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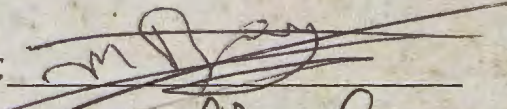
AFRICAN INSTITUTE FOR ECONOMIC DEVELOPMENT AND PLANNING

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DETERMINANTS AND CONSTRAINTS TO PRIVATE INVESTMENT:
The Case of Kenya

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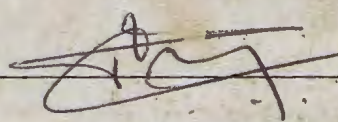
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DEDICATION

**TO THE MEMORY OF MY LATE PARENTS, JOSEPH AND JULIAN
AND
BROTHER CHRISPINUS EUTYCAS**

***...The only way to shape your own future is by being serious with your education.
[Julian: 7th October, 1984; 6.00am]***

STATEMENTS

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“Consider it pure joy, my brothers, whenever you face trials of many kinds because you know that the testing of your faith develops perseverance. Perseverance must finish its work so that you may be mature and complete, not lacking in anything”-James 1:2-4.

THE ENGINE OF ACHIEVEMENT IS HOPE, NOT INTELLIGENCE

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LIST OF ABBREVIATIONS AND ACCRONYMS

ACP	Africa Caribbean and Pacific
ARCH	Auto-Regressive Conditional Heteroscedasticity
BLUE	Best, Linear, Unbiased, Efficient
CEs	Cointegrating Equations
CGE	Computable General Equilibrium
COMESA	Common Market for Eastern and Southern Africa
CODESRIA	Council for Development and Social Research in Africa
CUSUM	Cumulative Sum
DRIEC	Department of Regional and International Economic Co-operation
EAC	East African Community
ECM	Error Correction Model
EPZ	Export processing Zone
ESAF	Enhanced Structural Adjustment Facility
EIEWS	Econometric Views
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GSP	Generalised system of Preferences
HIPC	Highly Indebted Poor Countries
ICOR	Incremental Capital Output Ratio
IDEP	Institute for Economic Development and Planning
IFS	International Financial Statistics
IMF	International Monetary Fund
IPC	Investment promotion Centre
K£	Kenya Pound (1 K£ = 20 Kenya shillings)
KANU	Kenya African National Union
KIPPRA	Kenya Institute for Public Policy Research and Analysis
LDCs	Less Developed Countries
LM	Langrage Multiplier
LS	Least Squares
MIT	Massachusetts Institute for Technology
MUB	Manufacturing Under Bond

NBER	National Bureau for Economic Research
NIC	Newly Industrialised Country
NIDC	National Industrial Development Council
NY	New York
OLS	Ordinary Least Squares
PEC	Presidential Economic Commission
P-P	Phillip-Perron
PTA	Preferential Trade Area
SAPs	Structural Adjustment Programmes
UK	United Kingdom
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNIDO	United Nations Industrial Development Organisation
UON	University of Nairobi
US\$	United States Dollar

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ABSTRACT

The main objective of this study was to determine some of the factors that influence private investment behaviour in Kenya. Private investment is one of the major contributors to economic growth and development in both developed and developing countries. This is because through investment, new technology can be adopted, employment opportunities can be created, incomes can grow and living conditions of the people can improve thus, ultimately leading to alleviation of poverty. Technology, employment and poverty are among the main problems facing most economies of developing countries and it is through investment that long-term solutions can be reached.

The key aspect of our methodology is the application of cointegration technique side by side regression analysis. The former helped us undertake a thorough data generating process in line with new developments in econometrics whereas the later ensured that individual elasticities between the dependent and explanatory variables are identified. In order to determine both the long-run and short-run behaviour of investment with regard to explanatory variables, a private investment function was developed and estimated at levels to determine the long-run behaviour and, then re-estimated on differenced terms. The estimation on differenced terms was to determine the short-run behaviour and the adjustment mechanism by which short-run dynamics adjust towards equilibrium.

Theoretical analysis has revealed a number of issues. First, the need for preparedness and flexibility in case of sudden fluctuations in the economy. Such preparedness should include sound economic policies and structural flexibility. Second, despite the low level of investment ratios on the aggregate and sectoral levels, there exist numerous investment opportunities in manufacturing, agriculture and service industries. This can be attributed to lack of strong incentives to attract and encourage investment in these areas or lack of general awareness of these opportunities among the prospective investors. Third, most traditional models of investment are not appropriate for explaining the behaviour of private investors in developing countries since they were basically developed to explain investment behaviour in developed countries, under circumstances quite different to those in developing countries. For instance, most of these models do not capture all variables (such as uncertainty, civil wars, debt overhang etc), some of which are peculiar to developing countries. Fourth, inadequacy of empirical work on private investment poses a serious problem because there is lack of empirical evidence and facts to act as a basis for investment policies and strategies. Such shortcomings may be considered among the reasons for weak, inappropriate policies and strategies for promoting private investment in developing countries and Kenya in particular.

The estimated coefficients of all the variables concurred with appriori expectations, consistent with economic theory. They depict the behaviour of private investors in response to macroeconomic policy and structural changes within the economy. The empirical analysis has demonstrated the positive influence of savings, GDP growth and public investment on the behaviour of private investors. It has also been shown that debt service ratio and inflationary uncertainty negatively influence private investment. In addition, the partial adjustment parameter has been shown to have a positive and significant sign thus indicating the divergence between the actual and desired levels of private investment within a particular period. Based on the findings of this study, recommendations have been suggested that would help in the synthesis and understanding some of the policy issues relating to private investment behaviour in Kenya and probably other developing countries.

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

The focus of many Africa countries now is the improvement of growth performance through increasing the level of investment after major reforms in the 1980s and 1990s. The underlying objective is the orientation of their economies from basically agricultural, primary producers and consumers to high value industrial manufacturers. Private investment remains the cornerstone of renewed growth in less developed countries that desire to boost their economies towards efficiency. Countries wishing to put their economies on a faster and stable growth path will therefore have to promote the level of investment and reduce the volatility of this level. If the private sector is to be the engine for renewed growth, policies for increasing the level of private investment are highly desirable. Experience has shown a close correlation between the level of private investment and economic performance elsewhere (see literature review). This is because investment not only adds to the productive capacity but also creates new opportunities for the acquisition of new and more efficient technologies. Private investment therefore determines not only the rate of accumulation but also the growth of productive capacity. A close association between capacity growth and physical accumulation of capital has been found in developing countries where, unfortunately, the level of private capital formation has fallen especially following the debt crisis (Agénor and Montiel, 1996). This state of affairs has generated a new interest in the behaviour and the determinants of private investment, yet relatively little empirical work on investment has been done in these countries.

Negative external and internal influences on economic growth in particular and macroeconomic variables in general have been witnessed since the 1970s. In line with these

however, the level of investment and growth has been fluctuating hence adversely affecting most African economies in totality. These influences have raised the need for policies with potential for not only hedging the economies against these negative influences but also reduce their direct impact on private investment. The Kenyan economy has been the object of reforms since the early 1980s when trade liberalisation and fiscal adjustment began to be implemented (Development Plans, various issues, Ronge and Kimuyu 1997). Economic liberalisation reforms were however intensified in 1993. The influence of the measures on private investment and growth will, to a large extent, depend on their impact on the determinants of private investment in the economy.

Policy efforts are presently geared towards the attainment of a newly industrialised status for the country by 2020. To this end, specific policies and incentives have been pronounced in the current development plan (1997-2001) to increase the level of investment in manufacturing. Such an increase implies that increasing the level of investment in equipment, machinery and, enacting policies to stimulate such investment. However, noting that the effect of what could have been effective policies in environment full of uncertainty can be greatly undermined, issues bordering on uncertainty and instability within the economy must be given special attention.

The main purpose of this study is to examine the factors that influence private investment in general and in particular some of the determinants of private investment in Kenya. In this way, the study seeks to expose some of the macroeconomic variables that can be used to explain the observed behaviour of private investment over the period of study. Furthermore, a study of determinants of private investment would be useful in explaining the likely growth performance and suggesting possible policy interventions. Ultimately, the study would contribute to the body of literature on growth and development in Kenya. Some of the policy issues pertinent to the study are: what are some of the important macroeconomic

determinants of private investment? What do these determinants reveal regarding appropriate policy interventions for promoting investment? How does uncertainty, affect private investment decisions? What are some of the macroeconomic policy measures and reforms that can be used in order to promote private investment and hence economic growth?

1.1 DEFINITION AND THE CONCEPT OF INVESTMENT

Investment is the process of exchanging income during one period of time for an asset that is expected to produce earnings in future periods. Consumption is foregone currently in order to obtain a greater return in future. For an economy as whole to invest, total production must exceed total consumption. Historically, investment has primarily been the function of private businesses. During the 20th century, however, governments in planned economies and developing countries have become important investors. From the standpoint of an individual, two types of investment may be distinguished thus investment in means of production and purely financial (portfolio) investment. Although at the individual's level, both types of investment provide a monetary return to the investor, from the standpoint of the entire economy, purely financial investment appear only as tittle transfers and do not constitute an addition to productive capacity. Hence this study is basically concerned with investment in means of production (physical capital).

Before 1930s, investment was seen as a function of interest rates. However, empirical investigation in various (especially developed) countries has shown that investment is less responsive to interest rates and more dependent on businessmen's expectations about future demand and profits, technical changes in production methods and expected relative costs of labour and capital. The main quest for this venture is in recognition of the changes that have taken place in the world, appreciating the fact the mechanisms under which economic variables interact in the contemporary world may not exactly be the same as in the classical and neo-classical periods.

1.2 NATURE OF THE PROBLEM AND JUSTIFICATION

Across-section review of literature related to the Kenyan economy indicates that though private investment is very essential for the required 'high' economic growth, the investment rate and its growth is very low especially in the context of the envisaged Newly Industrialised Country (NIC) status by the year 2020. Over the last forty years, it can be observed that on average the growth rate of national output has greatly fluctuated and in particular on a downward trend. The trends in these fluctuations in growth of output have been quite similar to fluctuations in private investment within the same periods. For instance, average GDP growth in the 1970s was 6.6% then 4.3% and 2.2% in the 1980s and 1990s respectively. Conversely, the share of private investment in GDP was 13.3% in the 1970s then 11.6% and 10.9% in the 1980s and 1990s respectively. The main question therefore is whether this similarity points to causal or spurious relationship; and, if there is any relationship, what factors can be used to explain the relationship. This therefore makes the main problematic that this study wishes to analyse and demonstrate the prime challenge and prospects facing private investment in the Kenyan economy.

The economic experiences since independence have, however, altered the perception of the government's role in socio-economic growth and development and by the early 1980s, there began a shift that called for greater involvement of the private sector. This shift has been alluded through government policy papers and documents¹. Some of the key issues in these documents concerns how to seek and promote foreign private investment to augment the domestic resources, reduction of government resort to Central Bank borrowing to ensure that the volume of credit available to the private sector will be sufficient to sustain substantial growth. In addition, through these policy documents, some of the factors that purport to

¹ Such government policy papers and documents include National Development Plans, Statistical Abstracts, Budget Speeches and Sessional Papers.

influence private investment in particular and capital formation in general are highlighted. They include: availability of capital resources (Sessional paper No. 1, 1992), local authority by-laws and other regulatory measures (Sessional Paper No.2, 1992).

For instance, the Eighth National Development Plan 1997-2001, with the theme "*Rapid Industrialisation for Sustained Development*" lays the foundation for the transformation of Kenya from an economy with agriculture as its backbone to a newly industrialised country (NIC) by 2020. The plan refers to the Sessional paper No. 1 of 1996 on Industrial Transformation to the Year 2020 in a way that it (the plan) is the first one in the series to implement policies and strategies in the paper. It is one that has clearly and maybe, overly stresses the shift from the traditional role of the government in raising and sustaining economic growth to the new emphasis on what the government must do to facilitate the private sector to be able to invest more in productive activities. For instance, the plan states that, it attempts to take deliberate measures to mobilise savings, maximise investments and create an enabling environment for the private sector to thrive, a move that requires a more responsive and efficient public sector. "*...The private sector will be expected to invest prudently in the most profitable ventures, motivate the labour force and manufacture products of the highest quality and competitive enough for the world markets. The government will go out of its way to ensure that the private sector will be successful.*"

The main challenges facing the economy (according to national policy papers) are unemployment and low output. According to Rusibane (1990), investment remains the major component of GDP in so far that capital accumulation, manpower adoption and introduction of new technologies cannot be realised without it. Therefore, by analysing and understanding the investment environment and factors influencing it, we can come up with recommendations that may strengthen investment policies.

A handful of studies have been carried out to examine the determinants of private investment in both developing and industrial countries. Quite often, the results of these studies tend to differ, thus showing the differences in policies and their impacts on investment decisions. In any case, very few studies that have analysed this relation have included Kenya in their investigation. Hence, it becomes even more necessary to carry out an empirical investigation to find out the major factors influencing private investment decisions in Kenya.

On the other hand, governments have tried to raise private investment and growth through interest rate liberalisation, direct tax incentives, capital market reforms and others. The failure of these attempts, however, raises questions about the responsiveness of private investment to such policies. Hence, an effort to find out some of the major factors influencing private investment decisions would further help in identifying appropriate policy-related variables.

Furthermore, most studies have invariably used time-series data in analytical studies without considering the effects of non-stationarity and co-integration of and among the variables especially in the context of long term studies. Developments in econometrics and statistics have, however shown that Ordinary Least Squares (OLS) and any other analytical technique is only efficient in estimating relations where time series data is stationary and variables are cointegrated, a situation that is rare in real life. Non-stationarity is extremely common in macroeconomic time-series data and as samples get longer, the phenomenon becomes more pronounced. Failure to appropriately deal with issues of data generating processes and estimation technique among others would have serious implications on the results of any empirical study, and this explains why these issues have been of major concern in the 1980's and 1990's. In respect to the above, the study would apply cointegration technique and the parameters estimated using OLS technique.

In view of the above, most studies have concentrated on examining the long-run behaviour of private investment without due respect to the short-run dynamics of investment decisions and the adjustment mechanisms that bring about equilibrium. Though investment in physical capital is a long-term venture, it quite often responds to short-term fluctuations in the economy and investment environment. For example, the influence of some macroeconomic variables such as external debt service, inflation, foreign exchange rate etc, may have an exactly different effect (in terms of size and sign) in the long-run as opposed to the short-run. The generalisation of the effect of certain variables on investment in particular and economic modelling in general, over time would either undermine or exaggerate their importance hence resulting in wrong or irrelevant policy subscriptions. In this regard, the study will adopt a methodology that would allow the examination of both long-run and short-run behaviour of private investment in relation to the selected explanatory variables.

Lastly, as observed by Kidane and Kocklaeuner (1985), macroeconometric models for African countries are rather limited. Those that are available have been critically evaluated and commended on. Other than the common problems associated with defective data, imprecise methods of estimation, high fluctuations in the export sector that are the main causes of high errors in econometric forecasting, models have other inherent problems associated with non-quantifiable variables. In spite of these problems, the above authors content that these models give some compact results, help to avoid inconsistencies with respect to policy objectives, and are good for identifying some effective policy measures. In alluding the need for combining econometric modelling with pragmatic common sense, these authors quote the United Nations Economic Commission for Africa (1980) that: *“Econometric techniques must go hand in hand with pragmatic approach based on a thorough study of the behaviour of the economy in the earlier years; both approaches depend of course on the structural characteristics of the economy in the past and on judgement and*

common sense to future developments and policies and thus cannot be isolated from each other." It is with this in mind that we undertake to estimate an econometric private investment function, one, to generally help in understanding private investment behaviour in Kenya and second, add on the existing pool of literature on the determinants of private investment in developing countries.

1.3 OBJECTIVE OF THE STUDY

The main objective of this study is to identify some of the major factors that influence private investment decisions in Kenya, both in the long-run and short-run with an aim of demonstrating the adjustment mechanisms that lead to an equilibrium investment position.

1.4 HYPOTHESES TO BE TESTED

In line with the objectives of the study, the following are the main underlying hypotheses that the study intends to test, that:

1. The response of private investors to the gap between actual and desired stock of physical capital depends on the initial investment, growth rate of GDP, the ratio of public investment in GDP, the ratio of gross domestic savings in GDP, the ratio of debt service to exports and, inflationary (macroeconomic) uncertainty.
2. There exist an adjustment mechanism through which the long-run and short-run private investment dynamics converge towards equilibrium.

1.5 ORGANISATION OF THE STUDY

In chapter 1, we have presented the overall introduction, statement of the problem, objectives and the hypotheses. The remaining part of the study will be organised as follows. Chapter 2 will present a brief review of the main macroeconomic features of the Kenyan economy after independence (1963) and some basic issues pertinent to investment in general.

Chapter 3 will review the literature related to determinants of private investment and its link to economic growth. Chapter 4 discusses the general theoretical framework-model specification and the cointegration technique. In addition, the empirical analysis and interpretation of results is carried out in this chapter. Lastly, in chapter 5, we shall present the policy implications and recommendations emanating from the entire study.

