897	0.8332
D(DSR)	0.178337	0.494166	0.360885	0.7329
D(DSR(-1))	-0.426444	0.486017	-0.877426	0.4204
D(DSR(-2))	0.385263	0.687690	0.560228	0.5995
D(DSR(-3))	0.205209	0.518144	0.396047	0.7084
ECM(-1)	-0.253216	0.511363	-0.495179	0.6415
C	0.010456	0.269786	0.038758	0.9706
R-squared	0.970215		Durbin-Watson stat	1.213350
F-statistic	7.755811		Prob(F-statistic	0.015901

By use of David Hendry's 'General to Specific' approach, the over-parameterised model is simplified to a more parsimonious model. This is done by first eliminating those parameters whose 't' values are most insignificant so as to maximise the goodness of fit with the minimum number of variables. Results of the specific model are presented in table 4.7 below.

Table 4.7:   Results of the Parsimonious (Specific) Model

Dependent Variable: GGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GGOV	0.034419	0.010719	3.210891	0.0046
GGOV(-2)	0.041062	0.011848	3.465736	0.0026
GGOV(-3)	0.039816	0.013084	3.043089	0.0067
GPC	0.668321	0.081949	8.155320	0.0000
GPI	0.161496	0.053185	3.036477	0.0068
GEXP(-1)	-0.163375	0.062878	-2.598295	0.0176
D(DSR(-1))	-0.486099	0.200957	-2.418925	0.0258
ECM(-1)	-0.500565	0.214229	-2.336592	0.0306
C	-0.149141	0.044088	-3.382798	0.0031

R-squared	0.903576		Durbin-Watson stat	1.758751
Jarque-Bera	1.669164		F-statistic	22.25571
Prob(Jarque Bera)	0.434056		Prob(F-statistic)	0.000000

The next step is to reassess the model in terms of diagnostic tests such as residual autocorrelation, normality, hetroskedasticity, standard error and model specification.

4.1.5   Diagnostic Tests

The R^2 suggests that 90% of variations in GDP growth rate are explained by variations in the specified explanatory variables in the model. The F-statistic is highly significant at 1% level of significance which means that we do not accept the null hypothesis that all slope coefficients (excluding the constant, or intercept) are equal to zero. The overall standard error of the model is about 2.8% which is low. Other tests carried out are as follows:-

Histogram and Normality Test

To test whether the error term is normally distributed, a histogram and normality test was carried out. The histogram (not displayed here) showed a bell-shape while the Jarque-Bera statistic (of 1.669164 with a probability significance level of 0.434056) was not significant which means that the residuals are normally

distributed.

Autocorrelation Test

Since the Durbin -Watson test is not valid in lagged models like the one above, there is need to carry out the Breusch-Godfrey LM test. Unlike the Durbin-Watson statistic for AR(1) errors, the LM test is used to test for higher order ARMA errors, and is applicable whether or not there are lagged dependent variables. The null hypothesis of the LM test is that there is no serial correlation up to lag order p, where p is a pre-specified integer. Results of this test are as shown below:

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.193231	Probability	0.899463
Obs*R-squared	0.978994	Probability	0.806335

The F-statistic is an omitted variable test for the joint significance of all lagged residuals while the Obs*R-squared statistic is the Breusch-Godfrey LM test statistic. This LM statistic is computed as the number of observations, times the (uncentered) R^2 from the test regression. Under quite general conditions, the LM test statistic is asymptotically distributed as a Chi Square - $\chi^2 (p)$.

Since the probabilities of both the F-statistic and the Obs* R-squared statistic are not significant at either the 1% or 5% level of significance, we do not reject the null hypothesis of no serial correlation.

ARCH LM Test

This is a Lagrange multipler (LM) test for autoregressive conditional heteroskedasticity (ARCH) in the residuals. The null hypothesis is that there is no ARCH in the residuals. Results of this test are as shown below:

ARCH Test			
F-statistic	0.364705	Probability	0.779160
Obs*R-squared	0.364705	Probability	0.743901

Since both the F-statistic and the Obs* R-squared statistic are not significant at either the 1% or 5% level of significance, we do not reject the null hypothesis of no ARCH in the residuals.

White's Heteroskedasticity Test

White's test is a test of the null hypothesis of no heteroskedasticity against heteroskedasticity of some unknown general form. The test statistic is computed by an auxiliary regression, where we regress the squared residuals on all possible (non-redundant) cross products of the regressors. Results of this test are presented below:

White Heteroskedasticity Test			
F-statistic	0.969537	Probability	0.535620
Obs*R-squared	16.38288	Probability	0.426573

Since both the F-statistic and the Obs* R-squared statistic are not significant at either the 1% or 5% level of significance, we do not reject the null hypothesis of no heteroskedasticity.

