DETERMINANTS OF CURRENT ACCOUNT BALANCE IN KENYA

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Declaration

This project paper was my original work and has not been presented for a degree in any other University or any other award.

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Dedication

This research is firstly dedicated to my dear Wife Gladys Njambi for moral and spiritual support. Secondly, to my children who allowed me to use their study room during my study. Thirdly, to the Ministry of Industrialization fraternity for financial support it offered towards this research.

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Abstract

Current account is one of the components in the Balance of Payment of a country. It covers all the transactions that involve the real sources (goods, services, income).It comprises the international balances of transactions in trade of goods and services, factor income and current transfers. Current account balance is significant because it is key economic indicator of country's external performance. Despite this voluminous literature, there is hardly any consensus as regards the determinants of the current account balance in the world Kenya included to facilitate the policy decisions.The overall objective of this research study was to investigate the determinants of the current account balance in Kenya. The specific objectives were be:to identify the factors that determines the current account balance in Kenya, to determine the magnitude of effect of each determinant on current account balance and to identify the policy option toward the favourable current account balance in Kenya. The study covered the 1970 to 2010 period. Vector error correction model (VECM) was employed to determine the factors that affect the current account balances. Empirical model was established and various econometric tests were conducted to reveal the determinants and their strength. Results established that the 16.18% of the current account was caused by economic growth, 17.97% was explained by exchange rate, 19.54% was explained by current account itself, 14.74% by budget deficit, and 15.31% by inflation while13.88% by balance of trade in long run. On the other hand the impact of the, budget deficit and current account balance itself are positive while growth rate investment, balance of trade ,inflation, exchange rate on the current account are negative. Effects of investment and savings on current account exhibited both positive and negative but in small scale under period under review. From results, deliberate export oriented approach through product diversification and value addition to venture in international markets, prudent fiscal measures by the government and stable exchange rate and inflation are some of policy measures that can be employed by the government to stabilize current account.

Keywords: Current account balance, vector auto regression

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Abbreviation and Acronyms

GDP	Gross Domestic Product
CAB	Current Account Balance
EXR	Real Effective Exchange Rate
BOT	Balance of Trade
BD	Budget Deficit
INV	Investments
INFL	Inflation
SAV	Saving
VAR	Vector Auto regression
BOP	Balance of Payment
IMF	International Monetary Fund

Operational Definitions of Terms

Gross Domestic Product: The monetary value of all the finished goods and services produced within a country's borders in a specific time period normally a year.

Current Account Balance: Balances of transactions in trade of goods and services, factor income and current transfers of country in one year.

Real Effective Exchange Rate: Weighted average of the Real Exchange Rate to the currencies of its trading partners adjusted by the weights of trading partners.

Saving: The portion of disposable income not spent on consumption of consumer goods but accumulated or invested directly in capital equipment

Term of Trade: Difference of exports and imports of goods and services

Consumer Price Index Growth (Inflation): Measure of the average change over time in the prices paid by consumers for a market basket of consumer goods and service

Gross Capital Formation: Measures the value of acquisitions of new or existing fixed assets by the business sector, governments and households less disposals of fixed assets.

Budget Deficit: The difference between national government revenues and expenditures

CHAPTER ONE

INTRODUCTION

1.1. Background

According to International Monetary Fund's (IMF) (2009) the balance of payments (BOP) is a statistical statement that systematically summarizes economic transactions between residents of the reporting country and residents of foreign countries (non-residents, foreigners or the rest of the world) during a specific time period. Since it gives the numerical information, it is presented in a systematic manner. The transactions are recorded in monetary value of the reporting country.

BOP is broadly divided into Current Account and Financial & Capital Financial Account. Current account covers all transactions that involve real sources (goods, services, income) and current transfers while the capital & financial account shows how these transactions are financed (generally through transactions in financial instruments or capital transfers).

According to International Monetary Fund's (IMF) (2009), Balance of Payment Manual, current account balance 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 behavior. The information on current account is

quite useful in balance of payments projections, compilation and measurement of national income.

The 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 some of the major contributors to deterioration of the current account positions of most non-oil developing countries. Due to this most of the policies have been formulated to increase the export values since the balance of trade is a key component of the current account.

For the country to achieve long-run steady-state economically, the savings, investments and budget constraint must balance each other .To meet the above a country needs to meet macroeconomic and institutional policy changes related to savings, investments and budget constraints which happens to be major components of the current account.

Edwards (2001) has noted that there has been persistent external imbalances especially among developing countries that have continued to motivate researchers and policy makers to investigate factors surrounding determination and sustainability of current account balance. The current account balance movements are used to assess the sustainable levels through the application of some 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

financial crisis (Edwards, 2001). Thus, determinants of current account balance have attracted considerable interest worldwide.

In dealing with current account balances, the two guiding principles are employed i.e. how to smoothen the consumption over time due to shocks affecting the major export or import and where to invest the savings to the most productive countries.

In Kenya the current account balance has been fluctuating in a very unpredictable way compared to other macroeconomic variables especially gross domestic product. The Table 1 has summarized the percentage changes of the current account balances and gross domestic product for the period 1970-2010.

Table 1.1 Percentage Change of GDP and Current Account Balances

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
6	22.2	17.1	5.90	4.07	0.88	2.15	9.45	6.91	7.62	5.59	3.77	1.51	1.31	1.8	4.30	7.18	5.94	6.20	4.7	4.2
	1.8	-0.4	0.1	3.3	-0.6	0.1	-0.4	9.5	-0.3	-0.9	-1.0	-0.9	-1.0	-0.9	-0.9	-0.9	-0.9	-0.9	-0.9	-1
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
	-0.8	0.4	2.6	4.4	4.1	0.5	3.3	2.3	0.6	3.8	0.5	2.9	5.1	5.9	6.3	7	1.5	2.7	5.8	
	46	283	1	-454	80	-539	-7	78	-187	-67	69	220	-194	-83	-81	-101	-91	7	-51	

Source: Researcher's Calculations from data of Various Economic Surveys

From the Table 1, -0.8 % and 22.2% were the lowest and highest growth rates of the GDP in the period under consideration while current account exhibited extremes fluctuations. From 1981 to 1990 the current account exhibited some sort of stability since the fluctuation was around negative 1%. From 1991 to 2010 the fluctuations in current account were abnormal since they exhibited erratic changes in each year. In 1971 and 1972 the gross domestic product grew by double digit but all the other years the rate was single digit change. In 1992 there was first multiple party elections and the Structural Adjusted programmes were introduced which were coupled with high levels of inflation that hindered the economic growth. Current account balance growth rate in the same period had been fluctuating with 1997 recording reduction of -539% and 1993 recording a positive change of 283%.

There is no direct relationship between the growth rates of GDP and CAB. In 1992 the GDP dropped by 0.8% and CAB grew by 46%. In 1998 GDP grew by 3.3%, CAB dropped by -7%.Further in 2007 GDP grew by 7% and CAB dropped by 101%. Further in 1971 GDP grew by 22.2% and CAB was1.8%. From the Table 1 above, it indicates that there are other macro-economic factors that affect CAB.

With such fluctuations, prediction of the current account balance in Kenya becomes very difficult for the policy makers. Also the investors cannot make long term decisions with their investments. These fluctuations sometime make Kenya to suffer from external shocks and easily accept punitive strings attached foreign aids. Policy makers in Kenya need to understand actions to take to contain the

level of the current account balance that can be sustained by our economy so as to smoothen the consumption and invest the savings in productive sector. In addition a current account fluctuation reflects that the economy is not competitive in its manufacturing sector meaning it cannot attract and maintain the investors.

To apply the appropriate policy actions, there was need to determine the factors that affect the current account balance and their magnitude.

The importance of the current account balance in Kenya was well noted in the Economic Recovery Strategy for Wealth and Employment Creation (ERS) which was the development blue print for Kenya for the period 2003-2007. One of the macroeconomic objectives was to contain the current account balance in the balance of payments to an average of 6.2 per cent of gross domestic product.

Kenya has been experiencing persistent current account deficits which may be considered as a structural problem that may persist in future. The economic blue print, Kenya Vision 2030, which aims at transforming the Kenya into a globally competitive and prosperous nation with high quality life by year 2030, has identified key sectors and strategic areas in order to achieve high economic growth, social development and good governance. In order to accomplish the vision, the activities lined up will affect the national saving, investment, trade and fiscal performance among other macroeconomic variables. These are some of the key variables that will determine the current account balances. The future movement and how to sustain the current account balances shall be a concern by the economists and the policy makers in Kenya.

As noted by Kariuki (2009), experience worldwide has suggested 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. The study shows that different countries have different experiences at different times and equally empirical evidence on current account performance is inconclusive, mixed and varied. Since the research findings depend on econometric methodology adopted, the period and country of study, there is no consensus on the determinants of current account balance. This is main reason why current account balances has continued to attract a lot of research interest.

This study will investigate the determinants of current account balance and their magnitude in Kenya on the yearly basis for the period 1970-2010. It will lead to better understanding the factors that affect the current account, their significance and policy implications.

1.2. Problem Statement

Despite the relatively extensive theoretical and empirical literature, there is no consensus on the determinants of current account balance especially in individual developing countries. It means that the nature, performance and determinants of the current account balance remain an empirical problem in different countries. In Kenya the CAB has been fluctuating for the entire period under review. The highest change was recorded in 1993 with 283% and the lowest change of -539% was recorded in 1997. Another observation was that there was no consistency in the changes of the CAB. For example, in 1990 the change was -1% ,in 1991 it

was -51%, in 1992 was 46% and in 1993 was 283% meaning that it was very hard to estimate the changes in current account balance. When the prediction of current account balance is not reliable it becomes very hard for a country to attract foreign investors, economy cannot be able to manage external shocks especially on exports or imports and application of appropriate economic policy becomes hard. A point to note is that when a country doesn't manage its current account/trade balance it is subjected to the political control/influence by foreign governments and international bodies like International Monetary Fund, United Nations and World Bank. But when a country's trades were in balance, its internal demand for goods and services would be met by internal producers.

Current account, being one of the indicators used to determine the future behavior of an economy forms part of the everyday decision process of policymakers because of its closeness to many variables of the economy and other macroeconomic variables. Due to the importance of the current account balance in any economy, it is prudent to know the factors or the variables that affect and understand the changes in the current account balance so as to make informed economic decisions.

Aristovnik (2007) recommended for deep investigation of the determinants of current account, detailed analysis must be undertaken for each individual country by way of time series analysis so as to isolate and take into account particular country-specific characteristics which are not clearly captured by cross-section and panel data analysis.

It has been revealed that most estimation methods of the determinants of current account in the empirical work have been based on cross-section and panel data regressions that involved the assessment of linear current account functions based on the intertemporal approach (Godfrey M. Kariuki (2009).

The aim of this study was to investigate empirical linkage between current account balance and a set of economic variables by use time series analysis to estimate and develop an econometric model to estimate and analyze Kenya's current account function by utilizing the vector autoregressive model.

1.3. Research Objectives

The overall objective of this research study was to study the determinants of the current account balance in Kenya.

1.4. Specific Objectives

The specific objectives were:

(i) To identify the factors that determines the current account balance in Kenya.

(ii) To determine the magnitude of each determinant on current account balance.

(iii) To identify the policy option for a favourable current account balance in Kenya.

1.5. Research questions

The research questions will be:

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

(ii) What was the magnitude of effect of each determinant on the current account balance?

(iii)What were the policy options for a favourable current account balance in Kenya?