CHAPTER 2

BACKGROUND TO THE KENYAN ECONOMY

2.0 MACROECONOMIC PERFORMANCE SINCE 1963

The Kenyan economy has three main characteristics: first, an important but dualistic agricultural sector; second, high degree of openness; and three, a relatively high investment ratio (Vandemoortele, 1985). Agriculture is the mainstay of the country's economy and is characterised by an important dichotomy between the large commercial oriented farms and small-scale subsistence oriented holdings. The industrialisation process also induced a structural change in the country's economy. This was based on the first stage import substitution policy (Balasa, 1981), behind high protective barriers, the manufacturing sector recorded a rapid growth rate of 7.5% between 1964 and 1983, so that its share in total GDP increased from 9% to 13%. The counter part public sector accordingly expanded its activities so that its contribution to GDP rose from 21% at independence to 28% over the same period. During the remaining part of the 1980s and the 1990s, the perception and orientation of the economy changed with greater emphasis on private sector and the diminishing role of the public sector in investment activities. The distinctive development episodes since independence are briefly presented as follows²:

a). The Period 1965-1970.

During this period, development was equated to industrialisation whereby capital intensive investment was emphasised in the prospects of import substitution. The strategy greatly relied on self-sustainability in the development process with a lot of protectionism, government intervention and weak private sector. Indeed most of the growth and development during this period was based largely on the transfer of land from large to small

² See Annex 2 for selected macroeconomic indicators.

farm use, extension of the area under cultivation of high value crops and industrialisation based on a strategy of import substitution.

The period immediately following independence saw a dynamic economy characterised by; rising real income per capita, growing employment, greater diversification and broader participation under a stable and resilient economy. However, the passage of power into indigenous hands induced uncertainty among non-citizens about the country's political and economic future and created fears regarding their role in the newly independent nation. This led to virtual stagnation of investment. There was substantial capital flight from the country and a decline in employment in the modern sector of the economy, low levels of gross domestic savings and investment, all that could be reflected in the negative aspect in net foreign assets between 1965 and 1968.

The economy generally performed well as exhibited by high GDP growth rates (average 6.6% p.a.), the fairly favourable current account with more exports than imports, low inflation rates, strong and stable local currency in relation to the US \$. During this period, interest rates were under control and maintained low (average 6.5%) in order to promote monetary stability. The government deficit remained low (below 4% of GDP) and with fairly good conditions in the local market after independence, the government increasingly preferred domestic sources for financing of budget deficits, a move that helped to maintain reasonably low level foreign debt.

b). *The period 1970-1980*

This period was referred to as the 'period of crisis'. Development was synonymous to growth. The period was dominated by international shocks (crises) such as:

- i). The first oil price rise of 1973/74 and the second oil price rise of 1979/80 all compounded by world recessions. The first oil crisis led to a substantial and progressive drop in GDP from a high rate of 6.6% in 1960s to a mere 3.1% in 1975.

This remarkable decline resulted from a steep increase in the price of crude oil and subsequently that of other imported goods. It further led to the deterioration of the country's balance of trade; import prices rose more swiftly than those of exports i.e. more exports were needed to pay for the same quantity of imports. At the same time, in the wake of global recession, there was a credit squeeze caused by decline in the flow of external funds needed to finance residual deficits in the balance of payments. The prevailing situation forced the government to impose fiscal and monetary measures. The tax base was broadened by imposing higher rates of import duty on non-essential and luxury consumer goods; duties on imported capital goods were raised to induce industry to adopt more labour intensive techniques; economies were effected in the consumption of petroleum products; income tax was made more progressive; total domestic credit was limited to growth rate of 16% although agriculture was allowed to raise its credit to 17% of net deposits in commercial banks; in 1976 the liquidity ratio of commercial banks was raised from 15% to 18%.

- ii). The coffee boom of 1976-78. In the late 1975, severe frost affected the crop in the world's largest exporting country (Brazil) of the commodity therefore leading to unexpected boom in the world coffee producers in the late 1976 and 1977. The boom neutralised the effects of the first and the second international oil shocks. The boom resulted in favourable balance of trade and payments, which ultimately resulted in appreciable rise in foreign reserves between 1975 and 1978. The boom further benefited almost all the sectors of the economy by increased imports, exports, wage employment and domestically consumed goods. On the overall the coffee boom resulted in a quite impressive GDP growth rate for the period 1977 and 1978 i.e. 8.2% and 7.9% respectively. Also domestic savings and investments grew tremendously over the same period. On the other hand, the boom resulted in an increase in money

supply, which increased private consumption ultimately leading to excess aggregate demand. Hence, inflation had to soar up during this period 1975-1978 whereas the currency became overvalued over the same period.

iii). The collapse of the East African Community in 1977 had adverse effects on Kenya's current account for the year 1978 and beyond. This is because the co-operation provided market for Kenya's goods and hence its collapse adversely affected investment and exports since the market had contracted.

c). *The Period 1980-1990*

The period from the 1980 through 1990s is referred to as the structural adjustment programme (SAPs) period. The SAPs were introduced in view of issues related to bad governance, economic mismanagement and shortcomings of the 1970s and 1960s. The key objectives in this period emphasised the creation of reliable economy through macroeconomic stabilisation with due respect to the aggregates of demand and supply in the macroeconomic equation.

In 1985, the economy began the recovery process from the ravages of severe drought that had befallen in 1984. With favourable weather conditions, government budgetary discipline and improved economic management policies enabled the country to achieve real growth rate of 4.3%. The fall of world oil prices and the rise in export prices augured well for further growth compounded with improved balance of payments (current account about US\$ -112.9) resulting from higher value of exports especially coffee and tea. However, with fairly prudent measures, the government budget deficit reduced from -6245 billion shillings in 1985 to -5144 billion shillings in 1986, in other words from about 10% of GDP in 1980/81 to 4.3% in 1984/85 whereas inflation greatly reduced from over 22% in 1982 to 5.7% in 1986 (current prices). Further on the international financial scene, the shilling strengthened i.e. from the exchange rate of 16.43 in 1985 to 16.23 in 1986. The current account condition improved

from US\$ -112.9 million to US\$ -38.1 as a sign of improvement in the international trading levels or values.

1987-1989 saw the deterioration in current account balances from the 1986 levels mainly due to the sharp drop in the prices of coffee and tea plus the doubling of oil prices over the same period. The weak balance of payments position meant a weak shilling that showed a remarkable drop in value between 1987 and 1989. On the same basis, inflation resumed an upward trend. This period witnessed an upward trend in foreign debt; a scenario that can be attributed to government's increased external borrowing to finance imports following the increase in oil prices.

The budget deficit widened during this period as a result of increased government expenditure on the 8-4-4 education programme, the funding of multiple university intakes, the construction of grain silos and the purchase of grain from the 1986 bumper harvest. The deficit was further raised by expenditure on the hosting of All Africa Games in August 1988 among others. However, the discount rates evaded the uniform low levels in years before 1988 to a high of 16.02% and even higher in the subsequent years as the economy gradually moved towards interest rates determined by market forces as capital and discount markets become more efficient. The challenges that resulted from the fluctuations in both external, internal and natural environmental factors gave impetus to reforms in the economy.

d). The Period 1990-1999

This was still the period of structural adjustment reforms. The 1990s have seen drastic changes in the political, economic and structural perspectives the world over. Compounded by SAPs at a hastened rate, the new world economic and political order has had tremendous influence on Kenya just as in the other countries of the world under the themes: globalisation, liberalisation and privatisation of the world economies. Kenya has had its share of all these

with special tribute to multi-partism, transparency and accountability, civil and public service reforms in varying magnitudes and dimensions.

Considering the external trade condition, the balance of trade continued to deteriorate meaning that the volume of imports increased at a much higher rate than exports. This can be attributed to the effects of trade liberalisation and the general increase in desire for imported goods. However, between 1995 and 1996 the current account showed some improvement due to increase in exports of horticultural products, tea and increased returns from tourism while during 1997 the current account deficit increased mainly due to strong imports growth against stagnated exports.

The economy recorded a dismal 2.3% growth rate in 1997 compared to 4.4% and 4.3% in 1995 and 1996 respectively. This was attributed mainly to the poor state of infrastructure facilities, persistent high interest rates and insecurity that had a major toll on tourism, that had been the essential contributor to growth. The situation was further compounded by the vagaries of weather as the country experienced both drought and floods in the period (El-Nino and La-Nino weather phenomenon). The withholding of the Enhanced Structural Facility (ESAF) loans and grants by donors in 1997 resulted in the depreciation of the currency by 20%, a hike in interest rates and reduced investment. The upward pressure on interest rates was further compounded by the sharp increase in government expenditure due to huge salary awards to teachers and the financing of the general elections cost overruns in 1997. These same factors may be used to explain the increase in government deficit between 1996 and 1997. Between 1995-1999, inflation rate was maintained at low level owing to the tight monetary policy instituted by the Central Bank.

2.1 THE MACROECONOMIC POLICY AND INSTITUTIONAL FRAMEWORK

Macroeconomic policy framework is understood in the Kenyan development planning history, and therefore in this study as a set of instruments which the government uses to translate development strategies into concrete achievements over the planning period(s). These instruments are always subject to elaboration and addition as development proceeds and as needs arise. They are therefore not rigid frameworks but rather a comprehensive statement of the policies considered necessary for the implementation of the nation's development strategy at a given point in time (usually over the plan period). Detailed macroeconomic framework(s) are described in the Policy Framework Papers that lay the guidelines for the implementation of future development plans.

Usually, the macroeconomic environment over a given period of time evolves around a certain specified theme. For example, the 1997-2001 planning period revolves around a macroeconomic environment/framework for industrialisation. It emphasises the creation of an environment within which the private sector would flourish. To achieve this, the current framework points out the need to stabilise prices in order to facilitate efficient private sector operations and increase both the level and efficiency of domestic savings and investment (1997-2001 National Development Plan). The current macroeconomic framework is characterised by four major sub-sections namely: 1) the Fiscal and Monetary Policies, 2) the Financial Institutions Framework, 3) Financial Resource Mobilisation for Industrialisation, 4) Structural Adjustment Programmes.

The institutional framework. Since independence till the 5th national development plan, the foundation of development planning was based on what was contained in the constitution, the several KANU³ manifestos and Sessional Paper No. 10 of 1965 entitled

³ Kenya African National Union (KANU) is and has been the ruling political party in Kenya since independence.

"African Socialism and its Application to Planning in Kenya". Generally, the framework required that all Kenyans participate in the development process. However, the government would play a decisive and leading role in initiating and directing development and indeed most policy and issues related to the management of the economy revolved around and originated from the public sector.

In tune with the long-term vision of Industrial Transformation of Kenya to the Year 2020 (as stipulated in Sessional Paper No. 1 of 1996 and other policy papers), the former planning institutional framework had to change to reflect the new vision. The change in institutional framework is reflected in the following new structures:

- i). The Presidential Economic Commission (PEC)
- ii). Kenya Institute of Public Policy Research and Analysis (KIPPRA)
- iii). The Forum for Private Sector Policy and Research
- iv). Public and Private Sector Partnership
- v). Investment Promotion Centre (IPC)
- vi). National Industrial Development Council (NIDC), etc.

2.2 INVESTMENT INCENTIVES, OPPORTUNITIES AND CONSTRAINTS

2.2.1 Major investment Incentives in Kenya

Since the government policy is to encourage private sector investment, a number of investment incentives are provided to existing and prospective investors. Some of the incentives include:

a). *Investment allowances*

This is provided for investment in the manufacturing and hotel sectors at a flat rate of 60% (since 1995) all over the country. For Manufactures, under Bond (MUB) and Export Processing Zone (EPZ) enterprises, the applicable rate is 100% for all locations. In addition,

eligible capital expenditures have been expanded to include certain infrastructure and environmental protection equipment expenditures related to the manufacturing activity.

b). Depreciation

Liberal rates are allowed for depreciation of assets based on book value as follows:

- | | | |
|-------|---|---------------------------|
| i). | Buildings | |
| | Industrial buildings | 2.5% (Straight line) |
| | Hotels | 4.0% (Straight line) |
| ii). | Machinery | |
| | Tractors, combine harvesters, earth moving equipment and similar vehicles | 37.5% (Declining balance) |
| iii). | Other self-propelled vehicle including aircraft | 25.0% (Declining balance) |
| iv). | All other machinery including ships | 12.5% (Declining balance) |
| v). | Computers and other office equipment | 30.0% (Declining balance) |

Source: Kenya Guide for Investors, 1994

c). Loss carried forward

d). Remissions from customs duties

e). Export promotion programmes. These include;

- i). Duty remission facility
- ii). Manufacturing Under Bond (MUB)
- iii). Export Processing zones (EPZ) programmes

f). Market access

Exports and investors from Kenya enjoy preferential access to world markets under a number of special access and duty reduction programmes. They include:

- i). Regional markets such as the Preferential Trade Area (PTA) agreement that embraces countries in Eastern and Southern Africa, which has been transformed to the Common Market for Eastern and Southern Africa (COMESA), the East Africa Community (EAC).
- ii). Africa Caribbean and Pacific (ACP)/Lome Convention which offers trade preferences to Kenyan products to the European Union markets. They include duty-free entry of all industrial products and a wide range of agricultural

products- cereals, fresh and processed fruits and vegetables, flowers, beef, fish, and diary products.

- iii). Generalised System of Preferences (GSP). Under this programme, a wide range of manufactured products are entitled to preferential duty treatment in the United States and most countries of Europe especially European Union markets

2.2.2 Major Investment Opportunities in Kenya

a). Agriculture

Agriculture is the mainstay of the Kenyan economy, providing livelihood to approximately 75% of the population. The sector has strong forward and backward linkages with the manufacturing sector providing most of the basic raw material inputs to local agro-industries. The major agricultural activities in Kenya are crop production, horticulture, diary and livestock farming. The principle crops produced include food crops such as maize, wheat, beans, potatoes, rice and cash crops such as coffee, tea, sugarcane, sisal and pyrethrum. The export base of the sector has remained largely dependent on coffee, horticulture and tea.

However, there is considerable scope for diversification and expansion of agricultural sector through accelerated food crop production and growth of non-traditional exports. There are also opportunities for improvement in technology infrastructure such as packaging, storage and transportation. Intensified irrigation and additional value added to in-country processing are important targets. Specific opportunities exist in horticulture, agriculture support, agro-processing, poultry products, fisheries, leather and leather goods, livestock etc.

b). Manufacturing

By mid 1990s, the manufacturing sector was one of the fastest growing sectors of the economy. Initially developed under the import substitution policy, there has been a shift to export oriented manufacturing as the thrust of Kenya's industrial policy. The sector plays an

important role in adding value to agricultural output, providing backward and forward linkages and hence accelerating overall growth.

For instance, between 1990 and 1993 the manufacturing sector registered improved performance with value of total output of the sector growing from K£ 8.8 billion in 1990 to K£ 15.9 billion in 1993 as shown in the table bellow. A wide range of opportunities for direct and joint-venture investments exist in the manufacturing sector including- agro-processing, manufacture of textiles and apparels, automotive components assembly, mining and mineral products, electronics, plastics, paper, chemicals and pharmaceuticals, metal and engineering products for both domestic and export markets.

Table 1: Value of manufacturing Sector output (current prices)

Year	1988	1989	1990	1991	1992	1993
Value of output (K£ millions)	6,102.68	7,282.57	8,816.31	10,817.57	11,877.06	15,907.51
Value added	797.56	906.91	1041.35	1234.26	1308.91	1512.85

Source: Kenya Guide for Investors, 1994

c). Construction

Construction industry is rapidly growing in Kenya. Quality engineering, building and architectural design services are readily available. By 1995, there were more than 170 large-scale firms registered as general or specific building contractors. The construction sector's current and expected growth emanates from the increasing investment in industrial and commercial buildings and infrastructure outside major urban centres. However, with the increase in population, opportunities exist in the construction of residential housing including prefabricated low-cost housing. The manufacture of sanitary wares and fittings also offers substantial opportunities.

d). Tourism

Tourism is among Kenya's foreign exchange earners. The country's natural endowments in wildlife, pleasant climate, beautiful scenery, sandy beaches, range of water sport activities fairly well developed hotel infrastructure make the country a major tourist destination.

According to the Investor's Guide (1994), the increase in the number of tourists visiting Kenya outpaced the country's available tourist infrastructure and superstructure. Enormous opportunities therefore exist for investment in accommodation, recreation and entertainment facilities in areas such as health spas, development of new tourist class hotels, villas, holiday centres; water sports facilities e.g. windsurfing, floating ship hotels e.g. on lake Victoria and aquaculture farming.

Table 2: International Visitors, Arrivals and Earnings (1990 to 1993)

Year	1990	1991	1992	1993
Africa	21,720	223,063	212,964	226,987
America	103,501	68,762	66,512	70,892
Asia	51,535	55,859	52,612	56,082
Europe	436,400	456,173	442,299	471,422
Grand Total	814,400	804,600	781,500	826,200
Earnings (K£ millions)	535	593	713	1,222

Source: Kenya Guide for Investors, 1994

e). Financial Services

With the on-going economic and financial reforms, a high level of market sophistication is beginning to emerge in Kenya's capital markets. These involve;

- i). Opening investments in shares and securities to non-residents through stock exchange.
- ii). Allowing the secondary trading of government treasury bonds.

Other opportunities exist in the provision of new financial products and services in banking and insurance.

These opportunities are made realisable with the removal of exchange controls and the floatation of the Kenya shilling, all of which have expedited the repatriation of dividends and other returns due to foreign investors.

f). Privatisation Programme

The government is privatising most public enterprises to reduce its direct involvement in production of goods and services. Two hundred and seventy enterprises were listed for privatisation. The privatisation process has been going on, so far, about six enterprises have been liquidated, and several have been sold either through pre-emptive rights, the Nairobi stock exchange or by competitive bidding. Enterprises earmarked for privatisation are of different investment sizes and cover a wide range of economic activities thus providing attractive opportunities for private sector investors.

