Determinants of Current Account Balance in Kenya: The Intertemporal Approach

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Abstract

This study investigates the determinants of current account balance (CAB) in Kenya using intertemporal approach. By use of time series analytical framework, an error correction model is estimated in order to examine both long and short term relationships. The analysis is based on a structural approach that highlights the role of fundamental determinants of saving and investment. The study results indicate that Kenya's current account balance is positively influenced by terms of trade, real exchange rate, economic growth and fiscal balance, with terms of trade being the most significant positive determinant. On the other hand, money supply, dependency ratio and foreign direct investment negatively affect CAB in Kenya, whereby money supply is the most significant negative determinant followed by dependency ratio. Cointegration analysis has confirmed existence of a significant long-run relationship in the foreign exchange market. However, current account balance is not part of the cointegrating equation. Therefore, for Kenya to progress towards a favourable current account balance aiming at reducing persistent current account deficits and attaining sustainable levels, the country should strive towards terms of trade improvement. This can be achieved through enhancing export competitiveness by means of diversification, quality improvement and technological upgrading in value addition industries. Export competitiveness efforts should be supported by policy measures that promote productivity growth. Whenever the Kenya Shilling is overvalued, the Government should resort to sterilized intervention in the foreign exchange market. Expansionary monetary policy should be discouraged and domestic savings mobilized through development, innovation and diversification of financial markets. Moreover, the problems of poverty, unemployment and income inequality should be addressed as a matter of priority so as to reduce the high dependency burden. Fiscal discipline is indispensable in order to improve and sustain favourable current account and economic performance. Therefore, Kenya Government should contain budget deficits through appropriate fiscal measures and prudent public expenditure management. It should aim at limiting public expenditures to be in harmony with revenue generation. The Government should strive towards increasing revenue collection and improving allocation and efficiency of its expenditure in accordance with national development priorities.

Abbreviations and Acronymns

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
AGOA	African Growth and Opportunity Act
BOP	Balance of Payments
CA	Current Account
CAB	Current Account Balance
COMESA	Common Market for Eastern and Southern Africa
CPI	Consumer Price Index
DEPR	Dependency Ratio
EAC	East African Cooperation
ECM	Error Correction Model
ECT	Error Correction Term
EG	Engle-Granger
EPA	Economic Partnership Agreement
EPC	Export Promotion Council
EPI	Export Price Index
EPPO	Export Promotion Programmes Office
EPS	Export Promotion Strategy
EPZ	Export Processing Zones
ERVAR	Exchange Rate Variability
EU	European Union
FB	Fiscal balance
FDI	Foreign Direct Investment
FGLS	Feasible Generalized Least Squares
FTA	Free Trade Area
GDP	Gross Domestic Product
GDPgr	Gross Domestic Product growth rate
GMM	Generalized Method of Moments
GMM-IV	Generalized Method of Moments – Instrumental Variables

IFS	International Financial Statistics
INFDEV	Inflation Deviation
IPI	Import Price Index
ISS	Import Substitution Strategy
ITB	Invisible Trade Balance
KETA	Kenya Export Trade Authority
KTMM	KIPPRA-Treasury Macro Model
LDCs	Least Developed Countries
LM	Lagrangian Multiplier
LSDV	Least Squares Dummy Variable
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MUB	Manufacturing Under Bond
M_2	Money Supply
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
PTA	Preferential Trade Area
RER	Real Exchange Rate
RESET	Regression Specification Error Test
RIR	Real Interest Rate
SBC	Schwartz Bayesian Criterion
TB	Trade Balance
TOP	Trade Openness
TT	Terms of Trade
UNCTAD	United Nations Conference on Trade and Development

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1. Introduction and Background

1.1 Introduction

Current Account Balance (CAB) is a major component of the Balance of Payments (BOP) in open economy macroeconomics. According to International Monetary Fund's (IMF) BOP Manual, CAB comprises international balances of transactions in trade of goods and services, factor income and current transfers. Current Account Balance is significant because it is a key economic indicator of a country's external performance. The net balance of the current account constitutes an integral measure of national saving hence a meaningful indicator of an economy's saving, and spending behaviour. The balance also represents national net foreign investment or net lending or borrowing vis-à-vis the rest of the world. The information on current account is quite useful in BOP projections, compilation and measurement of national income. The CAB plays a leading role and is an important factor in policy formulation, analysis and decision-making processes in the increasingly interdependent world economy.

There has been a long debate on whether current account really matters. The discussion became more prominent after the shocking 1990s currency crisis in Mexico and Asia, considering that the affected countries had large current account deficits. Prior to 1980s, most developing countries operated large current account deficits, due to heavy imports of capital and intermediate goods that were required for industrialization. The exports earnings were inadequate to pay for the imports, hence the deficits were largely financed through surpluses in the capital account occasioned by foreign aid, direct private investment and loans (Todaro and Smith, 2003). The current account balances continued to deteriorate in the 1990s due to declining commodity prices, global recession that contracted world trade, increasing protectionism in developed countries against LDCs exports and overvalued exchange rates among some developing countries.

During the last two decades, persistent external imbalances especially among developing countries have continued to motivate researchers and policy makers to investigate factors surrounding determination and sustainability of current account balance. Indeed, policy makers endeavour to explain current account balance movements in order to assess their sustainable levels and seek to induce changes through policy measures. As a result, during the last few years, macroeconomists have been frantically developing crisis "early warning" models, although there is no common agreement yet, on the role played by current account deficits in recent financial crisis (Edwards, 2001). Thus, determinants of current account balance have attracted considerable interest in macroeconomic analysis worldwide.

The relationship between current account balance and key macroeconomic variables such as economic growth, interest rates, budget deficit and exchange rate among others, represents one of the most widely debated topics among economists and policy makers in both developed and developing countries. Consequently, what determines the current account balance?; why do some countries experience chronic current account imbalances?; and, why are some imbalances a cause for greater concern than others?. These questions have remained key research questions?. The increasing interest to understand the CAB operations has been stimulated by the fast growing international trade and economic integration.

Generally, different theoretical models have different predictions about the factors underlying current account performance and the sign and magnitude of the relationships between current account fluctuations and these determinants. Simple national income accounting identities help in understanding macroeconomic determinants of current account fluctuations. Traditional theories of current account focused on defining current account as the difference between trade flows, that is imports and exports. Hence, based on these theories, a lot of effort, resources and focus has been directed towards exports promotion and development, while suppressing imports through several trade policies. Consequently, more emphasis focused on price elasticities and income changes as primary determinants of the current account. On the basis of modern economic theory, current account balance determinants have not only been addressed in a saving-investment balance framework using intertemporal or dynamic optimizing models, but also with differing opinions. Therefore, due to lack of consensus on the CAB determinants, empirical analysis could help discriminate among different theories.

Over the years, empirical work has talked about several factors that affect current account balances particularly in developing countries. The studies have focused more on the determinants of exports and imports with the aim of formulating policies that would ensure favourable current account balance. Hence, majority of the previous empirical studies as well as popular policy discussions, emphasized on trade competitiveness and policy measures as the driving forces behind current account performance. According to Khan and Knight (1983), fluctuations of the world market prices of primary commodities, increases in international oil price, slowdown of economic activity in some industrial countries, and the rise in real interest rates; are all major contributors to deterioration in the current account positions of most non-oil developing countries. At the same time, domestic developments in demand-management, exchange rate and trade policies have also played a significant role in exacerbating payments disequilibrium. These factors affect international competitiveness that also gives rise to current account and overall balance of payments difficulties.

Indeed, previous empirical literature has extensively discussed these factors but has often relied on casual observation rather than systematic evaluation of CAB trends in developing countries. In fact, a number of studies have drawn conclusions from "stylized facts" of developing countries' experiences, but have not subjected the available data to standard empirical tests (Khan and Knight, 1983).

All in all, experience worldwide suggests that there must be a combination of factors, both within and outside trade policy framework, which influence current account movements that require studying and monitoring. Indeed, different countries have different experiences at different times and equally empirical evidence on current account performance is inconclusive, mixed and varied. As a matter of fact, the research findings depend on econometric methodology adopted, the period and country of study. Therefore, there is no consensus on the determinants of current account balance. The main continuing research interest is to establish CAB determinants, sustainability levels and related issues of policy concern.

Kenya, like many other developing countries, has been experiencing persistent current account deficits. Mwega (2007) considers this as a structural problem that may persist in future. Currently, the country is implementing elaborate programmes under the millennium development goals (MDGs) and long-term economic development blueprint Vision 2030, which comprehensively covers several sectoral initiatives. As stipulated in Kenya Vision 2030, the aim is to transform the country into a globally competitive and prosperous nation with high quality life and simultaneously meeting the MDGs. Several key sectors and strategic areas have been identified in order to achieve high economic growth, social development and good governance.

Therefore, in the near future, these programmes are expected to affect national saving, investment, trade and fiscal performance among other macroeconomic variables. These are some of the key variables highlighted in determining CAB, hence the increasing economic activities will have a major impact on Kenya's current account performance. Policy makers should therefore be concerned about future movement and sustainability of the current account. This is because if this problem is unattended to, it could slow growth and lead to serious balance of payment problems in future (Mwega, 2007). One of the major challenges for policy makers is to intensify export diversification and improve domestic savings rate. For this reason, foreign exchange gap or the CAB should be identified as a critical policy target in Kenya.

This study investigates the determinants of current account balance in Kenya. It helps us understand the factors that influence fluctuations in the current account, their significance, magnitude and policy implications. The study is organized into five chapters: Chapter One gives an introduction and background of the study briefly discussing

Kenya's current account performances, the research problem, objectives and justification. Chapter Two provides both theoretical and empirical literature review, and Chapter Three outlines the methodology applied in the research. While Chapter Four discusses and interprets empirical results, Chapter Five summarises the study findings, highlights policy implications and proposes areas of further research.

1.2 Current Account Performance in Kenya

Over the years, Kenya like many developing countries, has been experiencing rising trade and current account deficits. Although Kenya has been registering invisible trade surpluses, the current account balance has worsened mainly due to deterioration in the trade account, visible trade balance. Apparently, the value of imports has been growing at relatively higher rates than that of exports due to deteriorating terms of trade. This has mainly been caused by increasing prices of oil and other intermediate goods imports due to increased domestic activities. The unfavourable trade scenario has been exacerbated by the fact that Kenya's exports are dominated by few primary commodities, which have low price and income elasticities.

In the early 1980s, under structural adjustment reforms, Kenya shifted from imports substitution strategy (ISS) and adopted exports promotion strategy (EPS) in order to address deteriorating exports performance. In addition to establishment of export compensation scheme and revival of the Kenya Export Trade Authority (KETA) in 1976, a number of export promotion programmes were put in place. These incentives include Green Channel in 1988, Export Guarantee and Credit Scheme, Preferential Trade Area (PTA), establishment of Export Promotion Council (EPC) and the Export Promotion Programmes Office (EPPO), establishment of Manufacturing Under Bond (MUB) in 1988 and Export Processing Zones (EPZ) in 1989/90 (Government of Kenya, 1986). Nevertheless, export incentives notwithstanding export orientation in the 1980s, remained weak largely due to very high effective rates of protection accorded to domestic industries, exchange rate bias against exports, high cost of imported inputs, foreign exchange controls, administrative delays and high transaction costs among others (Were *et al.*, 2002).

Upon trade liberalization in early 1990s, particularly abolition of trade licensing requirements and liberalization of foreign exchange market in 1993, exports registered improved performance with exports/GDP ratio rising from 14.8 per cent in 1990 to 26.3 per cent in 1996. This recovery was also brought about by macroeconomic reforms and increasing regional integration under the East African Cooperation (EAC) and the wider Common Market for Eastern and Southern Africa (COMESA). Over the last decade, exports have maintained poor performance whereby exports/GDP ratio averaged 20.2 per cent between 1997 and 2001 and 21.3 per cent between 2002 and 2006.

Like in most developing countries, Kenya's exports are dominated by primary commodities mainly horticulture, tea and coffee besides tourism. For example in 2006, horticulture, tea, coffee and clothes mainly from EPZs were the leading export earners collectively accounting for 53.4 per cent of total domestic export earnings (Government of Kenya, 2007b). Tourism was the leading export earner with Ksh 56.2 billion followed by horticulture and tea with Ksh 48.8 and 47.3 billion, respectively. Manufactured exports make a small proportion of total exports. The exports are therefore more vulnerable to external shocks such as world prices fluctuations, which has led to erratic performance of the exports sector. Traditionally, the leading destinations for Kenya's exports have been the EAC, COMESA and EU trading blocs.