1.6. Justification of the Study and Scope

Worldwide the business and the economic environment are mostly affected by the internal and external shocks. This was witnessed by the recent global financial crisis and European debt crisis which virtually affected all the countries either positively or negatively. Due to this there was a need to examine the country specific macro-economic variables like current account. By carrying out deeper study of the current account, it will provide opportunity of deeper understanding of determinants that affect the current account balances of an individual country.

As a recommendation of Aristovnik (2007), investigating the determinants of current account by undertaking detailed analysis of individual country by way of time series analysis, this study strongly took up the challenge and used different methodology with the aim of studying Kenya individually since it has its own characteristics which are different from other countries.

1.7. Significance of the Study

This study will be beneficial to the government of Kenya since it will inform how various macro-economic variables affect the current account when preparing the national policies. The study will contribute more knowledge about the current

account issues and will assist the private sector on the importance of trade, diaspora remittances on the current account of our country

CHAPTER TWO

LITERATURE RERVIEW

2.1. Introduction

This chapter analyzed the theoretical literature and the empirical literature on the determinants of current account balance.

As per IMF Balance of Payments and International Investment Position Manual 2009 define the Balance of Payments has a statement that summarizes transactions between residents and non-residents during a period. It consists of the goods and services account, the primary income, the secondary income account, the capital account and the financial account. It is a statistical statement that systematically summarizes economic transactions during a specific time period.

Balance of payments transactions are categorized into the Current Account, Capital and Financial Account and reserve Assets. The Current Account records exports and imports of goods and services, income receivable and payable abroad as well as current transfers. Current Account transactions are recorded on a transactions gross basis. All credit transactions (i.e. receipts from abroad) and debit transactions (i.e. payments to abroad) are recorded. As per (Todaro and Smith, 2003), current account balance 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. Current account balance is said to be in deficit when there is negative balance and surplus when the balance is positive. The Current Account balance (CAB) can be expressed as follows:

$$CAB = X - M + NY + NCT \quad (2.1)$$

Where, X is Exports of goods and services, M is Imports of goods and services, NY is Net income from abroad and NCT is Net current transfers.

The national income accounting identity as per macro-economic theory is given as: $Y=C+I+G+X-M$ (2.2)

Where Y= is national income

C = private consumption

I = private investment

G= government expenditure

X=exports and

M=imports, respectively.

Disposable income (Y_d) is Y –T (where T is Tax) implying that $Y=Y_d$ +T. It implies that Equation (2.2) can be re-written as

$$\{(Yd-C)-I\} + (T-G) =(X-M) \quad (2.3)$$

It is also true that Yd –C is savings(S). Then equation (2.3) which can eventually be rewritten as $X-M=(S-I) + (T-G)$ (2.4)

Equation (2.4) gives the current account balance (X-M) as the sum of private and public saving gaps i.e. the total of private savings less investment and fiscal

balance (taxes less government spending). From the above equation the current account deficit can be reduced by either raising savings rate by reducing investments, raising the government taxes or cutting its expenditure. The surplus of imports over exports (current account deficit that is usually financed by foreign borrowing), allowing a country to spend more than it produces or to invest more than it saves.

2.2. Theoretical literature

There are three theoretical approaches that try to explain current account balance that are applied differently according to prevailing economic environment due to the implications on economic policy of a nation.

Absorption Approach

The First theory of current account balance is the absorption approach. Giancarlo (2002) stipulated that current account balance is the difference between domestic output and spending (absorption). It assumes that prices remain constant and emphasizes in changes in real domestic income thus it real-income theory of the balance of payments. Keynesian national income framework is given by $Y=C+I+G+X-M$, while absorption or aggregate demand is given by $A=C+I+G$. Current account balance (CAB) is given by $X-M=Y-A$ (2.5)

It implies that the balance is affected by the change in domestic expenditure. It shows that currency depreciation can improve the current account since it depends on its effect on national income and on domestic absorption. 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. It concludes that the absorption approach proposes that depreciation can be effective in improving the current account balances when the economy has idle resources, the economy meets the Marshall-Lerner condition, and the government fulfills contractionary fiscal or monetary policy along with depreciation (Giancarlo G. (2002))

Elasticity approach

Elasticity approach of balance of payment is second theory on current account balance. It concentrates on the trade flows i.e. exports and imports. According to Giancarlo (2002), the approach mainly emphasizes on exchange rates, price and income changes as the ones that determine of current account balance. This means that current account depend on price and income elasticities. The quantity of a currency demanded in the foreign exchange market is derived from the country's demand for imports while the supply of foreign exchange to a country results from its exports of goods and services The elasticities approach centers on changes in the prices of goods and services as the determinant of a country's balance of payments and the exchange value of its currency. The theory assumes that Capital flows occur only as a means of financing current account transactions and trade balance exclusively represents the current account. Current account balance normally adjusts through changes in the exchange rate which affect

relative prices of goods and services, thus affecting the demand both by domestic and foreign consumers. 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 $e_x + e_m > 1$, where e_m is the price elasticity of import and e_x is the price elasticity of export.

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. Giancarlo (2002) noted that 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, current contracts and consumption patterns. However depreciation of the domestic currency is unlikely to immediately improve a country's balance-of-payments deficit. It is even possible that the depreciation could cause a country's balance of payments to worsen before it improves.

There are benefits of elasticities approach especially when using it for empirical predictions purposes. They proved helpful when examining short-run implications

of exchange rate changes on trade balance. In developing countries there are arguments that their elasticities are very low to satisfy the Marshal Lerner condition and depreciation worsens the Current account balance. This is because most of them mainly import intermediate inputs and machinery for production purposes meaning that the demand elasticity of imports is usually very low. At the same time demand elasticity for primary commodities exports is low. The elasticities approach relies on exchange rate changes and assumes constant commodity prices. It does not recognize the income effects and relative prices of exports and imports that are key determinants of terms of trade effects. Due to its shortcoming it is considered as a partial equilibrium analysis. As a result elasticity has a limited ability to explain long-term developments in saving-investment balance (Giancarlo (2002))

Intertemporal Approach

The intertemporal approach is another method of analyzing the current account. It shifted from the trade view of the current account to savings investment definition. Giancarlo (2002) defined current account balance as the difference between domestic savings and investment. The current account balance is regarded as an intertemporal phenomenon because the savings and investments are also based on intertemporal decisions .The decisions are made according to the future expectations of the economy like economic growth, government spending real interest rates etc. The approach accounts for the macroeconomic determinants of the prices and analyze the impact of the current and future prices on savings and investments. The macroeconomic factors that determine and affect

saving and investment end up influencing the current account balance. The factors like fiscal deficits, consumption smoothing and investment determine current-account behavior (Edwards, 2001).

As noted in 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 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.

According to Debelle and Faruqee, (1996) the current account balance acts as a buffer against shocks in productivity and demand. This approach postulates that the impact of economic changes on the current account balance varies according to their origin, persistence and timing of such changes. The approach advises that the current account deficits should reflect increase in (private) investment (and not decline in savings) and a bigger current account deficit is not a cause for concern as long as the fiscal account is balanced (Edwards, 2001).For a small open economy with low capital accumulation like most developing countries,

with access to international capital markets, will run current account deficits for a sustained period of time in order to build its capital stock, while maintaining its long-run rate of consumption. In long run the output will grow towards long-run level and return on capital converges making the current account to improve as net exports will be surplus, to pay interest obligations on the accumulated external debt as noted in (Debelle and Faruqee, 1996).

This study was based on the intertemporal approach because it views the current account balance as an outcome of forward-looking dynamic saving and investment decisions. This was due to the fact that 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).

2.3. Empirical Literature

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 current account 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 gross national product in industrial countries, foreign real interest rate, real effective exchange rate, fiscal position (as a ratio of nominal gross domestic product) and linear time trend. The equation was estimated using pooled time-series cross-section data for the sample of 32 non-oil developing countries. It was revealed that both external and internal factors affect current account balance 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 current account balance. 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 equally 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 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.

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 current account balance across countries and over time for both industrial and developing countries, Kenya included, between 1971 and 1993. Their Ordinary Least Squares 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 current account deficits due to decreasing savings.

Chinn and Prasad (2003) empirically investigated medium-term determinants of current account for a sample of industrial and developing countries Kenya included. The study utilized an approach that highlighted the macroeconomic determinants of long term saving and investment balances. Both the cross section and panel regression techniques were employed in data analysis. Fiscal balance,

net foreign assets stock, relative per capita income, dependency ratios, real gross domestic product growth, gross domestic product growth volatility, terms of trade volatility, real exchange rate, trade openness, financial deepening, capital controls and saving ratio were some of the factors that were considered. By use of Ordinary Least Squares and fixed effects estimation techniques, they 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.

Herrmann and Jochem (2005) used Feasible Generalized Least Squares estimation technique and analyzed the determinants of current account developments in Central and East European Union member states in a quarterly panel data framework. The study showed that current account balance was 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. Herrmann and Jochem (2005) concluded that the current account balances are essentially determined by domestic investment activity and the level of economic development and integration of the financial sector was also likely to encourage domestic saving and lead to an improvement of the current account.

Bitzis, Paleologos, and Papazoglou (2008) applying vector autoregressive (VAR) pointed out that the real effective exchange rate and the real interest rate had the greatest impact on current account developments during 1995-2006 in Greece. It

was established that the growing budget deficits also contributed to growing current account deficits.

Kariuki, G (2009) applied the intertemporal approach when investigating the determinants of current account balance in Kenya for the period 1970 to 2006 by use of secondary annual time series data. By application of multivariate analytical framework and ordinary least square (OLS) the study revealed that the most significant positive determinant of current account balance in Kenya was the terms of trade since 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 real exchange rate had a positive influence on CAB since 1 per cent depreciates the current account balance would increase by 0.10 points. Also one percent growth rate of Gross Domestic Product growth point raised current account balance by 0.39 points, an increase in money supply by 1 per cent reduces CAB by 0.12 points, implying that current account deficit widens, 1 per cent increase of the dependency ratio current account balance deteriorates by 0.09. Foreign direct investments and external shocks negatively affected the current account balances.

Morsy, H (2009) revealed that the factors that determines the current account balance in oil exporting countries are fiscal balance, oil wealth, age, dependency and the degree of maturity in oil production. He used Individual and panel data and country unit root tests and revealed that co integration methods were not appropriate because the current account balance (as percent of gross domestic product) is a stationary series in sample and the period leading him to apply the generalized method of moments (GMM) controls for endogeneity and corrects for

the bias that arose from including the lagged dependent variable in the fixed effects estimation. It was established that 1% percentage-point increase in the fiscal balance leads to an almost 0.5 percentage-point increase in the current account balance in percent of GDP in short run and in long-term it leads to 0.86.It was also established that 1% improvement in the oil balance will raise the medium-term current account balance by 0.35 percent.

Abbas et al (2011) using both the panel regression and panel VAR approaches to study the effect of fiscal policy on the current account using the large sample of the advanced, emerging and low income economies concluded that by strengthening the fiscal balance by 1 percent point of GDP lead to current account improvement of 0.3 percent points of GDP.