2.2.3 Some of the Major Constraints to Investment in Kenya

- ◆ Lack of adequate domestic resources to attain high level of investment to bring about the planned industrial transformation. For instance, low level of savings mean that access to capital is limited and the costs of finance are often high.
- ◆ Poor infrastructure. The inadequate and poor state of physical infrastructure discourages investments by increasing the cost of capital and production.
- ◆ The small and dwindling domestic markets and limited access to foreign markets. This is mainly through persistent low incomes, barriers to international trade and generally low level of openness. This reduces the return on capital, partly by restricting the market size and scope to exploit economies of scale.
- ◆ Weak or inadequate structural regulatory framework which touches on issues such as trade and industrial policies concerning licensing and import/export facilitation, taxation, pricing control, labour market etc.

- ◆ Widespread controls and bureaucratic red tape that tend to minimise the effectiveness of whatever incentives available for attracting industrial investment.
- ◆ Low levels of investment in human capital that leads to reduced quality of labour force (IMF 1998).
- ◆ High levels of corruption that are deterrent to private sector economic activity and certainly to foreign investment.
- ◆ High risk levels that reduce investment levels. This is because entrepreneurs tend to raise their hurdle rate of return to adjust for risk. In sub-Saharan Africa, perceived risk levels are high because of political instability and civil unrest. Also this may be because property rights may not be adequately protected, inflation rates high and frequent currency devaluation that has greatly reduced the home currency return to foreign investors.
- ◆ Lack of good governance. This may be reflected in lack or inadequate political commitment and credibility, political interference, policy inconsistency, issues of transparency, accountability and democratic rule of law, all that lead to an unreliable investment environment.

CHAPTER 3

LITERATURE SURVEY

In this section, we shall survey and examine the literature related to private investment. The literature will be presented as follows; sub-section 3.0 will present literature related to economic growth and private investment, in sub-section 3.1 we will present summary findings on private investment functions. In sub-section 3.2, we shall present a summary of literature on private investment in Kenya.

3.0 ECONOMIC GROWTH AND PRIVATE INVESTMENT

Despite the growing support for market-oriented strategies and for a greater role of private investment, empirical growth models for developing countries typically make no distinction between the private and public components of investment (Khan and Reinhart, 1990). This sceptical nature of most studies may be explained by the complex and dynamic nature of investment within and across countries.

Where governments emphasise the importance of private investment in economic growth and development, little is done to clarify the type and form of private investment. For instance Shen (1975) in the study of Sectoral Development in Tropical Africa observed a systematic bias towards plan optimism, weak correlation between planned and actual macroeconomic variables, especially aggregate growth rates. He also found disappointing results at the level of sectoral planning for agriculture, transport and communication, education, health and urban development with only manufacturing showing significant positive correlation. He then concluded that: *"planners had paid far too little attention to market forces when determining their sectoral targets, that this had made it impossible for the plans to be implemented successfully, and that if sectoral targets could not be achieved it was logically impossible for main targets to be achieved either"*.

Newman (1964) in the study of foreign investment and economic growth; The case of East Africa, notes that no matter how vigorously resource mobilisation is pursued on the home front, there being many obstacles on the way, there is likely to remain for the foreseeable future a need to obtain resources from abroad. That is, if the process of rapid economic growth is not, to impose intolerable strains on the local population. Though the study concludes that it is virtually important that East African governments should have as long and clear a warning as possible of the likely need for foreign funds (to support current development plan), makes no attempt to forecast or even project the probable supply of foreign funds over the decade (1963-1970). The reason being that this would depend on so many assumptions regarding foreign private investment, the cause of world interest rates, and the willingness of outside agencies to supply aid. That such an attempt would be even more speculative than the exercise carried out in the study. The study however emphasises the role of foreign private investment while at the same time points at how unreliable it is for economic growth and development.

Feltenstein, (1986) in the study of 'Financial Crowding Out' analyses the extent to which public spending crowds out private production and capital formation. The analysis is carried out within the context of an inter-temporal general equilibrium model, and a computational version of the model is developed and applied to Australia. The approach is especially relevant for policy analysis because it allows the consideration of desegregated fixed measures, such as changes in individual tax rates, and at the same time incorporates macroeconomic aspects of fiscal policy. Such aspects include rules for deficit financing and the interaction between government deficits, interest rates and inflation. By desegregating the private sector, a comparison can be made about the extend to which individual industries are affected by public sector spending.

The results of Feltenstein's study emanated from two counterfactual simulations. The first simulation assumed that a change in government expenditure as a percentage of GDP has risen by 10% (between 1981 and 1982, 1981 being referred to as the benchmark) after which both real and nominal interest rates increased sharply in response to higher government deficit financing. As expected, the rate of inflation rose, trade balance and budget deficit deteriorated, rate of growth in real GDP rose whereas gross private investment remained approximately constant as percentage of GDP. Observing the equilibrium relative prices for factors and financial assets, one can see the reason for the apparent absence of crowding out. The second simulation assumed that government's expenditure on goods and services stays the same in real terms as in the benchmark case but the government's rule for financing its budget deficit changes, such that 100% of the deficit will be financed by the sale of bonds so that the deficit is not monetised. Under this assumption, it was simulated that the growth rate of real GDP is 3.4% or approximately what it was in the benchmark case; the nominal and real interest rates rose, the later somewhat more than in the case of increased government spending; gross private investment as percentage of GDP fell in both years compared with benchmark case. This is mainly because there had been insufficient demand stimulus and corresponding increase in returns on capital to out-weigh the increased interest costs to investors. Thus moderate degree of crowding out of the private sector does take place under a government deficit wholly financed by bonds.

Feltenstein's model presents a case which can easily be found in many developing countries such that private investment is financed wholly by debt and competes for private savings with government debt, which is issued with money to finance the deficit. Exchange rate is fixed and capital flows are assumed to be exogenous.

In a 'A Re-examination of the Mckinnon-Shaw Hypothesis, Molho (1986), observes that the positive relationship between demand for capital and the rate of return on deposits is

a direct result of the conduit role of deposits. In his examination of Mckinnon (1973), Molho notes that a rise in deposit rate raises the quantity of funds available for investment in the second period without leading to a substitution away from capital and into deposits⁴. From the analysis, the change in deposits resulting from change in rate of return on capital may be positive or negative whereas $dk/\partial r_d$ is always positive⁵. On the other hand, the examination of Shaw (1973) reveals that the availability of external financing does not affect the results (by Mckinnon) with respect to demand for physical capital which continues to be positively related to the deposit rate even when loans account for a large share of the financing of physical capital. This is in respect to the assumption that actual borrowing is not affected by interest rate changes when there is excess demand for loans. As long as the rate of return on capital exceeds the loan rate, the investor wishes to borrow as much as he can and is restricted to the maximum amount of loans available to him. However, if interest rate rises sufficiently for the loan rate to exceed the rate of return on capital, then borrowing no longer becomes worthwhile and this degenerates to that of pure self-financing.

One of the major results of Mohlo's study is that the Mckinnon-Shaw approaches⁶ complement each other because most projects are financed in part with own funds and in part with borrowings. This study illustrated how the two views can be integrated without altering their basic conclusions. For instance it is clearly shown that when physical capital is lumpy, deposits may serve as a 'conduit' for its accumulation and high deposit rates may stimulate investment even if they do not encourage saving. Negative real deposit rates may thus constitute a tax on saver-investors that decreases the amount of internally generated resources

⁴ The implicit assumption here is that return on deposits (r_d) does not rise enough to overtake return on capital (r_k). If $r_d > r_k$, then the model implies that all wealth is shifted into deposits and that investment in physical capital falls to zero. This is one of the points emphasized by Khatkhate (1980)

⁵ This result confirms Mckinnon's complementarity hypothesis. It should be emphasized, however that this is a peculiar sort of complementarity because it refers to assets that are held at different points in time.

⁶ Mckinnon (1973) focused on the link between internally financed investment and deposit rate whereas Shaw (1973) highlighted the importance of financial deepening and external financing.

available for investment. The other side of this tax of course is the corresponding subsidy to borrowers that have access to artificially cheap credit. The net effect of interest rate changes on aggregate investment then depends on the fraction of the total investment that is financed by credit⁷. In addition, the theoretical model presented by Mohlo suggests that interest rates affect expenditure-saving decisions through a complex and possibly very long lag. In the presence of inflationary uncertainty, the ex ante current real deposit may be a function of ex post past rates, further complicating the lag structure.

Khan and Reinhart (1990), in the study of private investment and economic growth in developing countries observe and note that popular growth models that relate the rate of growth of output to the rate of capital formation among other factors such as labour force growth, imported inputs and technical progress, make no distinction between the private and public components of investment. Therefore it is not possible to determine if policies designed to encourage private investment will necessarily help the growth rate. The study's model specification was as follows;

$$y = A f(K, L, Z) \dots\dots\dots(1)$$

Where y is the level of output; K is the stock of physical capital; L is the labour force; Z is a vector including other factors and A measures factor productivity.

However, the final estimated equations included imports and exports as follows:

$$\Delta y/y_{-1} = \beta_0 + \beta_1 I^p/y_{-1} + \beta_2 I^s/y_{-1} + \beta_3 \Delta L/L_{-1} + \beta_4 \Delta X/X_{-1} \dots(2)$$

$$\Delta y/y_{-1} = \beta_0 + \beta_1 I^p/y_{-1} + \beta_2 I^s/y_{-1} + \beta_3 \Delta L/L_{-1} + \beta_4 \Delta M/M_{-1} \dots\dots(3)$$

Where X and M refers to exports and imports respectively, and β is the parameter (coefficient).

⁷ For systematic analysis of how the effects of interest rates on investment depend on the debt-equity ratios of firms, see Suundarajan (1987).

The empirical results show that where both private and public investment are included, private investment contributes about 43% to average growth. Conversely, the contribution of public investment is negative as was expected since the estimated coefficient of public investment was negative in the regression. However, when public investment is dropped from the equations, there is an increase in the contribution of private investment and of exports and imports. These results as much as they reflect on the importance of private investment, they also throw some light on the crowding-out effect of the private sector by the public sector.

Green and Villanueva (1991), in the study of private investment in developing countries quotes the IMF (1989) to stress the point that since the beginning of the 1980s developing countries have experienced a pronounced slowdown in economic growth. That the growth rates of real gross domestic product, which for all developing countries averaged 5.5% a year during 1971-80, averaged by 3.3% a year during 1981-1989. The study further notes that high among the reasons for this slowdown has been a decline in investment rates, which have been shown positively and significantly related to real growth rates in a large sample of developing countries. Gross capital formation in developing countries declined from an average of 26.5% of GDP during 1981 to less than 23.5% during 1985-88. However, the study notes that the importance of public sector investment has been underscored during the 1980s as the adoption of adjustment programmes led many developing countries to reduce public sector investment activity as a way to cut fiscal deficits.

Servén and Solimano (1992), observes that since the outbreak of debt crisis in 1982, both public and private investment in developing countries have slowed down sharply and that this decline has been accompanied by slowed growth. The study further notes that a resumption of growth will require a robust response of investment to macroeconomic adjustment and reform - particularly by the private sector that is expected to play a key role in

market oriented reforms. The study observes that though private investment did show signs of recovery beginning 1987, public investment rates have continued to decline. In summary the study depicts that private investment responded positively to SAPs, though slow and weak often-lacking adjustment measures by more than 5 years. Also they concluded that the continued decline in public investment has led to a contraction in public infrastructure expenditures which has had adverse implications for both medium-term growth and private capital accumulation, given the complementary relationship between private and public infrastructure investment.

In investigating the contribution of investment to growth, Levine and Renelt (1992) tested alternative specifications of growth process to find the one that is least sensitive to changes in additional variables to sample of countries, and to the choice of periods. They found that the only robust regressor, across countries and time is the ratio of physical investment to GDP. This result is supported by empirical analyses of growth determinants for different regions of the world. De Long and Summers (1991, 1993) desegregate investment into structures (construction and equipment components). While using a sample of both developing and industrial economies, they find that equipment investment contributes much, more to per capita GDP growth than does structures investment. This conclusion agrees with the notion that technological progress is largely embodied in new machinery.

While analysing the implications of exchange rate flexibility for the patterns of domestic and foreign direct investment, Aizenman, (1992) observes that the decades of the 1970s and 1980s had been characterised by growing integration of capital markets and a substantial increase in the importance of gross foreign direct investment flows. This period had also been characterised by the co-existence of various types of exchange rate regimes. For instance, European countries adopted fixed or pegged exchange rate system to minimise fluctuation in their bilateral exchange rates whereas USA, Japan, and Canada stayed with

flexible exchange rates or crawling peg system. The study used a macroeconomic approach to address the behaviour of foreign direct investment, building on the micro behaviour of producers. Such approach is useful for highlighting the feedback between shocks, the behaviour of economic agents and the adjustment of macro variables.

The microanalysis of foreign direct investment leads to the conclusion that if fluctuations in the real exchange rate are large enough, a corporation will benefit by expanding production and employment in the country experiencing a decline in its real exchange rate. Finally, following Aizenman's study, it is concluded that, the logic of the macro approach is consistent with the micro analysis of foreign direct investment, as long as it is recognised that monetary shocks may lead to results that are outside the micro content, and that the flexibility of real exchange rate differ from that of nominal exchange rate.

Schmidt-Hebbel et al, (1996) in a policy oriented review of recent theoretical and empirical work on the determinants of saving and investment and their link to growth notes that *"the strong association between gross domestic investment ratios and long-term growth performance is well established."* The review gives a good example, of East Asia, as having been the most successful region during the past thirty years in achieving rapid and sustained growth. These economies have been able to maintain rates of GDP expansion on the order of 7-8 percent a year, supported by rates of gross capital formation of about 30 percent of GDP; this high growth and high investment have thus gone hand in hand. However, the neo-classical growth theorists of 1960s and 1970s challenged this critical role of investment in the growth process. The neo-classical (Solow, 1956) model asserts that *"Capital accumulation affects growth only during the transition to the steady state, long-term growth is determined only by the rate of technological change, which is assumed to be exogenous."*

This view was criticised (Kaldor 1957, Robin 1962) on the grounds that the separation between investment and innovation (technological change) was artificial, because most

technological innovation is embodied in new machinery and equipment, a notion that dates back to (Young 1928 and Schumpeter 1934) neo-classical economists. Growth-accounting exercises based on the neo-classical model appear to confirm that cross-country differences in investment ratios explain only part of the differences in growth during long periods and that technological change might play a leading role in long-term growth. Therefore, since the arithmetic of Solow model does not provide the strong correlation between investment ratios and growth performance, recent work on this issue has brought capital accumulation back to the centre stage, suggesting an enhanced, albeit less direct role for investment as a principle determinant of growth.

Following the above reasoning, three lines of research have evolved. First, that which considers the complementarities between investment in physical capital and in human capital. Here, it is argued that new technologically advanced equipment requires operators with adequate skills and education. The identification and design of profitable and innovative investment projects require resourceful, skilled entrepreneurs with awareness of business opportunities. Similarly, Mankiw, Romer, and Weil (1992) extend the Solow model to include human capital. Assuming that accumulation of physical capital guides the accumulation of human capital, they find that investment performance can account directly and indirectly (through the parallel accumulation of human capital) for the bulk of the variation in growth across countries.

Second, the line of research that emphasises the close links between the accumulation of physical capital and technological change. If productivity growth is endogenous, rather than exogenous and is related to the accumulation of physical (or human) capital, an increase in the rate of investment can raise the rate of growth in the steady state. This thinking again has old roots most notably the "vintage capital" extension of the neo-classical model in which technological progress is embodied in successive generations of capital equipment of

increasing efficiency, and in Kenneth Arrow's "learning by doing" model, which makes society's stock of knowledge dependent on cumulative gross investment.

Third, documentation of the correlation between technological progress and investment. De Long and Summers (1993) estimates the determinants of total factor productivity for a large sample of developing countries and shows a positive and statistically significant correlation between total factor productivity growth and the ratio of investment to GDP. Also it is here argued that if all firms benefit from country-wide technological progress and if that progress is driven by aggregate investment, capital accumulation by any one firm will benefit other firms, creating an externality that opens the gap between the private and social returns to investment. In this vein Romer (1987) estimates that the social marginal product of capital may be more than twice as high as the private marginal return.

Guillaumont, Jeannery and Varoudakis (1999) assessed the prospects for growth of African economies upto the year 2010 by modelling structural and policy determinants of growth. They estimated a growth model for 39 African economies during seven five-year periods from 1960 through 1995 with emphasis on two engines of growth- investment and growth of exports.

However, their estimated growth regression confirmed the vigorous positive effect of investment and exports. On the other hand, their investment regression confirmed the positive influence of factors related to exposure to foreign competition and to the availability of core infrastructure. It however showed a weakly positive evidence of the effect of human capital and financial development. In addition, the investment regression confirmed the harmful impact of capital market related distortions and of political instability.

Dollar and Easterly (1999), observes that, economists suggested that growth was proportional to investment by a constant that was reciprocal of the incremental capital output ratio (ICOR). That, investment was low because of low domestic savings in Africa, but

donors' aid could finance additional investment. This implied that increasing aid financing would increase investment, which would increase growth. But, however, donors added the conditionality that additional domestic savings would match aid increase, making possible a greater than one-for-one increases in investment when aid increased.