Generally, Kenya is a net-importer. The imports have been increasing over the years with imports/GDP ratio averaging 35 per cent in 1997 to 2001, and 37 per cent in 2002 to 2006. The imports mainly consist of intermediate inputs and machinery commodities like crude petroleum, gas and diesel oils, vegetable fats and oils, kerosene, jet fuel, synthetic plastic materials, medical and pharmaceutical products, telecommunication equipment, motor vehicles and their parts (Kariuki, 2006). Kenya's imports mainly originate from Middle East, EU and Far East. Lately, new markets have been identified in China, South Korea and South Africa, hence Asia continues to be a major source of Kenya's imports with a share of 54.9 per cent of total imports in 2006.

Even though Kenya has generally experienced increasing trade deficit over time, trade with EAC and COMESA has been registering surpluses. Actually, trade deficits are experienced in trade with Europe, America and Asia due to tariffs escalation particularly in developed countries where tariffs are low for Kenya's primary commodity exports and high for manufactured exports. This discourages exportation of manufactured goods, which are more competitive, but favours exportation of primary commodities that are less competitive and vulnerable to external shocks. This is a big disadvantage to Kenya and other developing countries, which call for more preferential or fair trading systems such as African Growth and Opportunity Act (AGOA) and Economic Partnership Agreement (EPA). In contrast, Kenya has largely been exporting its manufactured products to the EAC and COMESA markets where trading systems are more favourable, hence the surpluses.

The trend of Kenya's current account balance together with its components, visible (trade) and invisible balances, is shown in Figure 1.1 for the last three decades. During the last thirty years, Kenya's economy has experienced a persistent current account deficit. It is worth noting that high CA deficits were experienced in 1974, 1978-81 and 1986-90 with ratios of over 6 per cent of GDP. Very few instances of CA surpluses were recorded in 1977, 1993/94 and 2003 with ratios of below 2 per cent of GDP. Over the last five years, the country has been on an increasing CA deficit trend. The deficit increased from Ksh 9.27 billion in 2002 to

Table 1.1: Kenya's trade account analysis

Year	Exports/ GDP ratio	Imports/ GDP ratio	Trade volume/ GDP ratio	Import cover ratio	Terms of trade
1987	14.0	25.3	39.3	55.2	84.6
1988	14.7	27.2	41.9	53.9	88.4
1989	13.8	30.3	44.1	45.6	78.8
1990	14.8	30.2	45.0	48.9	71.0
1991	16.8	27.3	44.1	61.6	81.5
1992	15.3	25.9	41.2	59.0	79.5
1993	25.9	35.6	61.6	72.7	88.3
1994	25.3	34.0	59.4	74.4	101.1
1995	24.7	39.4	64.1	62.7	125.5
1996	26.3	37.5	63.8	70.2	92.7
1997	22.5	35.6	58.0	63.2	101.7
1998	20.3	33.2	53.5	61.3	100.2
1999	19.2	32.3	51.5	59.4	86.4
2000	19.6	36.2	55.8	54.3	83.9
2001	19.2	37.8	57.0	50.9	78.9
2002	19.9	30.3	50.2	65.7	77.6
2003	18.9	29.1	48.0	65.0	81.4
2004	21.3	36.1	57.4	58.9	77.4
2005	24.4	41.5	65.8	58.8	71.9
2006	22.1	46.0	68.1	48.1	71.5

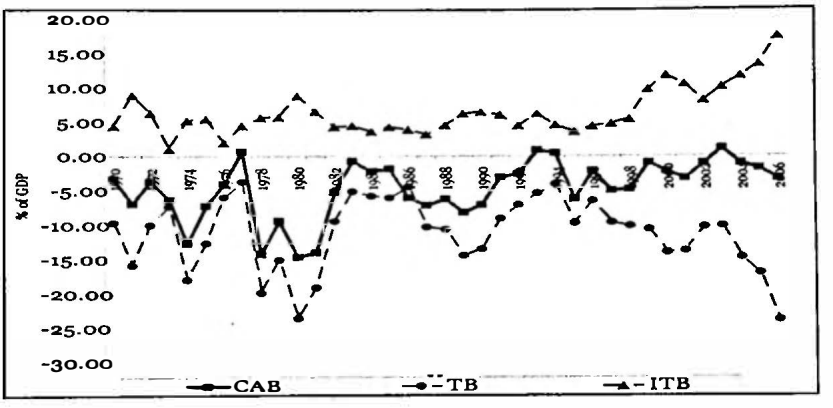
Source: Author's computation from GoK Statistical Abstracts and Economic Surveys

Ksh 19.7 billion and 37.9 billion in 2005 and 2006 respectively, which represents 3.3 per cent of GDP in 2006. It is also evidently clear that the current account balance (CAB) is mainly influenced by trade balance (TB) and the two plots appear to be cointegrated (Figure 1.1).

Although Kenya has continued to register trade deficits, the invisible balance has recorded surpluses over time. This is largely attributed to increasing trade in services, mainly tourism earnings, and unilateral private current transfers such as remittances.

Table 1.1 highlights the trends of terms of trade and exports, imports, trade volume and import cover ratios for the last two decades. Kenya has been experiencing declining terms of trade, whereby the index declined from 150.5 between 1970 and 1979 to 97.7 between 1980 and 1989 and 84.3 between 1990 and 1994. The index slightly increased to 101.3 in 1995 to 1999 but later dropped to 77.3 in 2000 to 2006. This is usually occasioned by high import oil prices, machinery and transport equipment (Government of Kenya, 2007b). Although the exports, imports and trade volume ratios have been on an upward trend, the import ratio has accelerated faster than the exports ratio. This has contributed to declining import cover ratio implying that the increasing trade openness

Figure 1.1: Kenya's current account balance, 1970-2006



is associated more to importation than exportation. In 2006, the country recorded trade openness of 68.1 per cent, as indicated by the trade volume ratio, and import cover ratio of 48.1 per cent. The latter implies that in 2006, exports earnings financed 48.1 per cent of the imports.

1.3 Problem Statement

Over the years, there has been no consensus on the determinants of current account balance. Despite the relatively extensive theoretical and empirical literature, individual country studies on CAB determinants are scanty, particularly for developing countries. Therefore, the nature, performance and determinants of the current account balance remain an empirical problem for different individual countries. The challenge of external imbalances becomes more serious by assessing possible alternatives for financing persistent and large current account deficits. Possible options include depleting official foreign exchange reserves, external borrowing, attracting capital inflows and devaluation of domestic currency.

Considering that official reserves are limited in supply, there is need to be careful in order to avoid future crises when reserves are depleted. Additionally, increased external debt dampens economic growth due to high cost of servicing that ultimately culminates into debt overhang problem. Short-term capital inflows are very volatile and unstable, which brings about macroeconomic instability. On the other hand, long-term capital inflows may not meaningfully benefit domestic economy since they may serve the interests of their home countries more than domestic interests. However, due to long-term nature of these flows, it is not a major problem if current account deficits are financed by long-term capital inflows. As a matter of fact, according to Mwega (2007), the recent current account deficits in Kenya seem to be mainly financed by short-term capital inflows, which if reversed, would lead to a currency crisis if not well managed. Devaluation of domestic currency is not an

option in a floating exchange rate regime like Kenya. Furthermore, CAB reversals and financial crises are detrimental to economic growth. Therefore, the consequences of these measures put a country in a more precarious position that should be avoided if an economy is to achieve stable economic growth in the long-run.

Current account balance is a key economic indicator of an economy's external sector performance, hence an important policy target. Despite the importance of current account balance in economic management together with the possible dangers of lasting current account deficits, there is little information on CAB determinants in Kenya to facilitate policy decisions. Furthermore, few studies have been done to explain current account performance in Kenya. Therefore, the possible dangers of persistent current account deficits coupled with apparent lack of empirical evidence is a concern that requires to be addressed in Kenya.

The aim of this study is to investigate empirical linkage between current account balance and a set of identified economic variables. The study uses an econometric model to estimate and analyse Kenya's current account function. Consequently, this study addresses the following questions:-

(i) What factors determine current account balance in Kenya?

(ii) What are the policy options towards favourable current account balance in Kenya?

1.4 Research Objectives

The overall objective of this research paper is to investigate empirical linkage between CAB and key economic variables proposed by both theoretical and empirical literature. The study assesses the determinants of current account balance focusing on Kenya. It aims at investigating responsiveness and significance of CAB variations with respect to changes in the identified macroeconomic variables.

1.5 Justification of the Study

This study supports the view that external imbalances should be of concern to policy makers, hence appropriate policy instruments should be applied to ameliorate any imbalances. Since current account deficits have to be financed by official reserves, which are limited in supply, the imbalances need to be monitored and reduced lest a crisis develops in future when reserves are depleted. In an environment where capital is internationally mobile, if private sector saving and investment decisions are made in an optimal (private and social) way, the outcome for the current account is also optimal, whether deficit, surplus or balance, and therefore it cannot be a policy target. However, since private saving

and investment decisions are made sub-optimally, the current account balance is also likely to be suboptimal, and for this reason policy makers should consider intervention measures.

Therefore, one has to look at the underlying sources of current account imbalances in order to implement the appropriate policy intervention. In some cases, imbalances are a result of optimal responses to particular shocks and are "good". In other instances, they may be the outcome of miscalculations, misguided decisions or distortions elsewhere in the economy.

It is only in this latter situation that policy intervention is appropriate and it in principle, it should be focused directly on the source of the problem. Policy-makers must therefore understand the factors influencing the current account balance so as to adopt appropriate adjustment and stabilization policies.

This study provides an empirical analysis of the determinants of Kenya's current account balance. The analysis is based on the fact that a better understanding of the factors affecting the current account is central for assessing whether policies aimed at domestic objectives are compatible with a sustainable external position. Understanding the factors that influence fluctuations in the current account has other important policy implications. The concept of current account sustainability has gained considerable interest in the context of recent episodes of macroeconomic turbulence in many emerging economies. Although this study does not directly address the question of current account sustainability, the analysis provides insights into key variables that may be considered when determining the "normal" CAB level or sustainability in Kenya. The study also forms the basis for developing crisis "early warning" models in future.

Another justification for this study is based on the fact that there are few empirical studies on Kenya's current account balance. Those available have considered Kenya in a panel (group) of countries, while others looked at how CAB relates with other variables such as economic growth and exchange rate. This implies that determinants of CAB in Kenya have not really been specifically and adequately researched into. This study therefore, has used a time series analysis, with the aim of studying CAB determination in Kenya. This analytical framework is motivated by its inherent advantages. The study is enriched by using a combination of factors that were identified by past studies. For these reasons, the empirical analysis undertaken in this study is an improvement on existing literature. It fills the existing information gap and enlightens more on CAB determination in Kenya. This study also forms a basis for reference for further research.

2. Literature Review

2.1 Theoretical Literature

Current account balance (CAB) is one of the key components of a country's balance of payments (BOP) and it encompasses imports and exports of goods and services, factor income and current transfers. It comprises trade or visible balance, which captures commodity trade, and invisible balance that covers trade in services, factor income and transfers. By definition, CAB is the difference between a country's total exports and imports of goods and services, plus net investment income, debt service payments, remittances and transfers (Todaro and Smith, 2003). Therefore, a negative balance represents a current account deficit and a positive balance represents current account surplus.

In macroeconomic theory, the national income accounting identity is given as:

$$Y=C+I+G+X-M \quad \ldots\ldots(1)$$

whereby the letters represent national income, private consumption, private investment, government expenditure, exports and imports, respectively. Considering that $Y= Y_d+T$, where Y_d is disposable income and T is taxes, equation (1) can be written as $\{(Y_d-C)-I\}+(T-G)=(X-M)$, which can be rewritten as follows:

$$X-M=(S-I)+(T-G) \quad \ldots\ldots(2)$$

Equation (2) represents the three-gap model, which shows that CAB equals the total of private savings less investment and fiscal balance (taxes less government spending). Thus, foreign saving gap is equal to the sum of private and public saving gaps. Hence, current account deficit is reduced if a nation raises its saving rate, if it reduces investment, or the government raises taxes or cuts spending. Any surplus of imports over exports (current account deficit that is usually financed by foreign borrowing), allows a country to spend more than it produces or to invest more than it saves.

There are three main theoretical approaches that explain current account balance, but they apply to different economic environment and therefore can have varying implications for economic policy and exchange rate adjustments. Traditional theory defined current account balance as the difference between trade flows (imports and exports) or net exports. Consequently, a lot of emphasis focused on exchange rates, price and income changes as the primary determinants of current account balance performance. CAB was therefore heavily dependent on price and income elasticities, hence this method is commonly known as the elasticities approach.

Indeed, relative international prices and their determinants were viewed as central to dynamics of the current account (Saksonovs, 2006). In particular, under the elasticity approach, current account balance adjusts through changes in the exchange rate. These changes affect relative prices of goods and services, which ultimately affect demand by both domestic and foreign consumers. Central to this traditional approach is the Marshall-Lerner (ML) condition, which states that, assuming initial equilibrium condition, the sum of price elasticities (in absolute value) of exports and imports must be greater than unity in order for currency devaluation or depreciation to improve the current account balance, that is $e_x + e_m > 1$.

