THE IMPACT OF EXTERNAL DEBT AND DEBT SERVICE PAYMENTS ON PRIVATE INVESTMENT IN KENYA 1970-2000

BY

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DECLARATION

This 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 with our approval as University supervisors.

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DEDICATION

To my dear wife, Mrs. Elizah Kimani and our son, Master Eric.

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ABSTRACT

Private investment remains not only a cornerstone but also an engine for renewed and sustainable economic growth. However, of late, the private investment rate in Kenya has declined. One of the possible causes for this continued decline is the huge external indebtedness that our country experiences.

The central focus of this paper was to empirically assess the effects of external debt and debt service payments on private investment. Also the paper examines the factors that have led to the accumulation of external debt in Kenya. The paper confirms the presence of debt "crowding out" effects (effects of huge external debt stock) although it fails to confirm the presence of debt "overhang "effects (effects of external debt service payments) on Private investment in Kenya. Other factors that were found to affect private investment decisions in Kenya include public investment, inflation, terms of trade shocks and the real exchange rate.

Also, the study findings indicate that both domestic and external factors are responsible for external debt accumulation in Kenya. They include terms of trade deterioration, real exchange rate misalignment, growth of income in industrialized countries, fiscal indiscipline and the rising real foreign interest on loans.

There is need to adopt policies that will lead to a reduction in external debt and service payments.

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

One of the severe and devastating problems currently facing developing countries is huge external indebtedness. The sheer volume of this debt has grown to a point whereby it is no longer seen solely as the problem of LDC's, but instead, it is seen as a threat to the stability of the international economy and a potential cause of a new 'great economic depression' (Trevor and Stephene 1989). Sub-Saharan Africa (SSA) countries are among the most indebted and poorest countries in the world. Out of 50 SSA countries, 33 are classified as the heavily indebted poor countries (HIPCs). The amount of the debt in this region grew from US$84 billions in 1980 to US $ 223 billions in 1995 representing a growth of 165.8% over the 15 years (Iyoha 1999). The debt service also rose sharply over the same period, especially in relation to exports (Mbanga and Sikod 2001).

The debt burdens poses a problem in that the large size of the debt relative to the size of the economy causes capital flight and discourages domestic investment. Rising debt-servicing requirement along with stagnant exports has meant either defaulting on the payment or parting with scarce foreign exchange needed for imports required for production and investment (Elbadawi et al. 1996). The resulting interest arrears block new commitments and disbursements from official creditors. Large debt stock will imply that taxes in future will be raised creating disincentives to potential investors.

Huge internal debt will not only lead to high interest rate but also crowds out the private investment particularly if the amount borrowed were used to service current fiscal expenditure. Private investment remains the cornerstone of renewed economic growth in developing countries and therefore countries wishing to put their economies on a faster and stable growth path will have to put measures into place aimed at promoting the level of private investment (Ronge and Kimuyu 1997). One of such measure is to address the adverse impacts of external debt on investment mentioned above.

1.1 Background Information

Kenya has witnessed mixed economic performance since independence. Analysis done on macroeconomic performance in Kenya shows that the first decade (1963-74) after independence was one of remarkable growth as the Gross domestic product (GDP) grew by an average of 6.5% per year (highest ever recorded). This impressive performance was made possible by agricultural expansion (stimulated by transfer of land from large to small land use, cultivation of high value crops like tea, coffee and other crops indigenous Kenyans were denied right to produce during colonial era), industrial development largely due to adoption of import substitution strategies for industrialization and the expanding domestic demand supported by the rising agricultural incomes as well as high protection that encouraged investment. Other factors that accounted for the commendable growth rates were massive capital inflows of resources, sound macroeconomic policies, favourable investment environment (low interest rates, political stability, low inflation e.t.c.). During this period growth rate of per capita income remained positive throughout despite high population growth. BOP was healthy and unemployment level was low. Also the national debt was confinable within the means of the government and as such many writers on Kenyan economic scene have referred to this period as "golden decade" (Mayore 2001).

By the beginning of the second decade of independence, the good economic performance had started to deteriorate. This was due to challenges such as the 1973 oil crisis which created severe balance of payments (BOP) problems forcing the government to resort to heavy external borrowing. Other factors that had a bearing in the falling economic performance include inappropriate government policies including trade and exchange rate policies that turned the internal terms of trade against agriculture, government involvement in marketing of agricultural produce, collapse of East African community e.t.c.

However, in 1976/77 unexpected coffee boom saw the economy grow at 8.2% (see Appendix 1) and as a result export earnings increased sharply leading to a temporally fall

in the debt- service ratio. This coffee boom also led to the worsening of fiscal accounts as the government expenditure was expanded and this could not have been immediately reversed after the boom (Ronge and Kimuyu 1997). The second oil crisis of 1979 worsened the situation as the price of the oil doubled. This was coupled with the consequent world recession that led annual inflation to rise to 12.9% in 1980. The droughts of 1979-80 and 1983-84 adversely affected economic growth making the economy to register a growth of 0.4 percent (the first ever below 1%). The 1982 coup attempt negatively affected investment lowering the domestic investment by 5.9 % of GDP. By mid 1980s compared to the early 1970s the share of exports in GDP had fallen by over 30 % and the share of imports in the domestic supply had increased by over 50% (Republic of Kenya 1994). As a result, the Kenyan economy became more vulnerable and dependent on donor funding to cover import requirements. However in 1986, Kenya experienced a small coffee boom, which raised GDP growth to 5.5%

The events that surrounded the first multiparty elections negatively impacted on investment and economic growth - the eruption of ethnic clashes, political uncertainty, and aid embargo from donors are some of these events. As a result, GDP growth recorded as low as 0.5% and 0.2% in 1992 and 1993 respectively. The inflation rate rose from 27,1% to 46.0% due to rapid monetary expansion.

1.1.1 The Debt Situation In Kenya

The extent of debt problem can be assessed by analysing the debt indicators that measures the debt burden. These ratios can be used as analytical tools for policy purposes and also for descriptive or predictive purposes (Iyoha, 1999). They include:

- ratio of total debt service to exports of goods and services (debt service ratio)
- ratio of total debt service to GNP
- ratio of total external debt to GNP
- ratio of total external debt to exports of goods and services
- ratio of interest payments to GNP
- ratio of interest payments to exports of goods and services
- ratio of international reserves to external debt and

- ratio of international reserves to debt service payments.

However, the debt service ratio, total external debt to GNP ratio, debt to export ratio and interest to export ratio are the most commonly used to assess external debt burden. The critical values of these four ratios are: debt to GNP ratio (50%), debt to export ratio (275%), debt service ratio (30%) and interest to export ratio (20%) (see World Bank, World Debt Tables 1990 pg. xxviii).

Appendix 2 shows that the total outstanding external debt rose from US$ 3530 million in 1980 to US$6652 million in 1999, representing an increase of 85.9%. The total debt service also increased from US$460 million to US$716 million over the same period. This is an increase of 55.7%. Three of the four indicators have been above the critical levels. The debt to GNP ratio has remained above the critical level since 1980 while debt service ratio remained above critical level up to 1995 except in 1993 when it temporarily dropped to 27.1%. Beyond 1995, it has been below the critical level though relatively high. The debt to export ratio has been above the critical value between 1982 and 1993.

1.2 Statement of the problem

The severity of the debt crisis in Kenya cannot be underestimated. The amount of debt stock both external and internal has been rising. The debt servicing has taken the same trend. At the same time, a continued declining trend in private investment has been observed in Kenya. A possible explanation for this performance is the presence of a huge external debt. Large external debt accumulation causes debt overhang that has adverse consequences on investment and growth because investors expect that current and future taxes will be raised to effect the transfer of resources abroad (Elbadawi et al. 1996). The existence of the large debt overhang reduces the incentives for investment because much of the forthcoming returns from the investment must be used to repay the debt. therefore acting as 'tax' on domestic investment (Greene and Villanueva 1990). The large debt size in relation to income causes capital flight thus discouraging private investment (Ajayi 1991, Osei 1995). The large debt burden threatens not only execution but also the prospects of success of reforms and adjustment particularly in relation to reestablishing

fiscal sustainability and renewing growth in the short run (Ajayi 1991, Elbadawi et al. 1996). A large external debt overhang creates uncertainty, reducing incentives for investment as investors exercise their waiting option until uncertainty is resolved (Rwegasira and Mwega 2001).

On the other hand, high debt service payments impact negatively on domestic investment. High debt service payments reduce funds available for investment. Difficulties in meeting debt service obligations deteriorate relations with external creditors thus reducing credit available for investment and hampering with investment. Another problem is that meeting debt servicing requirements eats significantly into whatever other facilities and resources that could be used to create employment opportunities, enhance economic development and improve the welfare of the citizens (Ajayi 1991, Were 1997). Large debt servicing hampers the country's ability to import the necessary capital for investment.

In light of the foregoing discussion, it is clear that unless an overturn of the debt trend in Kenya is done, very little will be achieved as far as investment is concerned. Given that investment is the main macroeconomic variable that directly influence growth, economic performance will continue to deteriorate (Mbanga and Sikod 2001). This implies that the economic and social problems facing the country such as poverty and mass unemployment will continue to persist.