Erica and Hiro (2011) examined the Persistence and Determinants of Current Account Balances for 70 countries using the panel data. With the assumption that stationary current account series ensures the long-run budget constraint while countries may experience "local nonstationarity" in current account balances, they used Markov-switching (MS)-ADF econometric framework and found that the lack of trade openness, net foreign assets, and financial development help increase the degree of current account persistence. Also the type of exchange rate regimes is not found to be a robust determinant of current account persistence, but fixed exchange rate regime is more likely to lead an emerging market country to enter nonstationary current account regime

Kayikçi (2011) applied the Variance auto regression to get the determinants of the current account balance in Turkey. Current account balance, GDP growth rate,

investment, savings, terms of trade and oil imports, inflation and real exchange rate were used as the variables in the model. The results showed that the current account balance was mostly affected by the inflation and the values of current account themselves. In one of the quarters it was established that 40% of the forecast error variance of the current account balance is caused by innovations in its own past and 26% was caused by inflation. Current account balance is also influenced from the innovations in the growth, investment to GDP ratio, saving to GDP ratio, openness, oil prices, and reel exchange rate. Other factors were innovations in growths, oil prices, openness savings, investments and real exchange rate.

Endegnanew Y et *al.* (2012) using the panel regression and panel auto regression on 42 micostates revealed that a percentage point improvement in the fiscal balances improved the current account balance by 0.4 percent points of GDP. They further revealed that the real effective exchange rate had no impact on the current account balance.

2.4. Overview of the Literature and Research Gaps

Past studies suffer from various shortcomings, like use of cross-sectional and panel data for various countries which may not address Kenya's specific issues like Khan and Knight (1983), Debelle and Faruqee (1996), Chinn and Prasad (2003). Kariuki, G (2009), Ghosh (1997) and Obstfeld and Rogoff (1994) used the intertemporal approach to address the determinants of the current account in their studies. Fazil Kayikçi (2011) used the VAR approach but used oil import

and other imports as the determinants of the current account balance in Turkey. Genberg and Swoboda (1992) has further noted that recent theoretical work on the determinants of the current account balance, has tended to emphasize the intertemporal aspects highlighted by the saving-investment approach. Despite this voluminous literature, there is hardly any consensus as regards the determinants of the current account balance in the world Kenya included. It is behind this background that this study specifically investigated the determinants using Variance auto regression model. 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.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This section developed the methodology for determinants of current account balance in Kenya and how they were related to each other. The chapter is organized as follows; research design, empirical model, definition of Variables and empirical model

3.2. Research design

The study utilized quasi experimental research design due to the fact that quality research examination should contain strong evidence in the form of data that is relevant to a question or a problem. Since the time series data was used, quasi-experimental design was preferred to experimental research design. The study was well designed in such way the internal validity was perfect.

3.3. Theoretical model

Intertemporal Approach of the CAB was applied.

The approach views the current account as a difference between domestic saving and investments as follows, CAB=S-I (3.11)

Where

CAB=Current Account Balance

S=Saving

I=Investments

These two factors are intertemporal in nature leading the CAB to also intertemporal in nature. This equation represents an open economy that can source domestically and externally for the funds needed for investment activities by borrowing which can allow domestic investments to exceed domestic savings. Savings can be separated into private savings **(Spr)** and government savings **(Sg)** to get S=Spr+Sg (3.12)

$$Spr=Y-T-C=Yd-C \qquad (3.14)$$

Where, Yd is the disposable income.

The Government Savings on the other hand is given as government revenue in terms of taxes less expenditure in terms of expenditure (G) and Government Transfers (Tr) as given by

$$Sg=T-G-Tr \qquad (3.15)$$

The savings arising from the above will be

$$S=Spr+Sg = I + CA \qquad (3.16)$$

It is true to say that any change in government expenditure, fiscal, interest rates will have an impact on the current account.

3.4. Model Specification

The model was based on the Structural Vector autoregressive (SVAR) approach & unlike past studies for Kenya. The SVAR model which unlike other models

doesn't impose restrictions to identify the system. Sims (1980) described the other models as incredible. It avoids oversimplifying the structure and impose just enough restrictions to identify the parameters. Accordingly, most SVAR models are 'just-identified' (Lutkepohl & Markus, 2004). A structural model allows us to predict the impact of a deliberate policy action and as such the model should be able to predict the extent to which a policy accommodation will affect the general economy. The variables to be used have been identified from the previous discussions. The function was:

CAB= (GDP, BD, I, S, X, INF, E, U) (3.17)

Whereby:

CAB=Current account balance

GDP= Gross Domestic Product

BD=Budget Deficit

I=Investment (Ratio of Gross Capital Formation),

S=Savings

X=Net Exports or Terms of trade or exports minus imports of goods and services.

INF=Inflation

E= Real Effective Exchange Rate

Where U is the error term (Unobservable Variables)

The VAR method was used due to the fact that there is insufficient theory that connects these variables and cannot adopt any one theory. The choice of the VAR is due to the fact that all the variables are treated symmetrically in a structural

sense with each variable having an equation explaining its evolution based on its own lags and the lags of the other variables in the model and no prior knowledge about the variables is required. VAR's modeling is also advocated for because is it a theory-free technique (Sims, 1980)

The model will take the form,

$$\text{CAB} = \sum_{i=1}^{n} \underline{\alpha}\, CAB_{t-1} + \sum_{j=1}^{n} GDP_{t-1} + \sum_{k=1}^{n} BD_{t-1} + \sum_{m=1}^{n} I_{t-1} + \sum_{\beta=1}^{n} S_{t-1} + \sum_{\phi=1}^{n} X_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 1$$

(3.18)

$$\text{GDP} = \sum_{i=1}^{n} \underline{\alpha}\, GDP_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} BD_{t-1} + \sum_{m=1}^{n} I_{t-1} + \sum_{\beta=1}^{n} S_{t-1} + \sum_{\phi=1}^{n} X_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 2$$

(3.19)

$$\text{BD} = \sum_{i=1}^{n} \underline{\alpha}\, BD_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} I_{t-1} + \sum_{\beta=1}^{n} S_{t-1} + \sum_{\phi=1}^{n} X_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 3$$

(3.20)

$$\text{I} = \sum_{i=1}^{n} \underline{\alpha}\, I_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} BD_{t-1} + \sum_{\beta=1}^{n} S_{t-1} + \sum_{\phi=1}^{n} X_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 4$$

(3.21)

$$\text{S} = \sum_{i=1}^{n} \underline{\alpha}\, S_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} BD_{t-1} + \sum_{\beta=1}^{n} I_{t-1} + \sum_{\phi=1}^{n} X_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 5$$

(3.22)

$$\text{X} = \sum_{i=1}^{n} \underline{\alpha}\, X_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} BD_{t-1} + \sum_{\beta=1}^{n} I_{t-1} + \sum_{\phi=1}^{n} S_{t-1} + \sum_{\upsilon=1}^{n} IN_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 6$$

(3.23)

$$\text{IN} = \sum_{i=1}^{n} \underline{\alpha}\, IN_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} BD_{t-1} + \sum_{\beta=1}^{n} I_{t-1} + \sum_{\phi=1}^{n} S_{t-1} + \sum_{\upsilon=1}^{n} X_{t-1} + \sum_{\varrho=1}^{n} E_{t-1} + \mu 7$$

(3.24)

$$E = \sum_{i=1}^{n} \underline{\alpha} E_{t-1} + \sum_{j=1}^{n} CAB_{t-1} + \sum_{k=1}^{n} GDP_{t-1} + \sum_{m=1}^{n} BD_{t-1} + \sum_{\beta=1}^{n} I_{t-1} + \sum_{\phi=1}^{n} S_{t-1} + \sum_{\upsilon=1}^{n} X_{t-1} + \sum_{\varrho=1}^{n} IN_{t-1} + \mu 8$$

(3.25)

The VAR involved estimation of eight regression equations in which current value of each variables was expressed as a function of lagged values of itself and the other variables,

3.5. Definition and Measurement of Variables and the source of Data

S/No	Variable	Definition	Measurement	symbol	Data Source
1	Gross domestic product(GDP)	The monetary value of all the finished goods and services produced within a country's borders in a specific time period normally a year	Annual GDP	GDP	IFS, Statistical Abstracts, Economic Surveys
2	Current Account Balance(CAB)	Balances of transactions in trade of goods and services, factor income and current transfers of country in one year.	Will be normalized by expressing as a percent of GDP	CAB	IFS, Statistical Abstracts, Economic Surveys
3	Real Effective Exchange Rate	Weighted average of the Real Exchange Rate to the currencies of its trading partners adjusted by the weights of trading partners.	Annual	EXR	IFS, Statistical Abstracts, Economic Surveys. Central Bank of Kenya

4	Saving	The portion of disposable income not spent on consumption of consumer goods but accumulated or invested directly in capital equipment	Will be normalized by expressing as a percent of GDP	SAV	IFS, Statistical Abstracts, Economic Surveys. Central Bank of Kenya
5	Balance of Trade	Difference of exports and imports of goods and services	Will be normalized by expressing as a percent of GDP	BOT	IFS, Statistical Abstracts, Economic Surveys
6	Consumer Price Index Growth Rate (Inflation) (2005)	Measure of the average change over time in the prices paid by consumers for a market basket of consumer goods and service	Will be normalized by expressing as a percent of GDP	INF	IFS, Statistical Abstracts, Economic Surveys
7	Gross Capital Formation(Investment)	Measures the value of acquisitions of new or existing fixed assets by the business sector, governments and households less disposals of fixed assets.	Will be normalized by expressing as a percent of GDP	INV	IFS, Statistical Abstracts, Economic Surveys
8	Budget Deficit	The difference between national government revenues and expenditures	Will be normalized by expressing as a percent	BD	IFS, Statistical Abstracts, Econom

			of GDP		ic Surveys

The data will be annual from 1970-2010.

3.6. Stationarity test

The rationale of performing this test was to model stationary series, to use the fitted model for forecasting and to identify the correct model for estimation. Data is said to be stationary if its mean and variance are constant over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and not on the actual time at which the covariance is computed. It means that the joint distribution does not change when shifted in time space and as a result, the parameters such as mean and variance do not change over time or position. Unless this test is carried out there is likelihood of ending up with spurious results. Either Augmented Dickey-Fuller test or The Phillips-Perron test which applies unit roots was employed.

3.7. Cointegration Test

Co-integration occurs when two or more series are non-stationary, but a linear combination of them is stationary. Testing for cointergration is a necessary step to check if one is modeling empirically meaningful relationships. Its analysis is done to investigate long- run relationship among variables

During this testing, the lag orders will affect the cointergration vectors of a system. An important feature of practical research studies based on the VAR model was selection of the optimal lag order, given that all deductions the VAR

model are based on the correct model specification. The study done by Lütkepohl (1993) pointed out that choosing a lag length of higher order than the true lag length leads to an increase in the mean-square forecast errors of the VAR while as choosing a lower lag length than the correct lag length mostly generates auto correlated errors .To get the optimal correct lag orders of variables Akaike information Criterion (AIC), the Swarz Bayesian Criterion (SBC) & Sim's modified log-likelihood (LR) test was employed.

3.8. Variance decomposition

Estimated coefficient values in VAR models do not constitute the strength of these models. Variance decompositions was employed since the aim of the study is to specify the variables which contribute to the current account balance. Variance decomposition showed the proportion of the forecast error variance for each variable in the model that was attributable to innovations in itself and in other variables in the system. The vector auto regression (VAR) setup employed and variance decomposition results with impulse response analysis were used both to specify the determinants of the current account empirically, and decide whether empirical results support the theoretical arguments about the current account behavior in Kenya.

3.9. Impulse response Function

The effect of shocks to the system was summarized by using impulse responses function. The impulse response functions allowed the determination of the signs

of the effect of innovations or external change in each variable on others i.e. how the various variables responded over time to exogenous shocks.