They further observed that the expressions of confidence in a short to medium-run relationship between aid, investment and growth are still surprisingly widespread, especially in work on Africa. The authors went further to quote (IMF, 1992, pp.18): "*Africa's economic performance is expected to improve in 1992-1993*", but the improvement in these two years hinged on among other things "*the increase in investment that is needed to promote economic growth*". Others put it, "*the adjustment experience of sub-Saharan Africa has demonstrated that to achieve gains in real per capita GDP, an expansion in private saving and investment are key*" (Hadjimichael et al 1996 pp.1).

They note that investment depends on aid and growth depends on investment under the hypothesis that aid, investment and growth jointly evolve. The results of the aid to investment link revealed that aid does not evolve hand in hand with investments. On the other hand, results for investment to growth link revealed that in most countries, investment and growth evolve, - in a number of them not so robust a relationship though. Conversely, some other studies have shown that causality goes from growth to investment rather than from investment to growth (Blomstrom et al 1996).

UNIDO (1999) in the "African Industry 2000: The challenge of going global" notes that industrial growth and diversification require improved investment performance. Indeed adequate and inappropriate investment has contributed to the weak growth record of sub-Saharan industry. The report further observes that investment response of private industry to macroeconomic reform has been disappointing. This is partly due to the sharp fall in public sector investment and the deterioration in the region's physical infrastructure that has

impeded private sector investment. It however, also notes that in general, public investment in physical infrastructure, training, skills development and governance "crowds in" private sector investment.

The UNIDO study notes that the relatively high capital-output ratios of sub-Saharan industry illustrate the relative inefficiency of investment in the region. Private capital flows play an important role in financing industrial growth but in particular in transferring technology and expertise, providing market access and establishing strategic alliances for greater participation in the globalisation process at the enterprise level.

It is also observed that since the new economic policy outlined in the Sessional Paper No.1 of 1994, most efforts were directed towards market incentives and the "self-motivation" of private enterprise. Tariff reform was to be an essential step in rationalising the manufacturing sector, while special assistance would be provided to the small-scale and '*jua kali*' enterprises sector. The report refers to a 1993 World Bank report that suggested that, Kenya needed to accelerate its GDP growth rate to 7% a year during the 1990s to reduce urban unemployment and raise rural incomes. In such cases, the strategy required is an increase in both the investment rate to 26.2% of GDP from 23% at the end of 1980s and investment efficiency so that the incremental capital-output ratio (ICOR) be lowered to 4 from around 6.5. These targets require a raise in domestic savings levels while pursuing an export-led growth strategy. On the other hand it refers to the African Competitiveness Report (1998) which identifies the weak infrastructure, corruption and crime and policy instability as the main constraints on the Kenyan economy.

While considering issues of financing and investment, the UNIDO report notes that inadequate and in appropriate investment has contributed to sub-Saharan Africa's lack-lustre growth record. It observes that this can be attributed to two main reasons. First, that private enterprise's response to macroeconomic (and political) reform has been disappointing in

many African economies. Second, that fiscal constraints have forced governments to economise on investment, especially in physical infrastructure and in institutional capacity (see table 4.below).

Table 3: International Comparisons of Savings and investment, 1990-1997

Item/Region	1990-1994	1995-1997
INVESTMENT		
Sub-Saharan Africa	16.4	16.9
Western Hemisphere	20.2	20.5
Asia (excluding Japan)	27.2	28.7
NIAE*	31.4	31.9
Industrialised Economies	20.9	20.7
PRIVATE INVESTMENT		
Sub-Saharan Africa	11.6	12.3
Western Hemisphere	15.3	15.4
Asia (excluding Japan)	18.6	20.3
NIAE*	24.4	25.2
Industrialised Economies	16.9	17
DOMESTIC SAVINGS		
Sub-Saharan Africa	15.7	16.1
Western Hemisphere	18.2	18.2
Asia (excluding Japan)	30.9	33.2
NIAE*	33.7	32.9
Industrialised Economies	20.6	21.1

NIAE= Newly Industrialised economies of Asia

Source: IMF Africa Development and World Economic Outlook Database, 1998

Table 3 compares recent investment performance in sub-Saharan Africa with that in other developing regions and also reveals that savings, total investment and private sector investment have all been lower than in the four other geographical regions.

Table 4: Investment in sub-Saharan Africa, 1975-1997

Type of Investment	1975-1984	1985-1990	1990-1997
Gross Private Investment.	10.3	10.1	12.1
Gross Public Investment.	12.6	7.7	6.0
Gross Domestic Investment.	22.9	17.8	18.1

Source: World Bank, African Development Indicators 1998/1999

3.1 DETERMINANTS OF PRIVATE INVESTMENT

Private investment plays an important role in developing countries for the same reasons that it does in industrial countries (Agénor and Montiel, 1996). Investment determines the accumulation of physical capital and is thus an important factor in the growth of productive capacity. The above authors further point out that since investment is a forward-looking activity with irreversible aspects, it tends to be a volatile component of aggregate demand. Traditionally, the association between capacity growth and physical capital accumulation has been viewed as very close and even much more recently as a response to the collapse of private capital formation in many heavily indebted countries during and in the aftermath of the international debt crisis.

According to Agénor and Montiel. (1996 pp.82), though a lot of importance has been attached to investment in developing countries, relatively little empirical work has been done on the determinants of private investment in these countries. This may be due to either the scarcity of data or the overemphasis on public enterprises given the large role of non-financial public investment or the need to reformulate investment theories developed for industrial countries to fit the circumstances typical of developing countries.

However, in spite of the above observations, evidence of the empirical investment functions for some countries has been carried out. Most notable among these are those by Chhibber and Dailami (1993) and Rama (1993). For instance, from Rama's studies the following conclusions emerge:

Aggregate demand plays an important role in driving private investment. This is consistent with standard industrial country 'flexible accelerator' specification.

Relative factor prices (user cost of capital, the wage rate, price of imported inputs) enter the stock version of the investment function (Shafik, 1992). The results so far obtained imply that little information is available at present on the effects of financial variables on capital

formation through user cost of capital in developing countries, which is a key link between financial markets and real economic activity in industrial-country macroeconomic models.

The link between the financial system and private investment behaviour is established in the studies surveyed through credit variable, which is typically included in investment functions for developing countries to capture the effect of financial repression. This variable has most often been statistically significant with expected sign (Leff and Sato, 1988; Oshikoya, 1994).

Indicators of foreign exchange availability (stock of foreign exchange reserves or dummies for import controls) were included in some of the empirical investment functions and always behaved as expected. However, according to Rama (1990), their interpretation is problematic as they could simply proxy for sound and unstable domestic policies.

A number of studies have examined the issue of substitutability-complementarity between private capital and public capital stock, a number of them found positive role for the public capital stock. Studies like those of Sundarajan and Thakur (1980) and Wai Wong (1982) came up with inconclusive results while attempting to gauge the effect of total public sector investment on private capital formation. Cardoso (1993), Bleaney and Greenway (1993 a), Oshikoya (1994), Ramirez (1994) and Shafik (1992) have identified a positive effect of public investment on private capital formation. It is however worth noting that when a distinction is made between infrastructure and other types of public investment, more significant results are obtained. For example, Blejer and Khan (1984) pooled a sample of twenty-four developing countries for the period 1971-79 and showed that for 1\$ increase in real infrastructure public investment would increase real private investment by 0.25\$. An equivalent increase in other forms of public investment would reduce real private investment by about 0.30\$. These results are consistent with the hypothesis that infrastructure investment is complementary to private investment, while increase in other types of government investment tend to crowd out the private sector.

Studies have also provided evidence of the negative effects of macroeconomic instability on private investment. Rodrik (1991) provides evidence to show that uncertainty on the part of economic agents regarding the government's future intentions affects investment behaviour in developing countries. Aizenman and Marion (1993) obtained similar results while examining a sample of forty developing countries, covering the period 1975-85. Larrain and Vergera (1993) have argued that real exchange rate variability (a popular measure of macroeconomic instability) has an adverse effect on private capital formation.

External shocks and debt overhang have also been shown to greatly impact on private investment in countries the world over, but more so in developing countries. Cardoso (1993) and Bleaney and Greenaway (1993 a) have shown that fluctuations in the terms of trade also affect private investment through their effects on real income and the profitability of the export sector. Cardoso (1993), Fitzgerald et al. (1994), Green and Vallinueva (1991), Oshikoya (1994), and Schmidt-Hebbel and Muller (1992) have found a significant negative effect of the debt-output ratio on investment, thus providing support for debt overhang effects. On the other hand, Cohen (1993) observes that the stock of debt itself does not appear to have had a significant influence on investment in the 1980s but that debt service may have crowded out investment. Empirically, Cohen finds out that a transfer of 1% of output to external creditors by rescheduling in 1980s reduced investment by 0.30% of output.

As for financial repression (macroeconomic effects), studies have examined in detail the aspects of savings and interest rates. On the overall it has been observed that regardless of the direction of the effect of savings, interest rate ceilings introduce a wedge between the social and private rates of return on asset accumulation, thereby distorting inter-temporal choices in the economy. Similarly, the portfolio effects of such ceilings are conducive to financial disintegration. This is because savers are induced to switch from the acquisition of claims on the banking system to accumulation of real assets traded in the informal markets and foreign assets.

But, it should however be noted that the induced incentive to real assets however, does not imply the achievement of high levels of investment.

Evidence of the above has however been given. For instance Feldstein and Horioka (1980), argued that examining the degree of correlation between savings and investment rates could test the degree of capital mobility among industrial countries. This follows the reasoning that under perfect capital mobility, domestic savings and investment rates should not be correlated. Such tests have been carried out, for instance by Dooley et al. (1987) and Summers (1988) who included a number of developing countries in their cross-section samples and considered the effect of including such countries and their results. Interestingly enough, they concurred in finding that the inclusion of developing countries reduced the strength of the savings-investment correlation in their samples. These results were unexpected since it was a priori perceived that countries are less integrated with world capital markets than industrial countries. However, Wong (1990) and Montiel (1994) in their separate studies seem to concur with the above results. For Wong, the savings ratio was found to have no statistically significant effect on the investment ratio while Montiel concluded that, "*while the degree of financial integration differs markedly across developing countries, financial links with the world capital markets can be documented for such countries*".

The studies by Chhiber, et al (1993) however came up with almost similar results as those discussed above. Most notably, their studies came up with four key issues; one, the impact of changes in exchange rates, a crucial variable in restoring external balance on the evolution of private investment in LDCs; two, the crowding-out of private activity as a result of government borrowing in domestic financial markets through interest rates or quantity rationing; three, whether government spending, particularly that on investment 'crowds-in' or 'crowds-out' private investment; and four, the effects of uncertainty in determining the response of private

agents to changes in the incentive structure. They observed that where policies are volatile or unsustainable and where a debt overhang exists, private investment suffers.

According to the 1998 African Competitiveness Report (World Economic Forum), some of the most important factors determining investment decisions (by foreign-owned firms) in Africa are political stability, predictability and reliability of government policies and regulations, inadequate infrastructure and corruption. Similarly, the 1997 African Competitive Report noted that the most important influences determining Foreign Direct Investment (FDI) in any country are: first, size of the national market; second, expected market growth rate in the target economy; third, ability to repatriate capital and profits; fourth, productivity and work habits of workers and; fifth, infrastructure.

The African Competitive Reports further notes that the often advocated industrial policy interventions, such as reduced corporate tax rates for specific activities, subsidised loans, tax holidays and other investment incentives appear to have little impact on FDI. Upstream government activities such as public investment in education and infrastructure that "crowds in" private sector investment by reducing costs and raising productive efficiency was shown to attract FDI.

Servén, (1998) presented a thorough empirical assessment of investment-uncertainty link in developing countries. The paper however notes that, relative to analytical literature, empirical studies on uncertainty and investment are less abundant. In many cases it is not clear whether any empirical association between uncertainty and investment reported by these studies operates directly or through third-variables relevant for investment (such as output growth or the cost of capital), and whether such association can be given a causal interpretation. Hence Servén in this paper attempts to provide a re-examination of the link between macroeconomic uncertainty and aggregate private investment by separating simple variability from uncertainty.

The author assesses their (macroeconomic uncertainty and variability) impact on private investment performance using an econometric framework encompassing other conventional determinants of investment and applying a range of estimation techniques that control for issues such as simultaneity and parameter heterogeneity. The final model for estimation was of the form:

$$I_{it} = f(I_{t-1}, X_{it}, \sigma_{it}) + u_{it}$$

where I is the log of private fixed investment at constant prices, X is a set of standard private investment determinants. σ is a set of uncertainty indicators, u is a random disturbance. Subscripts $i=1, \dots, N$ and t, \dots, T respectively refer to cross-section and time series dimensions (for description of these variable sets- X and σ , see Servén, 1998).

The overall estimation yields satisfactory results concerning the standard investment determinants (negative – for relative price of capital goods, interest rate; positive – GDP and credit to the private sector). All uncertainty variables came out with significant negative signs indicating that the relationship is causal rather than merely coincidental; thus, higher uncertainty leads to lower private investment.

3.2 STUDIES ON PRIVATE INVESTMENT BEHAVIOUR IN KENYA

Studies on investment behaviour in Kenya are few. However, Kenya has been included in some of the cross-country studies mentioned earlier such as by Blejer and Khan (1984), Green and Villanueva (1991), Oshikoya (1994) and the various United Nations (UN) studies and reports. In these studies, Kenya is just one of the countries pooled from the group of developing or African countries as the case may be. It is therefore impossible to isolate the Kenya-specific determinants of investment behaviour from these studies.

Bevan, Collier and Gunning (1990) used a Computable General Equilibrium (CGE) model to analyse the fiscal responses to the commodity boom in Kenya. Specifically, they

focussed on the coffee boom of 1976. Their model incorporates both the neo-classical features of optimisation and the key structural features of the Kenyan economy. The structural features include price and wage inflexibility, imperfect rural financial markets and fixed supply of land. Their analysis points out that government spending and foreign borrowing increased following the coffee boom. The net effect on capital formation was negative. Capital formation was reduced by over 65% between 1976 and 1979. Other boom induced were increases in prices of non-traded goods and real private investment. Following the analysis, they concluded that the increase in private investment was, however, inefficient, largely because of the government controls on private sector spending.

Wachira (1991), however, examined the effect of increased public investment on sectoral and aggregate private investment by estimating a private investment function for both the whole economy and specific sectors. The results for the aggregate investment model indicated that the level of domestic credit and past investment affect private investment. Public investment however, had a positive but insignificant effect on private investment. This result indicated that the evidence for complementarity between these two forms of investment was weak.

Another study of aggregate investment behaviour in Kenya by Matin and Wasow (1992) sought to explain the behaviour of aggregate private investment over the adjustment period through policy simulations. A private investment function was estimated in which domestic credit, foreign exchange reserves, the stock of infrastructure and the real exchange rate were explanatory variables. All these variables had significant positive impacts on private investment, with the stock of public infrastructure having the greatest impact. The study also found that the real interest rate had a significant, negative impact on private investment. The model used, however, did not examine the effect of debt overhang and uncertainty on the behaviour of private investment.

Bwire, (1992) in a study on the interactions between savings, investment and growth estimated a private investment function for Kenya which revealed that private investment was influenced by the rate of growth of GDP, the rate of inflation and external debt service. Though innovative in introducing the external debt element, Bwire's use of external debt service rather than the external debt stock may have tilted the study towards the short-term fluctuations of the former ratio to which investors may not necessarily respond, given their long-term focus.

Mwau and Handa (1995) developed and estimated a private investment model based on the neo-classical framework of intertemporal dynamic optimisation of the present discounted value of expected profits, subject to the underlying technology. According to them, the most usual formulation under this framework is as follows:

$$\text{Max.: } \int_0^{\infty} e^{-it} [P \cdot Y - W \cdot N - P^1 \cdot I] \Delta t$$

$$\text{Subject to: } Y = F(K, N).$$

Where P^1 is the price of investment goods, P is the GDP deflator, Y is domestic value added W is nominal wage rate, N is the labour, I is total investment and K is the stock of capital.

With regard to views about adjustment costs (Zagame, 1977) and the general specification of (Muet, 1990), they further developed and estimated an additive log-linear relationship of the form:

$$(I/K)_t = a_0 + a_1 Y_t^e + a_2 (P^k/W)_t^e + a_3 I_t^g + a_4 R_t^e + a_5 IM_t + \zeta_t$$

Where Y^e is expected sales, $(P^k/W)^e$ is expected relative factor prices, I^g is government investment, R^e expected real exchange rate, ζ is white noise and IM represents the capacity of the economy to import and is defined as the total value of export earnings deflated by the import price of index. This variable is used as a proxy for variables like foreign exchange constraints, availability of credit and profitability.

The results showed that the expected sales variable is strong at 2.83 and significant at 5% level. The capacity to import variable is positive and statistically significant indicating the crucial importance of exogenous effects such as foreign exchange shortages and increases in the price of imports in determining investment in Kenya. These results concurred with those of (Coughlin and Ikiara 1988) the Industrial Research Project of University of Nairobi (UON). Their findings showed that the two main constraints on investors' decisions to invest were foreign exchange availability and expected sales. On the other hand, the effect of government investment on private investment was negative, thus concurring with Ndegwa Commission report (1982) on consequences of high government deficits on private investment.

From the literature review, at least two important lessons can be learned. First, it is evident that the traditional models of investment are not appropriate for capturing the determinants of private investment in developing countries. This assertion follows the observation that even those models so far studied show some weaknesses. Such weaknesses include not being able ^{to} capture all the variables, a number of them do not span periods long enough to capture the long-term influences. Furthermore, none of the private investment literature examined has tried to analyse both the long-run and short-run dynamics and they would be associated adjustment mechanisms towards equilibrium. Lack of this aspect of analysis renders most of the literature and analysis not comprehensive enough to holistically explain the behaviour of private investment.