It is with this regard that this study is done. The study seeks to empirically evaluate these effects of debt on investment and prescribe policy recommendations deemed necessary to address this problem and help to raise investment and foster economic development.

1.3 Objectives of the study

The main objective of the study is to empirically evaluate the impact of debt and debt service payments on investment expenditures in Kenya. Specifically, the study will

a) assess the effect of external debt accumulation on private investment (debt overhang effect)

b) assess the effect of external debt service payments on private investment ('crowding out' effect)

c) identify and quantify the relationship between external debt and its determinants; and

d) Based on findings in (a) through (c) above, discuss policy implications with a view of enhancing private investment.

1.4 Significance of the Study

Most of the empirical studies available are cross-sectional, based on developing countries, developed countries or sometimes both. Some are continent and region specific (e.g. SSA). There are limited studies that are country-specific. Although countries included in the cross-sectional studies may share some similarities in their characteristics, each country to a larger extent has its own unique structural characteristics and debt problem patterns. Therefore it would be inconsistent to apply some of the findings from the cross-sectional studies to a specific country. It is therefore necessary to carry out an empirical study specifically on the Kenyan situation. In Kenya, there are limited empirical studies on debt and the few available do not address the effect of external debt on investment. There is need to identify the determinants of external debt. This is because the stock of external debt is out of direct control of the local policymakers. They can only manipulate these determinants in order to alter the accumulation of the external debt. Therefore, assessment of these determinants will be a step forward in addressing the debt problem in Kenya. Policy recommendations will be prescribed based on the research findings. The study may also generate an interest for further research in this area.

CHAPTER TWO: LITERATURE REVIEW

2.1 External Debt And Private Investment

Theoretical Literature

Investment theory has evolved over time from use of simple accelerator model to complex investment models. Let us start by looking at the accelerator principle. There are of two types

(a) The Naive accelerator model.

Cark (1917) proposed the accelerator model. This model assumes that investment is determined by change in the level of output. that is. investment is a linear function of changes in output. This is represented as

$$I_t = K_t - K_{t-1} = \alpha(Y_t - Y_{t-1}) \text{ or } \Delta K_t = I_t = \alpha \Delta Y_t$$

where α is the acceleration coefficient, which gives the change in the capital stock. resulting from the change in the level of effective demand. The major shortcoming of this model lies in the assumption of static relationship between investment and output changes. It would be naïve to assume that the present investment is affected only by the current output changes.

(b) The Flexible Accelerator model

This was originally propounded as an alternative to the accelerator model by Chenery (1952) and Koyck (1954). The model views the relationship between investment and output as dynamic or variable. Thus investment is only determined by the change in output but also by its past changes. However, this model suffers from several shortcomings. First it assumes that user cost of capital is constant but we expect it to vary over time as its components - interest rate. depreciation rate and price of capital goods are expected to change. Another limitation is that the model breaks when investment is negative. This is because when investment is negative, we expect producers not to reduce capital stock but instead they reduce capacity utilization.

Another alternative to the accelerator model was that investment depends on the level of profits. This was first proposed by Tinbergen (1938) and subsequently developed by Klein (1951). Tinbergen argued that realized profits measure expected profits. He argued "It is almost a tautology to say that investment is governed by profits expectations" (quoted by Jorgensen 1963)

Marginal Efficiency of Investment (MEI) criterion

This was introduced by Keynes (1936) Marginal Efficiency of Investment (MEI) criterion. The marginal efficiency of investment is used as a measure of business demand for investment. Thus MEI is an investment demand curve. Investment by a firm occurs when the MEI (internal rate of return) on an addition to investment exceeds the rate of interest or cost of funds that is incurred in making investment. However, Keynes' analysis suffers from several limitations. First, it assumes that the funds used in investment have the same opportunity cost. But firms can finance their investment from various sources with varying opportunity cost. Second, it assumes certainty- assume profits are certain. It also assumes no credit constraints.

Tobins (1969) Marginal Q Investment Model

Tobin's marginal q gives the ratio of the change in the value of the firm for a unit increment in the capital stock. Thus, according to Tobin, the decision of whether firms will increase or decrease their current capital stock depends on the relationship between the change in the value of the firm due to the installation and replacement cost of additional capital. If the firm is in equilibrium, the value of q is unity and in this case all investments that add more to value of the firm than their costs have already been undertaken (Branson 1989). However, due to delays in delivery of capital, adjustment or installation costs, Tobin's q differs from unity. Tobins q provides a simple rule to guide investment:

If $q > 1$, a firm should invest; and

If q<1, a firm should not invest and subsequently should shrink its existing capital stock Under certain assumptions, say, constant returns to scale which imply that average and marginal products are proportional (Branson 1989), marginal q equals the ratio of market value of the firm to book value (total cost of capital) of the firm. This is known as Average q expressed as

$$Q = \frac{\text{market value of the firm}}{\text{Book value of the firm}} = \frac{pv}{qk}$$

The decision rule is that

If Q>1, increase investment as it is profitable to maintain capital cost

If Q< 1, reduce investment as it is not profitable to maintain capital cost.

Recently, uncertainty has been considered a significant variable in explaining investment variations. Uncertainty adversely affects investment decisions. This is explained by three factors. First investment is at least partially irreversible- to reverse the decision once investment is done is costly. Second, investment decision takes into consideration the certainty of future rewards and the more uncertain the future the smaller is investment. Third, investors can time their investments. They exercise their option of waiting until the uncertainty is resolved or the returns are high enough to compensate for the risk of investing (Rwegasira and Mwega 2001).

The neoclassical investment theory

This theory suggests that private investment is positively related to the expected output level and user cost of capital. Neoclassical model can be thought as a combination of the flexible accelerator model, which emphasizes the reaction of capital to output and the classical principle that an optimal set of inputs is dependent on their relative prices. Adjustment of capital stock to its desired level is assumed to occur with a lag, as in the flexible accelerator model (Sundararajan and Thakur, 1980).

Empirical Literature Review

This section reviews the empirical studies on private investment both in developing countries and specifically in Kenya. This analysis will help to pinpoint those factors considered to influence private investment decisions. Literature on determinants of investment in developing countries is voluminous. Several studies have found that debt variables have a significant negative relationship with investment.

A controversy arises in the literature over the impact of real interest rate on private investment. Mckinnon (1973) and Shaw (1973) advanced the view that real interest rate positively relates with investment in developing countries. They argue that private investment positively relates to the accumulation of real money balances and real money balances positively are related to the deposit interest rate. Despite this assertion most of empirical studies have confirmed a negative relationship in developing countries.

Jorgensen (1963) empirically presented a theory of investment behavior based on the neoclassical theory of optimal accumulation of capital. In this analysis, he assumed that demand for capital is not demand for investment and that short-run determination of investment behavior depend on lagged response to changes in the demand for capital. For simplicity, he assumed that replacement investment is proportional to capital stock. In his results, he found that actual investment is determined by past changes in desired capital.

Jorgensen (1971) carried out a review of 12 empirical researches on time series of expenditures in fixed capital for individual firms and industries. In his review, he found that the determinants of the desired level of capital could be divided into three groups:

a) Capacity utilization- represented by the ratio of output to capacity, the difference between output and capacity, the change in output, and sales less previous peak of sales, e.t.c. ,
b) Internal finances -represented by the flow of internal funds, the stock of liquidity assets, debt capacity and accrued tax liability; and

c) External finance -represented by interest rates, rates of return, stock prices, the market value of the firm, e.t.c.

Capacity utilization appeared as the most significant determinant of the desired capital in most of the studies reviewed.

Wai and Wong (1982) carried out an empirical study on the determinants of private investment in 5 developing countries (Malaysia, Greece, Thailand, Mexico and S. Korea). They used a modified version of the flexible accelerator theory of investment. They found out that the change in bank credit to private sector and foreign capital inflows to the private sector are major determinants of private investment as they constitutes source of funds to this sector. In addition, the study confirmed that government investment plays an important positive role in determining private investment. They gave a number of reasons why such results were expected. First, if resources are not fully employed, an increase in government investment would increase income directly as well as indirectly through the multiplier effect, encouraging private investors to invest more since their profitability would tend to rise with the expected demand for final product. Second, most developing countries have a large component of government investment concentrated on infrastructure projects that will tend to encourage private investment. Also, government investment can act as an important catalytic agent by reducing certain costs of production.

Sundararajan and Thakur (1980) critically examined the relationship between public and private investment in developing countries by postulating a dynamic model of investment, savings and growth. They derived a private investment function by modifying the neoclassical theory of investment developed by Jorgenson (1971). Within this framework, they addressed the critical issue of whether the positive effects of public investment are strong enough to offset its negative effects, and within what time frame. The study revealed that current and lagged private sector GDP, real GDP and public sector investment were positively related to private investment. Lagged private investment was found to be negatively related to current private investment.