A depreciation or devaluation of the exchange rate makes domestic exports cheaper in foreign markets, which increases their demand. At the same time, imports become more expensive in the domestic market, and their demand diminishes. The net effect on the current account balance will depend on price elasticities. If goods exported are elastic to price, quantity demanded will increase proportionately more than the decrease in price, and total export revenue will increase. Similarly, if goods imported are elastic, total import expenditure will decrease and both cases will improve the current account balance. However, empirical evidence indicates that goods tend to be inelastic in the short term, since it takes time to adjust to new prices, change current contracts and consumption patterns.

Therefore, in the short-run, the Marshall-Lerner condition is not met and devaluation is likely to worsen current account balance, leading to the so-called "perverse" effect. In the long term, traders and consumers will adjust to the new prices, current account balance will improve resulting to the *J-Curve* phenomenon, which denotes the time path of the CAB that initially deteriorates and subsequently improves to a higher level than pre-devaluation level. The adjustment process passes through currency-contract, pass-through and quantity-adjustment periods, which allow current contracts to mature, and prices and quantities to change.

The second and alternative method is the absorption approach, which stipulates that current account balance is the difference between domestic output and spending (absorption). Based on the Keynesian national income framework, whereby Y=C+I+G+X-M, absorption or aggregate demand is defined as:

A=C+I+G. Therefore, CAB is written as: CAB=X−M=Y−A .....(3)

Hence, a CA surplus (deficit) means that domestic output exceeds (is less than) domestic spending. The main focus has been on how depreciation or devaluation affects CAB through its influence on national income and domestic absorption. It is quite clear that if devaluation raises (lowers) income relative to absorption, the current account will improve (deteriorate). Consequently, there are two effects on income, namely, idle resources and terms of trade effects; and, six direct effects

on absorption, of which cash balance, income re-distribution and money illusion effects, all associated with resultant demand-pull inflation, are more prominent. The other concerns are of future price increases leading to advance buying and discouraging investment and expenditure on foreign goods due to higher prices. This is occasioned by shifting resources from industries producing for domestic market to industries producing for the export market.

Since devaluation lowers relative price of exports, increases exports, and increases relative price of imports, if the economy is below full employment, increased demand for exports increases income through the multiplier process and this reduces both the trade deficit and unemployment problems simultaneously. But increased national income raises the demand for imports, hence worsening current account balance. On the other hand, increased relative price of imports deteriorates the terms of trade, which lowers a country's real income. Therefore, the net effect is ambiguous and the outcome of devaluation depends on its direct impact on absorption, which discourages investment and consumption. Consequently, a reduction of domestic expenditure (absorption) improves the current account balance.

The third method of analysing the current account came into effect in the 1970s and early 1980s under the so-called intertemporal approach, where the attention shifted from the trade view of the current account to savings investment definition. In this view, current account balance is defined as the difference between domestic savings and investment and since both variables are based on intertemporal decisions, the CAB is regarded as an intertemporal phenomenon. This modern viewpoint emphasizes that those macroeconomic factors that determine saving and investment also influence the current account balance. Consequently, this resulted in factors such as fiscal deficits, consumption smoothing and investment becoming important determinants of current-account behaviour (Edwards, 2001). According to Genberg and Swoboda (1992), recent theoretical work on the determinants of the current account balance, has tended to emphasize the intertemporal aspects highlighted by the "saving-investment" approach. Hence, intertemporal aspects identified as the determinants of saving and investment should be fundamental in any analysis of current account developments.

According to Obstfeld and Rogoff (1994) and Calderón *et al* (2000), current account balance is the outcome of forward-looking dynamic saving and investment decisions driven by expectations of productivity growth, government spending, and interest rates among others. The approach argues that private saving and investment decisions result from expectations of future development of these macroeconomic variables (Herrmann, S. and A. Jochem, 2005). The intertemporal approach to the current account recognizes that saving and investment decisions result from forward looking calculations based on the expected values of various macroeconomic factors. Hence, the current account is a

result of an intertemporal optimization with the objective of optimally distributing consumption over time (*consumption smoothing*) and welfare maximization.

Within this framework, the current account balance behaves as a buffer against transitory shocks in productivity and demand (Debelle and Faruqee, 1996). This approach also postulates that the impact of economic changes on the current account balance varies according to their origin, persistence and timing of such changes.

Two analytical views emanate from the intertemporal approach: first, as long as current account deficits reflect increases in (private) investment (and not declines in savings), policy makers have little to worry about, and secondly, a bigger current account deficit is not a cause for concern as long as the fiscal account is balanced (Edwards, 2001). In addition, an open economy would prefer to run a current account deficit and borrow from abroad rather than allow consumption to decline (Debelle and Faruqee, 1996). The approach also postulates that a small open economy, which is initially capital poor like most developing countries, provided it has access to international capital markets, will run current account (and trade) deficits for a sustained period of time in order to build its capital stock, while maintaining its long-run rate of consumption. Eventually, as output grows towards long-run level and return on capital converges, the current account will improve as net exports move into surplus, to pay interest obligations on the accumulated external debt (Debelle and Faruqee, 1996).

The basic intertemporal approach has also been extended to an overlapping generations framework. As a result, according to Ando-Modigliani life-cycle consumption hypothesis, consumption and saving behaviour are directly affected by the stage in the life-cycle. Hence, systematic changes in the age structure of the population will affect national saving behaviour (Debelle and Faruqee, 1996). Equally, to the extent that capital-labour ratios are also affected, changes in demographics may affect investment as well. Therefore, the dependency ratio has been considered as a key factor that influences current account balance.

A fourth representation has also been used to make the link between the current account and the accumulation of foreign assets. This is given by: CAB=ÄF, where F represents net foreign assets. This relationship has been emphasized by those who see capital flows as a driving force behind the current account. Expressed slightly differently in the context of explaining the overall balance of payments (BOP), this method of looking at the current account is commonly known as the monetary approach to the BOP. The "stages of development" hypothesis for the balance of payments suggests that, as countries move from a low to an intermediate stage of development, they typically import capital and, therefore, run current account deficits. Over time, as they reach an advanced stage of

development, countries run current account surpluses in order to pay off accumulated external liabilities and also to export capital to less advanced economies (Chinn and Prasad, 2000).

2.2 Empirical Literature

Empirical work on current account balance has also been extensive and varied. The dependent variable in most of the analyses is the current account balance expressed as a ratio of GDP. Aristovnik (2007) studied the short and medium term determinants of CA deficits in the Middle East and North Africa (MENA) region and estimated the following dynamic panel data model:

$$CA_{it} = \alpha_i + \gamma_t + \beta CA_{it-1} + \lambda x_{it} + \mu_i + \varepsilon_{it} \quad \text{.....(4)}$$

where CA is current account balance as a ratio of GDP and x_i a vector of independent variables including real GDP growth, domestic investment, financial deepening, relative income, government consumption, openness, foreign direct investment, oil price, growth of OECD countries and foreign interest rate; γ_t denotes time-specific effects and μ_i and ε_{it} denote unobserved (time-invariant) effects and residual error, respectively. The study used several econometric techniques including OLS, LSDV and FGLS but with special emphasis on GMM-IV, since it estimated a dynamic panel data model. The study by Aristovnik (2007) revealed that domestic and foreign direct investment, government expenditure, relative income and foreign interest rate have negative impact on CAB. The analysis also indicated that more open economy, higher oil prices, financial deepening, domestic economic growth and trading partners economic growth improve CAB and the balance is persistent.

Herrmann and Jochem (2005), using FGLS estimation technique, analysed the determinants of current account developments in Central and East European EU member states in a quarterly panel data framework. The study results show that CAB is positively influenced by real per capita income, fiscal balance, real interest rate and financial deepening, but negatively affected by investment and real effective exchange rate. According to Herrmann and Jochem (2005), current account balances are essentially determined by domestic investment activity and the level of economic development. Further, integration of the financial sector is also likely to encourage domestic saving and lead to an improvement of the current account.

Chang (2003) investigated long-term determinants of current account balance in Korea using annual data of structural variables such as demographics (dependency ratio), stages of economic development (the ratio of domestic per capita income to US per capita income), financial development (M2/GDP), fiscal policy stance, terms of trade, world interest rates and real exchange rate. Also included are terms of trade volatility and uncertainty, measured by standard deviation of monthly

terms of trade and inflation, respectively. Based on the *intertemporal approach*, Chang (2003) estimated the following multivariate regression model:

$(C/Y)t=á+âX_t+å_t$ .....(5)

where C is the current account, Y is nominal gross domestic product and X is a vector of explanatory variables. The dependent variable, current account balance, is expressed as a ratio to GDP in order to normalize it by controlling scale effects. The GMM estimation results reveal that dependency ratio, per capita income and money supply negatively affect current account. On the other hand, fiscal balance, terms of trade and real exchange rate positively influence CAB.

Calderón *et al.* (2000) examined empirical links between current account deficits and a set of macroeconomic variables that include public and private domestic savings, external savings and national income variables focusing on 44 developing countries. Using annual information and panel data model that distinguish within and cross-country effects and controlling for simultaneity, feedback and country heterogeneity, their results of Generalized Method of Moments (GMM) indicated that (i) CA deficits in developing countries are moderately persistent; (ii) a rise in domestic output growth generates a larger CA deficit; (iii) increases in savings rate have positive effects on CAB; (iv) shocks that increase terms of trade or cause real exchange to appreciate are linked with higher CA deficits; and, (v) either higher growth rates in industrial countries or higher international interest rates reduce CA deficits in developing countries. Other factors studied by Calderón *et al* (2000) include macroeconomic uncertainty, foreign interest rates and growth rate of industrial countries, which have negative effects on CA deficit. On the other hand, money supply has a positive relationship with CA deficit.

Chinn and Prasad (2003) empirically investigated medium-term determinants of current account for a sample of industrial and developing countries, Kenya included, utilizing an approach that highlights macroeconomic determinants of long term saving and investment balances, using both cross section and panel regression techniques. The factors considered in the study include fiscal balance, net foreign assets stock, relative per capita income, dependency ratios, real GDP growth, GDP growth volatility, terms of trade volatility, real exchange rate, trade openness, financial deepening, capital controls and saving ratio. By use of OLS and fixed effects (FE) estimation techniques, Chinn and Prasad (2003) revealed that current account balance is positively influenced by fiscal balance, net foreign assets, relative per capita income, financial deepening, terms of trade volatility and capital controls. In contrast, it is negatively affected by dependency ratio and trade openness.

Using both cross section and panel data estimation techniques, Chinn and Prasad (2000) investigated the empirical relationships between current account balances and variables that affect CAB through their

effects on saving and investment for both industrial and developing countries, Kenya included. Their general empirical specification was of the following form:

$$\left(\frac{CAB}{GDP}\right)_t = \alpha + \beta X_t + \varepsilon_t \quad \text{.....(6)}$$

where the current account is expressed as a ratio of GDP in order to control scale effects, and X is a vector of independent variables that includes government budget balance, relative income, dependency ratios, average GDP growth, terms of trade volatility, measures of capital controls, degree of openness, and financial deepening.

Chinn and Prasad (2000) found out that government budget balance, initial net foreign asset positions, real per capita income, and indicators of financial deepening are positively correlated with current account balances. Among developing countries, they also found that higher terms of trade volatility are associated with larger current account surpluses (or smaller deficits). The degree of openness to international trade appears to be weakly associated with larger current account deficits among developing countries. Their study found limited evidence to support the patterns of evolutions in current accounts predicted by the stages-of-development hypothesis. Other potentially important variables such as indicators of capital controls and average GDP growth however, appear to bear little systematic relationship with current account balances (Chinn and Prasad, 2000). On the other hand, they found out that CAB is negatively affected by dependency ratio and trade openness.

Debelle and Faruqee (1996), guided by the theories of saving and investment, used cross-section and panel data to examine determinants of current account focusing on the extent to which the variables have been relevant in explaining CAB across countries and over time for both industrial and developing countries, Kenya included, between 1971 and 1993. Their OLS and fixed effects estimation results found significant impact on the stages of development and demographic factors in the cross-section. This implies that the more advanced the economy, the more likely it will experience smaller deficits and vice versa. On the other hand, a country that has an above average dependency ratio tends to have large CA deficits due to decreasing savings.

By estimating both partial-adjustment and error-correction models using panel data, Debelle and Faruqee (1996) found significant short run and long run impacts of real exchange rate, terms of trade, fiscal policy, stage of development and demographics on the current account in the time series. Under time series analysis, they found out that fiscal policy has a large impact on the CAB with a positive relationship. Other variables considered include exports and imports of oil, real interest rate, inflation rate, terms of trade and inflation variabilities, domestic output gap, and financial liberalization or capital control index. From the panel estimations, Debelle and Faruqee (1996) found out that CAB

is positively influenced by fiscal balance, real exchange rate and terms of trade, and negatively by dependency ratio and domestic output gap.