Regression Specification Test

The Ramsey's RESET Test was also carried out to test for the specification of the regression. The null and alternative hypotheses of the RESET test are:

H_o: $\varepsilon \sim N(0, \sigma^2 I)$

H_1: $\varepsilon \sim N(\mu, \sigma^2 I), \mu \neq 0$

Results of this test are as follows:

Ramsey RESET Test			
F-statistic	0.011137	Probability	0.917121
Log likelihood ratio	0.017319	Probability	0.895300

The F-statistic is not significant at either the 1% or 5% significance levels and therefore we do not reject the null hypothesis where the disturbance vector ε is presumed to have the multivariate normal distribution $N(0,\sigma^2 I)$. This means that the model is correctly specified.

4.1.6   Analysis of the Single Equation Model Results

Having confirmed that the model is correctly specified, the model results are then analysed to establish whether they confirm the hypothesis set in chapter one of this study. Solving the parsimonious model we have the single equation being specified as follows:

GGDP = - 0.149 + 0.668*GPC + 0.161*GPI - 0.163*GEXP(-1) + 0.034*GGOV + 0.041*GGOV(-2) + 0.0398*GGOV(-3) - 0.486*D(DSR(-1)) - 0.501*ECM(-1)...(9)

From equation (9) above, the first hypothesis of debt-service ratio having a negative effect on economic growth rate can be confirmed. The specified equation shows that debt -service ratio of one period earlier (D(DSR(-1)) has negative effect on the current economic growth rate(GGDP). A 1% increase in debt-service ratio in the previous period leads to 0.486% decline in economic growth rate in the current period. From table 4.7 above, it can be seen that the coefficient of debt-service ratio is negative and significant at the 5% level of significance.

Coefficients of the domestic absorption variables have the expected signs [GGOV, GGOV(-2),GGOV(-3), GPC and GPI] and are highly significant at the 1% level of significance. Growth in exports of goods and

services in the previous period (GEXP(-1)) has an unexpected negative sign and is significant at the 5% level of significance. It is also interesting to note that current growth in exports of goods and services (GEXP) does not explain current economic growth rate yet it is highly significant in the simultaneous equation model and carries the expected positive sign. Both current and past government expenditure(up to the third previous period) seem to explain current economic growth rate in this model. This could be explained by the fact that some of the government expenditure goes to development projects which usually take a long time to be completed.

The coefficient of the error correction term lagged once (ECM(-1)) has the expected negative sign and is significant at the 5% level of significance. This implies that there is a long-run relationship between economic growth rate and debt-service ratio. The magnitude of the error correction term indicates that the economy adjusts to its long-run trend at a speed of about 50% which means that deviations from the long-run trend are not corrected within one period.

4.2   Estimation Results of the Simultaneous Equations Model

4.2.1   Estimation Techniques

As mentioned earlier, the simultaneous equations model is estimated using 3SLS regression method which combines both instrumental variable estimation and computes homoscedastic non- autocorrelated residuals for systems of equations. The Three-stage least squares (3SLS) is the two-stage least squares (2SLS) version of the Seemingly Unrelated Regression (SUR) method. It is an appropriate technique when right-hand side variables are correlated with the error terms, and there is both heteroskedasticity, and contemporaneous correlation in the residuals.

EViews applies 2SLS to the unweighted system, enforcing any cross-equation parameter restrictions.

These estimates are used to form an estimate of the full cross-equation covariance matrix which, in turn, is used to transform the equations to eliminate the cross-equation correlation. 2SLS is applied to the transformed model. This study therefore proceeds to estimate the model using the 3SLS method. Results are presented in table 4.8 below.

Table 4.8: Results of the Simultaneous Equations Model

Estimation Method: Iterative Three-Stage Least Squares
Sample: 1970 2000
Instruments: GPI GPC GGOV GEXP IRFD BOP GRS DIDR C

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.080062	0.047450	-1.687288	0.0945
C(2)	0.141244	0.046769	3.020021	0.0032
C(3)	0.751562	0.084769	8.866020	0.0000
C(4)	0.000690	0.013370	0.051624	0.9589
C(5)	0.215429	0.062598	3.441496	0.0008
C(6)	-0.391114	0.148644	-2.631217	0.0098
C(7)	0.016310	0.040556	0.402156	0.6884
C(8)	0.395138	0.089855	4.397512	0.0000
C(9)	-0.098853	0.581719	-0.169932	0.8654
C(10)	-0.123618	0.051230	-2.412989	0.0175
C(11)	0.068306	0.136021	0.502178	0.6166
C(12)	0.072438	0.013892	5.214414	0.0000
C(13)	0.150356	0.119257	1.260772	0.2101
C(14)	-0.007840	0.051461	-0.152352	0.8792
C(15)	-0.359342	0.267406	-1.343806	0.1819
C(16)	3.275626	1.998667	1.638905	0.1042
C(17)	11.78996	1.697510	6.945447	0.0000

Determinant residual covariance		9.77E-09		

Equation: GGDP = C(1)+C(2)*GPI+C(3)*GPC+C(4)*GGOV+C(5)*GEXP +C(6)*DSR

R-squared	0.687017	Mean dependent var	0.020972
Adjusted R-squared	0.624420	S.D. dependent var	0.073723
S.E. of regression	0.045181	Sum squared resid	0.051032
Durbin-Watson stat	2.209425		