Greene and Villanueva (1990) carried out a study on private investment in 23 developing countries. They noted that developing countries have experienced pronounced slow growth since the beginning of 1980s. They gave the reason behind this scenario as a decline in gross investment rates caused by many factors, notable among them. a decline in private external financing and the presence of a large stock of external debt. They discovered that developing countries with debt servicing difficulties experience lower rates of gross capital formation than their counterparts without such problems. They used the following model:

$IP/Y = f [RI, GR_{t-1}, IPUB/GDP, CPI, INC_{t-1}, (DS/XGS)_{t-1},$

$(DEBT/GDP)_{t-1}, Z]$

where

IP/Y is the ratio of private investment to GDP.

RI is the real deposit rate interest.

GR_{t-1} is the lagged percentage change in real GDP per capita

IPUB/GDP is the ratio of public sector investment to GDP.

CPI is the percentage change in the consumer's price index.

INC_{t-1} is the lagged level of per capita GDP in current prices.

$(DS/XGS)_{t-1}$ is the lagged ratio of external debt service payment to exports of goods.

$(DEBT/GDP)_{t-1}$ is the lagged ratio of the countries stock of external debt to nominal GDP.

Z is a vector of country dummy variables.

In their results. they found that the ratio of public sector investment to GDP and lagged per capita growth rate were statistically significant and positively related to private investment while the lagged debt service ratio, lagged debt stock. inflation rate and real interest rate were statistically significant and negatively related to private investment. However, the lagged value of GDP per capita was positive but insignificant.

Schmidt and Muller (1991) carried out an empirical study on private investment under macroeconomic adjustment in Morocco. In their study they used rates instead of absolute levels for all the relevant variables. Debt to GDP ratio was used as a certainty variable. They found out that private investment declined during the period of adjustment mainly

due to growing uncertainty on the future structural reforms. Empirical results showed that private investment in Morocco is significantly influenced by the cost of capital, capacity utilization or aggregate demand, rate of return on investment, bank credit and structure of financial markets, public investment, terms of trade shocks and uncertainty as reflected by the foreign debt to GDP ratio.

Iyoha (1999) carried out an econometric study on external debt and economic growth in sub-Saharan Africa countries. In order to estimate the effect of debt on investment, he adopted the Borenstein (1990) approach.

$PCGDI = b0 + b1r + b2MPK + b3P^{I} + b4GDPGR + b5 (D/X) + U$

where

PCGDI is per capita gross domestic investment

R is interest rate (commercial lending rate)

MPK is marginal product of capital

P^{I} is price of investment goods

GDPGR is growth rate of real output, which capture the "investment accelerator"effect

D/Y is ratio of external debt stock to GNP (measure of debt Overhang)

D/X is ratio of total debt service payments to exports of goods and services (capture the 'crowding out' effects

U is a stochastic error term.

Using OLS, he found that the explanatory variables explained 85% of the variations in per capita investment during the period of study. The debt variables were highly significant and had negative coefficients. He concluded that a high debt burden hinders investment in developing countries. Heavy external debt stock and debt- service payments act to reduce investment through both the debt overhang effect and the crowding out effect. He also found the elasticity of investment with respect to debt overhang variable to be –0.337. Thus a 10% decrease in the debt GNP ratio would results in a 3.37% increase in investment per capita. He, however, found that there is evidence of a distributed lagged response of investment to changes in the debt-income ratio. Thus, reductions in debt stock affect investment after a lag in time rather than instantaneously.

He further carried out policy simulation, which showed that a 50% reduction in debt stock would increase gross domestic investment significantly (by almost one-half), and slightly increase GDP.

Elbadawi (1996) and others investigated the effect of debt over hang on private investment using cross-section regressions for 99 countries spanning Sub-Saharan Africa, Latin America, Asia and the Middle East.

$$IPY = f\,[EDTGDPL, EDTGDPL^2, GDPCAP, DSX, DEFGDP, DEFGDPL, PUINV, INFL, TOTSHK, RPOF, LRGDP, REMIS, REVOLS\,]$$

where:

IPY is ratio of private investment to GDP.

EDTGDPL is lagged debt to GDP ratio (reflects debt overhang)

$EDTGDPL^2$ is lagged debt to GDP ratio, squared to capture the non-linearity of the debt effect.

GDPCAP is per capita GDP growth

DSX is the debt service as ratio of export earnings

DEFGDP is current fiscal deficit to GDP ratio

DEFGDPL is lagged fiscal deficit to GDP ratio

PUINV is public investment to GDP ratio

INFL is rate of inflation

TOTSHK is terms of trade shocks

RPOF is population growth

LRGDP is initial incomes (captures the convergence effect)

RERMIS is real exchange rate misalignment

REVOLS is a dummy reflecting political instability

NB: Fiscal policy, DEFGDP is included to capture the 'crowding out' effect on private sector investment, while public investment, PUINV supplements private investment.

The study found that the coefficient of per capita GDP growth was positive but insignificant and that of the lagged debt stock negatively significant. The ratio of public investment to GDP was positively significant while the rate of inflation was positively

significant. This implies that the inflation may not have reached the crisis level to discourage investment. The debt service ratio coefficient was negative and significant, thus it hinders private investment. The study showed that debt overhang works indirectly to affect other policy variables and reduce the economies' flexibility in absorbing or adjusting to internal and external.

Mbanga and Sikod (2001) carried out a study on impact of debt and debt service payments on investment in Cameroon. He estimated the effects of internal and external debt on private investment. The equation estimated was:

$$IPGDP = f\,[GGDP_{87}, DGDP, DGDP^2_{(-1)}, IGGDP, CEGDP, IPGDP_{(-1)}]$$

where:

IPGDP is the ratio of private investment to GDP;

GGDP is the growth of real GDP deflated by the 1987 prices;

DGDP is the ratio of debt stock (external or internal) to GDP; captures debt overhang

$DGDP^2_{(-1)}$ is the lagged value of DGDP squared, also a measure of debt overhang;

IGGDP is the ratio of public investment to GDP;

CEGDP is the credit expansion to private sector expressed as a ratio of GDP

$IPGDP_{(-1)}$ is the lagged value of the dependent variable, which captures the investment climate.

Using external debt data, the study found that the variables account for 75% of the variations in private investment. The coefficient of growth rate was positively significant as theoretically expected. The coefficient of the ratio of debt stock to GDP was negatively significant confirming the presence of debt overhang. The ratio of public investment to GDP was negative and significant reflecting the "crowding out" effects as both government and private sector competes for investment funds in the capital market. On the other hand, using internal debt data the variables explained 72% of variation private investment. The growth rate of real GDP was positively significant as expected. The ratio of debt stock to GDP was negative and significant implying a negative effect of debt overhang. The lagged value of ratio of debt stock to GDP squared was negative and significant confirming presence of debt overhang

2.1.0 Empirical Studies done in Kenya

Several studies that have been in Kenya mainly focus on the determinants of private investment.

Were (1997) captured the effect of external debt on sustained economic growth through its impact on private investment through accelerator principle.

PINV=f [$EDTGDP_{t-1}$, EDTGDP, GDP, GDPGR, DSR, FDGDP, $FDGDP_{t-1}$, TOT, HCD, GPUIV, INTr, INFL, RER]

where:

EDTGDP is stock of external debt to GDP ratio.

$EDTGDP_{t-1}$ is stock of external debt to GDP ratio lagged by one Period (reflect debt accumulation).

GDPGR is real GDP growth rate

DSR is the debt service payments as a ratio of exports earnings (reflect the "crowding out" effect)

FDGDP is fiscal deficit ratio to GDP ratio

$FDGDP_{t-1}$ is the lagged fiscal deficit to GDP ratio

TOT is terms of trade (captures external shocks)

HCD is human capital development

GPUIV is real public investment as a ratio of GDP

INTr is interest rate (Treasury bill rate)

INFL is rate of inflation (reflects macroeconomic stability)

RER is movements in real exchange rate (reflects credibility of policies)

She found that the variables explained more than 84% of variations in private investment as ratio of GDP. Both coefficients of current debt flows and past debt flows were statistically significant. She therefore concluded that current debt flows stimulate private investment while past debt flows hinder investment in the shortrun. Variations in current debt service ratio negatively impacts on private investment (this confirms the 'crowding out' effect) while variations in past debt service ratio has a positive effect on private investment. To her, this result was unexpected but valid only in short run. However, she did not show why the resuits were valid in the short run. Previous level of inflation was

found to discourage current investment implying that economic agents expect the previous level of inflation to persist thus discouraging investment. Variations in interest rates and terms of trade showed a negative relationship with private investment. Public investment was found to crowd in private investment. Human capital development and foreign financing of the deficit had a positive relationship with investment.

Martin and Wasow (1992) applied an eclectic version of the flexible accelerator model to explain the behavior of aggregate private investment over the adjustment period. They found that declining real credit to private sector, lower imports and falling stock of infrastructure to be the causes of reduced private investment. Real exchange rate and stock of foreign reserves were found to have positive and significant relationships with private investment.

Bwire (1993) carried out an empirical study on investment under macroeconomic adjustment for the period 1972-92. Using instrumental variables he found that private investment was influenced by GDP growth rate, external debt service and inflation rate. Public investment and debt stock coefficients were positive but insignificant. Real interest rate and lagged debt stock coefficients were negative as expected but insignificant.