Second, combining observations from various studies, it becomes even more clear that adjustment to the changing global environment of the 1990s and beyond requires recovery of private investment that leads to higher efficiency of resource use and services. Overall, private investment in developing countries is a necessity to boost economic growth and employment creation, which is ultimately, a sure way of tackling poverty and other

problems facing these economies. In order to achieve this we need to make efforts to find out factors that influence private investment which, can be used as policy variables for fine tuning the investment environment. This can only be achieved through a methodology that ensures a fair level of efficiency and accuracy, consistent with both economic theory and empirical practices. It is in view of these lessons that the methodology for the examination of the major determinants of private investment will be discussed in the next chapter.

CHAPTER 4

METHODOLOGY

This chapter will examine the theoretical fundamentals assumed to be the pillars of the empirical analysis hence the study. In section 4.0 we explain sources and measurement of data. The issues bordering on the theoretical framework will be examined in section 4.1. In section 4.2, we describe the analytical techniques and specify the private investment function while in section 4.3 we present econometric analysis. Section 4.4 will present the interpretation of the results.

4.0 SOURCES, MEASUREMENT AND LIMITATIONS OF THE DATA

The study will cover the period 1970-1997. The main sources of data used in the empirical analysis were International Financial Statistics of the IMF and the World Tables/African Development indicators of the World Bank (various issues).

The annual time series data for gross private investment, public investment and gross domestic savings as ratios of GDP were obtained from the World Tables/African Development indicators, various issues. Private investment as used in our study consists of private fixed capital formation plus net changes in the level of inventories. Precisely, it includes improvements in land, dwellings, machinery and other equipment [African Development Indicators, (1998)]. By definition, public investment represents government capital expenditure net lending. Such expenditure include payments for acquiring land, buildings, infrastructure and other non-financial assets to be used for more than one year in the process of production. Gross domestic savings is calculated by deducting total consumption from gross domestic product i.e. that part of GDP that is not put to final consumption. However, the figures for Gross domestic savings were got directly from the African Development indicators published by the World Bank.

GDP growth rate series was calculated using the real GDP figures from the IMF's International Financial Statistics (1998). The growth rates as calculated conform to those calculated and used in statistical abstracts and studies e.g. Mwau (1995) respectively. The debt service ratio as used was calculated as a ratio of debt service to exports of goods and services. In which case, debt service refers to the principal repayments and interest payments. The figures for debt service were got from the World debt Tables of the World Bank.

The uncertainty variable was derived as the standard deviation of inflation. Inflation is often taken as a summary measure of the overall macroeconomic stance and hence its variability or volatility can be viewed as an indicator of overall macroeconomic uncertainty (Servén, 1998 and Eberly, 1993). The theoretical assumption that the volatility of inflation would affect private investment emanates from the fact that inflation is related to the aggregate profitability of capital. Inflation itself was calculated as the annual percentage change in consumer price index, which was got from the IFS (1998). The uncertainty variable was then generated as the first difference of the log of inflation and henceforth referred to as 'inflationary uncertainty'. This method of generating inflationary uncertainty is inferred from Servén, (1998) who carried out an extensive assessment of investment-uncertainty link in developing countries.

4.1 THEORETICAL FRAMEWORK ON FACTORS INFLUENCING PRIVATE INVESTMENT

There are two major and interrelated theoretical issues that emerge in an attempt to pursue this kind of study. They are the theoretical underpinnings of the model/function and the list of factors to consider as influencing private investment.

First, traditionally, specification of investment functions follow either the stock or flow approach (Abel, 1990). The stock (neo-classical or flexible accelerator) approach presupposes that installed capital is available at a price. Given an initial capital stock,

investment represents a gradual adjustment of the actual to the desired capital stock and adding to this an amount of replacement investment that is proportional to the initial capital stock derives gross investment. Under this specification, determinants of investment include expected future values of aggregate demand, user cost of capital, wage rate, initial capital stock etc.

On the other hand the flow approach postulates the existence of a convex function that measures the total cost of achieving the level of gross investment. Under this approach, determinants of investment include marginal value of Tobin's q and the parameters of the adjustment-cost function.

Our model specification will try as much as possible to adopt the neo-classical flexible accelerator approach. The traditional view of this approach assumes that capital stock in the current period is derived from the requirement that the present value of the marginal productivity of capital at the exogenously given interest rate should be equal to the purchase price of capital in the previous period. This can be expressed as:

$$\delta\pi/\delta K_t = K_t(P_t, W_t, P_t^E)/i_t = P^K \dots\dots(4.1)$$

where π is profit, K is capital stock, P is price of output, W is nominal wage rate, P^E is price of imported inputs, i is the world interest rate and P^K is price of capital. At equilibrium, investment will be undertaken up to the point where the rates of return in both the sectors are equalised. Given our assumption that real investment augments capital with a lag of one period, the capital stock in the current period can be expressed as follows:

$$K_t = K_{t-1} + I_{t-1} \dots\dots(4.2)$$

where I is total investment. Given the initial capital stock K_{t-1} , its rate of depreciation δ and the optimal capital stock K_t as determined by equation (4.1) for current period, investment in the previous period is determined by:

$$I_t = K_t(P_t, W_{t-1}, P_t^E, P_{t-1}^K, i_t) - (1-\delta)K_{t-1} \dots\dots\dots(4.3)$$

In the case of developing countries such as Kenya, investment would be subject to a number of constraints that do not appear in the theories cited above. Relevant may be the equilibrium approach, which identifies two steps in the investment decision making process. This way, the first one would be a decision to increase productive capacity and the second, the decision to determine the factor intensity of the investment. The former depends on demand conditions (sales) which determine the level of capacity utilisation while the later depends on relative factor prices.

Second, a handful of studies have been carried out on determinants of private investment. Notable among these is Rama (1990, 1993) and Green and Vallinueva (1991). However, most of the studies so far surveyed failed to consider macroeconomic uncertainty, one of the factors, which of late is becoming very sensitive in investment decisions. Uncertainty in LDCs' set-up is very crucial as it is associated with macroeconomic policy stance, instability, irreversibility and investment risks, which any reasonable investment decisions must consider.

In identifying the possible determinants, we shall consider first, those factors which within the framework adopted above, does any of the following: (i) constitute or contribute to changes in aggregate demand, (ii) constitute or influence the user cost of capital/investment funds, (iii) may lead to risk, instability and hence, uncertainty. It is this principle that guides the selection of determinants listed later in the sub-section dealing with model specification.

4.2 ISSUES RELATED TO EMPIRICAL ANALYSIS AND MODEL SPECIFICATION

In this section we shall first briefly describe the analytical processes and techniques applied to the time series data in sub-section 4.2.1. In sub-section 4.2.2, we will highlight specification and diagnostic tests. We shall then proceed to specification of the private investment function in sub-section 4.2.3.

4.2.1 a) *The Cointegration Technique*

The cointegration technique will enable us to test the time series data for all variables to establish first of all the order of integration of the series and thereafter enable us develop, if need be, the necessary error correction model(s) that can probably improve the efficiency of the model. The details of the technique are elaborated upon in the following paragraphs.

This technique postulates the long-run relationship among a group of time series variables. Variables are said to be cointegrated if they are affected by the same long-run influences. Non-stationary variables may drift apart in the short-run but eventually converge towards equilibrium in the long run (see equations 4.5 and 4.6 below). Cointegration is a powerful and recent econometric technique that allows the econometricians to separate long-run equilibrium relationship postulated by economic theory in general, from their short-run dynamics. The adoption of this technique was a timely and appropriate response to rescue researchers many of whom, if not all, hitherto assumed that time series data were all stationary.

From the end of the Second World War until the economic crisis of the early 1970s, the macroeconomic environment of most countries was relatively stationary. World inflation was low and stable, while income growth, savings, investment and commodity prices fluctuated only marginally. Hence, in these times, the costs of treating non-stationary series as if they were stationary were not great. After mid 1970s, it became increasingly clear that the economic world was not stationary as researchers had thought and these found expression in large fluctuations in macroeconomic aggregates. Thus, inevitably, the costs of inappropriate time-series analyses became more pronounced.

It was mainly in view of the above that many econometric relationships that had been considered well established began to break down and estimated models failed to predict outcomes accurately. A search for a more comprehensive treatment of time-series

characteristics into econometric modelling led to the innovation of the concept of cointegration (see Hendry, 1986; Granger, 1986 and; Engle and Granger, 1987 for an elaboration of the technique).

Time-series as stated above are said to be stationary when they have a constant mean, constant variance and covariance, all of which are dependent on time. This can be established by a unit root test, which will be done, in our study using the Phillip-Perron (P-P) test. It is recognised that even if a set of variables is non-stationary, there may exist a linear combination of the set that is stationary. Such a set would be cointegrated and, require the same level of differencing to achieve stationarity.

The investment function in this study will be run using the Ordinary Least Squares and three different equations will be estimated as follows:

i) for unit root using the Phillip-Perron test. The equation applied to all the series is of the form: $\Delta y_t = \alpha_0 + \alpha_1 t + \alpha_2 y_{t-1} + \varepsilon_t \dots (4.4)$

ii) for the Cointegration regression model using OLS. This equation will be of the form: $y_t = \alpha_0 + \alpha_1 z_t + \varepsilon_t \dots (4.5)$

where y_t is the dependent variable, z is a vector of explanatory variables and; α_0 and α_1 are the parameters of interest. ε is the error term. This equation helps in singling out the presumed long-run influences and the estimation of the residual (ε).

iii) for the error correction model to obtain the dynamic equation over the short-run period. This equation takes the form;

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta z_t + \alpha_2 \text{RESID}(-1) + u_t \dots (4.6)$$

where $\text{RESID}(-1)$ is the lag of the residuals from the levels, equation (4.5).

The error correction model enables us to capture both the short-run dynamic and long run adjustment mechanism. According to the Engle-Granger Representation Theorem, *if a set*

of variables is cointegrated, it will have an error correction mechanism that will ensure an adjustment process in which the errors in the long-run relationship do not grow over time.

Thus, meaning the short-run dynamic relationship will converge with the long-run dynamic relationship by means of an error correction mechanism.

4.2.1 b) *The Johansen Procedure for Cointegration Test*

The cointegration procedure adopted in this study is the Engle-Granger two-step method (Engle and Granger, 1987). The problem with this two-step method, however, is that it assumes the cointegrating vector to be unique. Moreover, there is no way of testing whether this assumption is true or not (Hunt and Lynk, 1990; Chemreza and Deadman, 1997).

Recent work by Johansen (see Johansen, 1988; Johansen and Juselius, 1989a and 1989b) suggest a maximum likelihood approach to this problem. The 'Johansen procedure' provides estimates of all the cointegrating vectors that exist between a set of variables as well as test statistics for determining the number of cointegrating vectors. Hence, in order to check the robustness of the results from the Engle and Granger method, we will use the Johansen test for cointegration (simply, the Johansen procedure).⁸ The assessment of the Johansen test is based on the likelihood ratio statistics that are computed by the Johansen test procedure for each cointegrating equation.

The null hypothesis in the Johansen test is that there are no unique cointegrating vectors among the coefficients (i.e. $CE=0$). In order to confirm the robustness of our results of the Engle and Granger method, we must reject the null hypothesis and accept the alternative hypotheses that indeed there are cointegrating vectors. This is done based on the computed likelihood ratio (L.R), which is based on the eigenvalues of the cointegrating matrix, and generated as part of the test results.

⁸ For technical discussions of the Johansen procedure, see the authors mentioned in the text.

4.2.2) *Specification and Diagnostic Tests*

In addition to the standard tests of significance of the regression (R², D-W/D-h, F-Statistic)⁹, various specification and diagnostic tests will be carried out to check the performance of the estimated equations. These tests provide more information than the standard regression output and are essential in making judgements about the validity of the model.¹⁰ Since the OLS method is based on certain Least Squares (LS) assumptions, it is crucial to know how the model performs in relation to these assumptions. Violation of one or more of the assumptions has implications for the validity and reliability of the results. A number of residual tests, stability tests and forecast tests will be carried out. The results of the various tests will be presented along with the relevant regression results in the section dealing with empirical analysis.¹¹

4.2.3 *Specification of the Private Investment Function*

In addition to the discussions on the theoretical framework in the previous sections and findings from the literature survey, we shall take into account various explicit and intuitive considerations from both economic theory, econometric and statistical inferences as guides towards model specification. Economic theory and investment functions so far surveyed have identified a wide range of factors that influence private investment in developed and developing countries.¹² In view of the fact that all these factors are important in the determination of private investment decisions, a private investment model including all of them would generally appear to be the most appropriate. Such a model could minimise the

⁹ R² is the coefficient of (multiple) determination which measures the goodness of fit; D-W and/or D-h is the Durbin-Watson and the Durbin-h which measures the degree of autocorrelation; and the F-Statistic measures the overall (joint) significance of the explanatory variables in an equation.

¹⁰ According to Adam (1992, pp.16-17), 'there is no ultimate test through which models are unconditionally accepted, although there are tests through which models are unconditionally rejected.' Still on the same subject, Adam quotes Gilbert (1986) who notes that 'the plausibility of a model derives not from the procedure by which it was discovered but from the procedure by which it is validated.' According to Gilbert, the congruency of a model is established (or otherwise) by a battery of tests.

¹¹ Refer to Annex 4 for details on how EVIEWS conducts the tests, the null hypotheses and their assessment.

¹² For explicit discussion of these factors see the section on background and literature survey; *ibid.*

danger of misspecification due to omission of relevant variables. However, we face certain limitations in combining all the variables in a single model since some of them are either interrelated or serve exactly the same purpose. Hence there would be grounds to expect multicollinearity among variables.

The relevant LS assumption relating to multicollinearity is that explanatory variables should not be perfectly correlated (also see Koutsoyiannis (1977, pp.51). Hence we shall only include the most crucial regressors that can reasonably explain the changes in the dependent variable.

Furthermore, in deciding on a model suitable to the purpose of this study, we shall take into account the view of Adam (1992 pp.5) which proposes 'general-to-specific' approach to modelling. He quotes Hendry and Richard (1982) that define a congruent model as one, which is interpretable in terms of structural parameters of interest, data coherent, and where there is parameter stability. Therefore the private investment function is specified as follows:

$$GPI_t = f(GPI_{t-1}, G_t, GGI_{t-1}, GDS_t, GDS_{t-1}, DSR_t, QS_{t-3})$$

where GPI = ratio of gross private investment to GDP, G = growth rate of output (GDP), GGI = ratio of gross public investment to GDP, GDS = ratio of gross domestic savings to GDP, DSR = ratio of debt service to exports, QS = uncertainty associated with inflation and t = time. The above relation can be re-written in a logarithmic form as follows:

$$\begin{aligned} \text{Log}(GPI)_t = & \alpha_0 + \alpha_1 \text{log}(GPI)_{t-1} + \alpha_2 \text{log}(G)_t + \alpha_3 \text{log}(GGI)_{t-1} + \alpha_4 \text{log}(GDS)_t + \\ & \alpha_5 \text{log}(GDS)_{t-1} + \alpha_6 \text{log}(DSR)_t + \alpha_7 \text{log}(QS)_{t-3} + U_t \dots (4.7) \end{aligned}$$

where α_0 is the constant term, $\alpha_1 - \alpha_7$ are the parameters to be estimated ($\alpha_2 - \alpha_7$ are elasticities and α_1 is the partial adjustment parameter), U= the disturbance error term which is presumed to satisfy the least squares assumptions of homoscedasticity, serial independence and a normal distribution.

4.3 ECONOMETRIC ANALYSIS

The software used for estimating the model was EVIEWS (version 2.0) by QUANTITATIVE MICRO SOFTWARE of Irvine, California. The equation was estimated by the ordinary least squares technique with log-linear specification so that the parameter estimates obtained are constant elasticities.¹³

4.3.1 Stationarity Test

The first step in the application of cointegration technique is to establish the order of integration of the variables. This assumes that all the variables have been tested on the levels to show whether they are stationary. In a strict sense, a series is said to be stationary if the joint and conditional probability distributions of the series are unchanged, if displaced. The stationarity of each series was tested using the Phillip-Perron (P-P) unit root test. Despite the options available for the inclusion of either a constant and time trend or none, however, the unit root is a test on the coefficient of the series lagged once (y_{t-1}) in the regression under the null hypothesis that the coefficient equal to one ($\alpha_2 = 1$). The null hypothesis of non-stationarity is rejected if the computed P-P statistic is greater than the reported Mackinnon critical values in absolute terms. Otherwise, the alternative hypothesis of the presence of a unit root cannot be rejected at the conventional levels of significance. The summary of the output from the P-P test is presented in table 5 below.

The results in table 5 demonstrate that all the series are non-stationary at the 5% level of significance. This is indicated by higher Mackinnon critical values than their calculated P-P values in absolute terms. These results imply that the series have unit roots. In such circumstances, we can not reject the null hypothesis of non-stationarity; it can therefore be assumed the variables are I(1) and/or above. In order to determine the exact order of

¹³ With the exception of the partial adjustment parameter which, even though is derived from a log-linear specification, is not interpreted as elasticity.