Khan and Knight (1983) carried out an empirical analysis on determinants of current account balances of non-oil developing countries in the 1970s. The study estimated a simple CA model whereby current account balance (excluding official transfers), as a ratio of nominal exports of goods, is a function of terms of trade, growth of real GNP in industrial countries, foreign real interest rate, real effective exchange rate, fiscal position (as a ratio of nominal GDP) and linear time trend. The equation was estimated using pooled time-series cross-section data for the sample of 32 non-oil developing countries.

According to the results of Khan and Knight (1983), both external and internal factors affect CAB of non-oil developing countries, whereby terms of trade, growth of industrial countries and fiscal balance have positive effects, while foreign real interest rate and real effective exchange rate negatively affect CAB. Based on the coefficients, it was evident that the most important explanatory variable is the terms of trade, while foreign real interest rate, the real effective exchange rate, and the government's fiscal position turn out to be of roughly equal importance.

The least important factors are growth in the industrial countries and the time trend as determinants of current account developments in this particular sample of non-oil developing countries (Khan and Knight, 1983).

In order to ascertain how well the estimated model explains the current account for each individual country, Khan and Knight (1983) went further and obtained country-specific measures of goodness-of-fit. The study calculated correlation between the actual and fitted values of the current account ratio, using the observations pertaining to each country in the pooled sample. In the case of Kenya, the correlation coefficient was 0.776, which is reasonably satisfactory.

In recent times, current account balance has also been analysed in relation to other key macroeconomic variables such as fiscal balance, exchange rate, domestic saving and economic growth, particularly using the three gap framework. According to Sepehri and Akram-Lodhi (2005), Mwega *et al.* (1994) and Bacha (1990), the three gap model, which is an extension of the traditional two gap model, distinguishes fiscal constraint as another potentially important impediment to economic growth independent from domestic and foreign savings constraints. The three-gap model has been used to assess the relative importance of domestic and external resources on economic growth. According to the model, the utilization and expansion of existing productive capacity is constrained not only by domestic and foreign savings, but also by the impact of fiscal limitations on government spending and thus on its public investment choices. In the context of low-income transitional economies, public sector saving and investment play a crucial role in

determining the productive capacity of the economy and its growth rate (Sepehri and Akram-Lodhi, 2005).

In the Kenyan case, Mwega *et al.* (1994) found that availability of foreign exchange was the binding resource constraint on growth in the 1970s and 1980s. On the other hand, Mwega (2007) concluded that after liberalization of foreign exchange market, the saving gap has been the binding constraint to growth in Kenya since the 1990s. In a related study, Sepehri and Akram-Lodhi (2005) concluded that the size of the foreign financing gap illustrates the centrality of the foreign exchange constraint on Vietnam's ability to achieve a socially acceptable rate of growth in the medium-term. Thus, increased availability of foreign exchange would alleviate the saving, fiscal, and external gaps that undermine good macroeconomic performance.

2.3 Overview of Literature Review

The elasticities approach has the benefit of straightforward empirical predictions, which were often found to be helpful in examining short-run implications of exchange rate changes on trade balance. However, pessimists argue that elasticities in developing countries are very low to satisfy the ML condition and depreciation worsens the CAB. For instance, most of these countries mainly import intermediate inputs and machinery for production purposes, hence the demand elasticity of imports is usually very low. Equally, demand elasticity for primary commodities exports is low. Moreover, since the elasticities approach relies on exchange rate changes and assumes constant commodity prices, it is criticized for ignoring income effects and relative prices of exports and imports that are key in determining terms of trade effects. It is thus considered a partial equilibrium analysis.

Due to its partial-equilibrium, short-term analysis and static nature, this approach is inherently limited in its ability to explain long-term developments in saving-investment balance without a further reconciliation with the absorption approach and without greater attention to general equilibrium analysis (Debelle and Faruqee, 1996). Equally, the absorption approach also ignores relative prices of exports and imports, which are important in determining the value of marginal propensity to spend. Furthermore, the absorption approach is based on purely definitional tautology that does not explain any behavioural relationship among the variables.

The intertemporal approach views current account balance as an outcome of forward-looking dynamic saving and investment decisions. According to Obstfeld and Rogoff (1994), the intertemporal approach to current account analysis extends the absorption approach through its recognition that private saving and investment decisions, and sometimes government decisions, result from forward-looking calculations based

on expectations of future productivity growth, government spending demand, real interest rates and so on. Therefore, the intertemporal approach besides being dynamic, achieves a synthesis of both absorption and elasticities approaches by accounting for macroeconomic determinants of relative prices and by analysing the impact of current and future prices on saving and investment. Furthermore, it is also grounded on an accounting identity framework that provides consistency checks and reasoning based on partial and simplified models (Genberg and Swoboda, 1992). Hence, the approach provides a consistent and coherent foundation for open-economy policy analysis (Obstfeld and Rogoff, 1994). This approach has therefore gained empirical popularity due to its intertemporal aspects on the determinants of saving and investment.

A key emphasis on the saving-investment approach is that saving, investment and current account developments should be studied in a general equilibrium framework in which consistency between different partial methods is automatically ensured. Therefore, the focus on the intertemporal nature of the current account should be an integral part of any analysis of current account behaviour. This implies that empirical modelling of the current account focusing on the determinants of saving and investment is preferred to conventional estimation of aggregate export and import equations or of their difference (Genberg and Swoboda, 1992). This is supported by the fact that exports-less-imports equation is not a structural equation, but rather a reduced form reflecting the behaviour of a number of different economic agents, hence difficult to interpret estimated coefficients in terms of economic theory.

The most common estimation methods in the empirical work have been cross-section and panel data regressions involving assessment of linear current account functions based on the intertemporal approach. A brief summary of the reviewed empirical studies is given in Annex 1. Generally, the factors that have been theoretically and empirically considered in determination of current account balance include CAB persistency, domestic economic growth rate, real exchange rate, terms of trade, fiscal balance, trade openness, domestic saving and investment, foreign direct investment (FDI), financial deepening proxied by M_2/GDP, international oil price, terms of trade volatility, income of trading partners, domestic and foreign interest rates, dependency ratios, stage of economic development represented by relative per capita income and macroeconomic (in)stability. The latter is usually measured by the variance or standard deviation of inflation and exchange rate volatility. Others include: net foreign assets, domestic output gap and capital controls. By and large, this study basically uses these identified variables based on their relevance in the case of Kenya.

In general, there is no consensus on the determinants of current account balance. Above all, there are few empirical studies on individual developing countries particularly in Kenya. The available studies on Kenya have studied the country in a panel or group of countries, for

example Chinn and Prasad (2003 and 2000), Khan and Knight (1983) and Debelle and Faruqee (1996). Other studies on Kenya's external balance such as Mwega (2007 and 1994), discuss how Kenya's CAB relates with other variables such as economic growth and exchange rate.

Since cross-section regressions explain cross-country variations in current account positions, while panel regressions combine both cross-country and time series variations, it is difficult to isolate individual country's current account position behaviour.

Aristovnik (2007) recommends that in order to deeply investigate the determinants of current account, it is worthwhile to undertake detailed analysis for each individual country by way of time series analysis. Such an analysis could be able to isolate and take into account particular country-specific characteristics which are not clearly captured by cross-section and panel data analysis. This study strongly agrees on this and has therefore used a different methodology with the aim of studying Kenya individually.

3. Methodology

3.1 Conceptual Framework

Following the intertemporal approach to current account balance analysis, this study uses economic theories of saving, investment and current account based on the three-gap model. This helps in understanding of current account behaviour using the saving-investment balance framework. Indeed, empirical evidence has shown that a better understanding of current account developments could be gained if modern theories of investment and saving behaviour are used more systematically. Under this structure, CAB is taken as the difference between national saving and investment. It is then implied that factors that influence saving and investment also determine CAB performance.

From macroeconomic theory, national income accounting identity is normally given as:

$$Y=C+I+G+X-M \quad \ldots\ldots(7)$$

whereby the letters represent national income, private consumption, private investment, government expenditure, exports and imports of goods and services, respectively. Considering that $Y=Y_d+T$, where Y_d is disposable income and T is taxes, equation (7) can be expressed as follows:

$\{(Y_d-C)-I\}+(T-G)=(X-M)$, which can be re-written as:

$$(X-M)=(S_p-I_p)+(T-G) \quad \ldots\ldots(8)$$

This is the three-gap model framework which implies that current account balance or (X–M) is equivalent to private saving and fiscal balances combined. Since the fiscal balance is also referred to as public or Government saving, denoted by S_g, equation (8) which is an identity, may be simplified as follows:

$$CAB=S_p+S_g-I_p \quad \ldots\ldots(9)$$

Equation (9) is clearly in line with the *intertemporal approach* to the current account balance, which defines CAB as the difference between domestic saving and investment. Therefore, factors that affect saving and investment are taken as determinants of the current account balance.

Theories of saving behaviour are very closely related to consumption theories because saving is the difference between disposable income and consumption $S_p=(Y_d-C)$. Some common consumption theories include Keynesian absolute income hypothesis, Duesenberry's relative income hypothesis, Friedman's permanent income hypothesis and Ando-Modigliani-Brumberg's life-cycle hypothesis (Mikesell and Zinser, 1973).

According to Branson (1989), most of the consumer and saving theories are founded on microeconomic theory of consumer choice, whereby consumer behaviour is a result of rational maximization of utility by allocating lifetime stream of earnings to lifetime pattern of consumption that is intertemporal optimization behaviour, which is also known as consumption-smoothing. This is in agreement with the intertemporal approach to CAB analysis. The Keynesian savings function, in its most commonly used form, is linear with a constant marginal propensity to save (MPS), that is:

$$S = a_0 + a_1 Y \quad \ldots\ldots(10)$$

where S is gross domestic saving, Y is gross national product, and a_1 is the constant MPS. It is assumed that $a_0<0$ and $0<a_1<1$, such that as the level of income rises, propensity to save also increases. Generally, from economic theories and empirical studies such as Loayza, *et al.* (2000), Elbadawi and Mwega (2000) and Mikesell and Zinser (1973), saving is a positive function of disposable income, public expenditure, exports, terms of trade and macroeconomic uncertainty but a negative function of dependency ratio, capital imports and foreign aid. However, the relationship between saving and GDP growth, real interest rate and financial deepening is ambiguous.

According to neo-classical, Keynesian and accelerator theories and some empirical studies such as Oshikoya (1994), private investment is a positive function of output gap or growth, public investment, corporate profits, credit to private sector and saving rate but a negative function of real interest rate, inflation, foreign debt and uncertainty. The relationship with money supply and trade openness is uncertain. Traditionally, the savings-investment balance approach indicates that terms of trade, fiscal policy and real exchange rate do exert significant influence on current account.

3.2 Analytical Framework

Similar to Herrmann and Jochem (2005), this study has developed an analytical model using the national accounting identity given by equation (9). The paper follows the intertemporal approach and has applied saving and investment theories to transform the identity into behavioural form. From the literature reviewed, private saving function is expressed as follows:

$$S_p = \alpha_0 + \alpha_1 GDPgr + \alpha_2 FB + \alpha_3 RIR + \alpha_4 RER + \alpha_5 TT + \alpha_6 TOP + \alpha_7 M_2 + \alpha_8 DEPR + \alpha_9 FDI + \alpha_{10} INFDEV + \alpha_{11} ERVAR + \varepsilon \quad \ldots\ldots(11)$$

whereby the explanatory variables are income growth rate (GDPgr), fiscal balance also known as government saving ($FB=S_g$), real interest rate (RIR), real exchange rate (RER), terms of trade (TT), trade openness (TOP), financial deepening or money supply (M_2), dependency ratio

(DEPR), foreign direct investment (FDI) and macroeconomic stability represented by inflation deviation (INFDEV) and exchange rate variability (ERVAR); $\alpha_0 \ldots \alpha_{11}$ are parameters and å is an error term. Based on economic theory and past studies, private investment function is articulated as follows:

$$I_p = b_0 + b_1 GDPgr + b_2 FB + b_3 RIR + b_4 M_2 + b_5 TOP + b_6 INFDEV + b_7 ERVAR + \mu \quad \ldots\ldots\ldots\ldots (12)$$

Substituting equations (3e) and (3f) into (3c) gives the following CAB equation:

$$CAB = (\alpha_0 - b_0) + (\alpha_1 - b_1) GDPgr + (\alpha_2 + 1 - b_2) FB + (\alpha_3 - b_3) RIR + \alpha_4 RER + \alpha_5 TT + (\alpha_6 - b_5) TOP + (\alpha_7 - b_4) M_2 + \alpha_8 DEPR + \alpha_9 FDI + (\alpha_{10} - b_6) INFDEV + (\alpha_{11} - b_7) ERVAR + \varepsilon \quad \ldots.(13)$$

Taking natural logarithms of the positive series in equation (3e) and substituting the coefficients, results in the following semi-log linear function:

$$CAB_t = \beta_0 + \beta_1 GDPgr_t + \beta_2 FB_t + \beta_3 RIR_t + \beta_4 \ln(RER_t) + \beta_5 \ln(TT_t) + \beta_6 \ln(TOP_t) + \beta_7 \ln(M2_t) + \alpha_8 \ln(DEPR_t) + \alpha_9 \ln(FDI_t) + \beta_{10} INFDEV_t + \beta_{11} ERVAR_t + \alpha_i D_T + \varepsilon_t \quad \ldots\ldots\ldots\ldots (14)$$

whereby β_i and α_i are parameters to be estimated, β_0 being a constant and ε_t an error term, which is assumed to be white noise and it captures the influence of all other factors not explained in the model. The D_T caters for dummy variables D73, D77, D79, D93 and D00 used to account for the effects of oil shocks, collapse of EAC, mismanagement of coffee boom, foreign exchange liberalization and COMESA free trade area, respectively.