Ronge and Kimuyu (1997) applied an eclectic version of the flexible accelerator model, in the tradition of Martin and Wasow (1992). However, the model was modified to accommodate a greater emphasis on the effects of the resource constraints faced by private investors in developing countries. The study revealed that availability of credit and foreign exchange exerts positive significant effects on private investment. In addition the study confirmed the debt overhang hypothesis (used both internal and external debt). The net impact of real exchange rate depreciation was negative. The lagged GDP growth rate was insignificant implying that macroeconomic instability (which it was supposed to capture) doesn't exert a significance influence on private investment. When real interest rate was substituted for the credit expansion to private sector, its coefficient was negative but not significant. They argued that, this was probably because most of the period

covered under the study was marked by financial repression to the extent that interest rate were mostly negative and therefore could not have played a rationing role.

Mwangi (1997), in his study on determinants of private investment in Kenya's manufacturing sector, adopted the model formulated by Martin and Wasow (1992). He found that openness of the economy, human capital formation and public investment have positive and significant effect on investment. Lagged real GDP was positive but insignificant. In addition the study revealed that inflation, real interest rate, real exchange rate and initial capital stock in manufacturing sector are negatively related to investment in this sector. Debt stock had negative but insignificant effects on private investment in the manufacturing sector.

2.2 The Causes of Debt Accumulation

Empirical Literature

Several factors have been claimed to be responsible for the debt crisis in developing countries. One of them is the falling export prices. Many countries borrowed heavily with an assumption of persistent high prices of their major exports or that price fall will be temporary (Krumm 1985). This was aggravated by the rising import prices and the inelasticity in expansion of exports in the short run (Hussain and Underwood 1991). However Trevor and Riley (1989) disagreed with this arguing that this does not satisfactorily explain why major oil exporters countries such as Mexico and Nigeria were among the largest debtor states in their respective continents.

According to Adedeji (1984) the debt crisis was caused by poor economic policies and management combined with misuse of public funds, inability of countries to fully use of external aid to generate surpluses that would enable them to repay loans and debt service charges and lack of policy coordination among aid donors at the national level to guarantee the maximum economic impact of aid and loan packages.

Manundu (1981) stated factors responsible as the oil crisis of 1973/74, the 1981 world recession in the world commodity prices lowering exports earnings, drought conditions.

the government restriction on local borrowing by foreign investors in 1974 which forced the foreign investors to resort to external borrowing, etc.

Elsewhere, Ajayi (1991) says the debt accumulation has been brought about by the over-ambitious nature of many governments to overly speed up the process of growth promoted by the international creditors that were also overly generous. To him, many creditors overstated the potential capabilities of debtor countries to absorb and pay for debts in maturity.

Other factors are government policies of financing the current expenditure such as military and civil service payroll, rescheduling of debt that gave short-term relief but at the expense of increasing the debt service burden in future, domestic currency depreciation and over-borrowing by the debtor countries.

The causes of debt accumulation are generally grouped into two categories: domestic and external factors. Domestic factors include wrong macroeconomic policies such as exchange rate misalignment and fiscal irresponsibility which often leads to large fiscal deficits, excessive monetary expansion and consequent inflation and excessive reliance on external sources of funding (Ajayi 1991). Other domestic factors include policies that deter savings, such as negative real interest rates, which in turn reduce investment and encourage capital flight (Osei 1995). Debt problem also arises when long-run projects are financed with short-term credits (Osei 1995, Ajayi 1991). External factors include oil crisis, deterioration in terms of trade (Greene and Khan 1990, Ajayi 1991) and rising foreign interest rates (Krumm 1985, Atingi and Mbire 1997). However, Ajayi (1991) argues that the division of the factors into these two seemingly watertight compartments is incorrect. This is because external factors do impinge crucially on domestic factors. For example changes in terms of trade may influence the real effective exchange rate (Osei 1995).

Ajayi (1991) empirically assessed both internal and external factors responsible for external debt accumulation in Nigeria. He used a general model of the form:

$DSR_i = f(TOT, CGDP, FRRI, FPY, T, REER)$

where DSR_i is the debt-export ratio or debt-GNP ratio

TOT is the terms of trade

CGDP is the growth rate of income in industrialized countries

FRRI is the foreign real interest rate

FPY is the fiscal position of the government defined as revenue minus expenditures divided by the GDP/GNP

REER is the real effective exchange rate index: and

T is the linear time trend.

In his results, he found that a worsening of terms of trade worsens debt-export ratio, as so does a rise in foreign real interest rate. A fall in the growth of industrial countries had the same effect. An improvement in a fiscal position had a negative effect on this ratio. The real effective exchange rate was negatively related to debt-export ratio. He concluded that domestic policies play important roles in external debt accumulation.

Mbire and Atingi (1997) carried out an empirical study of the factors that caused the accumulation of external debt in Uganda. They adopted Ajayi's model. They found that an improvement in the terms of trade improves debt-export ratio. Foreign interest rate and effective exchange rates were found to be negatively related to the debt-export ratio, though their coefficients were statistically insignificant. Fiscal performance variable was found to have a negative relationship with debt-export ratio. This implies that a deterioration of the fiscal policy will have a raise the debt-export ratio. The results confirmed that the external factors had contributed significantly to Uganda's debt situation.

Ochieng (1991), in her study on determinants of external debt burden in Kenya found that real value of imports to be positively related to the stock of external debt. Thus an increase in real value of imports will raise the level of external debt. The real value of exports negatively related to the stock of external debt while the real budgetary deficit positively related to the real stock of external debt. Real foreign interest rate and the effective exchange rate were negatively related to the real stock of external debt.

2.3 An Overview of Empirical Literature.

The literature revealed that private investment decisions are mainly influenced by economic growth, real exchange rate, real interest rate, credit availability, debt stock, debt service payments, public investment, uncertainty, inflation rate, e.t.c. Most of the studies are cross-country. One of the potential methodological problems with most of these studies is that, it is never clearly specified whether private investment is demand determined or credit constrained or it switches between these two regimes. (Mukhopadhyay, 1995). It is only Elbadawi et. al (1996) who specified the kind private investment function estimated. As pointed out by Blejer and Khan (1984), Greene and Villanueva (1990), and Ronge and Kimuyu (1997), most of these studies have combined both features of the flexible accelerator and neoclassical models (eclectic) in their analysis. Most of the studies reviewed supported the debt overhang and crowding effects. However, most of these studies are confined on impact of external debt on private investment; it is only Mbanga and Sikod (2001) who investigated the impact of external debt on both private and public investment.

In case of determinants of external debt, several variables have been identified to influence debt accumulation. They includes terms of trade, fiscal position, foreign interest rate, the real effective exchange rate, real value of imports, real value of exports and growth in income of industrialized countries.

CHAPTER THREE: METHODOLOGY

3.1 Theoretical Framework

The studies reviewed in the preceding section shows that debt variables are negatively related to investment. The analyses of channels through which debt and debt service payments impact on domestic investment have not been adequately treated in most empirical models used to analyze developing countries especially, African countries. (Mbanga and Sikod 2001) According to Soludo (1998), no formal model could be taken exclusively as a framework for analyzing African economies, if the relationship between debt and the domestic economy are not elaborately spelt out (quoted by Mbanga and Sikod 2001). The study will use some of the variables identified in the literature review to influence private investment such as debt variables, lending interest rate, credit availability, terms of trade, growth in GDP, inflation and real exchange rate.

3.2 Model Specification

The Private Investment Model

The specification of this model draws from the recent empirical literature on private investment behavior. Our study is based on Mbanga and Sikod (2001) work, with a few modifications to suit the Kenyan situation. Other relevant works that our study will draw from include the studies by Elbadawi et.al (1996) and Martin and Wasow (1992). The model estimated is:

Model 1

$$IPGDP=[GDPGR,EDGDP,IGGDP,DSPX,LR,INFL,INFL^2,TOT,RER]$$

where:

IPGDP is the ratio of private investment to GDP;

GDPGR is the real GDP growth rate;

EDGDP is the ratio of external debt stock to GDP; included to capture debt overhang;

IGGDP is the ratio of Public investment to GDP;

LR is the average bank lending interest rate;

DSPX is the external debt service as ratio of export earnings (to capture debt crowding out effect);

INFL is rate of inflation;

$INFL^2$ is the ratio of inflation squared;

TOT is terms of trade shocks; and

RER is real exchange rate

Postulates

GDPGR coefficient is positive.

EDGDP coefficient is expected to be negative (debt overhang hypothesis)

IGGDP coefficient is ambiguous, it may 'crowd in or out' private investment

DSPX coefficient is expected to negative (debt crowding out effect)

LR is expected to have a negative relationship with investment.

INFL coefficient's expected to be positive as low inflation positively relates with investment

$INFL^2$ is expected to have a negative relationship with investment as high inflation rate discourages investment.

TOT is expected to have a positive relationship with investment.

RER is expected to have a positive relationship with investment

The External Debt Burden Model

MODEL 2

The current study adopts Ajayi's (1991) model

The model takes the form

EDEX=f(TOT, YGRI, FRRI, FPGDP, RER, T)

Where:

EDEX is the debt-export ratio

TOT is the terms of trade

YGRI is the growth rate of income in industrialized countries

FRRI is the foreign real interest rate on loans

FPGDP is the fiscal position of the government defined as revenue minus expenditures divided by GDP

RER is the real exchange rate

T is the linear time trend captures other factors excluded in the model.