Equation: DSR = C(7)+C(8)*ETDS+C(9)*IRFD+C(10)*GEXP

R-squared	0.707380	Mean dependent var	0.114765
Adjusted R-squared	0.674867	S.D. dependent var	0.063218
S.E. of regression	0.036047	Sum squared resid	0.035084
Durbin-Watson stat	0.890895		

Equation: ETDS = C(11)+C(12)*GFDI+C(13)*BOP+C(14)*GRS

R-squared	-0.624322	Mean dependent var	0.262988
Adjusted R-squared	-0.804802	S.D. dependent var	0.134189
S.E. of regression	0.180273	Sum squared resid	0.877456
Durbin-Watson stat	1.683106		

Equation: GFDI = C(15)+C(16)*GGDP+C(17)*DIDR

R-squared	0.377486	Mean dependent var	0.339190
Adjusted R-squared	0.333021	S.D. dependent var	1.735098
S.E. of regression	1.417034	Sum squared resid	56.22360
Durbin-Watson stat	1.629467		

4.2.2 Analysis of the Results

The R^2 statistic is not a meaningful test of goodness of fit of a model when instrumental variables are used in the estimation. This is because the distribution of the statistic in not bound between zero and one and is instead bound between negative infinity and one. This also renders the F-statistic meaningless since $F = R^2 / 1-R^2$. A more meaningful test of goodness of fit of the model is the simulation experiment (Bassman, 1962).

The results of the simultaneous equation model confirm the first hypothesis stated in chapter one of this study that debt-service ratio has a negative effect on economic growth rate. This is clearly illustrated by the first equation of the system (equation 3) which shows that the coefficient of DSR (i.e. c(6)) has a negative sign and is highly significant at 1% level of significance. Solving the model, we get the first equation of the system specified as follows:

GGDP = - 0.080 + 0.141*GPI + 0.752*GPC + 0.001*GGOV + 0.215*GEXP - 0.391*DSR.....................(10)

These results indicate that a 1% increase in the current debt-service ratio (DSR) leads to 0.39% decline in the current economic growth rate (GGDP). The other coefficients have the expected signs and three of them (GPI ,GPC and GEXP) are significant at the 1% level of significance. However, the coefficient of current government expenditure (GGOV) carries the expected positive sign but is not significant even at 5% level of significance. This result seems to contradict that of the single equation model which shows both current and past government expenditures explaining economic growth rate.

The second equation of the model is specified as follows:

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$$DSR = 0.0163 + 0.395*ETDS - 0.0998*IRFD - 0.124*GEXP...(11)$$

Results of the second equation indicate that both external debt stock as a percentage of GDP (ETDS) and growth in exports of goods and services have the expected signs and are significant at 1% and 5% level of significance, respectively. Interest rate on foreign debt (IRFD) has a negative sign which is unexpected though the coefficient is not significant. This may be explained by the fact that interest rate on foreign debt does not play a critical role in determining external loans since the debt being considered here is public debt which is given on concessional rates.

The third equation of the model is specified as follows:

$$ETDS = 0.068 + 0.072*GFDI + 0.150*BOP - 0.008*GRS...(12)$$

Results of this equation are most unexpected. The coefficient of growth in foreign direct investments (GFDI) has a positive sign and is highly significant at 1% level of significance. This could be explained by the fact that in Kenya, foreign investment is highly influenced by the relationship donor institutions/countries have with Kenya. It therefore may follow that the better the relations (hence more external debt flow), the higher the likelihood of foreigners investing in the country. The BOP coefficient also has a positive sign which is unexpected though it is not significant. This could be explained by the fact that even if the ratio of total credits to total debits in BOP has been positive and greater than one, most of the proceeds from the exports might not have been ploughed back in the economy since most of the exporting firms are foreign owned. The coefficient of the third explanatory variable (GRS) has the expected negative sign though it is not significant. The explanation for this could be that growth in real domestic savings has been negligible or negative in most of the years and has therefore not influenced the decision of whether to

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borrow externally.

The last equation of the model is specified as follows:

GFDI = - 0.359 + 3.276*GGDP + 11.79*DIDR..(13)

Both coefficients of GGDP and DIDR have the expected signs although that of GGDP is not significant. The DIDR coefficient is significant at 1% level of significance. Economic growth rate in Kenya may not directly influence growth in foreign direct investment and therefore the insignificance of the the GFDI coefficient is not surprising. Growth in FDI in Kenya is highly influenced by the political climate and other investor incentives (e.g. tax holidays) which are not captured in this model.