3.10. Data Analysis

The data collected was be analyzed with an aim of achieving the three objectives of the study.

To achieve objective one the determinants will be known from the literature review. Granger Causality will be employed to determine the theoretical relationships between the variables. This test will establish which variable affects which variable or variables and then they are ordered.

To achieve objective two variance decomposition or forecast error variance decomposition is used to aid in the interpretation of a vector auto regression (VAR) model once it has been fitted. The variance decomposition indicates the amount of information in term of the value each variable contributes to the other variables in the model. The values that will be gotten by performing the exercise will be the magnitude of each determinant. Variance decomposition will assist in getting magnitude of each determinant whereas impulse response function of current account to each variable will assist in determining effect of innovations or external change or shock over time in each variable. The effect can either be positive or negative. The response and the magnitude of each variable will determine the policy direction which the government or the policy makers will apply so as to maintain or attain the targeted level of the current account for the economy

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1. Empirical findings

The data was annual for 41 years from 1970-2010.Then the current account balance, budget deficit, savings, investments, and balance of trade were normalized by expressing it as the percentage of the GDP for the concerned year. The GDP was normalized by taking its annual growth. The Eviews software was utilized to analyze the data. The sources of the data were the World Bank, International Financial Services, Central bank of Kenya and Kenya National bureau of statistics. **APPENDIX 1** summarizes the normalized data.

4.2. Stationary Test

As noted by Enders, 2004, the goal of the VAR is to get the interrelationships among the variables and not to get the estimates of the parameters. Towards this end it is a requirement that for the VAR to give the accurate information the data must be stationary, otherwise spurious results would result. ADF unit root test was applied and we got the following results as shown in **APPENDIX II**. The data was found to be stationary at the level but for the exchange rate, it became stationary after the first difference.

4.3. Co integration Test

Co integration test was applied to ensure that the problem of spurious relationships is avoided. Two test are used both Rank and maximum Eigen value

and their results are shown **APPENDIX III.** It was found that the variables were co integrated.

4.4. Vector Error Correction model

Since the variables were co integrated, the Vector Error Correction Model (VECM) was applied .Two co integration equations were gotten due to the fact that the variables were lagged twice to make them stationary. Eight system equations were generated with 152 coefficients. To know which coefficients were significant further tests were done by getting the probabilities (p-values) of each coefficient.OLS each system equation was done so as to get p-values. The variables that were significant(that had less than 5%) were: BOT-1(balance of trade lagged 1, INV-1(investment lagged1), SAV-1(savings lagged 1), GDP-1(GDP lagged 1), EXR-1(exchange rate lagged 1), BD-1(budget deficit lagged 1), CAB-2(current account lagged 1), INF-2(inflation lagged 2), BOT-2(balance of trade lagged2) INV-2(investment lagged2), SAV-2(savings lagged 2) and constant.

4.5. Variance Decomposition of Variables

The variance decomposition of each variable was conducted as shown the Table 4.1 below. Variance decomposition illustrates the degree of shocks that affect the variable under consideration. (Enders, 2004).It provides more information about the relative importance of random innovation in affecting the entire variable in the VECM (Muniu, 2010)

Table 4.1 Variance Decomposition of the CAB

Period	GDP	EXR	CAB	BD	INF	BOT	INV	SAV
1	5.40	15.34	79.26	0.00	0.00	0.00	0.00	0.00
2	28.71	16.51	49.26	0.12	2.72	2.15	0.49	0.04
3	25.9	28.54	34.35	4.30	3.01	3.14	0.45	0.31
4	24.26	22.83	29.17	9.79	5.06	6.99	1.18	0.73
5	20.05	20.86	27.62	11.96	7.45	9.70	1.27	1.11
6	17.44	20.42	22.65	13.26	12.45	11.58	1.26	0.94
7	15.86	20.40	21.58	13.71	13.07	12.69	1.64	1.04
8	15.40	19.29	20.98	14.07	14.16	13.56	1.60	0.95
9	15.85	18.42	20.21	14.47	14.87	13.74	1.57	0.87
10	16.18	17.97	19.54	14.74	15.31	13.88	1.58	0.81

From the variance decomposition table it was established that in the first period 79.26% shock to the current account balance is explained by the current balance itself,15.34% is affected by the exchange rate and 5.4 % is explained by the growth in the economy. In the second period 49.26% shock in current account was affected by the current account itself,16.51% was due to exchange rate ,28.71% was due to economic growth,0.125% was due to budget deficit.2.72% was due to inflation,2.15% was due to balance of trade,0.49% was due to investment while 0.04% was due to savings level. From the Table 4.1, it was established that the influence of balance of trade, inflation and budget deficit on the current account balance was increasing steadily up to 13.88%, 15.31% and 14.74% respectively in the tenth period. It was further established that influence

of the current account, exchange rate and economic growth were diminishing until stabilizing at 19.54%, 17.97% and 16.18% respectively in the tenth period. Further it was established that investment and savings were also increasing but at low rate stabilizing at 1.58% and 0.81% respectively in the tenth period. In conclusion the shock to current account is highly affected by the its own value followed by exchange rate, economic growth, inflation, budget deficit ,balance of trade, investments and savings respectively in long run.

4.6. Impulse response

Impulse response function by using Cholesky One S.D was conducted for the all variables but since our concern is with current account balance, it's the impulse response to the variables and the response to current account .Impulse response function identified the responsiveness of the dependent variable in VECM when a shock is put on the error term.

4.7. Granger Causality

Granger Causality was done and the results are shown in the table below

Table 4.4 Granger Causality

Variable	Granger Cause	Variable
EXR	>>	**BD**
EXR	>>	**INF**
EXR	>>	**CAB**
CAB	>>	**BD**
CAB	>>	**INV**
BOT	>>	**CAB**

BOT	>>	**BD**
INV	>>	**BD**
BD	>>	**CAB**
SAV	>>	**BD**
INV	>>	**SAV**
SAV	>>	**INV**

NB: >> Means the variable on the left side granger causes the variable on the right side.

4.8. Data Analysis

The empirical results are hereby analyzed.

The Granger Causality for all the endogenous variables was ordered as follows; Current account balance, Budget deficit, Investment, Saving, Balance of trade, Inflation, and Gross domestic product. This is in line with the theoretical literature that the Current account balance is normally affected by the Budget deficit, the level of savings, balance of trade, inflation, exchange rate and gross domestic product.

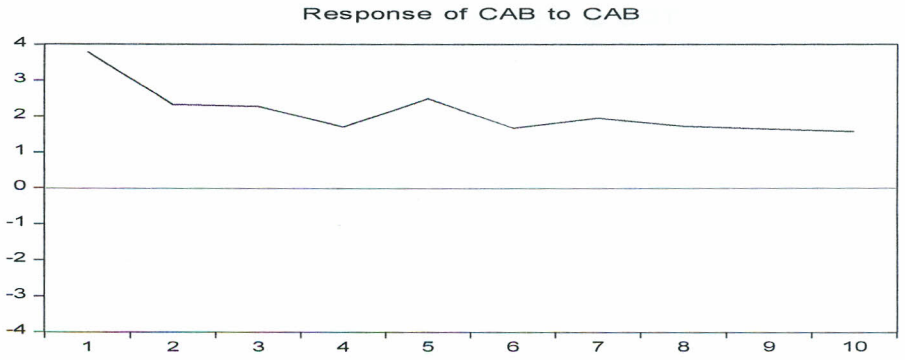
The variance decomposition was done so as to achieve the objective two of knowing the forecast of the effect of the each variable to the dependent variable. It was established that 79.26% of fluctuation to current account was caused by current account itself(own shock), 5.4% variation of current account balance was due to exchange rate while 15.26% variation of current account balance was brought by the gross domestic product in the first year. In second year 49.26%

shock in current account balance was explained by current account balance itself, 28.71% by gross domestic product, 16.51 % by exchange rate, 2.15% by inflation, 2% by balance of trade and less than 1 % is explained by savings and investments. It was noted that in long run the effect of the current account balance to itself goes on diminishing up to 19.54% in 10^{th} year while the effect of budget deficit goes on increasing but stabilizes at 14.74% in tenth year. It was noted further that effects of inflation, gross domestic product and exchange rate to current account also increase and stabilizes at 15.31%, 16.18% and 17.97% respectively. From the analysis it was established that in short run the current account balance and exchange rate affect the level of the current account balance. In long run the 16.17% variation of current account balance, will be explained by gross domestic product, 17.96% variation of current account balance will be explained by exchange rate, 19.54% variation of current account balance will be explained by the current account balance itself, 14.74% by budget deficit, 15.31% by inflation, 13.88% by balance of trade, 1.5% by investment and 0.81% by savings.

4.9. Impulse Response Function

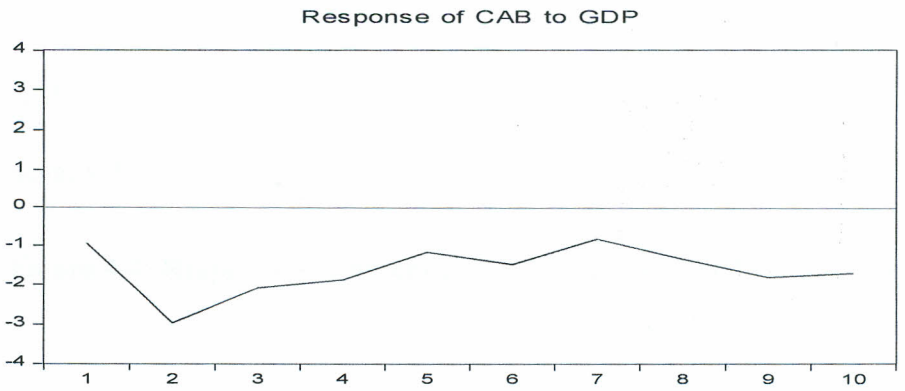
Impulse response function traces the effect of each shock on each variable in the Vector error correction model (VECM) over given period of time. As noted by Enders 2004, the shock to a variable is transmitted to all endogenous variables in the VECM and on itself and the following results were established.

Figure 4.1: Response of Current account balance to Current account balance



It was established that one standard deviation or shock to the current account balance, the effect is positive but it decrease gradually, and then increases, but from the 6th year the current account balance stabilizes.

Figure 4.2: Response of Current account balance to Gross domestic product.



As shown in Figure 4.2 above, when there is one standard deviation shock on the gross domestic product the current account balance reacts negatively and drops sharply in the first 2 years then negative response is reduced up to 5th year then it increases before stabilizing from 8th year onwards as shown in the Table 4.6 below.