Postulates

TOT is negatively related to the external debt ratio. An improvement in terms of trade leads to an improvement in the debt export ratio.

YGRI coefficient cannot be predicted *apriori*. An increase in the growth of income in industrialized countries leads to an improvement in debt export ratio. This growth directly impact on developing countries as it increases demand for exports from developing countries yielding foreign exchange required to repay the external debt. Also it indirectly affect terms of trade (Ajayi 1991) thus lowering the debt export ratio. However, income growth in industrialized countries may lead to an increase in debt export ratio as these industrialized countries are in a position to increase their lending to developing countries.

FRRI is negatively related to debt-export ratio as a rise in it increases the cost of borrowing.

FPGDP is negatively related to debt export ratio. An improvement in fiscal position will call for less external borrowing to fill the resource gap thus lowering the debt export ratio.

RER the sign of the coefficient cannot be determined appriori. A rise in the real exchange rate depreciation) will raise export earnings thus lowering the debt export ratio. However, depreciation also increases the value of the external debt.

3.3 Estimation and Data Exploration Techniques

This section gives an overview of econometric techniques of dealing with time series data in order to get reasonable and meaningful results. Before any estimation of the above equations was made, the data were subjected to various tests in order to avoid spurious regression problem. These tests involve testing for stationarity and cointegratipon. If these tests revealed that the series are non-stationary and/ or cointegrated the estimation equations would be respecified in the form of error correction models. Ordinary Least squares technique was used as it yields best linear and unbiased estimates.

Stationarity Analysis

Whether a variable is stationary or non-stationary depends on the behaviuor of the moments of the variable over time. A stochastic process $\{y_t\}$ is said to be covariance (weakly) stationary if the mean, variance and covariance are time invariant. If one of the conditions is violated, the process will be non-stationary.

Non-stationarity of variables leads to spurious regression. A spurious regression output 'looks good', that is, high R^2, t-statistics that appear to be significant but the results may lack any economic meaning. Thus the first step is to test for level of integration through Unit Root tests before any meaningful regression is done. A non-stationary series is said to be integrated of order **d**, denoted as I(d) if it can be differenced **d** times to become stationary.

Tests for Unit Roots

Dickey- Fuller Unit Root test

This was proposed by Dickey and Fuller (1979)

Suppose we have, $y_t = y_{t-1} + e_t$ .....(1)

where e_t is the error term and is assumed to be white noise. We can rewrite the equation above as $y_t = \alpha y_{t-1} + e_t$

if $\alpha = 1$ the variable is a pure random walk and is non-stationary

$\alpha < 1$ the series is stationary

Testing Unit Root essentially involve testing whether $\alpha = 1$

Alternatively suppose we subtract y_{t-1} from both sides of equation (1)

$y_t - y_{t-1} = \alpha y_{t-1} - y_{t-1} + \epsilon_t$

$\Delta y_t = (\alpha - 1) y_t + \epsilon_t$

$\Delta y_t = \beta y_t$ where $\beta = \alpha - 1$

In this form, testing for Unit Root essentially involves testing whether $\beta = 0$ i.e. $\beta = 0$ if $\alpha = 1$ $H_0: \beta = 0$ non-stationary

$H_1: \beta < 0$ Stationary

We reject the null hypothesis in favour of $\beta < 0$ implying the series is stationary. Failure to reject the null hypothesis means that there is at least one Unit Root. The DF test can also be used for testing Unit Root for a variable generated as a stochastic process with drift and /or deterministic trend. The methodology is precisely the same, regardless of which of the equation is used, that is, with drift and /or deterministic trend. However be aware that the critical values of the t-statistics do depend on whether an intercept and/or time trend is included in the regression equation.

Augmented Dickey- Fuller Unit Root (ADF) test

The above DF test has a weakness in that it fails to take into account the possible autocorrelation in the error term process ϵ_t, which normally arises when the series is not a random walk process. This autocorrelation, if present, makes the DF test biased. The augmented Dickey- Fuller test attempts to solve this problem. ADF test is identical to the standard DF test but it is constructed within a regression model of the form

$$\Delta y_t = \alpha y_{t-1} + \sum_{i=1}^{I} \gamma_i \Delta y_{t-i} + \varepsilon_t$$

The coefficient of interest is α, if it is equal to zero, then the equation has unit root. The same hypothesis is tested $H_0: \alpha = 0$ non-stationary

$H_1: \alpha < 0$ Stationary

This test can also be used to test the order of integration for a variable as stochastic process with drift and/or deterministic trend as in case of DF above.

Cointegration

The basic idea behind cointegration is that in the long-run, two or more variables may be moving together. Cointegration suggests that there is a long run equilibrium or relationship between them. Two variables are said to be cointegrated if the individual variables are non-stationary but a linear combination of the two variables is stationary. In other words, variables are cointegrated if they are integrated of the same order and yields a combination that has a lower order of integration. One of the tests that will be employed to test for cointegration is Engle-Granger cointegraton test.

3.4 Data Type And Sources

The study used time series data for the period 1970-2000. The period was chosen because it is the time within which debt crisis emerged. Both debt stock and debt service payments (external) have increased tremendously in the same period in SSA and more specifically in Kenya. Another reason why the period was chosen is the availability of data. The study utilized secondary data from various sources such as World debt Tables. Global Development Finance, and International Financial Statistics. Other sources included Economic Surveys, Statistical Abstracts and other relevant sources.

CHAPTER FOUR: RESEARCH FINDINGS

This section presents results for the data analysis. The results of estimation are obtained by use of Generalised Instrumental Variables Estimators econometrics Computer Package [PCGIVE- version 8.0]

4.1 Stationarity (Unit Root) Tests-Results

	ADF(2)	Integration order I(n)
IPGDP	-3.0520	I>0
GDPGR	-3.8489*	I=0
FGDPGR	--3.3870	I>0
EDGDP	-1.7526	I>0
IGGDP	-2.6249	I>0
DSPX	-0.51761	I>0
LR	-2.7262	I>0
TOT	-1.6249	I>0
RER	-2.4963	I>0
YGRI	-2.5797	I>0
FRRI	-1.4850	I>0
FPGDP	-1.8260	I>0
EDEX	-0.77488	I>0
INFL	-2.1475	I>0
$INFL^2$	-2.3813	I>0
RFGDP	-2.4732	I>0
LE	-1.9675	I>0
Critical Values at 5%	-3.58	

NB: The ADF test included a constant, trend and two lags (the figure in parenthesis).

The ADF unit root test shows that GDPGR is stationary in levels. This is because the t-calculated is greater than t-critical at 5% significance level. The rest of the variables have non-stationary series. In order to ascertain the actual level of integration. unit root test was performed on the first differences of the non-stationary variables. The results are given below. From the results these variables were confirmed to be integrated of order 1.

	ADF(1)	integration order I(n)
DIPGDP	-5.7455**	I(0)
DFGDPGR	-7.6575**	I(0)
DEDGDP	-7.3683**	I(0)
DIGGDP	-7.3683**	I(0)
DDSPX	-5.7142**	I(0)
DLR	-4.7658**	I(0)
DTOT	-6.2255**	I(0)
DRER	-7.7415**	I(0)
DYGRI	-5.5644**	I(0)
DFRRI	-5.1878**	I(0)
DFPGDP	-7.5908**	I(0)
DEDEX	-6.1103**	I(0)
DINFL	-5.3636**	I(0)
$DINFL^2$	-5.0083**	I(0)
DRFGDP	-6.3553**	I(0)
DLE	-4.4546**	I(0)
Critical value at 5%	-3.58	

4.2. Cointegration Results

(a) Private Investment Model

A regression was run on the dependent variable and the non-stationary variables and the residuals were subjected to cointegration test. The results below show that the residuals are stationary implying that the stationary variables have a long-run relationship i.e. they are cointegrated. This indicates that the relationship between the dependent variable and the non-stationary variables can be analysed using the error correction model. Therefore, we include the residuals (ECM) lagged once as an explanatory variable in our estimated model.

	ADF(1)	DECISION
ECM	-4.4586**	Cointegration present

Critical values: 5%=-2.966 1%=-3.675

where

$$ECM=IPGDP-a_0-a_1FGDPGR-a_2EDGDP-a_3IGGDP-a_4DSPX-a_5LR-a_6INFL-a_7INFL^2$$
$$-a_8TOT-a_9RER$$

(b) Debt Burden Model

This was done in order to check whether the integrated variables have a long-run relationship. This was carried out by running a regression with EDEX as the dependent variable and the non-stationary variables as the explanatory variables (See below). The residuals from this regression were subjected to cointegration test. The results show that the residuals were stationary and hence the non-stationary variables are cointegrated. Therefore, we included the residuals (Res) lagged once as an explanatory variable in our estimated model.

Cointegration results

	ADF(1)	DECISION
Res	-4.8402**	Cointegration present

Critical values: 5%= -3.58 1%=-4.323

where

$$Res=EDEX-a_0-a_1TOT-a_2RER$$

Regression Results

Estimated Results for Private Investment Model

According to the theory, private investment and GDP growth rate positively correlated due feedback effects. To avoid this problem. GDP growth rate was regressed on ratio of rainfall to GDP (RFGDP) and life expectancy and the fitted GDP growth rate values (FGDPGR) were used in place of the GDP growth rate.