The third and fourth equations contradict the second hypothesis which traces the feedback effects of economic growth rate in influencing the debt-service ratio. The fact that economic growth rate is not significant in influencing growth in FDI and that growth in FDI has a positive relationship with stock of external debt negate the hypothesis that economic growth rate influences debt-service ratio. Probably, these feedback effects might have been captured better if the model included an endogenous variable that is directly affected by economic growth rate and is also an exogenous variable in the stock of external debt (ETDS) equation.

4.2.3 Simulation Results

As earlier stated, the R^2 statistics do not provide a meaningful test of goodness of fit of a model when instrumental variables are used in the estimation. This study therefore uses simulations to test for the goodness of fit of the model. This will entail simulating the historical endogenous variables of each of the

four equations in the system and comparing them against those predicted by the model.

Results of these simulations are presented in form of line graphs in appendix 3. The goodness of fit in this case is given by evaluating whether the model is able to predict the turning points in the predicted variables. The graphs show that most of the turning points are captured by the predicted values and this is a good indication for the goodness of fit.

CHAPTER FIVE: POLICY IMPLICATIONS AND CONCLUSION

5.1 Main Findings

The overall results of the two models indicate that debt-service has a negative effect on the economic growth rate. This therefore confirms the first hypothesis set in chapter one of this study. The single equation model reveals that there is a long-run relationship between debt service ratio and economic growth rate. This is done through the error correction term which carries the expected negative sign and lies between zero and one.

A surprising result is that of the negative relationship between previous period's growth in exports of goods and services and current GDP growth rate in the first model. This result however is contradicted by that of the second model which finds the relationship to be positive and highly significant, in line with economic theory.

The second hypothesis of debt servicing being influenced by the rate at which the economy grows is however not confirmed by results of the second model which were intended to attest to this through the feedback effects. The coefficient of the GDP growth rate in the last equation of the second model carries the expected positive sign but is however not significant. This therefore means that growth in foreign direct investments (GFDI) is not being explained by the GDP growth rate (GGDP) and hence further feedback effects cannot be traced. Similarly, growth in foreign direct investments (GFDI) was found to have an unexpected positive relationship with stock of external debt (ETDS) in equation (12) which further breaks down the feedback effects of GDP growth rate to debt servicing. This result seems to contradict results found in Algeria and Morocco using a similar model which implies that the size of FDI in Kenya does not influence stock of external debt (ETDS) directly. This result is however not surprising in the Kenyan case

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given that donor relationship highly influences foreign investor confidence .

These results provide a better understanding of the debt service problem in Kenya and its effects on economic growth rate and therefore form a basis for drawing some policy implications addressed in the next section.

5.2   Policy Implications

From results of both models, it can be concluded that debt-service ratio has a negative effect on economic growth rate. Given the economic recession the country has been experiencing in the last few years, it would be crucial to try and reduce this high debt-service ratio so as to boost economic growth. From the simultaneous equation model (equation 11) one option is to increase our exports and this could have two effects; first, to actually bring down the debt-service ratio, and secondly, to improve on the openness of the country (i.e. ratio of exports to GDP) which could lead to the country qualifying for the HIPC Initiative debt relief. As pointed out earlier in chapter one of this study, one of the threshold criteria for the HIPC Initiative relief is for a country to have the ratio of exports of goods and services to GDP to be at least 30%. Currently, Kenya's ratio of exports to GDP stands at 26% which makes the country not to qualify for the HIPC Initiative debt relief. There is need therefore to make deliberate effort to increase the country's exports and this could be done through offering various export related incentives to investors and/or exporters.

The second way of trying to reduce the debt service ratio is to reduce the stock of external debt. This however might not be a solution in the short-run due to the existing resource gap which would mean that Government tries to raise more revenue either through domestic borrowing or higher taxes. The two latter options of raising revenue have negative impacts given that increased domestic borrowing by the

government would only raise the interest rates while higher taxes will only increase the tax burden granted that Kenya is one of the heavily taxed countries. From the simultaneous equation model, stock of external debt seems to be explained by other factors not captured in this model. This could be because of the nature of Kenya's external debt which is mainly public and hence susceptible to factors influencing public expenditure. There is therefore need to address the factors influencing public expenditure with the aim of better utilisation and reduction of the resource gap so as to reduce the stock of external debt.

Another policy implication that can be drawn from the results is that related to the determinants of foreign direct investments. Growth in foreign direct investments in Kenya seems to be highly explained by the difference between domestic interest rates and international interest rates. This implies that for the country to be able to attract more foreign direct investment, this gap between the interest rates needs to be narrowed.

5.3   Conclusion

This study set out to analyse the magnitude and effect of debt service ratio on economic growth. It also set to analyse whether economic growth influences debt-servicing and this was done through the simultaneous equation model which was to capture the feedback effects of economic growth rate. The two models used in this study were borrowed from an earlier study done for three North African countries (Egypt, Morocco and Algeria) which showed different results from those obtained in the Kenyan case. In the case of the North African countries, the second hypothesis of economic growth rate affecting debt-servicing through the feedback effects was confirmed while in the Kenya case, there is a breakdown of these feedback effects. This is mainly because growth in foreign direct investment in the Kenyan case is neither being explained by economic growth rate nor does it explain growth in the stock of external debt.