Figure 4.3: Response of Current account balance to Balance of trade

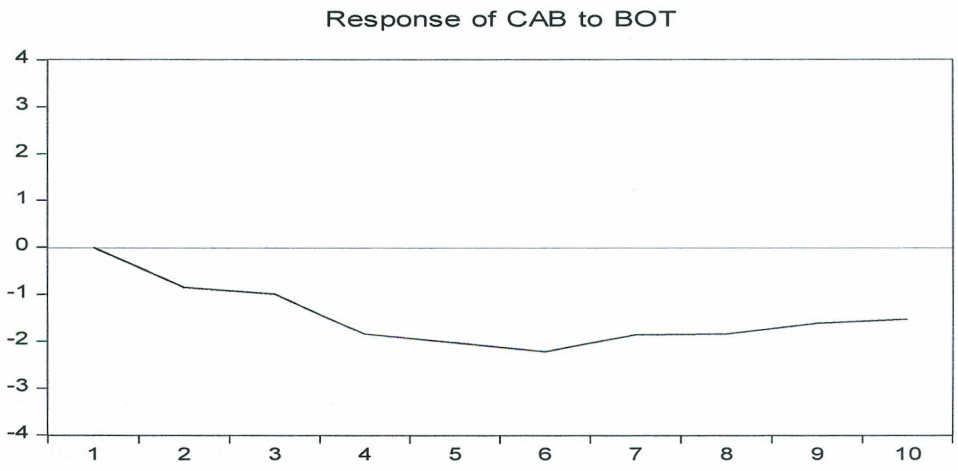


Figure 4.3 shows that when balance of trade is subjected to shock, current account is negatively affected and goes on reducing up to 6th year then the negativity are reduced but a slower rate onwards. With the shock in savings the current account is slightly affected positively in the 1st year but it fluctuates both positively and negatively in the subsequent years.

Figure 4.4: Response of Current account balance to Inflation

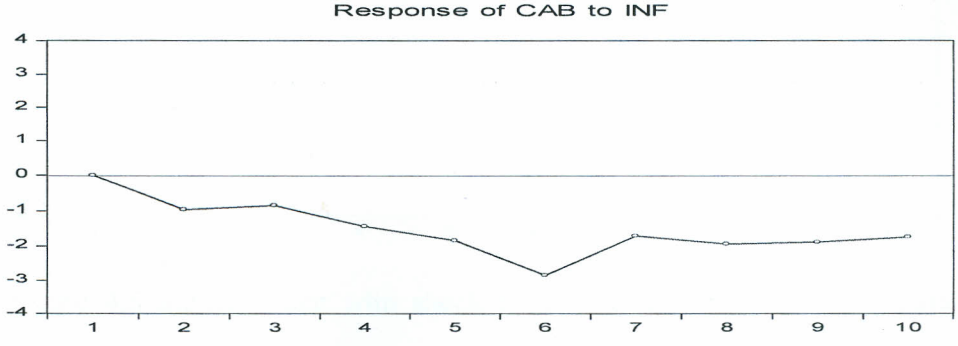


Figure 4.4 shows that with the shock in the inflation the current account balance is negatively affected and the negativity increases up to 6th year then the effect reduces in the negative way up to the 7th year before stabilizing to 10th year.

Figure 4.5: Response of Current account balance to Budget deficit

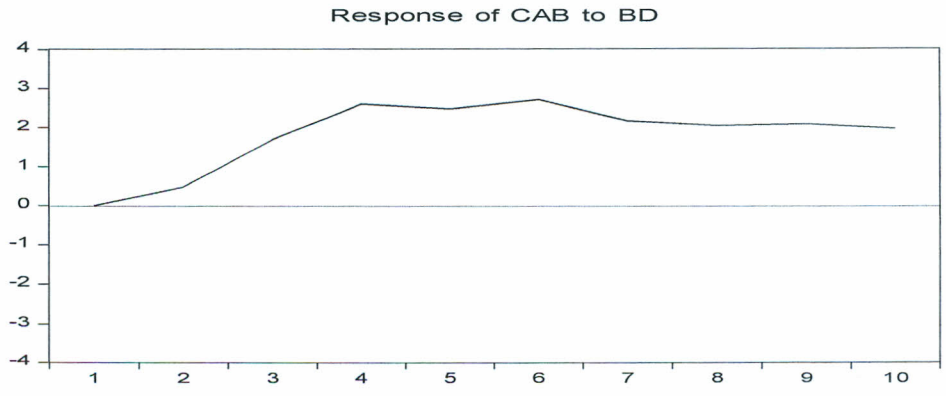


Figure 4.5 indicates that when there is a shock budget deficit the current account balance increasingly been affect positively till 4th year when it stabilizes at up to 6th year then the positive effect is slightly reduced in the 7th year. But from 8th year the positive effect is stabilized.

Figure 4.6: Response of Current account balance to Investments

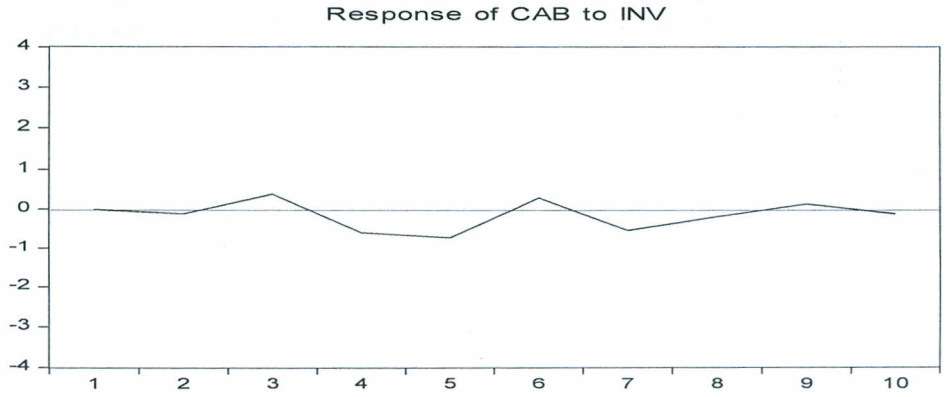


Figure 4.6 indicates that with shock in investment current account balance is slightly negatively affected in the 1st year but the effect improves in the second year then it negatively affected towards the 4th and 5th year but suddenly effect is positive from up to 6th year then it drops .and the pattern is the same up to 10th year.

Figure 4.7: Response of Current account balance to Savings

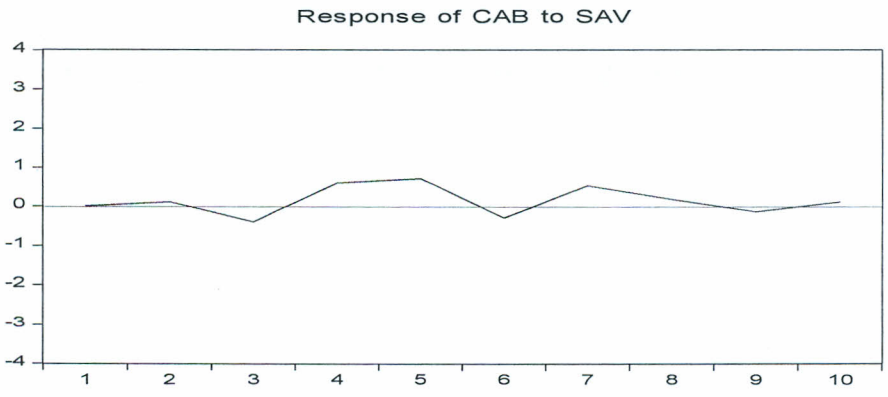


Figure 4.7 indicates that in the 1st and the 2nd year the shock of saving to current account balance is almost zero but towards the 3rd year it negatively affected,then it increases positively in the 4th year then it maintains that level but then it reduces to negative in the 6th year.The same pattern is repeated till no effect is on the tenth year.

Figure 4.8: Response of Current account balance to Exchange rate.

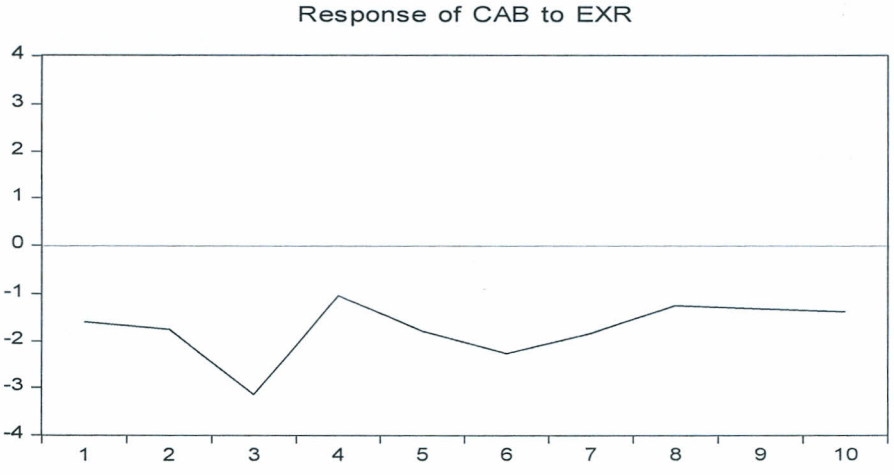


Figure 4.8 indicates that the effect of the exchange rate to current account balance is negative but the negativity increases up to 3rd year, then it reduces to -1 in 4th year then increases up to 6th year. The effect stabilizes at -1 from the 8th year.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

This chapter contains summary, conclusions, the policy implications and area for further studies.

5.1. Summary

The broad objective of this research was to establish the determinants of the current account balance in Kenya and the specific objective were: to determine the macro-economic variables that affect the current account in Kenya, to determine the magnitude of each variable and to come up with the policy options of addressing the over fluctuating current account balance in Kenya. All the necessary tests were performed as required and the Vector error correction model was applied since some the variables were co integrated. Estimated coefficient values VECM do not show the strength of this model. Variance decomposition and impulse response functions were used to improve the VECM .Since the aim was to determine the variables which contribute to the current account balance, applying these two analyses proved more useful. Variance decomposition showed the proportion of the forecast error variance for each variable in the system that is attributable to innovations in itself and in other variables in the system. It was established that apart from saving and investment all the other variables contribute significantly the current accounts balance in the 10^{th} year.

The effects of shocks to the system were summarized by using impulse. The impulse response functions determined the signs of the effect of innovations in each variable on others. It complimented the results in variance decompositions.

The impulse response functions of the current account from one standard deviation shock in each of the other variables. It showed how much the current account would change up to 10 years after the shock. It was established that the impact of the GDP growth rate, current account balance, budget deficit and exchange rate were positive while inflation, balance of trade were negative, investment, and savings were ambiguous.

5.2. Conclusions

Results confirm theoretical expectations the impact of the GDP growth rate, investment, exchange rate, budget deficit and current account balance are positive on the current account balance whereas the impact of inflation, balance of trade are negative. Effects savings investment seems weak since plays are exhibiting positivity and negativity effect in very small scale.

Results of the VECM approach indicate that there is a persistency in the current account. Current since it is the most influential factor for itself explains the structural conditions of the Kenya economy. Other variables with notable effects are GDP growth rate, exchange rate, balance of trade and inflation Kenya has been experiencing persistent current account deficits which may be considered as a structural problem that may persist in future. The response of shocks from variables to current account and the magnitude of the variables are key in determining the action to take to salvage the current account situation of Kenya.

The growth rate, current account, exchange rate, balance of trade, budget deficit affects the level of saving and investments. Inflation is factor that has most

influence on the current account it has considerable impacts on saving and investment. It affects saving positively and investment negatively by representing macroeconomic uncertainty which causes current account balance to

Improve

Exchange rate, balance of trade and growth rate together with inflation have long lasting influence on the current account. The balance of trade of is the most significant positive determinants of current account balance in Kenya. This is explained by the fact that Kenya is the net importer indicating that any change the exchange rate will have adverse effect on the balance of payment and thus affecting the current account. They are indicators for the sustainability of the deficits through increasing productive capacity and future income. It means that increasing investment causes the current account to deteriorate in the first place; it helps to recovery of the current account afterwards. However, as we see from the figure of impulse responses that recovery phase is not strong and stable as compared to the initial effect of deterioration. Beside this, most of the government investments disregard profitability criteria thus directed to the less productive or non-tradable sectors cannot contribute much to the recovery of the current account balance in the long run.