Table 5 : P-P Tests on the Levels of the Series

Variable	P-P-Statistics	Mackinnon Critical Values
Log(GPI)	-3.045	-3.587
Log(GPI(-1))	-3.045	-3.587
Log(G)	-3.344	-3.573
Log(GGI(-1))	-2.965	-2.975
Log(GDS)	-3.373	-3.573
Log(GDS(-1))	-3.419	-3.580
Log(DSR)	-0.625	-3.573
Log(QS(-3))	-3.380	-3.603

Note: The P-P test was conducted with constant and a time trend except in the case of Log(GGI(-1)) where we did not apply the time trend. The reported Mackinnon values are at the 5% significance level.

integration of such series, further tests on differenced terms are necessary. Differencing the series and testing for stationarity show that the series become stationary after first differencing as demonstrated by their calculated P-P test statistic values greater than the Mackinnon critical values in absolute terms. Table 6 below shows that the series are integrated at level one, thus they are I(1) series.

Table 6: P-P Tests for the Order of Integration

Variable	P-P-Statistic	Mackinnon Critical Value	Order of integration
D(Log(GPI))	-6.078	-3.594	I(1)
D(Log(GPI(-1)))	-6.078	-3.594	I(1)
D(Log(G))	-5.778	-3.580	I(1)
D(Log(GGI(-1)))	-10.184	-2.980	I(1)
D(Log(GDS))	-7.753	-3.580	I(1)
D(Log(GDS(-1)))	-7.527	-3.587	I(1)
D(Log(DSR))	-6.463	-3.580	I(1)
D(Log(QS(-3)))	-8.435	-3.612	I(1)

Note: The reported Mackinnon critical values are at 5% level of significance. D(..) represents first difference.

4.3.2 The Cointegration Regression

If the investment equation (4.8) is an appropriate representation of the relationship between dependent and explanatory variables, the variables must be cointegrated, thus there exists a long-run relationship between them as represented by equation (4.7). A common pre-

condition for cointegration is that all the variables are integrated of the same order.¹⁴ Since all the variables have been found to be I(1), we estimated the long-run equation and the results are summarised in table 7 below. The cointegration regression was done to investigate the existence of a long-run relationship between the dependent and the explanatory variables.

Table 7: Cointegration regression for the Private Investment Function, 1970-1997

Variable	Coefficient	t-statistic	Probability
Log(GPI(-1))	0.329	4.337	0.001
Log(G)	0.050	6.692	0.000
Log(GGI(-1))	0.164	2.811	0.016
Log(GDS)	-0.233	-3.888	0.002
Log(GDS(-1))	0.324	3.720	0.003
Log(DSR)	-0.154	-4.370	0.001
Log(QS(-3))	-0.061	-3.387	0.005
C	1.402	4.064	0.002
AR(1)	-0.799	-3.234	0.007
AR(2)	-0.398	-1.807	0.096
R2 = 0.91	F-Stat = 13.991	D-W = 2.223	
R2(Adjusted) = 0.85	Prob(F-Stat) = 0.00004	D-h = -0.560	

Specification and Diagnostic Tests

NORMALITY	J-B = 1.027	PROB = 0.598
BREUSCH-GODFREY LM	F-s = 1.428	PROB = 0.285
ARCH LM	F-s = 2.017	PROB = 0.172
WHITE HETEROSC.	F-s = 0.494	PROB = 0.876
CHOW BREAKPOINT (1987)	F-s = 0.415	PROB = 0.860
CHOW FORECAST (1987)	F-s = 0.226	PROB = 0.941
RAMSEY RESET	F-s = 4.141	PROB = 0.067
THEIL INEQUALITY COEFFICIENT(U)	= 0.007	

Note: J-B refers to the Jacgue-Berra statistics whereas F-s and PROB refers to the F-Statistics and probability respectively.

4.3.3 Cointegration Test

Cointegration test investigates the behaviour of variables over time as postulated by the theory underlying cointegration. Cointegration theory postulates that variables may move a part in the short-run but be brought together again by market forces, government policy or both in the long-run. The test follows the information gathered in the previous section in

¹⁴ It has however been shown (Johansen, 1985; Chemreza and Deadman, 1997) that in multivariate regressions, it is not necessary that all the variables have the same order of integration to achieve Cointegration.

which the order of integration [I(1)] for the variables was revealed. It can be done in two main ways: first by employing the Engle and Granger (1987) two-step method and second, the Johansen method for cointegration test.

a). *The Engle and Granger two-step method for cointegration test*

The first step of this method is to estimate the cointegration equation (4.7) while the second step is to test for the stationarity of the residual of the cointegration regression. The rejection of the null hypothesis of no cointegration requires stationarity of the residuals as judged by the unit root (P-P) test statistic against the Mackinnon critical values. The residual from the cointegration regression was tested for stationarity and the results are summarised in table 8 below.

Table 8: Test for Cointegration- Engle and Granger Method

Variable	P-P-Statistic	Mackinnon Critical Value
RESIDUAL	-4.835	-3.645

The unit root test statistic on the residual from the long-run equation show that the P-P value is higher than the Mackinnon critical value at 5% level of significance. This implies that the residual is stationary and hence, it can be concluded that there is cointegration among the variables of the private investment function. It is therefore possible to use the results of the private investment equation (4.7) in table 7 to make preliminary conclusions about the long-run behaviour of private investment in Kenya.

b). *The Johansen Test for Cointegration*

Johansen test for cointegration is due to Johansen (1988) and extended by Johansen and Joselius (1990). Since our study has mainly referred to the Engle and Granger two-step method, which was originally based on bi-variate models, the robustness of the cointegration results can be confirmed by use of the Johansen method of testing for cointegration. The Johansen method is a multivariate method that has to a large extent replaced the Engle-

Granger two-step method (Al-Loughani and Moosa, 1993). The method is superior with regard to the fact that: its results are invariant with respect to the direction of normalisation; it gives estimates of unique cointegrating vectors and offers test statistics for their number; and it allows hypothesis testing on linear restrictions on the coefficients of the cointegrating vectors.

The results of the Johansen test are presented in table 9 below. Since the Johansen test results in table 9 indicate that there are 4 cointegrating equations (CEs), it can be taken as a sufficient condition to accept that the Engle and Granger method results are robust and there really is cointegration among the variables of the long-run private investment function. Therefore we can proceed and estimate the error correction model using the lagged residuals as proposed by the Engle and Granger Representation theorem.

Table 9: Johansen Cointegration test results. Series: INGPI, ING, INGGI(-1), INGDS, INDSR, INOS(-3) Lags interval: 1 to 1, for the period 1970-1999

<i>Likelihood</i>	<i>5 Percent</i>	<i>1 Percent</i>	<i>Hypothesised</i>	
<i>Eigenvalue</i>	<i>Ratio</i>	<i>Critical Value</i>	<i>Critical Value</i>	<i>No. of CE(s)</i>
0.985988	236.9145	114.90	124.75	None **
0.926768	143.0215	87.31	96.58	At most 1 **
0.836411	85.51084	62.99	70.05	At most 2 **
0.698509	45.68206	42.44	48.45	At most 3 *
0.410434	19.30372	25.32	30.45	At most 4
0.294659	7.679612	12.25	16.26	At most 5
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. test indicates 4 cointegrating equation(s) at 5% significance level				

4.3.4 The Error Correction Model (ECM)

In order to establish the equilibrium relationship, in which the short-term behaviour can be examined, we re-estimate the private investment equation on the differenced terms of the variables, including the lag of residuals from the levels regression as an explanatory variable. The inclusion of the lagged residual is to determine short-run dynamics and the

adjustment mechanism to the long run. The coefficient of this error correction term should be negative and statistically significant in order to support our earlier findings that there is cointegration among the variables of the model. This is in fact a more powerful test for the presence of cointegration. For the error correction model, equation (4.7) was re-estimated, as equation (4.8) below and the results are summarised in table 10.

Equation (4.7) was re-estimated as follows:

$$D\text{LogGPI}_t = \alpha_0 + \alpha_1 D\text{LogGPI}_{t-1} + \alpha_2 D\text{LogG}_t + \alpha_3 D\text{LogGGI}_{t-1} + \alpha_4 D\text{LogGDS}_t + \alpha_5 D\text{LogGDS}_{t-1} + \alpha_6 D\text{LogDSR}_t + \alpha_7 D\text{LogQS}_{t-3} + \alpha_8 \text{RESID}_{t-1} + u_t \dots \dots (4.8)$$

where RESID = the residuals from the levels equation and D = the first difference of the series.

Table 10: ECM regression for the Private Investment Function, 1970-1997

Variable	Coefficient	t-statistic	Probability
Dlog(GPI(-1))	0.124	1.120	0.285
Dlog(G)	0.044	5.249	0.000
Dlog(GGI(-1))	0.178	3.492	0.004
Dlog(GDS)	-0.303	-4.033	0.002
Dlog(GDS(-1))	0.206	3.052	0.010
Dlog(DSR)	-0.052	-0.613	0.551
Dlog(QS(-3))	-0.065	-5.494	0.000
RESID(-1)	-1.673	-4.727	0.001
C	-0.008	-0.665	0.519
R2 = 0.90	F-Stat = 13.361	D-W = 1.692	
R2(Adjusted) = 0.83	Prob(F-Stat) = .00006	D-h = 0.820	

Specification and Diagnostic Tests

NORMALITY	J-B = 0.287	PROB = 0.866
BREUSCH-GODFREY LM	F-s = 0.196	PROB = 0.825
ARCH LM	F-s = 0.643	PROB = 0.433
WHITE HETEROSC.	F-s = 2.001	PROB = 0.263
CHOW BREAKPOINT (1987)	F-s = 2.245	PROB = 0.274
CHOW FORECAST (1987)	F-s = 1.231	PROB = 0.613
RAMSEY RESET	F-s = 3.985	PROB = 0.071
CUSUM TEST (see figures 3&4, annex 1)		
THEIL INEQUALITY COEFFICIENT (U)	0.008	

4.4 INTERPRETATION OF THE RESULTS

4.4.1 *Interpretation of the results of the levels regression; table 7.*

The levels regression shows the long-run behaviour of private investment in relation to the explanatory variables. The validity and reliability of the private investment function has been based on three main procedures. First, it has been confirmed through the stationarity of the residuals and the Johansen test that there is cointegration among the variables in the equation. We then conclude that the results are not due to spurious correlation rather, there is a real long-term relationship between the dependent and the explanatory variables. Second, the results of the standard statistical tests of significance of the regression are all satisfactory. For instance, the coefficient of multiple determination (R^2) indicates that the model explains about 91 percent of the variation in gross private investment ratio (also see the residuals graph, Annex 1 Figure 1). F-statistic of 13.991 and the associated low probability of 0.00004, all which show that the coefficients in this regression are jointly significant. The Durbin-h (D-h) of -0.560 (in its absolute terms) shows the absence of first-order serial correlation among the residuals.

Third, specification and diagnostic tests were carried out to detect whether the private investment function was well specified and hence stable and, whether the basic assumptions of the OLS were violated. The later is important since regression analysis is based on the assumptions of the LS while the former tests the assumption that the specification, identification and stability of the function are without error over the period of study. In this respect, all the tests confirm the above (see test results appended to table 7). However, the Breusch-Godfrey Serial Correlation LM test was conducted in a bid to diagnose the presence of general forms of serial correlation in the residuals. The test however indicated the presence of higher forms of serial correlation. This realisation prompted us to use the auto-regressive serial correction, AR(1) and AR(2) terms after which the null hypothesis of zero auto-

correlation could be accepted at all levels (F-statistics equal 1.428, associated probability of $0.285 > 0.050$). These results however disapproved the h-statistic that had shown lack of (first order) serial correlation among the residuals of the private investment function. In addition, the forecast evaluation test has shown that the equation has a high predictive capacity (see results below table 7). These results imply that, the estimated equation can accurately forecast the value of the dependent variable given the values of explanatory variables. Given that the various tests conform to the requirements and assumptions underlying the time-series data, we can with confidence interpret the coefficients in the model with the aim of identifying some of the factors that determine the long-term behaviour of private investment.

The partial adjustment parameter is positive and significant at the 5 percent level. It is $1 - 0.329 = 0.671$, indicating that about 67% of the adjustment towards desired level of private investment is achieved in the current year and that, full adjustment takes about 17.88 months to complete.¹⁵ This disequilibrium implies that there is a difference between the level of private investment desired by the economy and the actual investment undertaken. Partial adjustment theory holds that investment decisions are made on the basis of objective functions of investors and constraints within the market. It then follows that investment decisions of firms seek to maximise the sum of their discounted dividends or increase their market value over a finite horizon. First, a positive partial adjustment could be on the basis of expected profits in a given period (current) and, second, adjustment would result from changes in gains or losses during the first period which arise from changes in market price of the firm's machinery and equipment. Third, investment firm's optimisation problem may include a set of technological and economic constraints. Among the former is the notion of the capital stock, which depends on the investment level and the depreciation rate while the

¹⁵ This interpretation of the adjustment process is borrowed from GHOSE, LAHIRI and WADHWA (1986, pp.257). Their implied formula is $(1/\delta) * 12 =$ number of months required to complete adjustment.

later depend on market structure as explained above. Omitting adjustment aspects in investment functions would imply total lack of dynamism in investment decisions in LDCs hence, imposing a static rule in a dynamic investment environment.

The results show that private investment in Kenya is positively related to growth rate of GDP. It is demonstrated that one-percentage increase in GDP growth would lead to 0.050% increase in private investment and vice-versa. This result is in line with the classical and Keynesian flexible accelerator principle, which postulate a positive relationship between private investment and demand of output. Similarly, the results conform to the observation by Angénor and Montiel (1996) among others. They depict a case of optimal investment rule where investors (firms) face an infinitely elastic demand curve. Under such circumstances, firms operate in an environment where there is no constraint on sales and prices are not controlled hence investment becomes an increasing function of growth of GDP and that of a country's infrastructure (as explained by Rama, 1990).

Gross domestic savings lagged one period are positively related to private investment. A one percent increase in savings would increase private investment by 0.324%. These results fit in the findings of Rama (1990, 1993) where he observed that capital accumulation in a given period could be determined by an amount of savings forthcoming at the prevailing interest rate. On the other hand the results concur with those by Molho who suggests that when physical accumulation is lumpy, investors have limited access to credit, with poorly developed equity markets, deposits may serve as a conduit for its accumulation and high deposit rates may stimulate investment. In Kenya and developing countries in general, the above illustrations service in addition to low incomes. This in turn means that individuals and firms have to save for some time before transforming the savings into real investments.

The results further demonstrate the presence of debt overhang situation in Kenya. This is observed from the negative effect of debt service ratio on private investment. A one

percent increase in debt service ratio would result in a 0.154% decrease in private investment. Generally, this result concurs with other similar studies for developing countries- Green and Vallinueva (1991); Cardoso (1993); Oshikoya (1994); and Kenya in particular-Bwire (1992). The presence of large external debt burdens can be seen to reduce investment activity in three main ways. First, the higher debt-service payments associated with large external debt reduce the resources available for investment. Second, the existence of a large debt overhang, in the form of a high ratio of external debt to GDP can reduce the incentives for investment because much of the forthcoming returns from investment must be used to repay existing debt therefore acting as a tax on domestic investments. Third, if substantial external debt leads to difficulties in meeting debt-service obligations, relations with external creditors may deteriorate thus reducing the amount of trade financing a country can obtain.

The estimated coefficient for the ratio of public sector investment to GDP is positive and significant, suggesting that in this sample public sector investment is on balance complementary to private sector investment activity. It has been demonstrated that a one percent increase in public investment ratio would increase private investment by 0.164%. The result concurs with those by Matin and Wasow (1992) and Green and Vallinueva (1991) among others and slightly differs with those by Wachira (1991) who found public investment to have a positive and insignificant effect on private investment. In line with this result, public investment could impose a positive externality on private investment in a country characterised by lack of infrastructure, or by weaknesses in the provision of public goods. The practical situation in Kenya during the late 1980s and the 1990s clearly falls within the above. As a result of large public deficits, suspension of ESAFs by donors all coupled with adverse weather conditions (El Nino and La Nina) led to the collapse of infrastructure and provision of public services and goods. For instance, in the mid 1990s adverse weather conditions led to the breakdown of infrastructure in and around the major towns in Kenya

leading to transport and communication barriers, which had a double negative impact on investment. First, some potential resource areas could not be accessed, and second, finished goods and services could not be delivered to end-users. This situation not only discouraged a lot of would be viable investment ventures but also led to huge investment losses.

The coefficient for inflationary uncertainty is negative and significant, demonstrating the negative effect of uncertainty on private investment. A one percent increase in inflationary uncertainty would lead to a 0.061% decrease in private investment. Servén (1998) arrived at similar results. Generally, studies have found domestic inflation rate to affect private investment in developing countries, where inflation is less often correlated with rise in economic output than in industrial countries. High inflationary uncertainty adversely affect private investment by increasing the riskiness of long-term investment projects, reducing the average maturity of commercial lending and distorting the information content of relative prices. Also, high inflation rates are often considered an indicator of macroeconomic instability and a country's inability to control macroeconomic policy, both of which adversely affect the investment climate.

In the developing country context like Kenya, inflation and the uncertainty associated with it, affects investment in two major ways. First, it has traditionally been known that inflation leads to a rise in prices, which are negatively related to demand. Hence, inflation and the uncertainty associated with it, signals investors to the likelihood of reduced demand, thus requiring investors/producers to reduce output and hence investment (in this case we shall be assuming a perfect elasticity of demand to changes in prices). Second, uncertainty related to inflation may also lead to expected rise in the prices of factor inputs—equipment and machinery, thus, imposing the same negative impact on private investment. In all these, the investment climate is adversely affected as reflected by sharp rises in imports of consumer

goods, fluctuations in exchange rates, capital flight, reduced foreign investments and decline in investors' confidence.