To improve on the simultaneous equation model, an improvement on the last two structural equations could be done so that the model has a variable that is directly being explained by economic growth rate and one that is also explaining stock of external debt. This would help to capture the feed-back effects of economic growth rate on debt-servicing.

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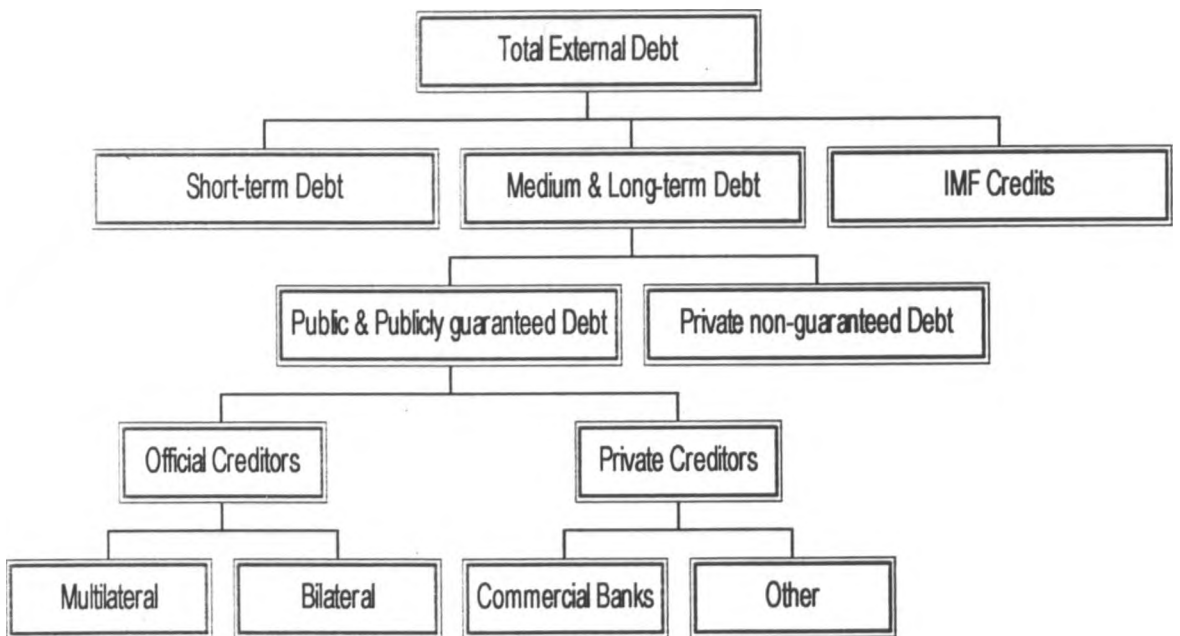
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APPENDIX 1

Fig. A1:   Debt Stock and its Components

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                        ┌─────────────────────┐
                        │  Total External Debt │
                        └─────────────────────┘
              ┌──────────────────┼──────────────────────┐
    ┌──────────────────┐ ┌──────────────────────────┐ ┌──────────────┐
    │  Short-term Debt  │ │ Medium & Long-term Debt  │ │  IMF Credits │
    └──────────────────┘ └──────────────────────────┘ └──────────────┘
                          ┌────────────┴──────────────┐
              ┌───────────────────────────────┐ ┌──────────────────────────┐
              │ Public & Publicly guaranteed Debt │ │ Private non-guaranteed Debt │
              └───────────────────────────────┘ └──────────────────────────┘
                  ┌──────────────┴──────────────┐
          ┌──────────────────┐          ┌──────────────────┐
          │ Official Creditors │          │ Private Creditors │
          └──────────────────┘          └──────────────────┘
            ┌──────┴──────┐              ┌──────────┴─────────┐
    ┌────────────┐ ┌────────────┐ ┌──────────────────┐ ┌────────┐
    │ Multilateral │ │  Bilateral  │ │ Commercial Banks │ │  Other  │
    └────────────┘ └────────────┘ └──────────────────┘ └────────┘
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Source Global Development Finance 2000 and Ministry of Finance and Planning, Debt Management Division
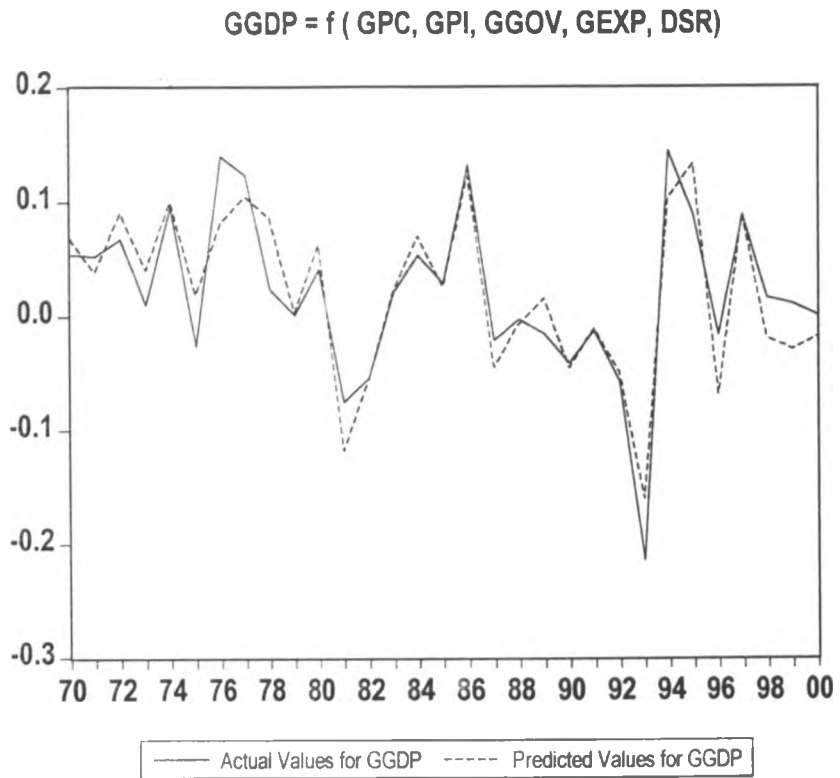
APPENDIX 2