Relationship between investment and current account balance demonstrates that investment decisions in Kenya are not made according to the profitability or sustainability criteria and far from being rational. Hence, current account deficit can be considered as a structural problem; exports largely depend on imported goods. Moreover, as the Kenya grows imports increase more than exports which

results with current account deficit since the income elasticity of import is higher than the income elasticity of export.

5.3. Contribution to Knowledge

It was established that Kenya being unique economy, the issue of current account is very tricky. The exchange rate was established that highest impact on the current account amounting to 17.97% in long run. But its shock the current is negative though negativity stabilizes to -4 in long run. Since Kenya is net importer any variation to it leads to deterioration of the current account.

The results show that investments and savings have mild effect on the current account balance in Kenya. This is attributed to the fact that the savings and investments are affected by other macro-economic variables. For Savings the effect is less felt by current account but if those savings are borrowed by the government to bridge the tax gap, then its effect is more felt by the current account because the funds may not be used in the productive sector (Muniu, 2010) Further, the research findings confirm the existence of twin-deficit hypothesis in Kenya.

5.4. Policy Implications

For Kenya to progress the study advocates for favorable current account balance by reducing persistent deficits and achieving current account balance sustainability, several policy options should be applied.

Deliberate export oriented approach through product diversification, quality improvement and technological upgrading in value-addition must be applied so as our products can be competitively compete in the international markets.

Infrastructure and appropriate key institutions must be enhanced to reduce the business transaction costs for prospective investors.

Stability in exchange rate and low inflation are critical in ensuring productivity growth and technological adoption in attraction of foreign direct investments.

Kenyan Government operates in fiscal deficits, thus leading to current account deficits. Fiscal measures that would limit excessive government expenditures should be put in place 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.

5.5. Areas for Further Study

From the results the twin deficit hypothesis should be investigated further by using the similar methodology or using the different methodology. Also since the exports need to be competitive in the international markets, then the specific areas for product improvements and various ways for product diversification should further be investigated.

References

Abbas, S.M.Ali, J.Bougha-Hagbe, A.J.Fatas, P.Mauro, and R.C.Velloso, (2010). *Fiscal Policy and Current Account* .IMF Working Paper No.WP/10/121 (Washington: International Monetary)

Aristovnik, A. (2007). *Short and Medium Term Determinants of Current Account Balances in Middle East and North Africa Countries,* The William Davidson Institute Working Paper Number 862, The University of Michigan.

Chinn, M.D. & E.S. Prasad (2000). *Medium Term Determinants of Current Accounts in Industrial and Developing Countries: An Empirical Exploration*, IMF Working Paper WP/00/46, International Monetary Fund.

Clower,E. and Ito,H. (2012). *The Persistence of Current Account Balances and its Determinants: The Implications for Global Rebalancing.* ADBI Working Paper 400. Tokyo: Asian Development Bank Institute.

Debelle, G. and Faruqee, H. (1996). *What Determines the Current Account? A Cross-Sectional and Panel Approach*, IMF Working Paper, No. 58, International Monetary Fund.

Edwards, S. (2001). *Does the Current Account Matter*? National Bureau of Economic Research (NBER) Working Paper No. 8275.

Ender,W.(2004):*Applied Econometric Time Series.*2 ed. John Wiley and Sons

Endegnanew, T. & Yartey, C. & Jones, T. (2012*) Fiscal Policy and Current Account: Are Microstates Different?* IMF Working Paper No.WP/12/51,IMF

Genberg, H. & A.K. Swoboda (1992). *Saving, Investment and the Current Account* , The Scandinavian Journal of Economics, Vol. 94, No. 2, Proceedings of a Conference on Savings Behaviour: Theory, International Evidence and Policy Implications, *pp. 347-366.*

Giancarlo G. (2002), *International Finance and Open –Economy Macroeconomics,* Springer,

Godfrey M. Kariuki (2009). *Determinants of Current Account Balance in Kenya: The Intertemporal Approach.* KIPPRA Discussion Paper No. 93

Ghosh AR, Ostry JD (1997). *Macroeconomic Uncertainty, Precautionary Saving and the Current Account*. J. Monet. Econ., 40:121-139.

Government of Kenya (2007), *Kenya Vision 2030,* Government printer, Nairobi

Government of Kenya (2003), *Economic Recovery Strategy for Wealth and Employment Creation*, 2003-2007 Government printers, Nairobi

Grigorios, B. & John, P. & Christos P. (2008). *The Determinants of the Greek Current Account Deficit*: *The EMU Experience*, University of Piraeus* and Panteion University and Bank of Greece

Hanan Morsy (2009). *Current Account Determinants for Oil-Exporting Countries.* IMF Working Paper No. 07/296.

Herrmann, S. & A. Jochem (2005), "*Determinants of Current Account Developments in the Central and East European EU Member States-*

Consequences for the Enlargement of the Euro Area", Deutsche Bundesbank Economic Studies Discussion Paper No 32/2005.

International Monetary Fund 2009. *Balance Of Payments Manual,* IMF

Kandiero,T. (2007). *Current Account Situation in South Africa: Issues to consider*. Economic Research Working Paper No.90, African Development Bank

Ketenci, N. & Uz I. (2010).*Determinants of current account in the EU: the relation between internal and external balances in the new members* Yeditepe University.

Kayikçi,F. (2012): *Determinants of the current account balance in Turkey: Vector auto regression (VAR) approach.* Department of Economics, Yıldız Technical University.

Khan, M.S & M.D. Knight (1983). *Determinants of Current Account Balances of Non-oil Developing Countries in the 1970s: An Empirical Analysis*, Staff Papers - International Monetary Fund, Vol. 30, No. 4, pp. 819-842.

Muniu, J.M (2010).*Assessing Finance-Growth Channel in Kenya: A VAR Analysis*, Africa Finance Journal Article No.2010/070

Mwega, F. M., Njuguna Mwangi, and F. Olewe-Ochilo (1994), *Macroeconomic Constraints and Medium Term Growth in Kenya: A Three-Gap Model,* African Journal of Economic 43 Policy, Vol. 1, No. 1, and African Economic Research Consortium (AERC) Research paper No. 23, Nairobi.

Mwega, F. M. (2007).*The Exchange Rate, External Balance and Economic Growth in Kenya,* Nairobi: University of Nairobi, School of Economics.

Obstfeld, M. & K. Rogoff (1994), *The Intertemporal Approach to Current Account,* National Bureau of Economic Research Working Paper No. 4893.

Sergejs Saksonovs (2000). *The Intertemporal Approach to the Current Account and Currency Crises,* Cambridge University.

Sepehri, A. & A. H. Akram-Lodhi (2005). *Transition, Savings and Growth in Vietnam: A Three Gap Analysis, Journal of International Development, 17, 553-574.*

Sims, C. A. (1992) *"Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy," European Economic Review*, 36, 975-1000.

Todaro, M.P. & S.C. Smith (2003). *"Economic Development"*, Eighth Edition, India: Pearson Education, Inc.

Umo, J. & Tayo, F. (1995). *Profiles and determinants of Nigeria's Balance of payments: The current account component, 1950-88* Africa Research Consortium Research paper 40.

Vos, R. & Taylor, L. & Barros, RPD (2002). *Economic Liberalization, Distribution and Poverty: Latin America in the 1990s,* UNDP, Edward Elgar Publishing.

APPENDIX I: DATA

YEAR	GDP	EXR	CAB	BD	INF	BOT	INV	SAV
1970	-4.66	7.14	-3.40	-5.66	2.2	-0.84	24.3	23.56
1971	22.17	7.14	-7.00	-6.06	3.8	-6.55	23.92	17.37
1972	17.08	7.14	-3.70	-6.88	5.8	-2.14	22.32	20.18
1973	5.90	7.02	-6.50	-4.50	9.3	-1.28	25.81	24.54
1974	4.07	7.13	-13.00	-7.06	17.1	-7.22	25.76	18.53
1975	0.88	7.34	-6.76	-8.67	19.1	-4.69	18.14	13.45
1976	2.15	8.37	-3.46	-5.41	11.4	0.69	20.24	20.94
1977	9.45	8.28	0.78	-5.87	14.8	3.37	23.72	27.1
1978	6.91	7.73	-12.46	-8.44	16.9	-9.75	29.79	20.04
1979	7.62	7.48	-7.93	-6.64	8	-5.86	18.13	12.27
1980	5.59	7.42	-12.08	-0.35	13.9	-6.38	24.51	18.12
1981	3.77	9.05	-8.22	-11.23	11.6	-3.36	22.91	19.55
1982	1.51	10.92	-4.79	-10.02	20.2	-4.9	21.86	16.96
1983	1.31	13.31	-0.84	-4.44	11.4	-2.26	20.93	18.66
1984	1.76	14.41	-2.10	-5.76	10.3	-5.3	19.81	14.51
1985	4.30	16.43	-1.92	-4.25	13	-4.85	25.32	20.48
1986	7.18	16.23	-0.65	-7.45	2.5	-4.04	21.77	17.72
1987	5.94	16.45	-6.31	-4.05	8.6	-5.09	24.29	19.2
1988	6.20	17.75	-5.65	-4.59	12.2	-5.23	25.45	20.22
1989	4.69	20.57	-7.13	-6.21	13.8	-7.09	24.86	17.77
1990	4.19	22.91	-6.15	-7.28	17.8	-5.64	24.16	18.53
1991	1.44	27.51	-2.62	-1.87	20.1	-1.51	20.97	19.46
1992	-0.80	32.22	-2.19	-3.65	27.3	-0.41	16.92	16.51
1993	0.35	58.00	-4.55	-6.23	46	4.95	17.61	22.56
1994	2.63	56.05	-6.28	0.82	28.8	2.81	19.29	22.11
1995	4.41	51.43	-17.45	-17.78	1.6	-6.56	21.82	15.26
1996	4.15	57.11	-7.98	-0.83	8.9	-6.91	15	8.09
1997	0.47	58.73	-13.65	-1.44	11.4	-8.68	15.14	6.46
1998	3.29	60.37	-18.68	0.63	6.7	-8.56	16.69	8.13
1999	2.31	70.33	-18.34	1.75	5.7	-6.53	15.52	8.99
2000	0.60	76.18	-1.57	-1.61	10	-10.13	17.41	7.28
2001	3.78	78.56	-2.47	-1.26	5.7	-10.08	18.79	8.71
2002	0.55	78.75	-0.89	-2.62	2	-5.38	15.14	9.76
2003	2.93	75.94	0.89	-1.64	9.8	-5.96	16.48	10.52
2004	5.10	79.17	-0.82	-2.78	11.6	-6.26	16.96	10.71
2005	5.91	75.55	-1.35	-1.72	10.3	-7.46	17.65	10.19
2006	6.33	72.10	-2.27	-1.59	14.5	-10.76	18.49	7.77
2007	6.99	67.32	-3.79	-2.99	9.8	-10.92	19.12	8.2
2008	1.53	69.18	-6.51	-5.08	26.2	-14.14	19.24	5.1
2009	2.74	77.35	-5.52	-4.86	9.2	-13.27	19.84	6.58
2010	5.76	79.23	-7.54	-5.94	4	-12.16	19.63	7.46

APPENDIX II: STATIONARY TEST

ADF TEST

Variable	Constant			Constant &trend		
	t-Statistics	c-value	p-value	t-Statistics	c-value	p-value
CAB	-3.660126	-2.936942	0.0087	-3.628598	-3.52660	0.0399
EXR	0.070442	-2.936942	0.9458	-1.968682	-3.52660	0.6001
GDP	-5.017197	2.936942	0.0002	5.644083	3.526609	0.0002
BD	-5.914041	-2.936942	0.0000	-8.063364	-2.94114	0.0000
INF	-3.669260	-2.936942	0.0085	-3.595742	-3.52660	0.0429
BOT	-2.932743	-2.936942	0.0505	-3.664793	-3.52660	0.0367
SAV	-2.256923	-2.936942	0.1905	-3.742206	-3.52660	0.0308
INV	-2.445408	-2.938987	0.1365	-4.632316	-3.52660	0.0033
^EXR	-5.430050	-2.938987	0.0001	-5.392208	-3.52975	0.0004

^Denotes the 1st difference and the values are at 5% confidence levels

The data was found to be stationary at the level but for the exchange rate, it became stationary after the first difference.