4.4.2 Interpretation of the results of the Error Correction Model; table 10

According to the Engle-Granger Representation theorem, the error correction model (ECM) is meant to show the equilibrium position in which short-run and long-run dynamic relationships converge. The advantage of the ECM formulation, which combines the first-difference variables of the long-run equation and their lagged residuals, is that it shows the short-run dynamics and the adjustment mechanism of the actual value of the dependent variable to its long-run value. The first is indicated by the contemporaneous and lagged first differences of the explanatory variables; the second is represented by the error correction term i.e. RESID(-1).

Unlike the long-run relation where the plausibility, validity and reliability of the function was on the basis of three procedures, the validity and plausibility of the short-run equation is tested on the basis of only two of the procedures. First, on the basis of standard statistical tests of significance of the regression, which have all proved satisfactory. For example, the coefficient of multiple determination (R^2) indicates that the model explains about 90% of the variation of private investment ratio in the short-run (also see the residual graph, annex 1 figure 2). The F-statistics, 13.631 and the associated low probability of 0.00006 show that the coefficients of the ECM are jointly significant. In addition, the D-h of 0.820 indicates that at least there is no first-order serial correlation among the residuals.

Second, the ECM passed all the specification and diagnostic tests, indicating that the short-run, like the long-run function is well specified, stable and that none of the LS assumptions was violated (see test results appended to table 10, and annex 1 figures 3 and 4). The Breusch-Godfrey serial correlation LM test however confirmed lack of general or higher forms of serial correlation (F-statistic=0.196, Probability=0.825)- this supports the results of

D-h statistic that indicated the absence of first-order serial correlation among the residuals.¹⁶

With this validation of the plausibility of the ECM, we can confidently interpret the coefficients as representing the short-run dynamic behaviour of private investment in Kenya.

The partial adjustment parameter is positive and insignificant at both the 5% and 10% levels. The partial adjustment parameter is $1-0.124=0.876$, indicating that about 88% of the adjustment towards desired level of private investment is achieved in the current period and that full short-run adjustment takes about 13.7 months to complete. The positive sign indicates the importance of positive adjustment of investments in the light of the objective function of the investors and constraints within the market. On the other hand, the insignificance of this parameter in the short-run as opposed to the long run demonstrates the difficulties investors face in case of changes in expectations and market conditions. Noting that investment in physical capital is usually lumpy and therefore undertaken within a long-term perspective, it could be reasonable to expect lack of robust adjustment mechanisms in the short-run in case of abrupt changes in the investment environment. However, this result may, in a way concur with the observation by Nunnenkamp, (1991) that considerable debt overhang and weak macroeconomic policy can seriously reduce inertia to adjust investment incentives in LDCs.

In the short-run, the rest of the variables except debt service ratio maintained the same signs and significance similar to the long-run function. These variables include GDP growth rate, gross domestic savings ratio, public investment ratio and the measure for uncertainty. The maintained significant influence of the variables may be an indication of how stable/reliable they are in explaining the behaviour of private investment both in the long and short-run.

¹⁶ Since there was no indication of any form of serial correlation, there was no need to use the auto-regressive serial correlation correction terms as was in the case for the levels regression.

The estimated short-run coefficient for the debt service ratio is still negative though insignificant. It is demonstrated that in the short-run, a one percent increase in debt service ratio would lead to a 0.052% decrease in private investment. This implies that the long-run mechanisms through which external debt affects private investment are not applicable in the short-run. We may further note that the larger part of external debt in Kenya is public and hence in times when there are debt-servicing problems, the private investors may not be immediately or directly affected. This is because it is the government, which has to negotiate with the donors, lay down strategies on how to manage the debt, a process that takes time. In other words the private sector only responds to the strategies taken-up by the government as concerns debt service- strategies which often include taxation, foreign exchange squeeze etc against which private investment decisions may not strongly respond to immediately.

The lagged residual from the levels regression was introduced as an explanatory variable in the ECM in order to first confirm the presence of cointegration and second, to show the adjustment mechanism of the actual value of the dependent variable to its long-run value. Since the coefficient of the lagged residual is negative and statistically significant, it can be concluded (following the Engle-Granger method) that there is cointegration between private investment and the explanatory variables of the long-run equation (3.7). The coefficient of -1.673 demonstrate that following a short-run distortion, 167.3% of adjustment to the long-run would be required to take place within one period. Market mechanisms, government intervention or both would facilitate such adjustment.

CHAPTER 5

POLICY IMPLICATIONS, RECOMMENDATIONS AND CONCLUSIONS

5.0 POLICY IMPLICATIONS

In order to respond to the objectives and hypotheses of the study, an empirical analysis was carried out with the application of cointegration technique and then regression analysis using the OLS method. First, the series were tested for stationarity using the P-P unit root tests. The results show that all the series were non-stationary but integrated of order one. Second, the variables of the private investment function were tested for cointegration using the Engle and Granger two-step method and the Johansen test. However, all the methods confirmed that at least there was cointegration among the variables. The presence of cointegration indicates the absence of spurious correlation among the variables of the model, leading to the conclusion that the observed behaviour between the dependent and explanatory variables is real.

In order to determine the long-run behaviour of private investment, the equation was regressed on the levels of the series. The results of the estimated elasticities showed that both the explanatory variables are important in explaining the behaviour of private investment in Kenya. More specifically, they revealed that private investment behaviour in Kenya is positively influenced by; past investment, GDP growth rate, lagged gross domestic savings and public investment. On the other hand, current gross domestic savings, debt service ratio and inflationary uncertainty negatively influence it. Some of the conclusions and implications that can be drawn from these results are that:

First, partial adjustment plays a very important role in private investment decision making in Kenya. Concern for partial adjustment may result from expectations related to changes in prices of inputs and output, demand for output (market size), depreciation and general

investment environment that lead to divergence between the desired and actual level of private investment. The essential implication of the partial adjustment parameter is that positive changes in any or all of the above would lead to an increase in private investment.

Second, factors related to the demand of investment output positively influence private investment decisions. This conclusion is in line with the neo-classical and Keynesian flexible accelerator principle or what is commonly referred to as the multiplier effect or the growth-investment link. If this is the case, it implies that demand policies, which may relate to incomes, prices, size of the market etc, must be of great relevance to policy makers as tools for manipulating private investment in Kenya.

Third, an attempt to show the historical savings-investment link has revealed that gross domestic savings promote private investment in some cases and not others. Results have shown that lagged savings positively influence private investment while current savings do not. These results are, however, consistent with Molho's suggestion that where investment in physical capital is lumpy with lack of access to capital and equity markets, low incomes; savings act as a conduit for capital accumulation. On the other hand, if we consider the relationship between interest rates, savings and investment; it is possible to conclude that there is a time lag between the transmission process between interest rates-savings and savings-investment. This time lag may be due to market imperfections i.e. institutional and informational flow differences between the financial sector and investors, which leads to delayed response in the market. On the overall, the positive relationship between savings and investment has been demonstrated. This conclusion points to the importance of financial sector (interest rates, credit to the private sector, capital and equity markets etc) on private investment decisions in Kenya.

Fourth, the positive and significant coefficient of public investment has demonstrated the complementarity between public and private investment in Kenya. Some studies have found

similar results and the most commonly held view is that public investment that is related to the development of infrastructure would be complementary to private investment. This is normally observed in countries characterised by lack of infrastructure or by weaknesses in the provision of public goods- an explanation that can fit the Kenyan economy since the late 1980s. Hence, the most probable implication would be that such public investment would promote private investment by raising private sector productivity, increase demand for private output and ancillary services.

Fifth, evidence has also been provided to show that debt service ratio is negatively related to private investment ratio. Thus, debt service ratio reduced private investment over the period of study. This can, with confidence be inferred for the period 1980 to 1989 when despite the heavy external debt burden, the government tried to service the debt obligations without resorting to rescheduling. This meant that most of the national resources (which largely constitute taxes) were directed to debt service implying that debt burden imposed a tax on private investment and the economy as a whole. The second phase of 1990s depicted an economy without the capacity to service its debts thus creating rifts with donors (especially multilateral donors) and ultimately leading to suspension of ESAFs. This culminated in lack or shortage of foreign exchange and depreciation of the Kenya shilling against major currencies of trading partners. The negative impact of debt service ratio in a way may imply poor debt management policies that might have led to misuse or investment in non-performing projects. However, in view of the prevailing Highly Indebted Poor Countries (HIPC) programme, it would be interesting to note that debt relief would have the effect of making investment more attractive for debtor countries in general and Kenya in particular.

Sixth, the regression results have provided some support to the theoretical propositions about the effect of uncertainty on private investment. It has been shown that inflationary

uncertainty discourages private investment in developing countries. Since inflation is normally taken to represent the general macroeconomic stance, its variability or volatility leads to uncertainty among investors. The negative effect of uncertainty can be viewed in the light of policy changes from import substitution (1960s to 1970s) to export promotion in the 1980s to 1990s and of late, to industrialisation in the second half of the 1990s. From the literature review and background information, it can be observed that the above mentioned policy changes in one way or the other responded to changing internal and external economic conditions. For instance, 1970s were associated by the international oil prices and commodity shocks while 1980s and 1990s were associated with the debt crisis and structural adjustment programmes. The policy changes are, however, accompanied by fluctuations in major macroeconomic variables such as inflation, balance of payments and current account balances, foreign exchange rate fluctuations etc, which in turn directly or indirectly manifest themselves as agents of uncertainty. The main implication of this result is that once an economy cannot maintain a stable macroeconomic policy environment, there would be high chances that investment will be negatively affected.

An attempt to determine the short-run behaviour of private investment and the dynamic mechanism through which the short-run and long-run behaviour converge towards equilibrium was made by regressing the function in its differenced terms. Whereas the rest of the variables maintained similar effects as in the long-run regression, there were some notable observations as follows.

First, the partial adjustment parameter though positive as in the long-run regression, it was insignificant. The most important conclusion and implication of this result is that private investment in physical capital being long term venture with irreversible characteristics, may not easily adjust to the changes in the investment environment within the short-run. Such changes may include fluctuations in prices, policy changes, market size or demand against

which private investors may not react to promptly by increasing or reducing investment. In Kenya, an example of the short-run inflexibility could be realised in the 1970s during the oil price and commodity shocks. For instance, though 1975 realised the shortage in world coffee supply, heavy investment in the coffee industry could only be realised after one year, after which the benefits started accruing in 1977 and 1978. This is because investment in physical capital-equipment and machinery comprise imports, which take time between purchase and delivery periods. The second example is the structural adjustment programmes which, according to some studies, investors are initially sceptical hence take a wait-and-see attitude. This explains why despite the fact that SAPs begun in mid 1980s, their effects on investments could only be felt two or more years later.

Second, the debt service ratio though negative was insignificant in the short-run regression. This implies that debt service may not be useful in explaining the behaviour of private investment in the short-run. The main reason for this may be the long and complicated channel through which the effects of external debts are transmitted to the investors. For instance, we realise that most of the external debt is public debt which has to be serviced by public revenue that mainly constitute taxes. The process by which the decision to impose taxes on private businesses is long and complicated in itself. Second, most developing countries offer tax-holidays to new private investors. This implies that in the short-run taxes (which constitute large part public revenue) may not be a major constraint to new investments. Instead, they are incentives.

Third, the result of the lagged residual has demonstrated two important issues at the basis of this study. The first issue is that, it has confirmed the presence of Cointegration between the variables of the private investment function, especially between the dependant explanatory variables. This validates the results of similar studies in developing countries and Kenya in particular. The second issue is the presence of a mechanism by which short-run and

long-run dynamics converge towards equilibrium. This result implies that there is an optimal level of private investment that can be attained with prudent combination of the explanatory variables.

5.1 POLICY RECOMMENDATIONS

Taking into account the objectives of the study and results emerging from the empirical analysis, the following policy recommendations are proposed:

1. In connection to the positive relation between GDP growth and private investment, we propose that the government should further policies that promote the demand for investment output and production capacity. Such policies would include:
 - i). Reduction in or rationalisation of personal and company income taxes. This would ensure high disposable incomes as a means of increasing the purchasing power of the consumers.
 - ii) Trade liberalisation, by opening up borders and frontiers with the neighbouring countries and the rest of the world. This would increase the market size for Kenya's output. One of the means of achieving such would be through aggressive participation and implementation of regional and interregional economic agreements and creating awareness of the existing business opportunities to the general public.
 - iii) Price decontrol and free movement of goods, services and information in order to encourage perfect and fair competition in the product market.
 - iii) Increase the range of incentives to the prospective investors through tax reductions on imported machinery and equipment, tax holidays to new investors; establish attractive investment schemes such as manufacturing under bond, export processing zones and promotion of small and medium size investment ventures.

2. The government should ensure that public investment is directed to areas with high externalities or complementary to private investment. This would require the government to invest heavily in areas such as infrastructure- schools, hospitals, sanitation and water supply, roads, railway lines, air transport, water transport, energy/power supply communication networks (telephones and other modern communications means), etc. The strength of this recommendation lies in the hope that such public investment would promote private investment by raising private sector productivity, increase demand for private output and ancillary services.

In view of the fact that government revenues are limited with shortage of technical support capacity in many areas, the government can improve the infrastructure by involving the private sector in the provision of such goods and services. This proposition requires that the on going privatisation process be fastened and extended to those areas that would enhance private sector investment and productivity. By this recommendation, the government would desist from monopolising or investing in sectors where it has no adequate financial and technical capabilities and from behaving in a way that, it is in competition with the private sector. With reference to the vision and theme "Industrial Transformation to the year 2020", as stipulated in the Sessional paper No.1 of 1996 and the current (eighth) national development plan, it is clear that the private sector is the engine of growth and development. Moreover, that, the government should create an enabling environment for the private sector to thrive.

3. In support for the positive savings-investment link, we recommend that the government should undertake institutional , financial reforms which would ensure;
 - i). Confidence in the financial sector,
 - ii). Stability of the financial sector,
 - iii). Diversification of the financial sector institutions,

- iv). Proper regulatory framework and
- v). Dynamic financial sector with the prime aim of promoting and channelling savings into the most productive sectors of the economy.

With regard to confidence and stability, this proposition is based on the assumption that individuals and companies would prefer to save in a financial market with minimal risks and uncertainty. This in turn would mean that the actors in the financial sector become transparent and consistent in their business with the public and companies who constitute main sources of national or domestic savings. It would also require that instances of mismanagement and insolvency be totally eliminated or minimised.

As concerns diversification of the financial system, it would require that a diverse range of financial institutions are encouraged or set up to be able to serve both big corporate and individual customers (investors). For instance, there would be need to establish or encourage specialised and general financial institutions, banking and non-banking financial institutions, credit and mutual funds, formal and informal financial societies. Such institutional network would play an important role in mobilising investment resources in form of savings from a wide range of savers and investors.

In the endeavour to encourage savings, it is necessary that monetary policy instruments are well managed to ensure that they are attractive to would be savers. This would require positive real interest on savings and attractive returns on investments. Such could partly be achieved through liberalisation of the financial sector and reduced interference by the government in direct or indirect fixing or manipulation of financial instruments of monetary policy.

It is however, common sense that incomes are generally low in Kenya, like in other developing countries. Efforts to mobilise domestic financial resources in form of

domestic savings may not merge the investment needs. This unfortunate situation would require efforts to attract foreign savings (resources) through developing an effective equity and stock market and encouraging foreign direct investment that would be useful in supplementing domestic resources for investment.

4 On the basis of the negative effect of debt service ratio and considering the likelihood of continued reliance on external debt in the far and the near future, we recommend that prudent debt management practices and policies be adhered to. Such practices and policies would include:

- i). Prudent sourcing of external debt. This may imply borrowing from cheap sources and amounts within the repayment capacity of the country. In addition, Kenya and other developing countries should only borrow as long as the loans are on concessionary terms in which case the grant element of the loans should be relatively high.
- ii). External resources (debt) must be invested in high yielding projects in such a way that returns from such projects cover the cost of borrowing implying that external debt service should not lead to adverse externalities.
- iii) Efforts should be made to increase the country's exports and probably reduce luxury imports in order to ensure availability of adequate foreign exchange resources for optimal imports and debt service. This can be done through the implementation of strategies geared towards export promotion and import substitution; improving on the value and quality of exports i.e. moving from agricultural to manufactured high value exports.

In lieu of the on going HIPC Programme, we further recommend that the economic management and reforms should ensure improved economic performance so that the country qualifies for debt relief which would greatly reduce the debt burden and the subsequent debt related problems afflicting the Kenyan economy. This

proposition would require sound economic management and improved relations with the donor community. In spite of the foreseen need for foreign resources that constitute external debt, one of the most favourable recommendation out of this study would be the move towards proper use of domestic resources through allocation and redistribution. Such should be done so that in the near future, the economy becomes self reliant and/or only depend on foreign resources of investment finance that do not lead to indebtedness.

5. Uncertainty- investment link has been demonstrated by the results of this study. To tackle uncertainty would require streamlining channels through which it is caused. In this regard, we recommend that efforts should be made towards ensuring macroeconomic stability. This would involve ensuring;

i). The stability of macroeconomic policy,

ii). Political stability,

iii). Resilience to negative external influences etc all which can be achieved through effective socio-economic and political reforms.

In addition to the above, we recommend that a legal and institutional framework should be developed in such a way that the roles and the rights of private investors are clearly stated and protected both domestically and internationally. This would include specialised organs for settling disputes and general issues related to investment disputes, property rights, compensation and channels of investment networks at the domestic and international levels. This would go a long way in protecting and instilling confidence in existing and potential investors.