Table A2:   Debt Service Ratio and GDP Growth Rate

Year	Exports of Goods an d Services (Ksh Million)	Debt Service Charges as a percentage to Export of Goods and Services	GDP Growth Rate (%)
1994	148,224.8	20.7	3.0
1995	152,596.4	18.6	4.8
1996	172,459.2	17.3	4.6
1997	174,846.2	15.1	2.4
1998	171,894.7	17.0	1.8
1999	188,693.1	16.5	1.4
2000	208,799.8	16.5	-0.3

Source: Economic Surveys (Vanous Issues)

GGDP = f (GPC, GPI, GGOV, GEXP, DSR)

DSR = f(ETDS, IRFD,GEXP)

Actual Values for DSR ----- Predicted Values for DSR

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GFDI = f(GGDP, DIDR)

Actual Values for GFDI   Predicted Values for GFDI

56
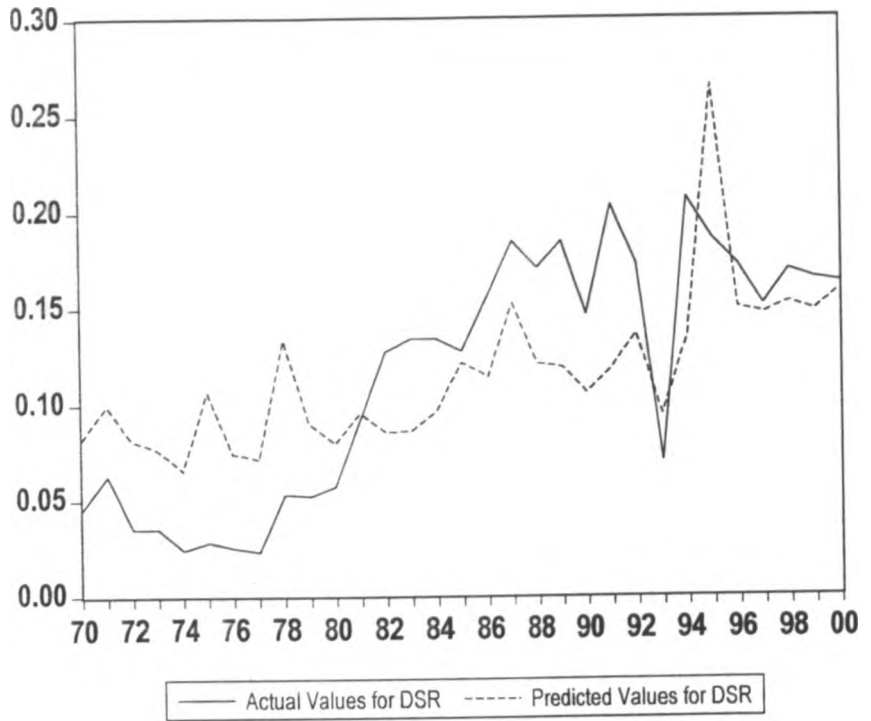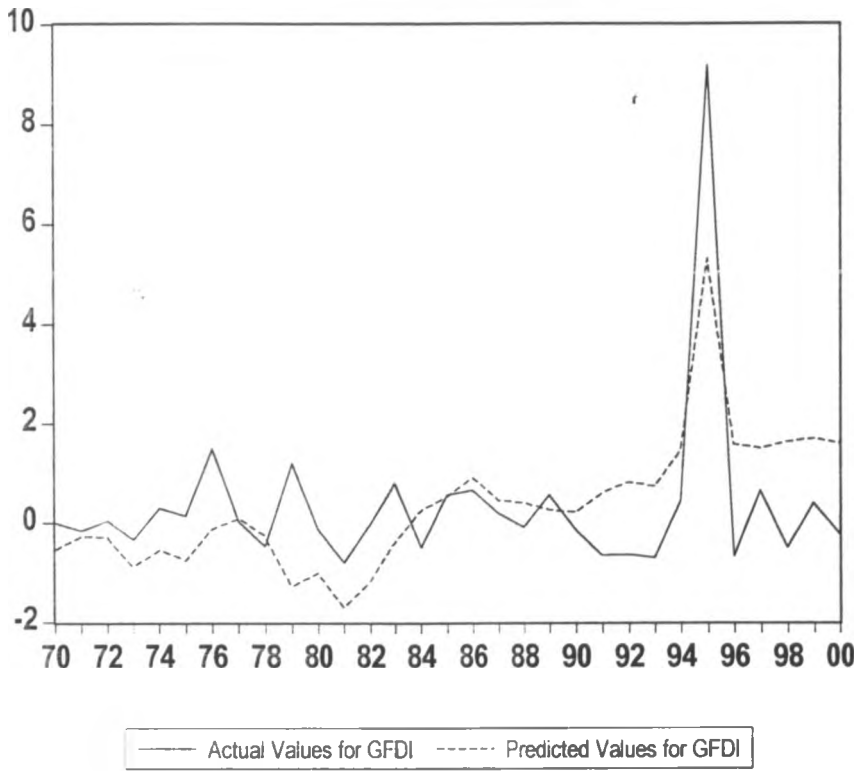
APPENDIX 4: DEFINITIONS