APPENDIX III: CO INTEGRATION TEST

Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.838852	247.7363	159.5297	0.0000
At most 1 *	0.761073	176.5444	125.6154	0.0000

At most 2 *	0.630333	120.7122	95.75366	0.0003
At most 3 *	0.567188	81.90116	69.81889	0.0040
At most 4 *	0.411827	49.24050	47.85613	0.0368
At most 5	0.360242	28.54190	29.79707	0.0692
At most 6	0.245366	11.12198	15.49471	0.2041
At most 7	0.003650	0.142595	3.841466	0.7057

Trace test indicates 5 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Unrestricted Co integration Rank Test (Maximum Eigen value)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.838852	71.19196	52.36261	0.0002
At most 1 *	0.761073	55.83223	46.23142	0.0036
At most 2	0.630333	38.81099	40.07757	0.0690
At most 3	0.567188	32.66066	33.87687	0.0693
At most 4	0.411827	20.69860	27.58434	0.2948
At most 5	0.360242	17.41992	21.13162	0.1531
At most 6	0.245366	10.97938	14.26460	0.1553
At most 7	0.003650	0.142595	3.841466	0.7057

Max-eigenvalue test indicates 2 co integrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

It was found that the variables were co integrated.

APPENDIX IV: VECTOR ERROR CORRECTION MODEL

Vector Error Correction Estimates
Date: 10/06/14 Time: 20:15
Sample (adjusted): 1973 2010
Included observations: 38 after adjustments
Standard errors in ( ) & t-statistics in [ ]

CointegratingEq:	CointEq1	CointEq2
GDP(-1)	1.000000	0.000000
EXR(-1)	0.000000	1.000000
CAB(-1)	0.206008	-0.770888
	(0.05707)	(0.35729)
	[3.60976]	[-2.15760]
BD(-1)	-0.609330	-4.311850
	(0.17949)	(1.12372)
	[-3.39476]	[-3.83711]
INF(-1)	-0.130514	1.336224
	(0.05800)	(0.36313)
	[-2.25012]	[3.67971]
BOT(-1)	-76.31468	1149.345
	(53.5090)	(334.998)
	[-1.42620]	[3.43090]
INV(-1)	-76.82128	1148.506
	(53.4945)	(334.908)
	[-1.43606]	[3.42932]
SAV(-1)	76.29517	-1145.650
	(53.5025)	(334.958)
	[1.42601]	[-3.42028]
C	6.578476	-116.0310

Error Correction:	D(GDP)	D(EXR)	D(CAB)	D(BD)	D(INF)	D(BOT)	D(INV)	D(SAV)
CointEq1	-0.296372	-0.847865	-1.400970	0.429549	0.680509	-0.656838	0.563465	-0.094494
	(0.22467)	(0.47778)	(0.36737)	(0.28979)	(0.60329)	(0.20274)	(0.23510)	(0.13741)
	[-1.31912]	[-1.77461]	[-3.81348]	[1.48228]	[1.12800]	[-3.23987]	[2.39675]	[-0.68767]
CointEq2	0.012741	-0.049483	-0.113832	0.017439	-0.145737	-0.100793	-0.037491	-0.138196
	(0.03471)	(0.07381)	(0.05675)	(0.04477)	(0.09320)	(0.03132)	(0.03632)	(0.02123)
	[0.36708]	[-0.67043]	[-2.00576]	[0.38954]	[-1.56376]	[-3.21828]	[-1.03229]	[-6.51018]
D(GDP(-1))	0.186644	0.359270	0.126706	-0.119018	-0.630399	0.269041	0.176897	0.446984
	(0.17637)	(0.37506)	(0.28840)	(0.22749)	(0.47359)	(0.15915)	(0.18455)	(0.10787)
	[1.05823]	[0.95789]	[0.43935]	[-0.52318]	[-1.33110]	[1.69046]	[0.95851]	[4.14367]
D(GDP(-2))	0.041241	-0.082232	0.505933	-0.012133	-0.121615	0.128122	-0.137084	-0.008847
	(0.14989)	(0.31876)	(0.24510)	(0.19334)	(0.40249)	(0.13526)	(0.15685)	(0.09168)
	[0.27513]	[-0.25798]	[2.06420]	[-0.06276]	[-0.30215]	[0.94723]	[-0.87399]	[-0.09651]
D(EXR(-1))	0.021029	-0.002680	0.098302	0.325916	0.212483	0.013421	0.167394	0.180245
	(0.14517)	(0.30870)	(0.23737)	(0.18724)	(0.38980)	(0.13099)	(0.15190)	(0.08878)
	[0.14486]	[-0.00868]	[0.41413]	[1.74064]	[0.54511]	[0.10246]	[1.10200]	[2.03013]
D(EXR(-2))	-0.181375	-0.239083	-0.393230	-0.184377	-0.244524	-0.139925	0.272189	0.132089
	(0.16467)	(0.35018)	(0.26926)	(0.21240)	(0.44218)	(0.14859)	(0.17231)	(0.10072)
	[-1.10142]	[-0.68273]	[-1.46038]	[-0.86807]	[-0.55300]	[-0.94165]	[1.57963]	[1.31150]
D(CAB(-1))	0.145544	0.008975	-0.145825	-0.066595	-0.218346	-0.120594	-0.005752	-0.126132
	(0.13050)	(0.27750)	(0.21338)	(0.16832)	(0.35040)	(0.11775)	(0.13655)	(0.07981)
	[1.11531]	[0.03234]	[-0.68340]	[-0.39565]	[-0.62313]	[-1.02412]	[-0.04213]	[-1.58035]
D(CAB(-2))	0.010572	-0.030644	-0.028029	0.143851	-0.002506	0.199735	-0.153485	0.046320
	(0.10783)	(0.22930)	(0.17631)	(0.13908)	(0.28954)	(0.09730)	(0.11283)	(0.06595)
	[0.09804]	[-0.13364]	[-0.15897]	[1.03431]	[-0.00866]	[2.05280]	[-1.36033]	[0.70237]
D(BD(-1))	-0.083202	-0.501730	-1.239191	-0.611295	-0.362628	-0.854559	0.092658	-0.762170
	(0.18535)	(0.39415)	(0.30307)	(0.23906)	(0.49769)	(0.16725)	(0.19394)	(0.11336)
	[-0.44890]	[-1.27296]	[-4.08882]	[-2.55703]	[-0.72863]	[-5.10950]	[0.47776]	[-6.72347]
D(BD(-2))	-0.008673	-0.087984	-0.636038	-0.149177	0.227951	-0.580867	0.162610	-0.418211
	(0.14333)	(0.30480)	(0.23437)	(0.18488)	(0.38488)	(0.12934)	(0.14998)	(0.08766)
	[-0.06051]	[-0.28866]	[-2.71380]	[-0.80690]	[0.59227]	[-4.49105]	[1.08419]	[-4.77059]

D(INF(-1))	-0.099318	-0.088947	-0.161642	-0.007196	-0.145833	0.031216	0.045379	0.076714
	(0.07166)	(0.15239)	(0.11717)	(0.09243)	(0.19242)	(0.06466)	(0.07498)	(0.04383)
	[-1.38597]	[-0.58370]	[-1.37952]	[-0.07786]	[-0.75790]	[0.48275]	[0.60519]	[1.75036]
D(INF(-2))	0.069861	-0.097644	-0.058568	-0.093069	-0.349639	0.129754	-0.058651	0.071036
	(0.06824)	(0.14511)	(0.11158)	(0.08802)	(0.18323)	(0.06158)	(0.07140)	(0.04174)
	[1.02376]	[-0.67288]	[-0.52489]	[-1.05740]	[-1.90816]	[2.10721]	[-0.82139]	[1.70206]
D(BOT(-1))	-125.9431	118.2133	8.768242	-21.91628	240.0611	37.43948	-6.604358	31.51188
	(44.6559)	(94.9622)	(73.0187)	(57.5981)	(119.909)	(40.2956)	(46.7272)	(27.3119)
	[-2.82030]	[1.24485]	[0.12008]	[-0.38050]	[2.00203]	[0.92912]	[-0.14134]	[1.15378]
D(BOT(-2))	-41.04217	131.7437	-11.64640	-53.08983	-102.7490	46.84801	16.59067	63.74946
	(38.7626)	(82.4298)	(63.3822)	(49.9967)	(104.084)	(34.9777)	(40.5605)	(23.7075)
	[-1.05881]	[1.59825]	[-0.18375]	[-1.06187]	[-0.98717]	[1.33937]	[0.40903]	[2.68900]
D(INV(-1))	-125.9275	117.6119	8.444893	-22.22556	238.4440	37.10772	-7.249506	30.53407
	(44.6651)	(94.9817)	(73.0336)	(57.6099)	(119.933)	(40.3038)	(46.7368)	(27.3175)
	[-2.81937]	[1.23826]	[0.11563]	[-0.38579]	[1.98814]	[0.92070]	[-0.15511]	[1.11775]
D(INV(-2))	-41.59142	131.1002	-11.85384	-53.14313	-103.4474	46.44666	15.97986	62.73651
	(38.7569)	(82.4178)	(63.3730)	(49.9895)	(104.069)	(34.9726)	(40.5546)	(23.7040)
	[-1.07314]	[1.59068]	[-0.18705]	[-1.06309]	[-0.99403]	[1.32809]	[0.39403]	[2.64666]
D(SAV(-1))	125.6628	-118.1606	-8.574913	21.63253	-239.2266	-37.66729	6.851408	-31.49251
	(44.6456)	(94.9402)	(73.0018)	(57.5848)	(119.881)	(40.2863)	(46.7164)	(27.3056)
	[2.81467]	[-1.24458]	[-0.11746]	[0.37566]	[-1.99554]	[-0.93499]	[0.14666]	[-1.15334]
D(SAV(-2))	41.21866	-131.3089	11.62558	52.76499	103.5637	-47.07173	-16.25018	-63.63240
	(38.7326)	(82.3661)	(63.3332)	(49.9581)	(104.004)	(34.9507)	(40.5292)	(23.6892)
	[1.06418]	[-1.59421]	[0.18356]	[1.05618]	[0.99577]	[-1.34681]	[-0.40095]	[-2.68614]
C	0.025561	2.338454	0.469279	-0.384278	0.614238	-0.348690	-0.659273	-1.007008
	(0.58542)	(1.24491)	(0.95724)	(0.75508)	(1.57194)	(0.52825)	(0.61257)	(0.35805)
	[0.04366]	[1.87842]	[0.49024]	[-0.50892]	[0.39075]	[-0.66008]	[-1.07624]	[-2.81252]
R-squared	0.665933	0.443216	0.691826	0.807608	0.707815	0.812273	0.726534	0.923970
Adj. R-squared	0.349449	-0.084264	0.399872	0.625342	0.431008	0.634426	0.467461	0.851941
Sum sq. resids	116.5785	527.1833	311.6936	193.9442	840.5450	94.92381	127.6440	43.60779
S.E. equation	2.477036	5.267493	4.050299	3.194932	6.651256	2.235171	2.591931	1.514974