Model (a)

Modelling DIPGDP by OLS

Variable	Coefficient	Std.Error	t-value	t-prob
Constant	-0.00057204	0.0036855	-0.155	0.8786
DFGDPGR	0.012824	0.017179	0.747	0.4662
DIPGDP_1	0.12732	0.19770	0.644	0.5287
DEDGDP_1	-0.0061158	0.053338	-0.115	0.9101
DIGGDP	0.47933	0.47071	1.018	0.3237
DDSPX_1	-0.27889	0.13691	-2.037	0.0585
DLR_1	-0.00047289	0.00078322	-0.604	0.5545
DINFL	0.0078831	0.0019168	4.113	0.0008
DINFL^2	-0.00019597	0.000054373	-3.604	0.0024
DTOT	-0.039245	0.019229	-2.041	0.0581
DTOT_1	0.070365	0.026993	2.607	0.0191
DRER	0.0014485	0.00068347	2.119	0.0501
ECM_1	-1.3878	0.31977	-4.340	0.0005

R^2 = 0.861 F(12, 16) = 8.2465 [0.0001] σ= 0.019 DW = 1.92
RSS = 0.005617461102 for 13 variables and 29 observations

Model tests

AR 1- 2F(2, 14) = 0.049876 [0.9515]
ARCH 1 F(1, 14) = 0.0033214 [0.9549]
Normality $\chi^2(2)$= 1.6186 [0.4452]
RESET F(1, 15) = 0.40276 [0.5352]

The coefficients of **IPGDP_1**, **FGDPGR_1**, **EDGDP_1**, **LR_1** are highly insignificant. To improve the model these variables were dropped from the model. The model results after these changes are given below as model I (b)

Model 1 (b)

Modelling DIPGDP by OLS

Variable	Coefficient	Std.Error	t-value	t-prob
Constant	-0.0012275	0.0033077	-0.371	0.7145
DIGGDP	0.71099	0.32048	2.219	0.0383
DDSPX_1	-0.20940	0.10040	-2.086	0.0500
DINFL	0.0066965	0.0012898	5.192	0.0000
DINFL^2	-0.00016288	0.000035601	-4.575	0.0002
DTOT	-0.037977	0.017728	-2.142	0.0447
DTOT_1	0.072807	0.017910	4.065	0.0006
DRER	0.0012319	0.00040248	3.061	0.0062
ECM_1	-1.1713	0.17013	-6.885	0.0000

R^2 = 0.850 F(8, 20) = 14.212 [0.0000] σ= 0.017 DW = 1.90
RSS = 0.006037854219 for 9 variables and 29 observations

Model tests

AR 1- 2F(2, 18) = 0.09602 [0.9089]
ARCH 1 F(1, 18) = 0.02276 [0.8818]
Normality $\chi^2(2)$= 2.3944 [0.3020]
RESET F(1, 19) = 0.05098 [0.8238]

Estimated results for Model 2

Modelling DEDEX by OLS

Variable	Coefficient	Std.Error	t-value	t-prob
Constant	0.12293	0.11690	1.052	0.3055
DEDEX_1	-0.063589	0.17974	-0.354	0.7272
DTOT	-0.84786	0.27610	-3.071	0.0060
DYGRI	-0.016392	0.030113	-0.544	0.5922
DFRRI_1	0.0055044	0.0086143	0.639	0.5301
DFPGDP_1	-2.9744	1.7114	-1.738	0.0976
DRER	0.0052859	0.0028339	1.865	0.0769
Trend	-0.0034651	0.0063059	-0.550	0.5887
Res_1	-0.28232	0.16065	-1.757	0.0942

R^2 = 0.497186 F(8, 20) = 2.472 [0.0481] σ=0.240 DW = 1.98
RSS = 1.155520974 for 9 variables and 29 observations

Model Tests

AR 1- 2F(2, 18) = 0.085844 [0.9181]
ARCH 1 F(1, 18) = 0.42809 [0.5212]
Normality $\chi^2(2)$ = 5.6045 [0.0607]
RESET F(1, 19) = 0.4334 [0.5182]

Diagnostic (Model) Tests

These tests are given beneath each model. They indicate whether the model tracks the data well over study period. Among the tests considered includes:

Autocorrelation Test (AR)

AR is used to test for autocorrelated residuals. According to the above results. AR shows that there is no autocorrelation in all the models as F-calculated are less than F at critical levels given in parentheses.

Heteroscedasticity Test

ARCH (Autoregressive Conditional Heteroscedasticity Test) shows that computed F values are less than F at critical levels in the three models above. We therefore accept the null hypothesis that hetroscedasticity is absent at 5% level in all cases.

Jarque Bera Normality Test

This normality test utilizes the first four moments of distribution namely, mean, standard deviation, skewness and excess kurtosis together with minimum and maximum values of the data series to construct a normal error term distribution. The distribution is distributed as chi-squared (χ^2). The Normality Test results above indicate that, the error term is normally distributed as the computed χ^2 are less than critical χ^2 in all models at 5% level.

Regression Specification Test (RESET)

The RESET shows that all the models are correctly specified as linear. These because F calculated are less than F at critical levels given in parentheses.

Discussion of Estimated Results

This section gives a discussion of the results in models 1(a), 1(b) and 2.

Private Investment Model

The results show that the overall explanatory power of model 1(a) is 0.861 while that of model 1(b) is 0.850. This implies that the explanatory variables jointly account for 86.1% and 85% of variations in private investment in Kenya in model 1(a) and 1(b) respectively. Other factors not included in the models explain the remaining 13.9% and 15% of the variations respectively. The F-test shows that the two models are highly significant. Model 1(b) is more preferred because it not only has a higher F statistic but also lower standard errors than model 1(a).

As expected the coefficient of current real GDP growth is positive though not statistically significant. This conforms to studies by Bwire (1993), Ronge and Kimuyu (1997), Elbadawi et.al (1996) and Mwangi (1997).

The debt stock coefficient has the hypothesized sign though it is not statistically significant.

Public investment has a positive significant relationship with private investment. This corresponds to findings by Sundararajan and Thakur (1980), Blejer and Khan (1984), Martin and Wasow (1992), Elbadawi et.al. (1996). This implies that there is complementarily between the two. Public investment in infrastructure not only raises the productivity of the private capital stock but also reduces private sector's cost of per unit output. In addition, increased public investment raises the demand for private sector output. It also raises aggregate output and savings, supplementing the economy's physical and financial resources and thus offsets at least part of any initial crowding out effects on private investment (Sundararajan and Thakur 1980).

Debt service payments lagged once have negative and significant impacts on private investment in Kenya. The study confirmed debt-crowding effects on private investment

in Kenya. The result conforms to studies done by Greene and Villanueva (1990), Bwire (1993), Elbadawi et. al (1996), Were (1997)and Iyoha (1999).

Real interest rate lagged once has the hypothesized sign but it is not significant even at 10% significance level. Other studies that found similar results are Bwire (1993) and Ronge and Kimuyu (1997). A possible explanation is that most of period covered by the study was marked by financial repression to the extent that real interest rates were mostly negative and therefore could not have played a significant role in credit rationing (Ronge and Kimuyu 1997). Another probable explanation is that, even if the interest rates are flexible, financial markets are cleared through price and non-price factors so that observed interest rates are a poor measure of the shadow cost of capital (Mukhopadhyay 1995).

Inflation rate has the expected positive and significant impact on private investment. Similar findings were given by Elbadawi et.al. (1996) and Bwire (1993. Low inflation encourages the transfer of resources from economic agents with high marginal propensity to consume (MPC) to agents with low MPC hence savings and investment increases.

Inflation squared (captures the non-linearity of the inflation effect) negatively impact on private investment as theoretically expected. High inflation erodes saving's purchasing power creating disincentive to mobilization of savings meant for investment. It also changes the composition of the investment projects from long-term to short term projects with higher risks.

Current terms of trade have negative and significant relationship with private investment. This was unexpected although it corresponds to a study by Were (1997) who found a negative but insignificant relationship. However, terms of trade lagged once have positive and significant impact on private investment. As terms of trade improve, export earnings rise that can be used to import capital goods required for investment.

Real exchange rate has positive and significant relationship with private investment. This because an increase in real exchange rate raises demand for domestic output as imports becomes more dearer than domestically produced goods. This creates incentives to the producers to increase production. In addition, as Martin and Wasow (1992) argue, real exchange rate has a favourable indirect impact on private investment in the long-run as it relaxes the foreign exchange constraints and increase imports allocation. Also, they argue that real exchange rate can raise investment by raising profitability of private investment in the tradable sector as it reduces the real product wage in terms of traded goods.

Error correction term (ECM) lagged once has the expected sign but greater than –1. This implies that the adjustment takes less than one year.

The Debt Burden Model

The results show that the overall explanatory power of the model is 0.497. This implies that the explanatory variables included in the model explain approximately 49.7% of the variations in the dependent variable. Other factors not considered in the model account for the remaining 50.3% of variations. The F-test shows that the model is significant 5% level.