Principal Repayments - Amounts of principal (amortization) paid in foreign currency, goods or services in the year specified.

Interest Payments - Amounts of interest paid in foreign currency, goods, or services in the year specified.

Net Flows on Debt (or Net Lending or Net Disbursements) - Disbursements minus principal repayments.

Net Transfers on Debt - Net flows minus interest payments(or disbursements minus total debt service payments).

Total Debt Service Paid - Debt service payments on total long-term debt (public and publicly-guaranteed and private non-guaranteed), use of IMF credit, and interest on short-term debt.

Use of IMF Credit - denotes repurchase obligations to the IMF with respect to all uses of IMF resources(excluding those resulting from drawings in the reserve tranche) shown for the end of the year specified. Use of IMF Credit comprises purchases outstanding under the credit tranches, including enlarged access resources and all special facilities (the buffer stock, compensatory financing, extended fund, and oil facilities), trust fund loans, and operations under the structural adjustment and enhanced structural adjustment facilities.

Foreign Direct Investment - Investment that is made to acquire a lasting management interest (usually 10% of voting stock) in an enterprise operating in a country other than that of the investor (defined

according to residency), the investor's purpose being an effective voice in the management of the enterprise. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.

Public Debt - An external obligation of a public debtor, including the national government, a political subdivision (or an agency of either), and autonomous public bodies.

Publicly- guaranteed Debt - An external obligation of a private debtor that is guaranteed for repayment by a public entity.

Private non-guaranteed External Debt - An external obligation of a private debtor that is not guaranteed for repayment by a public entity.

Debt Service -the sum of principal repayments and interest payments actually made.

Private Creditors - include bonds, commercial banks, and other private creditors. Commercial banks and other private creditors comprise bank and trade- related lending.

Long-term External Debt - Debt that has an original or extended maturity of more than one yaer and that is owed to nonresidents and repayable in foreign currency, goods, or services.

Short-term External Debt - Debt that has an original maturity of one year or less.

Current Account Balance - the sum of the credits less the debits arising from international transactions

in goods, services, income, and current transfers. It represents the transactions that add to or subtract from an economy's stock of foreign financial items.

Multilateral Creditors - These creditors are multilateral institutions such as the IMF and the World Bank, and other multilateral development banks.

Bilateral creditors - these creditors are governments. Their claims are loans extended by, or guaranteed by, governments or official agencies, such as export credit agencies.

Debt Sustainability - The position of a country when the net present value of debt (public and public-guaranteed) - to- exports ratio and the debt service (on public and publicly-guaranteed loans) - to- exports ratio are below certain country specific target levels within ranges of 200- 250 per cent and 20- 25 per cent, respectively.

Net Present Value (NPV) of debt - takes into account the degree of concessionality by discounting the sum of future debt-service obligations (principal and interest) at market interest rate. Therefore, if the loan interest rate is less than the market rate, then NPV of debt will be lower than the face value.

Traditional Relief - traditional relief mechanisms can be summarised as follows;

i)   the adoption of stabilisation and economic reform programmes supported by concessional loans from the IMF and the World Bank;

ii)   in support of these adjustment programmes, flow-rescheduling agreements with Paris Club creditors on concessional terms followed by a stock-of-debt operation after three years of good track records under both IMF agreements and rescheduling agreements'

iii)   agreements by the debtor country to seek at least comparable terms on debt owed to non-Paris Club bilateral and commercial creditors facilitated by International Development Association (IDA) debt-reduction operations on commercial debt;

iv)   bilateral forgiveness of official development assistance debt by many creditors; and

v)   new financing on appropriately concessional terms.