This study uses annual time series data to investigate and estimate equation (14) in order to establish determinants of current account balance in Kenya. It is worth noting that the variables CAB, FB, M_2 and FDI are scaled or normalized by dividing by GDP. Since the series of RER, TT, TOP, M_2, DEPR and FDI are positive, they are transformed into logarithm form. The log form reduces heteroscedasticity as it compresses the scale in which the variables are measured and also it implies that the estimated parameters are elasticities, but in this case they are semi-elasticities because the dependent variable is not in log form.

A priori, and based on economic theory and literature reviewed, it is hypothesized that RIR, RER, FB, TT, INFDEV and ERVAR positively affect CAB. On the other hand, CAB is negatively affected by FDI, and DEPR, while the relationship with GDPgr TOP, M_2 and the dummy variables is ambiguous.

The most common estimation method in the empirical work has been cross-section and panel data regressions involving estimation of linear current account functions based on the intertemporal approach. The dependent variable in most of the analyses is the current account balance expressed as a ratio of GDP, while the explanatory variables are

chosen on the basis of their relevance in literature. This study follows the same estimation approach. The analytical framework has also been applied by Herrmann and Jochem (2005), Hung and Bronowski (2002), Chin and Prasad (2000), Calderon *et al.* (2000) and Khan and Knight (1983), but in a panel data framework.

The intertemporal approach has been selected due to its several advantages. First, besides being dynamic, the approach achieves a synthesis of both absorption and elasticities approaches by accounting for macroeconomic determinants of relative prices and by analyzing the impact of current and future prices on saving and investment. Furthermore, it is also grounded on an accounting identity framework that provides consistency checks and reasoning based on partial and simplified models. Second, by using structural equations, the approach has strong theoretical foundation on the determinants of national saving and investment decisions, and pays extra attention to their intertemporal nature. This approach is more appropriate if the goal is to understand how policy interventions influence current account balance. Moreover, it allows us to include determinants of savings and investment to explain the behaviour of the current account, an advantage not offered by the elasticity and absorption approaches. Lastly, due to its general equilibrium, intertemporal and consistent nature, the approach has been recommended by past empirical studies such as Genberg and Swoboda (1992).

3.3 Hypotheses to be Tested

This study tests the following two hypotheses:

(i) GDP growth rate, fiscal balance, real interest rate, real exchange rate, terms of trade, trade openness, money supply, dependency ratio, foreign direct investment and macroeconomic stability are not significant factors in explaining current account balance in Kenya; and,

(ii) There is a long-run relationship between CAB and the variables in (i).

3.4 Measurement and Discussion of Variables

The current account balance (CAB), represented as (X–M) is the difference between Kenya's total exports and imports of goods and services, plus net investment income, debt-service payments, remittances and transfers. A negative value represents a current account deficit, while a positive value represents current account surplus. This is the dependent variable which is measured at current prices, but normalized by expressing it as a ratio of nominal GDP.

The public saving or the fiscal balance (FB) is calculated as public revenue minus expenditure, that is (T–G) and it is expressed as a ratio of GDP. A positive relationship between current account and fiscal balance, which confirms the twin-deficit hypothesis,[1] is expected in the absence of Ricardian Equivalence.[2] Money supply (M_2) is a good indicator or proxy for financial deepening. High financial deepening leads to higher savings when financial markets are well developed. On the other hand, increased money supply lowers interest rate that increases investment. Hence, the effect of money supply on current account balance can be either positive or negative. Money supply is normalized by expressing it as a ratio of nominal GDP.

Foreign direct investment (FDI) inflows are one of the mechanisms through which current account deficit is financed. Since it enhances investment, a negative relationship with CAB is expected. The FDI net inflows are measured at current prices, but normalized by dividing by nominal GDP. Economic growth in a country, which reflects income growth, affects both saving and investment, hence the CAB outcome is ambiguous. Annual real GDP growth rate (GDPgr) is considered for the national income growth rate.

Following the Fisher's Equation, real interest rate (RIR) is calculated as the difference between nominal annual lending rate (i) and inflation rate (ñ), that is RIR=(i–ñ) in order to control for inflationary effects. Investment theories stipulate a negative relationship between RIR and investment and therefore a positive impact on current account balance is expected.

The real exchange rate (RER) is calculated as follows:

$$RER = \frac{eCPI^{USA}}{CPI^{KE}} \qquad \text{.....(15)}$$

whereby, e is the nominal exchange rate expressed in price quotation system (Kenya shillings per USD), CPI^{USA} is the USA consumer price index and CPI^{KE} is the Kenya's consumer price index based on 1997=100. An increase in the nominal exchange rate that is depreciation, also represents depreciation of the RER. Depreciation of the real exchange rate makes domestic exports cheaper thus stimulating exports demand, which increase income and savings. In contrast, imports become more expensive leading to decreasing demand. Therefore, if the Marshall-Lerner condition is fulfilled, depreciation improves CAB, while

[1] Twin-deficit hypothesis states that fiscal deficit leads to current account deficit. If government reduces taxes or increases expenditure, its savings decline. Equally, it stimulates private consumption and eventually, total national savings decrease.

[2] Ricardian Equivalence states that the two deficits are not related at all. It suggests that it does not matter whether government finances its spending with debt or tax increase, total level of demand in an economy would be the same, since any reduction in public saving is immediately offset by an equal increase in private saving occasioned by high interest rate caused by high government borrowing, hence fiscal deficit has no effect on current account deficit.

appreciation worsens the CAB, hence positive relationship is expected. However, possibility of perverse effects of depreciation and the J-curve phenomenon cannot be ruled out, whereby depreciation worsens CAB in the short-run, but improves after some period.

The terms of trade (TT) variable is calculated as exports price index divided by imports price index.

$$TT = \frac{EPI}{IPI} \quad \text{.....(16)}$$

An increase in export price index or a decrease in import price index leads to improved terms of trade. This is expected to increase exports earnings, hence national income and saving resulting into improved CAB. This is in line with Harberger-Laursen-Metzler (HLM) effect, which states that terms of trade deterioration will cause a decrease in savings and a current account deficit due to the decrease in real income. Therefore, a positive relationship between TT and CAB is expected.

Trade openness (TOP) variable is calculated as the sum of total exports and imports at current prices divided by nominal GDP.

$$TOP = \frac{(X + M)}{GDP} \quad \text{.....(17)}$$

where X and M represent total exports and imports, respectively. A more open or liberalized economy is expected to increase its exports as a result of larger market availability, thus improving the CAB. However, in cases of developing countries like Kenya which largely rely on imports of capital and intermediate inputs, the more an economy is open, the more it attracts capital and other imports. Furthermore, restrictive and unfavourable global trading systems adversely affect exports from developing countries, hence reducing income and saving resulting to worsening CAB. Therefore, the relationship between CAB and TOP remains ambiguous.

Dependency ratio (DEPR), normally expressed as a percentage, is defined as the ratio of economically dependent part of the population to the productive population. The economically dependent part comprises children aged 0 to 14 years and people aged 65 years and above. The productive population makes up the gap in between 15-64 years. The ratio is calculated using the formula:

$$DEPR = \left(\frac{A + B}{C}\right) X100 \quad \text{.....(18)}$$

where A=number of people aged 0-14 years; B=number of people aged 65 years and above; and C=number of people aged 15-64 years. Economically dependent population in most cases has low savings and high consumption, which reduces savings of the productive population and the economy. This leads to worsening CAB, hence the expected negative relationship.

Macroeconomic stability or certainty is also a key determining factor on CAB performance. It is usually indicated by standard deviation of inflation, exchange rate or terms of trade. This study considers the first two

indicators. Inflation deviation (INFDEV) is used as a proxy for standard deviation of inflation and it is calculated as $INFDEV = \rho_t - \rho_{t-1}$ where, ρ_t is the annual inflation rate at time t. Exchange rate variance (ERVAR) is used as a proxy for standard deviation of annual nominal exchange rate and it is calculated as $ERVAR = (eEP_t - ePA_t)$ where eEP_t is the annual end of period nominal exchange rate at time t and ePA_t is the annual period average nominal exchange rate at time t. These proxy variables are based on the normal statistical formula of calculating standard deviation, which has also been applied in some empirical studies. An increase in any of the indicators is a reflection of instability or uncertainty, which increases precautionary savings and stifles investment. Consequently, current account balance improves and vice versa, hence the expected positive relationship.

According to Mwega and Ndung'u (2004), Kenya has experienced a series of external shocks over the years. These include oil crisis of 1973 and 1979, mismanagement of coffee boom in 1976/77 and collapse of the East African Community in 1977; structural adjustment reforms mainly the shift from imports substitution strategy (ISS) to export-promotion strategy (EPS) in the early 1980s, which was followed by trade liberalization that culminated in foreign exchange market liberalization in May 1993. Lately, Kenya has participated in regional, sub-regional and international trade initiatives and economic integration efforts, the most notable one being COMESA's Free Trade Area (FTA) that became effective in 2000.

In order to capture the effects of these shocks or structural breaks on Kenya's current account balance, this study uses dummy variables in the analytical framework. The dummies are also confirmed by assessing characteristics of estimation residual series. The variables are defined as step dummies as follows:

DT }=1 if year=T+1

}=0 otherwise

where T=1973, 1977, 1979, 1993 and 2000.

The oil shocks led to deterioration of terms of trade, poor income and therefore low savings. During the coffee boom, there was heavy consumption with little savings while the collapse of the EAC led to loss of export market, and less export earnings that led to low income and savings. Therefore, a negative relationship between CAB and these dummies is expected. On the other hand, liberalization of foreign exchange market and COMESA's FTA are expected to boost export earnings, national income and savings. However, liberalization and economic integration is also expected to lead to more imports, reducing national saving. For these reasons, the relationship between CAB and these two dummies is uncertain. In conclusion, a brief description of all the variables used in this study is given in Annex 2 Table (a).

3.5 Data Type and Sources

This study uses Kenya's secondary annual time series data for the period 1970 to 2006 sourced from Government's Statistical Abstracts, Economic Surveys, Central Bank of Kenya's statistical bulletins, KTMM database, International Financial Statistics (IFS) database and UNCTAD's statistics.

3.6 Econometric Approach

This study applies a multivariate analytical framework to carry out time series analysis on current account balance performance in Kenya, and estimates an error correction model (ECM). Error correction mechanism and cointegration analysis are carried out using Engle Granger two step residual based method. This mechanism is preferred since it integrates, hence making it easier to analyse, both short run and long run effects. It also helps to analyse the linkage between short run and long run relationships of the series under consideration. Cointegration analysis ensures that the problem of spurious relationships is avoided. Engle and Granger (1987) pointed out that a linear combination of two or more nonstationary series may be stationary. If such a stationary, or I(0), linear combination exists, the non stationary time series are said to be cointegrated. The stationary linear combination is called the cointegrating equation and may be interpreted as a long run equilibrium relationship among variables. Therefore, cointegration analysis is only valid when working with nonstationary series.

The Granger Representation Theorem states that if a linear combination of variables is stationary, then the variables are cointegrated and can be considered to be generated by an error correction model. Hence, it can be stated that ECM generate cointegrated series and conversely cointegrated series have an ECM representation, which implies there is a long run relationship among the series. The ECM integrates both short run and long run dynamics in a model and ideally, it restricts the long run behaviour of endogenous variables to converge to equilibrium. The cointegrating error term is known as the error correction term (ECT) since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. Using the simple model $Y_t = \beta X_t + \mu_t$, the ECM is of the form:

$$\Delta Y_t = \alpha \Delta X_t + \gamma \mu_{t-1} \varepsilon_t \quad \text{.....(19)}$$

The lagged residual, also known as the error correction term, captures error correction process or the long-run responses. The coefficient γ measures speed of adjustment, hence it is known as adjustment parameter, which is expected to be negative and significant for a stable convergent model. If it is positive, the model is explosive. The rest of the variables in the model, the first differences that are stationary, are the short-run responses. In the absence of cointegration, only the

short-run responses are considered hence missing the valuable long-run information.