Lagged dependent variable has a negative and insignificant relationship with debt export ratio. Huge past debt stock will discourage new disbursements and commitments from potential lenders hence the negative relationship.

Terms of trade have the hypothesized sign and is significantly influence the debt-export ratio. An improvement of the terms of trade leads to an increase in export earnings required for debt repayment hence the debt export ratio will improve. Also when terms of trade improve the country tends to borrow less.

The coefficient of real exchange has a positive and significant impact on debt export ratio. This is because real depreciation increases the value of past debt stock.

Income growth in industrialized countries lagged once. negatively impacts on debt accumulation. However, the impact is not significant.

Real foreign interest rates on loans have unexpected positive but insignificant impact on debt export ratio. This is because when real foreign real interest rate rises the debt service payments on past debts also rise worsening the debt-export ratio. The situation is worse when the borrowed funds are invested in projects with lower return than the borrowing rate or in projects with long gestation periods.

Lagged fiscal position has negative and significant relationship with debt-export ratio. An increase in the ratio of government revenue minus expenditures to GDP means an improvement in fiscal position and it will have a negative impact on debt export. This because as the fiscal position improves the country tends to borrow less thus lowering the debt export ratio.
Trend, which captures the time trend, has negative impact on debt-export ratio.

The error correction term has the expected sign and is significant at even 10% level. The results give a speed of adjustment of about 28%. This implies that deviations form the long run equilibrium paths are corrected in more than two years.

CHAPTER FIVE: SUMMARY POLICY RECOMMENDATIONS AND CONCLUSIONS

5.1 Summary of Findings

The central focus of the study was to assess the impact of debt stock and debt service payments on private investment in Kenya. The study also examined the factors responsible for external debt accumulation in Kenya. In mode 1 we identified several factors that significantly influence private investment in the country. They include public investment, debt service payments, inflation, terms of trade, and real exchange rate. On the other debt stock, GDP growth rate and real lending interest, despite having the expected signs, were not significant. The study has confirmed the debt crowding out effect.

In model 2, both internal and external factors were found to be responsible for external debt accumulation. They include terms of trade, real exchange rate and fiscal position. The impacts both growth of income in industrialized countries and the rising real foreign interest on loans is not significant.

5.2 Policy Recommendations

In light of the foregoing discussion we give policy suggestions that aim at reducing the debt burden and enhancing private investment in Kenya. First, the government should continue negotiating forgiveness, rescheduling of the debt service arrears and even reduction of the interest rate charged on new commitments. Also a matter of policy the government should go for concessional loans with long maturity periods and that attract low interest rates.

There is need for continued government commitment to structural reforms and sound debt management. The government should ensure that the borrowed funds are used for the intended purpose and there is no mismatch between the debt and project maturity period. To ensure sustainable servicing of our debt borrowed funds should not be invested in projects with lower return than the cost of borrowing unless in capital acquisition capital that will in future boost private investment.

Terms of trade deterioration were identified as one of the prime cause of debt accumulation. Thus there is the need to pursue policies that will reduce the vulnerability of our economy to terms of trade shocks. In addition, exports should not only be increased but also diversified to avoid the influence of the ever-fluctuating prices of our primary goods exports. Trade barriers (protectionism) and low price elasticity of our exports hinder export expansion. Trade barriers in the world markets should be lifted for countries that are highly indebted like Kenya.

Real exchange depreciation raises the debt burden although it also positively relates with private investment. There is thus the need to ensure that exchange is not over-devalued in order to balance two effects.

The government should improve its fiscal discipline by eliminating or reducing the budget deficit. This can be achieved through improved tax revenue collection, efficient allocation and utilization of public funds, getting rid of corruption and avoiding investment in "white elephant" projects. Also policies should be put in place that will increase mobilization of domestic savings and hence reduce over-reliance on external borrowing.

All these measures will ensure debt service payments reduction and hence boost private investment.

Other policies emanating from our research findings include

- The public investment complements private investment and therefore there is need for the government to expand its investment in infrastructural facilities and other activities that boost private investment such as human capital development. It should also ensure that public investment is efficient. In addition, the government should desist from investing in projects that crowds out private investment.

- The monetary authority should ensure macroeconomic stability especially low inflation that favours private investment. This can be done by mopping up excess liquidity in circulation using efficient market based instruments such as reserve requirement ratio, discount rate e.t.c. However, this should be only in short run as excess monetary tightening and credit constraint in long run adversely affects private investment

All these measures if put in place we expect debt stock and debt service payments to fall making resources available for private investment.

5.3 Limitations of the Study

The major limitation of this study is data inconsistency from various sources. Different sources report varying figures of the same variable. For example, World Bank and IMF publications give higher debt figures than the government publications. Another limitation is that the period of study is characterized by major shocks such as oil crisis of 1973/74, coffee boom of 1977/78, severe droughts, political uncertainties (tribal clashes, multiparty e.t.c.). The effects of these shocks on our analysis could not be filtered.

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APPENDIX 1 Selected indicators of Economic performance in Kenya for the period:1970-2000

Year	GDP Growth rate	Annual Inflation	Exchange Rate	Private investment % of GDP	Public investment % of GDP
1970	6.2	2.20	7.14	15.98	5.95
1971	4.9	2.80	7.14	16.60	8.65
1972	6.4	5.40	7.14	13.95	8.43
1973	4.0	10.3	6.90	19.17	8.81
1974	3.1	18.6	7.14	19.42	9.05
1975	2.9	17.6	8.25	10.69	8.50
1976	4.4	11.7	8.31	11.29	8.43
1977	8.2	14.9	7.95	14.85	8.87
1978	7.7	16.9	7.40	20.26	9.41
1979	4.9	7.80	7.33	11.77	10.95
1980	4.0	14.4	7.40	18.56	8.59
1981	6.0	11.7	9.10	17.74	10.67
1982	3.4	20.2	11.0	13.20	8.56
1983	3.0	12.1	13.4	12.52	6.89
1984	0.4	10.2	14.5	12.34	7.54
1985	5.1	13.0	16.4	13.95	6.81
1986	5.5	4.80	16.2	10.56	8.10
1987	4.9	7.30	16.5	17.65	7.13
1988	5.1	11.1	17.9	16.70	8.26
1989	5.0	13.1	20.7	16.60	8.09
1990	4.3	15.6	23.2	14.49	9.78
1991	2.3	19.7	27.8	11.68	8.66
1992	0.5	27.1	32.5	8.69	7.34
1993	0.2	46.0	60.1	10.30	7.31
1994	3.0	29.0	55.7	10.28	9.01
1995	4.8	0.81	51.8	8.31	7.87
1996	4.6	8.80	56.9	12.28	7.51
1997	2.4	12.0	58.5	11.78	6.72
1998	1.8	5.80	60.4	11.32	6.03
1999	1.4	2.6	70.3	10.41	5.49
2000	-0.5	5.8	79.0	11.66	6.59

Sources. 1. Economic surveys various issues.
2. Statistical Abstracts. various issues
3. African Development Indicators. various issues

APPENDIX 2:Kenya's debt indicators for the period 1970-1999

Year	EDT	TDS	EDT/XGS	EDT/GNP	TDS/XGS	INT/XGS
1970	406	46	63	21	5	2
1971	498	53	94	29	10	3
1972	682	49	100	28	8	4
1973	845	65	120	33	9	4
1974	1153	98	119	40	10	4
1975	1290	151	128	41	15	5
1976	1494	170	131	45	15	4
1977	1658	326	104	39	21	4
1978	2178	216	141	43	14	5
1979	2728	298	167	45	18	7
1980	3530	460	173.3	50.2	22.3	11.7
1981	3234	497	165	52.4	27	13
1982	3540	532	217.2	57.3	32.6	15.4
1983	3787	546	248.4	65.4	35.8	15.1
1984	3689	618	221.8	61.7	37.1	14.5
1985	4309	673	268.2	72.9	41.9	15.7
1986	4834	725	254.1	69.2	38.1	14.1
1987	5775	691	336.4	75.1	40.4	17
1988	5781	735	306.8	70.9	39	16.5
1989	5862	705	303.8	73.2	36.5	14.5
1990	7056	785	318.7	87.2	35.5	15
1991	7455	715	339.1	98.3	32.5	14.5
1992	6907	666	319.4	91.3	30.8	12
1993	7120	627	328.4	139.6	28.9	12.2
1994	7202	881	269.2	106.6	32.9	12.8
1995	7412	901	249.3	85.3	30.3	10.1
1996	6931	844	227.9	77.4	27.8	9.1
1997	6603	669	220.1	63.5	22.3	7.4
1998	6943	612	240.1	61.5	21.2	6.6
1999	6562	716	244.8	62.6	26.7	6.5

Sources: 1.World Debt Tables. various issues.
2. Global Development Finance 2001
3.World Bank. African Development Indicators, several issues

where:
EDT is the total outstanding external debt in millions U.S. dollars.
TDS is the total debt service payments in millions U.S. dollars.
EDT/XGS is the debt export ratio; EDT/GNP is the debt-GNP.
TDS/XGS is the debt export ratio; INT/XGS is the interest export ratio.