F-statistic	2.104160	0.840252	2.369642	4.430928	2.557070	4.567257	2.804360	12.82782
Log likelihood	-75.21825	-103.8889	-93.90392	-84.88936	-112.7525	-71.31394	-76.94119	-56.53501
Akaike AIC	4.958855	6.467839	5.942312	5.467861	6.934341	4.753365	5.049536	3.975527
Schwarz SC	5.777649	7.286632	6.761105	6.286654	7.753134	5.572159	5.868329	4.794320
Mean dependent	-0.297895	1.897105	-0.101053	0.024737	-0.047368	-0.263684	-0.070789	-0.334737
S.D. dependent	3.071084	5.058672	5.228358	5.219681	8.817603	3.696775	3.551794	3.937206

Determinant resid covariance (dof adj.)	125.2710
Determinant resid covariance	0.489340
Log likelihood	-417.7780
Akaike information criterion	30.83042
Schwarz criterion	38.07028

To get the p-values for each coefficient was gotten as follows

System: UNTITLED
Estimation Method: Least Squares
Date: 10/06/14 Time: 20:37
Sample: 1973 2010
Included observations: 38
Total system (balanced) observations 304

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.296372	0.224674	-1.319118	0.1891
C(2)	0.012741	0.034708	0.367084	0.7141
C(3)	0.186644	0.176374	1.058232	0.2916
C(4)	0.041241	0.149895	0.275135	0.7836
C(5)	0.021029	0.145167	0.144865	0.8850
C(6)	-0.181375	0.164674	-1.101421	0.2725
C(7)	0.145544	0.130496	1.115309	0.2665
C(8)	0.010572	0.107828	0.098044	0.9220
C(9)	-0.083202	0.185347	-0.448900	0.6541
C(10)	-0.008673	0.143334	-0.060511	0.9518
C(11)	-0.099318	0.071659	-1.385973	0.1678
C(12)	0.069861	0.068239	1.023761	0.3076
C(13)	-125.9431	44.65592	-2.820301	0.0054
C(14)	-41.04217	38.76257	-1.058809	0.2914
C(15)	-125.9275	44.66508	-2.819374	0.0055
C(16)	-41.59142	38.75692	-1.073135	0.2849
C(17)	125.6628	44.64559	2.814674	0.0055
C(18)	41.21866	38.73263	1.064184	0.2889
C(19)	0.025561	0.585417	0.043663	0.9652
C(20)	-0.847864	0.477776	-1.774605	0.0780
C(21)	-0.049483	0.073808	-0.670433	0.5036
C(22)	0.359270	0.375064	0.957890	0.3396
C(23)	-0.082232	0.318756	-0.257978	0.7968
C(24)	-0.002680	0.308701	-0.008683	0.9931
C(25)	-0.239083	0.350184	-0.682735	0.4958
C(26)	0.008975	0.277505	0.032341	0.9742
C(27)	-0.030644	0.229299	-0.133642	0.8939
C(28)	-0.501730	0.394146	-1.272955	0.2050
C(29)	-0.087984	0.304805	-0.288658	0.7732
C(30)	-0.088947	0.152385	-0.583699	0.5603
C(31)	-0.097644	0.145113	-0.672882	0.5020
C(32)	118.2133	94.96219	1.244846	0.2151
C(33)	131.7437	82.42979	1.598253	0.1121
C(34)	117.6119	94.98165	1.238259	0.2175
C(35)	131.1002	82.41777	1.590679	0.1138
C(36)	-118.1606	94.94021	-1.244579	0.2152
C(37)	-131.3089	82.36611	-1.594211	0.1130
C(38)	2.338454	1.244907	1.878417	0.0622
C(39)	-1.400970	0.367373	-3.813476	0.0002
C(40)	-0.113832	0.056753	-2.005763	0.0467
C(41)	0.126706	0.288396	0.439349	0.6610
C(42)	0.505933	0.245099	2.064199	0.0407
C(43)	0.098302	0.237368	0.414133	0.6794
C(44)	-0.393230	0.269265	-1.460384	0.1462
C(45)	-0.145825	0.213380	-0.683405	0.4954

C(46)	-0.028029	0.176313	-0.158974	0.8739
C(47)	-1.239191	0.303068	-4.088825	0.0001
C(48)	-0.636038	0.234372	-2.713798	0.0074
C(49)	-0.161642	0.117173	-1.379517	0.1698
C(50)	-0.058568	0.111581	-0.524891	0.6004
C(51)	8.768242	73.01866	0.120082	0.9046
C(52)	-11.64640	63.38220	-0.183749	0.8545
C(53)	8.444893	73.03363	0.115630	0.9081
C(54)	-11.85384	63.37296	-0.187049	0.8519
C(55)	-8.574913	73.00176	-0.117462	0.9066
C(56)	11.62558	63.33324	0.183562	0.8546
C(57)	0.469279	0.957238	0.490243	0.6247
C(58)	0.429550	0.289789	1.482283	0.1403
C(59)	0.017439	0.044767	0.389541	0.6974
C(60)	-0.119018	0.227490	-0.523179	0.6016
C(61)	-0.012133	0.193338	-0.062756	0.9500
C(62)	0.325916	0.187239	1.740641	0.0838
C(63)	-0.184377	0.212400	-0.868065	0.3867
C(64)	-0.066595	0.168317	-0.395650	0.6929
C(65)	0.143851	0.139078	1.034313	0.3026
C(66)	-0.611295	0.239064	-2.557034	0.0115
C(67)	-0.149177	0.184876	-0.806903	0.4210
C(68)	-0.007196	0.092427	-0.077857	0.9380
C(69)	-0.093069	0.088016	-1.057400	0.2920
C(70)	-21.91628	57.59811	-0.380503	0.7041
C(71)	-53.08983	49.99675	-1.061866	0.2900
C(72)	-22.22556	57.60992	-0.385794	0.7002
C(73)	-53.14313	49.98946	-1.063087	0.2894
C(74)	21.63253	57.58479	0.375664	0.7077
C(75)	52.76499	49.95813	1.056184	0.2926
C(76)	-0.384278	0.755082	-0.508922	0.6115
C(77)	0.680510	0.603287	1.128004	0.2611
C(78)	-0.145737	0.093197	-1.563754	0.1200
C(79)	-0.630399	0.473593	-1.331100	0.1851
C(80)	-0.121615	0.402493	-0.302153	0.7629
C(81)	0.212483	0.389797	0.545114	0.5865
C(82)	-0.244524	0.442177	-0.552999	0.5811
C(83)	-0.218346	0.350405	-0.623125	0.5341
C(84)	-0.002506	0.289535	-0.008655	0.9931
C(85)	-0.362628	0.497687	-0.728626	0.4674
C(86)	0.227951	0.384877	0.592271	0.5545
C(87)	-0.145833	0.192417	-0.757903	0.4497
C(88)	-0.349639	0.183234	-1.908155	0.0583
C(89)	240.0611	119.9086	2.002034	0.0471
C(90)	-102.7490	104.0840	-0.987174	0.3251
C(91)	238.4440	119.9332	1.988140	0.0486
C(92)	-103.4474	104.0688	-0.994029	0.3218
C(93)	-239.2266	119.8809	-1.995536	0.0478
C(94)	103.5637	104.0036	0.995770	0.3209
C(95)	0.614238	1.571942	0.390751	0.6965
C(96)	-0.656837	0.202736	-3.239861	0.0015
C(97)	-0.100793	0.031319	-3.218273	0.0016
C(98)	0.269041	0.159152	1.690462	0.0930
C(99)	0.128122	0.135259	0.947233	0.3450
C(100)	0.013421	0.130992	0.102456	0.9185
C(101)	-0.139925	0.148595	-0.941655	0.3479
C(102)	-0.120594	0.117754	-1.024115	0.3074

C(103)	0.199735	0.097299	2.052798	0.0418
C(104)	-0.854559	0.167249	-5.109502	0.0000
C(105)	-0.580867	0.129339	-4.491051	0.0000
C(106)	0.031216	0.064662	0.482753	0.6300
C(107)	0.129754	0.061576	2.107214	0.0367
C(108)	37.43948	40.29559	0.929121	0.3543
C(109)	46.84801	34.97768	1.339369	0.1824
C(110)	37.10772	40.30385	0.920699	0.3587
C(111)	46.44666	34.97258	1.328088	0.1861
C(112)	-37.66729	40.28626	-0.934991	0.3513
C(113)	-47.07173	34.95066	-1.346805	0.1800
C(114)	-0.348690	0.528255	-0.660080	0.5102
C(115)	0.563464	0.235095	2.396749	0.0178
C(116)	-0.037491	0.036318	-1.032295	0.3036
C(117)	0.176897	0.184555	0.958508	0.3393
C(118)	-0.137084	0.156848	-0.873991	0.3835
C(119)	0.167394	0.151900	1.102003	0.2722
C(120)	0.272189	0.172312	1.579626	0.1163
C(121)	-0.005752	0.136549	-0.042127	0.9665
C(122)	-0.153485	0.112829	-1.360329	0.1757
C(123)	0.092658	0.193944	0.477757	0.6335
C(124)	0.162610	0.149983	1.084194	0.2800
C(125)	0.045379	0.074983	0.605190	0.5460
C(126)	-0.058651	0.071404	-0.821389	0.4127
C(127)	-6.604358	46.72724	-0.141338	0.8878
C(128)	16.59067	40.56053	0.409035	0.6831
C(129)	-7.249506	46.73682	-0.155113	0.8769
C(130)	15.97986	40.55462	0.394033	0.6941
C(131)	6.851408	46.71643	0.146659	0.8836
C(132)	-16.25018	40.52920	-0.400950	0.6890
C(133)	-0.659273	0.612571	-1.076240	0.2835
C(134)	-0.094494	0.137412	-0.687666	0.4927
C(135)	-0.138196	0.021228	-6.510176	0.0000
C(136)	0.446984	0.107872	4.143670	0.0001
C(137)	-0.008847	0.091677	-0.096506	0.9232
C(138)	0.180245	0.088785	2.030126	0.0441
C(139)	0.132089	0.100716	1.311502	0.1917
C(140)	-0.126132	0.079813	-1.580348	0.1161
C(141)	0.046320	0.065948	0.702366	0.4835
C(142)	-0.762170	0.113359	-6.723474	0.0000
C(143)	-0.418211	0.087664	-4.770594	0.0000
C(144)	0.076714	0.043827	1.750364	0.0821
C(145)	0.071036	0.041736	1.702058	0.0908
C(146)	31.51188	27.31190	1.153778	0.2504
C(147)	63.74946	23.70748	2.689002	0.0080
C(148)	30.53407	27.31750	1.117748	0.2654
C(149)	62.73651	23.70402	2.646661	0.0090
C(150)	-31.49251	27.30558	-1.153336	0.2506
C(151)	-63.63240	23.68917	-2.686139	0.0080
C(152)	-1.007008	0.358045	-2.812516	0.0056
Determinant residual covariance		0.489340		