Ordinary least squares (OLS) regression estimation technique is applied using Eviews software. Application of OLS, as opposed to systems methods such as simultaneous equation method and vector autoregression, has several advantages. The OLS is a simple and very popular econometric technique, which produces consistent and more reliable results when the appropriate assumptions are met. The basic OLS assumptions include: the residuals are normally distributed, not serially correlated, have constant variance and not correlated with explanatory variables and the regeressors are not correlated.

3.7 Unit Root Tests

Unit root tests are applied to check whether a series is stationary or non-stationary and determine its order of integration. A non-stationary series has long memory, time-dependent mean and variance, permanent innovations and strays away from its mean. Differencing is one way to remedy non-stationarity, though this would lead to loss of long run information. A series that is differenced *d* times to achieve stationarity is said to be integrated of order *d* that is I(d). A non-stationary series has a unit root or more, and is therefore differenced to make it stationary and hence it is integrated of order one, I(1) or higher. By contrast, a stationary series is time-independent, has short memory, constant mean, finite variance, transitory innovations and reverts to its mean or equilibrium value.

A stationary series has no unit root and does not require differencing, hence it is integrated of order zero, that is I(0) and it does not have estimation problems. If a series is non-stationary, use of classical estimation methods such as OLS and traditional t-tests and F-tests could lead to mistaken acceptance of spurious relationships with meaningless results. Furthermore, parameter estimates of a regression using nonstationary series are inconsistent, unless the variables are cointegrated. Unit root tests therefore, precede cointegration and regression analyses. In this study, existence of unit root(s) is examined by graphical analysis and carrying out Augmented Dickey-Fuller (ADF) tests on the individual time series. The unit root test is based on the null hypothesis of non-stationarity or existence of a unit root against the alternative hypothesis of stationarity. The test model is defined as:

$$\Delta y_t = \mu + \lambda T + \beta y_{t-1} + \sum_{i=1}^{k} \theta \Delta y_{t-i} + \varepsilon_t \qquad \text{.....(20)}$$

where Y_t is the variable in question, ì is the intercept, T is time trend, k is the lag length and ε_t is a random error term. The lag length that minimizes both the AIC and SBC is selected so as to overcome autocorrelation in the error term and at the same time address parameterization problem

ensuring the residuals are white noise. The initial maximum lag length is determined using the formula:

k=integer (cube root of the sample size). Fundamentally, the ADF unit root test involves testing $H_0: \beta = 0$ (non-stationarity) against $H_1: \beta < 0$ (stationarity). The β is expected not to be positive since it would imply that the series is explosive. The significance of the drift (intercept) and the trend is tested by using joint-significance F-test.

3.8 Diagnostics Tests

In order to ensure proper statistical inference, several specifications and diagnostic tests are carried out. These include tests for normality, serial correlation and heteroscedasticity on the residuals obtained from the estimated equations and model specification tests. It involves histograms and Jarque-Bera statistic for testing normality, LM test for serial correlation, white's heteroscedasticity test and stability tests. Ramsey's Regression Specification Error (RESET) test is carried out to test functional form of the estimated models.

3.9 Summary Statistics

The estimation procedure in this study starts by investigating normality and correlation characteristics of the series. This is achieved by getting the correlation matrix and descriptive statistics, which also include standard deviation and Jarque-Bera normality test. The explanatory variables that are highly correlated are not used together in order to avoid multicollinearity problem.

4. Empirical Results and Discussions

This section highlights descriptive statistics and correlations of the variables used. Annex 2 Table (b) shows the mean, median, maximum, minimum, standard deviation and Jarque-Bera normality test. There are 37 observations in each series, which is a good sample size with adequate degrees of freedom that is satisfactory for time series analysis. The null hypothesis of normality is rejected by the JB test for current account balance, fiscal balance, real interest rate, FDI, inflation deviation and exchange rate variability. This implies that these variables are not normally distributed, although the CAB is normal at 5 per cent significance level. From Annex 2 Table (c), correlation analysis reveals dependency ratio is highly correlated with terms of trade and money supply, while the exchange rate variability is highly correlated with real exchange rate, with correlation coefficients greater than 0.60.

4.1 Stationarity Properties

The results of unit root tests are summarized in Table 4.1. The ADF unit root tests reveal that current account balance, fiscal balance, real interest rate dependency ratio, foreign direct investment, inflation deviation and exchange rate variability are stationary in levels at 5 per cent significance level, they are I(0). On the other hand, GDP growth rate, real exchange rate, terms of trade, trade openness and money supply are non-stationary in levels but stationary at first difference, hence they are I(1). The results are supported by graphical analysis in Annex 3.

From these results therefore, cointegration is tested using the I(1) variables, that is GDP growth rate, real exchange rate, terms of trade, trade openness and money supply. This implies that CAB is not part of the cointegrating (long-run) equation.

Table 4.1: Unit root tests

Variable	Character-istics	Levels				First Difference			Inference at 5%s.l.
		k	ADF statistic	1% c.v.	5% c.v.	ADF statistic	1% c.v.	5% c.v.	
CABY	d, t	3	-4.708074***	-4.2605	-3.5514				I(0)
GDPGR	d, t	2	-3.513826	-4.2505	-3.5468	-4.512213***	-2.6344	-1.9514	I(1)
FBY	d, t	1	-4.557178***	-4.2412	-3.5426				I(0)
RIR	prw	1	-2.146483**	-2.6300	-1.9507				I(0)
LRER	prw	1	-0.484760	-2.6300	-1.9507	-4.355174***	-2.6321	-1.9510	I(1)
LTT	prw	1	-1.462807	-2.6300	-1.9507	-4.275445***	-2.6321	-1.9510	I(1)
LTOP	prw	1	-0.846457	-2.6300	-1.9507	-5.203540***	-2.6321	-1.9510	I(1)
LM2Y	prw	1	-1.006477	-2.6300	-1.9507	-3.938004***	-2.6321	-1.9510	I(1)
LDEPR	prw	1	-2.820411***	-2.6300	-1.9507				I(0)
LFDIY	d, t	1	-3.843555**	-4.2412	-3.5426				I(0)
INFDEV	d, t	1	-6.300653***	-4.2412	-3.5426				I(0)
ERVAR	d, t	1	-3.956016**	-4.2412	-3.5426				I(0)

c.v-critical value, s.l.-significance level
*** Stationary at 1% significance level, ** Stationary at 5% significance level
d, t -significant drift and trend
prw-pure random walk

4.2 Cointegration Analysis

This study has applied Engle-Granger two-step residual based method to test for cointegration. Based on economic theory and past empirical studies, the I(1) variables represent exchange rate market. Therefore, these variables are used to estimate a long-run exchange rate equation, which is tested for cointegration. The estimated long-run exchange rate equation is given in Table 4.2.

The residuals generated from the above equation are tested for unit root using Augmented Dickey-Fuller (ADF) test. The residuals are stationary at levels, confirming that the long-run equation is statistically significant, hence the variables are cointegrated. Since the above model is the cointegrating or long-run equation, its residuals represent equilibrium in the foreign exchange market, which is determined by output growth and trade openness. The cointegration results are confirmed by applying Johansen cointegration test. The trace statistic or likelihood ratio test, rejects the null of at most none cointegrating equation thus indicating existence of one cointegrating equation at 5 per cent significance level. This confirmation is in line with Charemza and Deadman (1997) who argues that Johansen method can be used as an auxiliary tool to check the validity of the Engle-Granger method. The generated residual is therefore used in the error correction model estimation as an error correction term (ECT).

4.3 Error Correction Model

In order to analyse the linkage between short run and long run relationships, this study estimated an error correction model. The study initially estimated an over-parameterized model, and then applied Hendry's general-to-specific estimation approach to get a parsimonious model whose results are given in Table 4.3.

The results further confirm existence of cointegration since the ECT is negative and significant as expected with an adjustment parameter of 8.14 per cent. Significance of the ECT reveals that current account balance is responsive to equilibrium in the foreign exchange market.

Table 4.2: Long run relationship

Dependent Variable: LRER				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.554587	0.434085	10.49239	0.0000
GDPGR	-3.973543	1.117639	-3.555300	0.0012
LTT	-0.004748	0.101227	-0.046908	0.9629
LTOP	-0.448659	0.145811	-3.076994	0.0043
LM2Y	0.123370	0.127127	0.970448	0.3391
Adjusted R-squared	0.436080			
Durbin-Watson stat	2.029807			

Table 4.3: Error correction model

Dependent variable: CABY				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.334130	0.140799	2.373098	0.0278
DGDPGR	0.389708	0.182111	2.139949	0.0449
DLTT	0.105733	0.028628	3.693276	0.0014
DLTOP	-0.020963	0.032859	-0.637968	0.5307
DLTOP(-2)	-0.038458	0.029179	-1.318029	0.2024
DLRER(-1)	0.094235	0.030958	3.043916	0.0064
DLM2Y(-2)	-0.115831	0.036927	-3.136733	0.0052
FBY	0.133537	0.069651	1.917225	0.0696
LDEPR	-0.086414	0.028687	-3.012276	0.0069
LFDIY	-0.006796	0.003283	-2.069876	0.0516
D79	-0.103857	0.015859	-6.548722	0.0000
D77	-0.068166	0.021067	-3.235746	0.0041
D73	-0.064897	0.020271	-3.201515	0.0045
ECT(-1)	-0.081411	0.043158	-1.886349	0.0739
Adjusted R-squared	0.858320			
Durbin-Watson stat	1.671139			
Jarque-Bera	0.361419			0.834678
Serial Correlation LM	2.485150			0.288640
Hettest	26.16319			0.293223
RESET	0.400340			0.526913

The ECM has good explanatory power of 85.8 per cent as indicated by the adjusted R^2, implying that the explanatory variables in the model account for about 86 per cent variations in current account balance. The results of diagnostics and specification tests indicate that the estimated error correction model is robust. Its residuals are normally distributed, not serially correlated and are homoskedastic, that is, they have constant variance. Furthermore, Ramsey specification test indicates that the model is correctly specified. Stability tests carried out using cumulative sum of recursive residuals shows that the model is stable at 5 per cent significant level as shown in Annex 3.

It is quite evident from the results that current account balance in Kenya is positively influenced by changes in terms of trade, real exchange rate, economic growth and fiscal balance. On the other hand, CAB is negatively affected by money supply, dependency ratio and foreign direct investment. As expected, the oil shocks of 1973 and 1979, coffee boom and the collapse of the EAC in 1977, negatively affected Kenya's current account balance. The significance of the intercept term implies that there are other factors which are important determinants of current account balance, but have been excluded in the model. This strengthens the case for further research in future.

The most significant positive determinant of current account balance in Kenya is the terms of trade. An increase of 1 per cent in terms of trade increases current account balance by 0.11 points, which is a current account surplus. The positive impact was expected, hence concurring with Harberger-Laursen-Metzler (HLM) effect. Increasing terms of

trade implies that export prices rise faster than import prices or export prices increase, while import prices decline. In developing countries, the former is more applicable than the latter. Terms of trade improvement increases real income and savings; and if investment and government saving were to remain constant, the increase in saving would be equal to the change in the current account surplus.

The real exchange rate has a positive influence on CAB as expected, which is associated with a one-year lag. If the Kenya shilling depreciates by 1 per cent, current account balance would increase by 0.10 points. This is in line with devaluation theory whereby an increase in real exchange rate (that is, depreciation) makes exports cheaper, while imports become more expensive. This leads to increased exports demand and earnings, national income and saving, hence current account surplus. Although perverse effects of depreciation and J-curve were expected in the short-run, whereby depreciation would have negative effects on CAB in the short run, this is not experienced in the case of Kenya.

Income growth represented by Gross Domestic Product growth has the highest positive effect on CAB that is significant at 5 per cent. An increase of GDP growth by one point raises current account balance by 0.39 points. Although income growth is expected to influence both saving and investment, the study results indicate that in Kenya, output growth positively influences saving more than investment, hence the current account surplus. Therefore, it implies that if economic growth declines, the country is bound to experience current account deficit. This study confirms the twin-deficit hypothesis as expected and hence rejects existence of Ricardian Equivalence. An increase in fiscal balance or fiscal surplus would lead to current account surplus and vice versa. Actually, if fiscal balance improves by one unit, current account balance increases by 0.13 units.