The Paris Club - this is an informal forum where countries experiencing difficulties in paying their debts to governments and private institutions meet with their creditors to restructure these debts. It is an ad hoc institution with no legal status.

Data used for Estimation

Year	GGDP	GPI	GPC	GGOV	GEXP	DSR	ETDS	IRFD	GFDI	BOP	GRS	DIDR*
1970	0.05	1.01	0.03	0.50	0.06	0.05	0.16	0.024	0.01	1.09	-0.03	-0.03
1971	0.05	0.83	0.05	-0.03	0.00	0.06	0.16	0.049	-0.15	1.18	0.05	0.00
1972	0.07	0.90	0.06	0.09	0.13	0.04	0.13	0.034	0.04	1.10	-0.09	-0.02
1973	0.01	0.72	0.05	-0.05	0.06	0.04	0.13	0.042	-0.34	1.18	-0.08	-0.06
1974	0.10	0.81	0.03	2.65	0.30	0.02	0.12	0.025	0.29	1.31	0.08	-0.04
1975	-0.03	0.99	0.06	0.05	-0.15	0.03	0.12	0.065	0.14	1.20	-0.33	-0.04
1976	0.14	0.91	0.02	0.01	0.21	0.03	0.12	0.045	1.49	1.10	0.03	0.00
1977	- 0.12	0.99	0.04	0.47	0.21	0.02	0.11	0.047	0.02	0.97	0.37	0.01
1978	0.02	1.15	0.12	-0.11	-0.16	0.05	0.11	0.044	-0.48	1.42	0.41	-0.02
1979	0.00	0.58	0.05	0.05	-0.08	0.05	0.11	0.040	1.19	1.28	-0.26	-0.08
1980	0.04	0.95	0.02	0.11	0.13	0.06	0.19	0.035	-0.13	1.41	-0.25	-0.07
1981	-0.08	0.82	-0.10	-0.10	-0.18	0.09	0.16	0.054	-0.81	1.40	-0.23	-0.08
1982	-0.05	0.84	-0.03	-0.10	-0.04	0.13	0.19	0.050	-0.04	1.27	0.01	-0.05
1983	0.02	0.97	-0.01	-0.05	0.03	0.13	0.22	0.056	0.80	1.08	0.26	-0.01
1984	0.05	0.69	0.09	0.13	0.12	0.13	0.28	0.055	-0.50	1.11	0.00	0.03
1985	0.03	1.07	0.01	0.04	-0.02	0.13	0.32	0.041	0.56	1.12	0.43	0.07
1986	0.13	0.99	0.11	0.12	0.10	0.16	0.26	0.035	0.65	1.02	-0.05	0.07
1987	-0.02	0.91	0.01	-0.10	-0.19	0.18	0.31	0.024	0.18	1.25	-0.18	0.08
1988	0.00	0.81	0.00	0.25	0.02	0.17	0.31	0.022	-0.09	1.20	0.05	0.07
1989	-0.02	0.81	0.03	-0.11	0.03	0.18	0.31	0.022	0.56	1.25	-0.16	0.05
1990	-0.04	0.81	-0.08	0.04	0.09	0.15	0.27	0.030	-0.14	1.20	0.01	0.06
1991	-0.01	0.77	0.00	-0.02	0.03	0.20	0.31	0.021	-0.66	1.08	0.00	0.08
1992	-0.06	0.75	-0.01	0.15	-0.07	0.17	0.35	0.008	-0.65	1.04	-0.17	0.11
1993	-0.21	0.65	-0.24	-0.08	0.20	0.07	0.37	0.023	-0.71	0.96	-0.04	0.14
1994	0.14	0.99	0.12	-0.17	0.03	0.21	0.68	0.019	0.43	0.97	0.25	0.12
1995	0.09	1.26	0.20	0.03	-0.04	0.19	0.48	0.021	9.18	1.11	-0.19	0.44
1996	-0.02	0.70	-0.03	-0.12	-0.01	0.17	0.47	0.007	-0.67	1.02	0.11	0.18
1997	0.09	0.85	0.16	0.64	-0.07	0.15	0.38	0.016	0.65	0.89	-0.24	0.13
1998	0.02	0.82	0.03	-0.08	-0.09	0.17	0.32	0.016	-0.50	0.88	-0.08	0.17
1999	0.01	0.79	-0.01	-0.16	0.02	0.16	0.31	0.008	0.39	1.00	0.11	0.18
2000	0.00	0.79	0.05	-0.05	-0.10	0.16	0.39	0.012	-0.22	0.94	-1.00	0.17

* The US Treasury Bills rate is used as a proxy for international interest rate while Kenya's Treasury Bill rate is used for the domestic interest rate.