6. With regard to the partial adjustment parameter we recommend that, first, private investment decisions should always be made on the basis of both past, present experiences and future expectations so that risks and sudden changes in the investment

environment can be anticipated *ex ante*. This is to ensure dynamism in private investment decisions since under normal circumstances, developing countries are prone to sudden fluctuations in macroeconomic indicators and variables that in turn dictate changes in the investment plans. Such fluctuations may originate from internal and external influences in form of policy, price and demand changes. This recommendation may require that extensive *ex ante* and *ex post* analysis of investment projects in view of prevailing and expected policy environment with an aim of minimising the difference between desired and actual investment.

Second, it is necessary that the government should try to put in place policies that would lead to price stability and general macroeconomic stability in order to avoid adverse fluctuations that may call for enormous adjustments in investments. Such policies would range from both monetary and fiscal policies, policies relating to depreciation and related compensation mechanism among others.

5.2 CONCLUDING REMARKS

The effort to search for factors that influence private investment in developing countries is worthwhile and unlimited in various aspects. Though it is widely accepted that investment is key for sustainable economic growth and development, no consensus has been reached on its determinants within and among countries. It is important to note that economic theory proposes a wide range of traditional and emerging factors. Emerging factors and conditions have often tended to shift economic practice from the traditional viewpoint to what is now referred to as contemporary economic practice. In view of this, we realise that not all the proposed variables can be included in an investment function or model due to specification, identification, and measurement problems. For instance, some of the traditional factors include; savings, demand, exchange rate, interest rates, etc. Among the emerging

factors are political and civil unrest, institutional factors, uncertainty and irreversibility, structural adjustment, governance among others. This observation therefore, requires that more empirical research need to be undertaken in order to identify the influence of those factors yet to be examined, in the light of the problems facing developing countries.

In addition to the above, we observe that macroeconomic variables and investment environment are prone to changes resulting either from internal or external, economic or non-economic influences. Such changes require economic explanation that quite often dictates new, innovative or improved methods of analysis. This move would ensure that economic research and policies are dynamic enough to provide solutions to the changing social, political and economic environment within which investment is undertaken.

Although in this study, we have aggregated private investment, it would be interesting for further studies in this field to consider disaggregated investment functions, either in form of sectors or categories- equipment, machinery, structures etc. Such studies would go a long way in providing sector specific or customised policy options that would streamline the behaviour of private investment in response to the ever-changing socio-economic and political conditions within developing countries.

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ANNEX 1

RESULTS OF THE RESIDUALS AND CUSUM TESTS

Figure 1: The Residuals Graph for the Levels/Long-run (Equation 3.7)

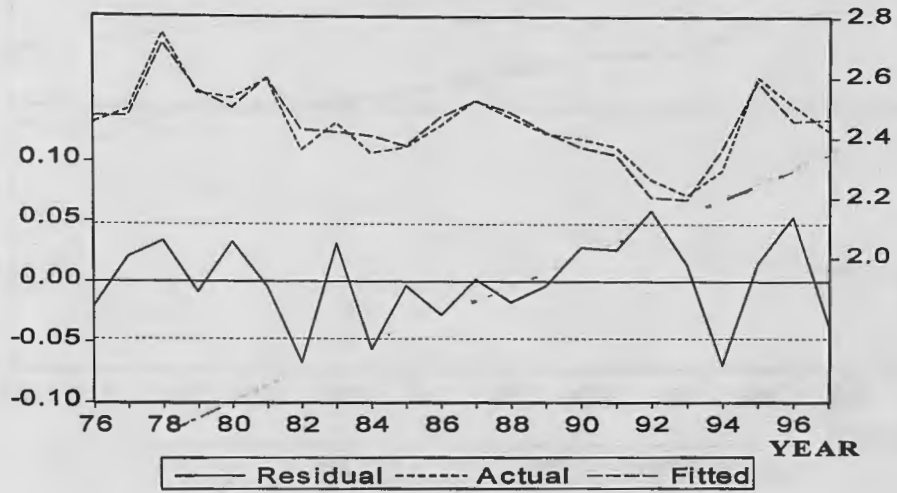


Figure 2: The Residuals Graph for the ECM (Equation 3.8)

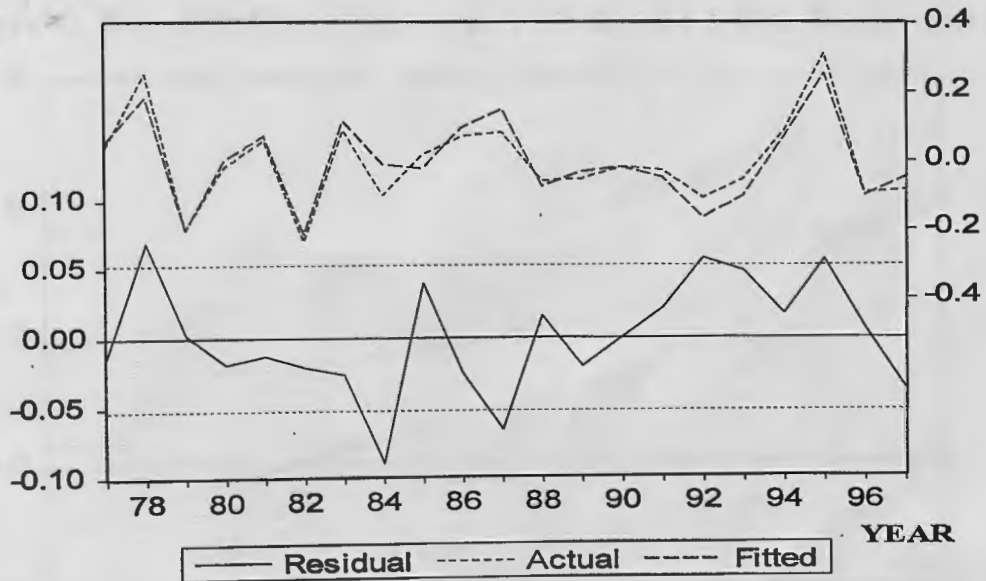


Figure 3: The CUSUM test for the ECM

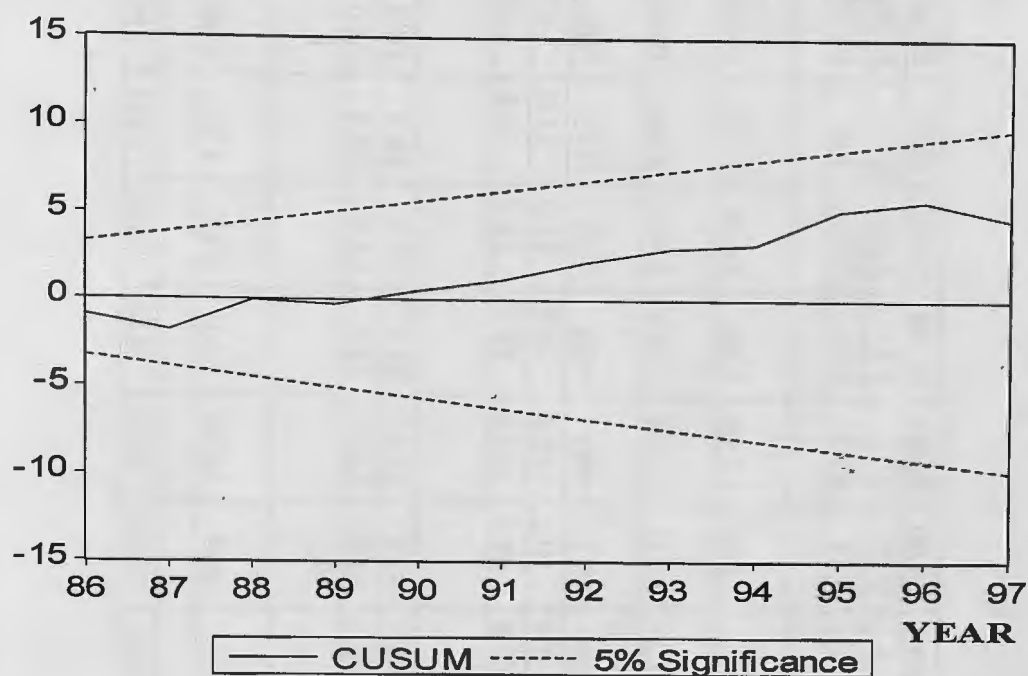
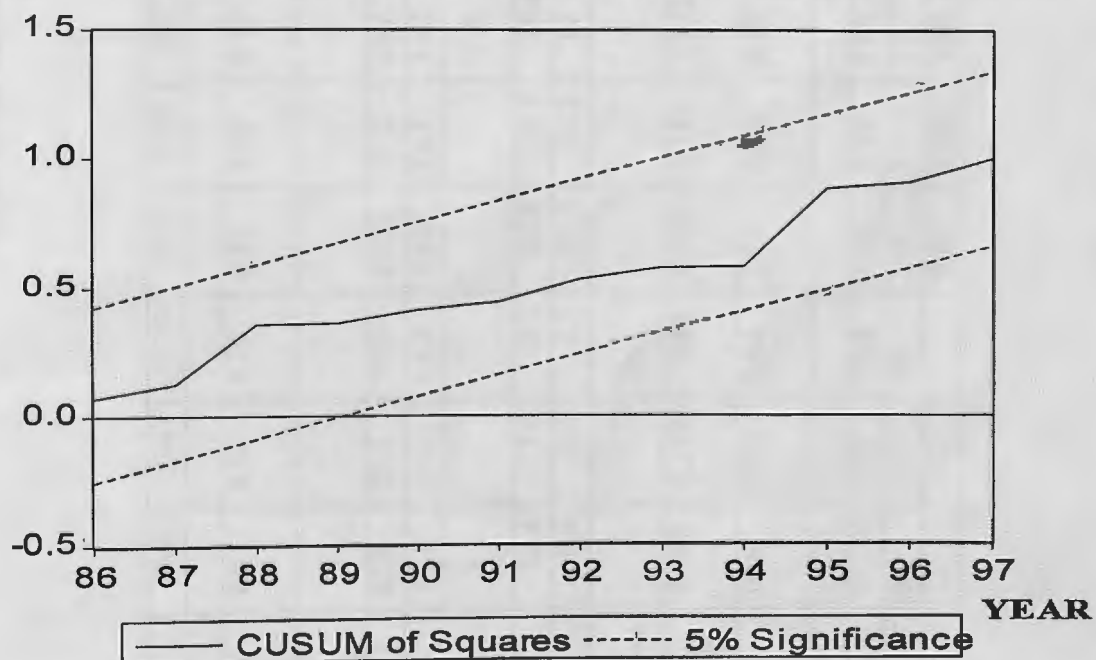


Figure 4: The CUSUM of squares Test for the ECM (Equation 3.8)



ANNEX 2

MACROECONOMIC INDICATORS, 1968-97

Year	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
GDP Growth Rate*	9.17	7.54	7.70	6.51	9.92	6.91	1.23	3.25	7.05	9.46	10.98	3.77	5.52	4.23	1.59
Consumption (%GDP)*															
Private	80.4	77.1	77.0	83.3	75.5	68.8	73.4	75.1	68.8	67.8	72.6	73.6	69.6	65.4	67.0
Public	14.2	15.1	14.8	16.2	16.4	16.2	17.1	18.9	18.8	20.2	21.7	21.8	21.5	19.3	18.6
Investment(% GDP)*															
Private	16.4	17.0	20.2	20.4	18.3	15.4	14.0	13.8	12.9	14.2	16.9	13.1	13.1	12.8	9.5
Public	9.4	8.1	8.1	12.2	11.2	12.1	10.7	9.6	9.4	10.7	10.6	11.2	21.5	11.0	9.5
Current Acc.(US\$mil)**	-	-	-	-	-	-	-	-220	-120	35.1	-661	-495	-878	-563	-307
Exch.Rate (Ann. Aver.)**	7.143	7.143	7.143	7.143	7.143	7.143	7.143	7.343	8.37	8.277	7.729	7.425	7.420	9.047	10.92 2
Inflation (CPI 1990=100)**	0.00	0.00	1.94	3.81	6.42	9.48	17.32	19.46	11.2	14.65	17.80	7.89	13.94	11.62	20.55
Interest Rates**															
Treasury Bills	-	3.95	2.00	1.42	3.45	1.92	4.63	6.08	5.54	2.13	4.29	6.01	5.26	7.61	12.58
Deposit Rate	3.5	3.5	3.5	3.5	3.5	3.5	4.32	5.13	5.13	5.13	5.13	5.13	5.75	8.85	12.20
Lending Rate	-	-	-	9.00	9.00	9.00	9.50	10.00	10.0	10.00	10.00	10.00	10.58	12.42	14.50

Macroeconomic indicators continued

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
GDP Growth Rate*	1.33	1.73	4.28	7.19	5.91	6.24	4.67	4.16	1.48	-0.8	0.41	2.62	4.38	4.15	2.07
Consumption (%GDP)*															
Private	65.6	68.4	64.9	70.4	72.9	74.2	64.8	62.2	63.0	66.2	63.1	62.4	69.3	68.2	71.7
Public	19.1	20.3	16.7	17.0	16.5	17.2	17.9	18.7	17.0	16.2	14.5	15.2	14.8	15.5	16.9
Investment(% GDP)*															
Private	9.1	8.8	8.7	8.9	9.8	9.3	11.2	11.0	10.6	9.5	9.6	9.9	13.5	12.3	11.3
Public	6.6	6.9	6.2	7.1	6.3	7.4	8.1	9.8	8.7	7.6	7.3	9.0	7.9	7.5	7.0
Current Acc.(US\$mil)**	-50.4	-130	-118	-46.8	-503	-472	-591	-527	-213	-180	71.2	97.9	-480	-166	-377
Exch.Rate (Ann. Aver.)**	13.31	14.41	16.43	16.23	16.45	17.75	20.75	22.92	27.51	32.32	58.00	56.05	51.43	57.11	58.73
Inflation (CPI 1990=100)**	11.36	10.20	14.07	4.75	7.66	11.18	12.92	15.61	19.80	29.50	45.80	29.03	0.79	8.80	12.02
Interest Rates**															
Treasury Bills	14.15	13.24	13.90	13.23	12.86	13.48	13.86	14.78	16.59	16.53	49.80	23.32	18.29	22.25	22.87
Deposit Rate	13.27	11.77	11.25	11.25	10.31	10.31	12.00	13.67	-	-	-	-	13.60	17.59	16.72
Lending Rate	15.83	14.42	14.00	14.00	14.00	15.00	17.25	18.75	19.00	21.07	29.99	36.24	28.80	33.79	30.25

SOURCE:*World Bank. World Tables 1989 and The African Development Indicators 1998/99.

** The International Monetary Fund. International Finance Statistics 1998.

ANNEX 3

DATA

Table 12: Basic Data used in Econometric Analysis

Obs	GPI	G	GGI	GDS	DSR	I	QS	RESID
1970	14.300	7.700	3.800	23.600	8.770	1.940	NA	NA
1971	16.900	6.510	5.000	17.400	8.430	3.810	0.631	NA
1972	14.500	9.920	5.400	20.200	8.940	6.420	0.479	NA
1973	12.500	6.910	5.400	24.500	10.440	9.480	0.346	NA
1974	10.900	1.230	4.700	18.500	10.400	17.320	0.559	NA
1975	11.700	3.250	4.700	13.500	13.370	19.460	0.072	NA
1976	11.600	7.080	5.400	20.900	11.470	11.240	0.593	-0.020
1977	12.100	9.460	4.200	27.000	9.020	14.650	0.221	0.021
1978	15.600	10.980	4.900	20.000	12.220	17.180	0.115	0.034
1979	12.800	3.770	5.400	16.400	14.780	7.8900	0.822	-0.009
1980	12.600	5.520	10.400	18.100	16.680	13.940	0.525	0.033
1981	13.400	4.230	6.500	19.600	18.120	11.620	0.226	-0.005
1982	10.600	1.590	10.200	18.100	20.710	20.550	0.526	-0.067
1983	11.600	1.330	6.800	20.400	23.980	11.360	0.637	0.031
1984	10.500	1.730	7.500	19.400	21.380	10.200	0.152	-0.056
1985	10.700	4.280	7.200	24.900	26.370	13.150	0.210	-0.004
1986	11.500	7.180	8.100	21.900	24.350	4.750	1.062	-0.028
1987	12.500	5.910	7.100	19.200	33.490	7.660	0.434	0.002
1988	11.800	6.240	8.300	19.700	30.580	11.180	0.334	-0.017
1989	11.200	4.670	8.100	17.300	30.180	12.920	0.101	-0.004
1990	11.000	4.160	9.800	19.100	31.350	15.610	0.145	0.028
1991	10.700	1.480	8.700	20.000	33.550	19.800	0.194	0.026
1992	9.600	0.010	7.600	17.600	31.790	29.550	0.356	0.059
1993	9.100	0.410	7.300	22.400	30.290	45.810	0.394	0.014
1994	9.900	2.620	9.000	22.400	30.140	29.030	0.500	-0.070
1995	13.500	4.380	7.900	15.900	24.760	0.790	3.648	0.015
1996	12.300	4.150	7.500	16.300	22.580	8.800	2.366	0.054
1997	11.300	2.070	7.000	11.400	20.850	12.020	0.268	-0.037

Sources: 1. The International Financial statistics of the IMF (various issues)

2. World Tables/African Development indicators (various issues)

3. World Debt Tables (various issues)

Note: 1. The latest data source referred to is for 1999.

2. I is annual inflation rate, while the other variables are as defined in chapter 4.