Although money supply is expected to positively influence both saving and investments, the study results confirm that money supply in Kenya positively influences investment more than saving, hence the negative impact on current account balance. The impact is associated with a two-year lag. This effect is explained by the fact that increased money supply lowers interest rates, which encourages more investment. An increase in money supply by 1 per cent reduces CAB by 0.12 points, implying that current account deficit widens. Money supply is usually used as an indicator of financial deepening that highlights depth and development of financial system in an economy. By use of this indicator, money supply is expected to positively influence national savings. Therefore, the results imply that the financial system in Kenya is not adequately developed to stimulate savings growth.

The dependency ratio as expected, negatively influences current account balance in Kenya. If the ratio increases by 1 per cent, current account balance deteriorates by 0.09 points. This is attributed to reduced

national savings occasioned by increasing dependency burden. These results therefore are in agreement with life cycle hypothesis on saving and consumption.

The study expected that FDI would negatively influence current account balance as confirmed by the results. This implies that FDI is significant in financing current account balance in Kenya. Since FDI is one of the alternative methods of financing current account balance, then it is expected that increasing FDI inflows indicates rising current account deficits and vice versa, hence the negative relationship. FDI relieves foreign exchange shortage and it is considered a more favourable way to finance current account deficits because the investors have long-term interests in the economy, as opposed to short-term capital inflows that are volatile and sometimes unstable. It raises investment or capital formation through transfer of technology and new knowledge in the host country. However, FDI may crowd out domestic investment.

The external shocks experienced in 1979, 1977 and 1973 are also significant, with negative effects as expected. This is explained by the fact that the oil crises of 1973 and 1979, the collapse of the EAC and mismanagement of coffee boom in 1977, had negative effects on Kenya's CAB. The shocks led to deterioration of the terms of trade mainly due to high oil import prices and decreasing export prices due to loss of the East African export market. Additionally, during the coffee boom, there was heavy domestic consumption with little saving.

5. Conclusion and Policy Implications

5.1 Conclusion

This study has estimated Kenya's current account balance equation using saving-investment balance or the intertemporal approach. The study investigated determinants of CAB following economic variables proposed by both theoretical and empirical literature. By use of ADF unit root tests, the study reveals that current account balance, fiscal balance, real interest rate, dependency ratio, FDI and macroeconomic stability variables are I(0). In contrast, GDP growth rate, real exchange rate, terms of trade, trade openness and money supply are I(1) variables.

Cointegration analysis indicates that current account balance is not part of the cointegrating or long-run equation. However, the study has confirmed existence of a significant long-run relationship in the foreign exchange market, i.e. between real exchange rate and GDP growth rate, terms of trade, trade openness and money supply. Based on these findings, the study has estimated an error correction model in order to examine factors that influence CAB and whether there exists any long-run relationship among the variables considered.

The results of the estimated Kenya's current account function indicate that current account balance is positively influenced by terms of trade, real exchange rate, economic growth and fiscal balance. The terms of trade are the most significant positive determinants of current account balance in Kenya. The study therefore concurs with HLM effect and devaluation theory. Further, the research findings confirm twin-deficit hypothesis and rule out Ricardian hypothesis. The study found out that money supply, dependency ratio and foreign direct investment, negatively affect CAB in Kenya. The results imply that the financial system in Kenya is not well developed to stimulate savings growth. Money supply is the most significant negative determinant of CAB, followed by dependency ratio. In principle, the study has confirmed the life-cycle hypothesis on consumption and saving. All in all, the study has satisfactorily tested its two hypotheses.

5.2 Policy Implications

The study argues that in order to progress towards a favourable current account balance aimed at reducing persistent deficits or achieving CAB sustainability, several policy options should be pursued in Kenya.

Improving the terms of trade should be a top policy priority. This can be achieved by enhancing export competitiveness through product diversification, quality improvement and technological upgrading in value-addition industries. It is expected that these manufacturing

industries will produce products that will remain competitive in the global markets, hence the ability of the country to produce and trade in international markets at prices and quality that ensure long-term viability and sustainability. This is a more sustainable method towards current account improvement, since it enhances productivity growth in the economy. It is also in line with Kenya's Vision 2030 that aims at strengthening local production capacity.

Export competitiveness should be supported by policy measures that promote productivity growth in order to produce quality exports at competitive prices. The measures should aim at reducing business transaction costs through development of infrastructure and appropriate institutions. Human resource and skills development, should be supported to improve labour productivity. Macroeconomic stability indicated by stable exchange rate and low inflation and interest rates, are critical in ensuring productivity growth. There should be easy access or increased provision of financial services to entrepreneurs so that they can adopt new technologies. At the same time, the country should invest in research and development and attract FDI for technological upgrading purposes.

Depreciation of the real exchange rate is expected to have positive impact on the current account balance. Since the results of this study are consistent with devaluation theory, whenever the Kenya Shilling is overvalued, the Government through the Central Bank of Kenya should resort to sterilized intervention in the foreign exchange market. This will depreciate the nominal exchange rate, hence the real exchange rate. In fact, experience worldwide has shown that central banks can influence exchange rates by means of sterilized interventions, and degree of exchange rate misalignments can be reduced substantially. This also guards against future currency crisis.

Sterilized intervention means that the Government would take separate action(s) in order to prevent money supply and interest rates from changing. For example, in case of an intervention to prevent nominal exchange rate from declining or appreciating, monetary authorities should sell, hence increase supply of domestic currency on the foreign exchange market and buy foreign currencies in return. Since this operation increases domestic money supply, the authorities should simultaneously sell some interest-bearing domestic assets, in order to reduce money supply, hence offsetting effects. Although in a pure floating exchange rate system the exchange rate is determined by market fundamentals, central bank intervention is justified for two reasons: to stabilize fluctuations in exchange rate when there is high volatility; and, to reverse growth in a country's trade or current account deficit.

However, it should be noted that currency depreciation has limited scope, since it increases the cost of imported inputs. This leads to terms of trade deterioration and slow growth especially in developing countries,

which heavily rely on imported capital and intermediate inputs. It also raises the value of external debt denominated in domestic currency. Therefore, depreciation as a policy option is undesirable in the short-run or during early stages of a country's economic development.

Expansionary monetary policy should be discouraged since increased money supply has a negative effect on the current account. This is explained by the fact that more money supply lowers interest rates, which encourages more borrowing for investment purposes. This is an indication that private saving in Kenya is low, probably since financial markets are not well developed to encourage a saving practice. This is complicated by the fact that Kenya, like most developing countries, is credit-constrained. Therefore, increasing private saving should be induced through development of financial markets and diversification into new financial instruments in order to promote saving behaviour in Kenya.

More importantly, in order to succeed in savings mobilization, good practices should be pursued in the financial sector. There should be intensive product development, diversification and innovation in addition to professional staff, effective internal control, regulation and supervision of the financial system. The monetary authorities are required to put in place institutional and legal frameworks that will ensure security and easy access of the savings. This is also in line with Kenya's Vision 2030, which aims at improved access and deepening of financial services and products to a larger number of Kenyans and small entrepreneurs, efficient delivery of services, stability and better financial environment. This will ensure attractive returns and deposits security and hence encourage wide participation. Equally important is economic and political stability in a country.

The low saving in Kenya could also have been caused by the high and significant dependency ratio. Considering that ability to save depends primarily on per capita income, growth of income and distribution of income, Kenya should pursue growth-generating policies that will reduce unemployment, increase per capita income and ensure equitable income distribution. Indeed, an appropriate conducive environment that will generate more working opportunities should be provided. Consequently, these measures are expected to minimize the high dependency burden and hence support savings mobilization in the country. It is worth noting that domestic saving can be mobilized by encouraging voluntary saving, which depends on ability and willingness to save. The willingness to save depends (potentially) on the rate of interest, the level of financial deepening and the rate of inflation. Sound monetary policy should be implemented in order to increase savings in Kenya.

The more Kenyan Government operates fiscal deficits, the more the country experiences current account deficits. This should be controlled through appropriate fiscal measures that would limit government

expenditures to be in harmony with revenue generation. This requires prudent government consumption and viable taxation policies that will ensure wide taxation base and increased revenue collection. The government should reduce domestic debt and liability burden on the economy and improve domestic revenue and administration capacities in order to meet greater part of budgetary resource requirements and avoid fiscal deficits. Indeed, in order to maintain a sustainable budget position targeting fiscal surplus, the Government is supposed to align its expenditure growth with long-term trend growth in revenue so that recurrent services can be funded from recurrent revenue. This requires implementation of a sound fiscal strategy. Furthermore, a fiscal strategy is an effective planning tool that provides clear signals to financial markets, the business sector and entire economy of the Government's direction in financial management.

Strategic approach to expenditure planning is very critical, since it will go a long way in improving allocation and efficiency of public expenditures based on national development priorities. Through public expenditure management, the Government ought to strengthen capacities and increase accountability of public institutions. This would enhance budget transparency and public expenditure efficiency. The government should also improve basic budget support systems, which must be complemented by an effective monitoring and evaluation mechanism. Fiscal discipline is therefore indispensable in order to improve and sustain favourable current account and economic performance as well as maintain macroeconomic stability.

It is quite necessary that the discipline should be improved through a combination of fiscal approaches that include rules, laws, responsibility and institutional development. However, such a fiscal strategy requires effective management and political commitment.

5.3 Study Limitations and Research Agenda

This study encountered some problems. The first problem is data inconsistency among different sources and even within the same source, for example discrepancies exist among publications of different time periods, especially during 1970s and early 1980s. There was no monthly or quarterly data, which could have produced better results with higher degrees of freedom. Most of the macroeconomic variables in Kenya, especially those used in this study, are not available in monthly or quarterly data. Secondly, this study assumed unidirectional causality, running from the explanatory variables to the dependent variables, hence ignoring possibility of feedback and resultant endogeneity problem. All in all, despite these shortcomings, the objective of the study has been achieved . The study provides helpful insights into the current account determinants in Kenya and areas of further research.

While the study gives some useful policy guidance, some issues could be clarified by further empirical work, and this could give better specificity to policy guidelines. For instance, from an intertemporal perspective, a better understanding of the dynamic effects on the current account of shocks with different degrees of persistence could have important theoretical as well as policy implications. Therefore, taking care of causality consequences, a similar study should be carried out using dynamic modeling that aims at examining impulse responses. Another important issue is to find out the appropriate channels, via trade balance or other components of the current account, through which different shocks could affect variations in the current account.

Moreover, saving, investment and current account developments should be better studied in a general equilibrium framework, in which consistency among different partial methods is automatically ensured. This could ultimately help in understanding better the factors that could determine sustainable current account balance in Kenya. Furthermore, other related studies may be carried out in order to shed more light on transmission mechanisms under the saving-investment balance approach. These may include detailed saving and investment functions, using growth models to analyse how current account balance affects economic growth in the economy.

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Annexes

Annex 1: Summary of empirical studies reviewed

Study	Dependent Variable	Method	Independent Variables	Sign	Comment
Aristovnik (2007)	CA/GDP	OLS, LSDV, FGLS GMM-IV	Domestic Investment	-ve	
			Foreign direct investment	-ve	
			Government expenditure	-ve	Supports twin-deficit hypothesis
			Foreign interest rate (RIR-USA)	-ve	
			Relative income	-ve	Rejects stages of development hypothesis
			Openness	-ve	Economies more export-oriented
			Oil price	-ve	Consistent with HLM effect due to improved terms of trade
			Domestic economic growth	-ve	
			Financial deepening M2/GDP	-ve	(FGLS) Depth and sophistication of financial system increases saving more than investment
			OECD GDP growth	-ve	
			Persistency (lagged CA/GDP	-ve	
Herrmann & Jochem (2005)	CA/GDP	FGLS,IV	Real per capita income	-ve	Supports stages of development hypothesis
			Fiscal balance	-ve	Supports twin-deficit hypothesis
			Real interest rate	-ve	
			Financial deepening	-ve	
			Investment	-ve	
			Real effective exchange rate	-ve	
			Persistency (lagged CA/GDP)	-ve	In IV estimation
Chang (2003)	CA/GDP	GMM	Dependency ratio	-ve	Confirms life-cycle hypothesis
			Per capita income	-ve	Rejects stages of development hypothesis
			Money supply (M_2/GDP)	-ve	
			Fiscal balance	-ve	
			Terms of trade	-ve	
			Real exchange rate	-ve	
Calderón *et al.* (2000)	CAD/ GNDI	GMM	Persistency (lagged CD/GNDI	-ve	
			Public and private saving rate	-ve	Public saving rate coefficient higher that private saving rate coefficient
			Domestic output growth	-ve	Growth associated more with investment than with saving
			Money supply (M_2/ GDP)	-ve	Through low interest rate that raise investment
			Standard deviation of inflation	-ve	Macro uncertainty lowers investment