APPENDIX 3 Estimated Results For Overparmeterized Model 1

Modelling DIPGDP by OLS

Variable	Coefficient	Std.Error	t-value	t-prob
Constant	-0.0017870	0.0063256	-0.283	0.7847
DIPGDP_1	0.17252	0.41631	0.414	0.6895
DFGDPGR	0.056523	0.047795	1.183	0.2709
DFGDPGR_1	0.062170	0.044624	1.393	0.2011
DEDGDP	0.080742	0.14450	0.559	0.5916
DEDGDP_1	-0.17530	0.13571	-1.292	0.2325
DIGGDP	0.40571	0.91676	0.443	0.6698
DIGGDP_1	-0.69271	0.89031	-0.778	0.4589
DDSPX	0.055974	0.18210	0.307	0.7664
DDSPX_1	-0.070133	0.25638	-0.274	0.7914
DLR	-0.00040817	0.0027820	-0.147	0.8870
DLR_1	0.00087923	0.0034543	0.255	0.8055
DINFL	0.0088100	0.0046216	1.906	0.0931
DINFL_1	-0.0011688	0.0047215	-0.248	0.8107
DINFL^2	-0.00020165	0.000089972	-2.241	0.0553
DINFL^2_1	0.000086963	0.000094742	0.918	0.3855
DTOT	-0.065087	0.040857	-1.593	0.1498
DRER	-0.00022151	0.0013753	-0.161	0.8760
DRER_1	-0.00027357	0.0011849	-0.231	0.8232
ECM_1	-1.2688	0.73460	-1.727	0.1224

R^2 = 0.853 F(19,8)=2.4411 [0.0990] σ= 0.027 DW = 1.75

RSS = 0.005843787319 for 20 variables and 28 observations

APPENDIX 4 :Estimated Results For Overparmeterized Model 2

Modelling DEDEX by OLS

Variable	Coefficient	Std.Error	t-value	t-prob
Constant	0.048352	0.14309	0.338	0.7401
DEDEX_1	0.090772	0.28558	0.318	0.7550
DTOT	-1.0606	0.40533	-2.617	0.0194
DTOT_1	0.23689	0.31731	0.747	0.4669
DYGRI	-0.0083603	0.038522	-0.217	0.8311
DYGRI_1	0.034931	0.044211	0.790	0.4418
DFRRI	-0.0066273	0.012324	-0.538	0.5986
DFRRI_1	0.0035739	0.012520	0.285	0.7792
DFPGDP	-2.1541	2.3836	-0.904	0.3804
DFPGDP_1	-3.6427	2.1366	-1.705	0.1088
DRER	0.0070170	0.0036015	1.948	0.0703
DRER_1	0.00033910	0.0044202	0.077	0.9399
Trend	0.00056282	0.0077983	0.072	0.9434
Res_1	-0.33600	0.21218	-1.584	0.1341

R^2 = 0.573 F(13,15)=1.5463 [0.2081] σ= 0.256 DW = 2.15
RSS = 0.9820333458 for 14 variables and 29 observations

APPENDIX 5 (A): BASIC DATA USED IN REGRESSION ANALYSIS

YEAR	IPGDP	GDPGR	EDGDP	IGGDP	DSPX	LR	INFL	INFL²
1970	0.1598	6.2	0.252	0.0595	0.054	6.8	2.2	4.84
1971	0.166	4.9	0.277	0.0865	0.1	6.2	2.8	7.84
1972	0.1395	6.4	0.287	0.0843	0.08	3.6	5.4	29.16
1973	0.1917	4.0	0.347	0.0881	0.09	-1.3	10.3	108.16
1974	0.1942	3.1	0.405	0.0905	0.1	-9.1	18.6	345.96
1975	0.1069	2.9	0.447	0.085	0.15	-7.6	17.6	309.76
1976	0.1129	4.4	0.427	0.0843	0.15	-1.7	11.7	139.89
1977	0.1485	8.2	0.354	0.0887	0.21	-4.9	14.9	222.01
1978	0.2026	7.7	0.391	0.0941	0.14	-6.9	16.9	285.61
1979	0.1177	4.9	0.44	0.1095	0.18	2.2	7.8	60.84
1980	0.1856	4.0	0.508	0.0859	0.223	-3.82	14.4	207.36
1981	0.1774	6.0	0.55	0.1067	0.27	0.72	11.7	136.89
1982	0.132	3.4	0.641	0.0856	0.326	-5.7	20.2	408.04
1983	0.1252	3.0	0.655	0.0689	0.358	3.73	12.1	146.41
1984	0.1234	0.4	0.652	0.0754	0.371	4.22	10.2	104.04
1985	0.1395	5.1	0.696	0.0681	0.419	1.0	13.0	169
1986	0.1056	5.5	0.66	0.081	0.381	9.2	4.8	23.04
1987	0.1765	4.9	0.727	0.0713	0.404	6.7	7.3	53.29
1988	0.167	5.1	0.711	0.0826	0.39	3.9	11.1	123.21
1989	0.166	5.0	0.738	0.0809	0.365	4.15	13.1	171.61
1990	0.1449	4.3	0.869	0.0978	0.355	3.15	15.6	243.36
1991	0.1168	2.3	0.946	0.0866	0.325	-0.7	19.7	388.09
1992	0.0869	0.5	0.944	0.0734	0.308	-8.43	27.1	870.25
1993	0.103	0.2	1.455	0.0731	0.289	-6.0	46	2116
1994	0.1028	3.0	0.806	0.0901	0.329	7.24	29	841
1995	0.0831	4.8	0.89	0.0787	0.303	28.0	0.81	0.6561
1996	0.1228	4.6	0.722	0.0751	0.278	25.0	8.8	77.44
1997	0.1178	2.4	0.665	0.0672	0.223	18.3	12	144
1998	0.1132	1.8	0.621	0.0603	0.212	23.7	5.8	33.64
1999	0.1041	1.4	0.639	0.0549	0.267	19.8	2.6	6.76
2000	0.1166	-0.5	0.786	0.0659	0.165	16.5	5.8	33.64

APPENDIX 5 (B): BASIC DATA USED IN REGRESSION ANALYSIS

YEAR	TOT	RER	YGRI	FRRI	FPGDP	EDEX	LE	RFGDP
1970	1.12	90.38	3.5	-3.2	-0.0327	0.63	52.8	0.104392
1971	1.33	91.73	3.5	-0.2	-0.0261	0.94	52.1	0.089708
1972	1.67	89.65	5.3	-1.1	-0.0568	1.0	51	0.079449
1973	1.67	83.73	6.1	-5.8	-0.0441	1.2	51.5	0.060086
1974	1.40	81.06	2.7	-14	0.0083	1.19	52	0.050629
1975	1.14	86.9	-0.1	-7.0	-0.0596	1.28	52.5	0.070439
1976	1.38	82.95	4.9	-4.8	-0.0609	1.31	53	0.029857
1977	2.0	73.35	3.8	-6.6	-0.0312	1.04	53.5	0.034336
1978	1.44	62.92	4.3	-4.1	-0.0245	1.41	54	0.034495
1979	1.4	64.28	3.6	-5.2	-0.0314	1.67	54.9	0.02656
1980	1.31	65.94	1.1	-13.7	-0.0251	1.733	54.9	0.015649
1981	1.12	88.54	1.7	-7.5	-0.0755	1.65	55.4	0.018235
1982	1.05	96.69	-0.1	-9.7	-0.0766	2.172	56.3	0.018631
1983	1.0	96.42	2.9	-9.5	-0.0241	2.484	56.7	0.012599
1984	1.12	104.6	4.8	-8.8	-0.0374	2.218	57.7	0.007397
1985	0.97	98.77	3.6	-9.1	-0.0374	2.682	51.1	0.010392
1986	1.07	94.56	3.0	-5.6	-0.0476	2.541	57.5	0.008141
1987	0.9	94.14	3.3	-12.7	-0.075	3.364	57.9	0.046139
1988	0.94	99.24	4.5	-12.8	-0.0365	3.068	58.1	0.008238
1989	0.82	106.9	3.6	-10	-0.0383	3.038	58.3	0.006803
1990	0.76	108.5	2.6	-23.5	-0.0428	3.187	58.6	0.007021
1991	0.85	110.2	1.6	-12.7	-0.0505	3.391	58.8	0.004924
1992	0.83	113.2	1.8	-15.7	-0.013	3.194	59.0	0.0037
1993	0.95	150.2	1.1	-16.1	-0.0448	3.284	58.5	0.004526
1994	1.06	78.62	3.0	-23.3	-0.0584	2.692	50.8	0.003192
1995	1	100	2.4	-9.7	-0.0133	2.493	51.7	0.002838
1996	0.97	93.03	2.8	-7.2	0.0118	2.279	52.7	0.002465
1997	1.06	96.95	3.0	-4.2	-0.0218	2.201	54.3	0.003768
1998	1.05	91.8	2.7	-9.1	-0.0077	2.401	54.5	0.002629
1999	1.02	107.6	2.7	-0.1	-0.0069	2.448	54.7	0.001902
2000	1.03	112.5	3.6	-5.1	0.013	2.546	54.7	0.001995