			X/GNDI	-ve	More openness implies improved capacity to repay external debts
			Real exchange rate	-ve	
			Terms of trade	-ve	Consistent with HLM effect
			Output growth of industrialized countries	-ve	
			Macroeconomic uncertainty	-ve	
			International RIR	-ve	
			Relative per capita GDP	-ve	Supports stages of development hypothesis
Chinn and Prasad (2003)	CA/GDP	OLS, FE	Fiscal balance	-ve	Supports twin-deficit hypothesis
			Net foreign assets	-ve	
			Real per capita income	-ve	Supports stages of development hypothesis but not for developing countries
			Young dependency ratio	-ve	Confirms life-cycle hypothesis
			Financial deepening (M_2/GDP)	-ve	Terms of trade volatility
			Trade openness	-ve	
			Capital controls	-ve	Capital account controls in developing countries has a negative effect
Chinn and Prasad (2000)	CA/GDP	OLS, FE	Fiscal balance	-ve	
			Net foreign assets	-ve	
			Real per capita income	-ve	
			Young dependency ratio	-ve	
			Financial deepening (M_2/GDP)	-ve	
			Terms of trade volatility	-ve	
			Trade openness	-ve	
			Capital controls	-ve	Capital account controls in developing countries has a negative effect
Debelle & Faruqee (1996)	CA/GDP	OLS, FE	Relative per capita income	-ve	Supports stages of development hypothesis
			Dependency ratio	-ve	Confirms life-cycle hypothesis
			Fiscal balance	-ve	
			Real exchange rate	-ve	
			Terms of trade	-ve	
			Domestic output gap	-ve	Confirms accelerator theory of investment
Khan and Knight (1983)	CA/X	OLS, FE	Terms of trade	-ve	
			Growth of real GNP in industrial countries	-ve	
			Foreign real interest rate	-ve	
			Real effective exchange rate	-ve	
			Fiscal balance	-ve	

Annex 2: Variable description, descriptive statistics and correlation

Table (a): Variable description

Acronym	Variable description
CABY	Current account balance as a ratio of GDP
GDPGR	Real GDP growth rate
FBY	Fiscal balance as a ratio of GDP
RIR	Real interest rate
LRER	Logarithm of real exchange rate
LTT	Logarithm of terms of trade
LTOP	Logarithm of trade openness
LM2Y	Logarithm of money supply as a ratio of GDP
LDEPR	Logarithm of dependency ratio
LFDIY	Logarithm of foreign direct investment a ratio of GDP
INFDEV	Inflation deviation – proxy inflation volatility
ERVAR	Exchange rate variation – proxy for exchange rate volatility

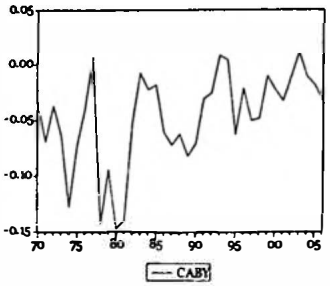
Table (b): Summary statistics

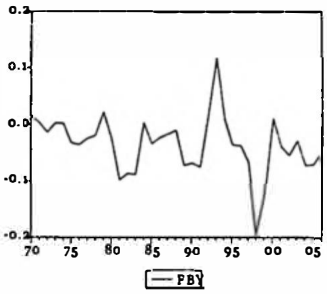
	CABY	GDPGR	FBY	RIR	LRER	LTT	LTOP	LM2Y	LDEPR	LFDIY	INFDEV	ERVAR
Mean	-0.05	0.04	-0.03	0.04	4.56	4.63	-0.64	-0.91	4.65	-5.57	0.00	0.39
Median	-0.04	0.04	-0.03	0.03	4.58	4.61	-0.64	-0.90	4.69	-5.36	0.02	0.06
Max	0.01	0.08	0.12	0.32	5.05	5.26	-0.38	-0.56	4.87	-3.98	0.19	10.16
Min	-0.15	0.00	-0.20	-0.08	4.21	4.25	-0.93	-1.23	4.44	-9.79	-0.27	-11.21
Std. Dev.	0.04	0.02	0.05	0.09	0.17	0.28	0.15	0.20	0.14	1.15	0.08	3.02
Skewness	-0.89	0.00	-0.29	1.19	0.10	0.63	-0.07	-0.09	-0.17	-1.49	-1.20	-0.57
Kurtosis	3.21	2.24	5.54	4.11	3.83	2.42	1.94	1.79	1.67	6.17	6.82	9.74
Jarque-Bera	4.90	0.89	10.50	10.59	1.14	3.00	1.77	2.31	2.92	29.22	31.34	72.17
Prob	0.09	0.64	0.01	0.01	0.57	0.22	0.41	0.31	0.23	0.00	0.00	0.00

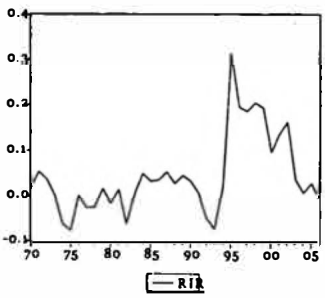
Table (c): Correlation

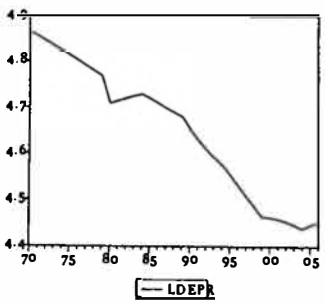
	CABY	GDPGR	FBY	RIR	LRER	LTT	LTOP	LM2Y	LDEPR	LFDIY	INFDEV	ERVAR
CABY	1.000											
GDPGR	-0.290	1.000										
FBY	0.047	0.007	1.000									
RIR	0.165	-0.145	-0.408	1.000								
LRER	0.366	-0.574	0.088	0.159	1.000							
LTT	-0.302	0.449	0.290	-0.147	-0.384	1.000						
LTOP	-0.103	0.083	0.056	0.100	-0.430	0.170	1.000					
LM2Y	0.139	-0.259	-0.135	0.443	0.240	-0.556	0.109	1.000				
LDEPR	-0.458	0.442	0.337	-0.515	-0.183	0.762	-0.233	-0.655	1.000			
LFDIY	-0.282	0.140	-0.001	-0.053	-0.323	0.349	0.132	-0.397	0.273	1.000		
INFDEV	0.022	-0.077	0.242	-0.520	0.210	-0.139	-0.086	-0.076	0.054	-0.075	1.000	
ERVAR	-0.069	-0.336	0.133	0.063	0.626	-0.009	-0.127	0.092	0.035	-0.014	0.351	1.000

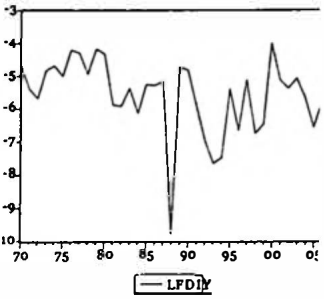
Appendix 3: Graphical analysis

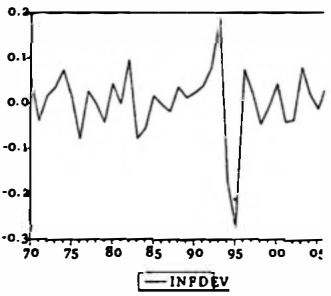


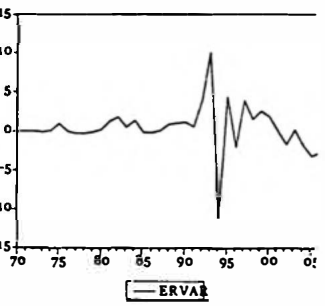


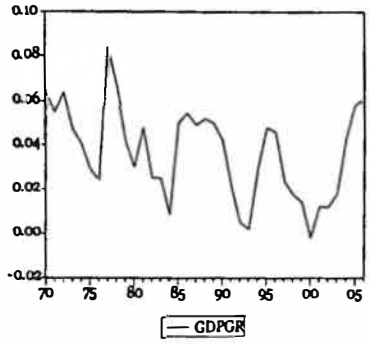








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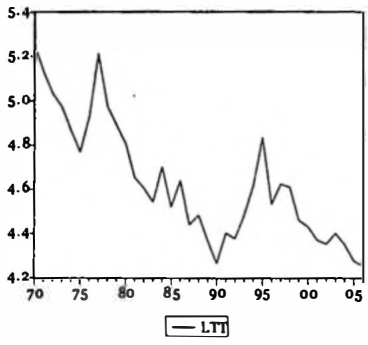
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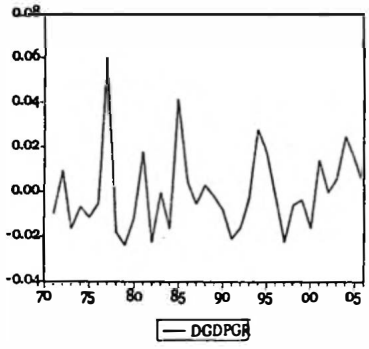
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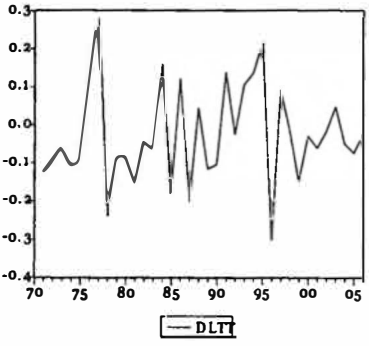
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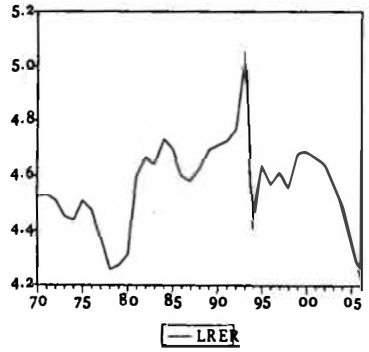
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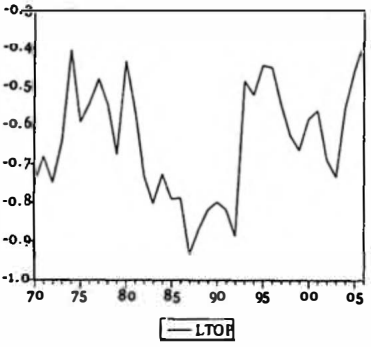
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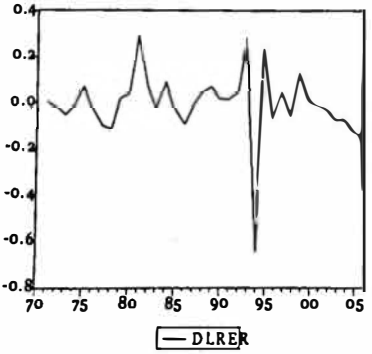
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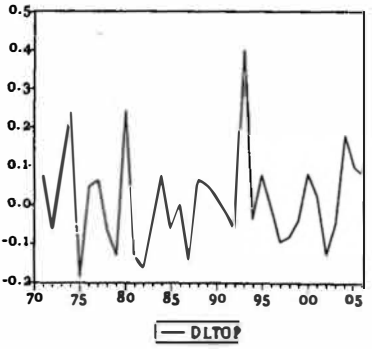
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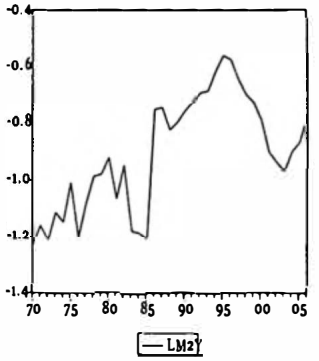
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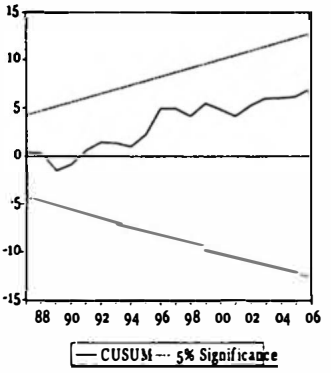
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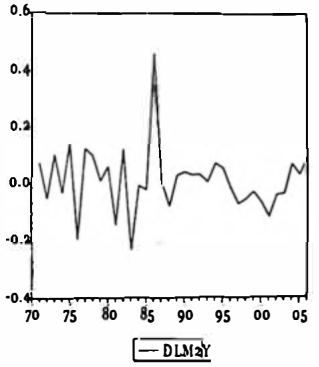
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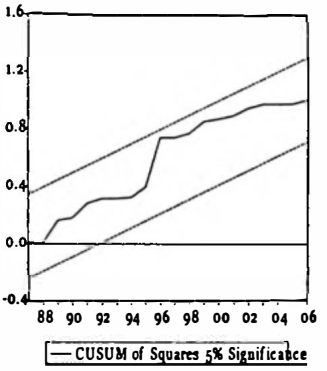
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