

**AN EMPIRICAL ANALYSIS OF THE EFFECT OF BUDGET DEFICITS ON THE
CURRENT ACCOUNT DEFICITS IN KENYA**

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DECLARATION

I declare that this paper is my original work and has not been submitted for the award of a degree in any other university or institution.

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SIGNATURE: DATE.....

This paper is submitted for the award of the degree of Master of Arts in Economics with my approval as a university supervisor.

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SIGNATURE: DATE.....

DEDICATION

This study is dedicated to Edward, Titto and Hadassah. I celebrate each of you. Your love, encouragement and support contributed to the successful completion of this paper.

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I am grateful to God who has made it possible to complete this course.

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LIST OF ABBREVIATIONS

CAD	Current Account Deficit
BD	Budget Deficit or Fiscal Deficit
RER	Real Exchange rate
GDP	Gross Domestic Product
IMF	International Monetary Fund
WDI	World Development Indicator
FDI	Foreign Direct Investments
ARDL	Autoregressive Distributed Lag
LM	Langragian Multiplier
VAR	Vector Auto Regression
GARCH	Generalized Auto Regressive Conditional Heteroskedasticity
CUSUMQ	Cummulative Sum of Squares
KNBS	Kenya National Bureau of statistics

ABSTRACT

There are three main theories that try to explain the association between budget deficits and current account deficits. The Ricardian Equivalence hypothesis suggests that there is no relationship between budget deficits and current account deficits, while the Keynesian expenditure and the Mundell Femming Frameworks suggest that budget deficits affect current account deficits directly and indirectly (through the exchange rate and interest rates) respectively. This study examined the effect of the budget deficit on current account deficit in Kenya using time series data covering the period 1980-2015. To examine the long-run relationship, a cointegration test was carried out and the variables were found to have a long run relationship. To address the central objective, an ARDL model analysis was run in which budget deficit was found to positively influence the current account deficit, while the Real Exchange rate was found to be negatively related to current account deficit and both had a significant effect. In the short run, both factors were negatively related to the current account deficit. The study recommended on appropriate fiscal policies of having restrained budgets and appropriate exchange rate to control the current account policy. Finally, the study proposed further research on the role of the institution and political environment on the current account deficit.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

1.1.1 Budget Deficits and Current Account Deficits -A Global Perspective

Budget deficits and current account deficits are a mirror of the economic well-being of a country. High budget deficits are associated with high rates of inflation (Oladipo, 2011), reduced national savings (Chin and Prasad, 2013), public debt crises, current account deficits (Calderon *et al.*, 2000), reduced national investment (Krugman, 1979), reduced credit access, among others. A current account deficit may be a reflector of competition problems where imports exceed exports, a productive-growing economy where investments exceed savings or a poor fiscal policy where savings are low or are as a result of temporary shocks in the economy. Like the budget deficit, current account deficit may lead to currency account reversals (Osakwe and Verick, 2007), currency crisis (Edwards, 2002), run down of foreign exchange reserves and external debts (Njoroge et al., 2014). Most countries have registered persistent budget deficits and current account deficits. This has raised concern among Governments, policymakers and researchers about their sustainability with varying measures been undertaken to mitigate against any negative effects emanating from them.

Rich countries such as the USA and Euro region recorded high current account deficits while China and Germany recorded highest current account surpluses for the last ten years (Blanchard, 2007). In China, the surpluses are attributed to high savings due to absence of social safety nets (health and retirement insurance) while in the USA; current account deficits are primarily driven by private savings which are low and are largely financed from Foreign Direct Investments, equity and local currency government bonds, as opposed to borrowing from commercial banks and budget deficits.

These modes of financing are considered fairly stable even during financial disturbances and the current account deficit may not require any government intervention as market participants adjust their savings and investment decisions with time to bring an economically sufficient adjustment (Blanchard, 2007).

In the Eurozone, current account deficits are associated with low savings, and are largely financed by fairly stable foreign direct investment inflows although there is an increasing shift from this financing to borrowing from foreign banks. Possible explanations given for the low savings include; individuals are more optimistic about the future, there are well-developed safety nets and retirement plans unlike other regions such as Asia, businesses register low profits due to overvalued exchange rates, consumer loans are increasingly available and a large retired population. In overall, the need for precautionary saving is low. Investments in the region are however considered normal as compared to other emerging countries. Government deficits which are associated with low national savings are low and in countries where they are high, they are related with low current account deficits (Shelburne, 2008).

The African experience is different. Africa has experienced persistent current account and budget deficits. Current account deficits are mainly attributable to the trade deficit emanating from low /falling export primary commodity prices compared to prices of imports, and relatively low national savings compared to national investments leading to a financing gap that is financed from external capital inflows (Osakwe and Verick, 2007). Others causes of current account deficits include slow growth trend across the globe, foreign exchange volatility and high external indebtedness to ease the budgetary pressure. Similarly, budget deficits and public debt recorded in the region are attributable to poor budgetary administration, investments in infrastructure projects and other sectors such as education.

According to Battaile et al., (2015), poor governance, low FDI and rise of public debt in Africa is partly attributable to growth in current accounts deficits. From 2009, borrowing domestically and externally to finance budget deficits drove up public debt for all Sub Saharan countries except for oil exporting countries which benefitted from high commodity price, and others benefitting from debt relief. Current account deficits will contribute to the growth of public debt although this is expected to be offset by FDI inflow (Osakwe 2007). Budget deficits in Africa are also largely driven by external shocks (oil prices) and heavy borrowing unlike in developed countries where budget deficits are driven by economic stimulus packages such as tax cuts (Nkube , 2015).

Kenya like most developing nations has experienced growing twin deficits. Studies by Gichuki (2013) and Moyi (2013) and Mukras et al., (2013) indicate that yearly current account deficits exceeded the 5% of GDP international cap of sustainability. The deficits are attributable to; Kenya been a net importer of goods and services, her overreliance on agricultural produce (tea, coffee, horticulture sectors) which is vulnerable to low prices and weak external demand (Kariuki, 2009), fluctuating prices of international crude oil and lack of sufficient capital inflows to offset the current account deficit and budget deficits (Mutuku, 2013) among others. Persistent budget deficits, on the other hand, are attributable to the uptake of key development projects with huge capital outlays, repayment of debt, low revenue collection, a limited tax base, devolution, cross-border security operations and inability to control expenditure among others.

At the same time, the economy has experienced several shocks and foreign exchange regimes during the period of study such as oil shocks, coup in 1982, disintegration of the East African Community, corruption, public debt and borrowing constraints of 1980s and 1990s that aggravated the twin deficit problem (Swamy, 1994 and Gichuki, 2013). Details on the current account and budget positions are given in the subsections below.

1.1.2 Budget Deficit in Kenya

Budget deficits can either be financed domestically, externally or through seignorage. Domestic financing takes the form of issuance of government securities to the private sector and the public through the commercial banks while external financing is largely in form of loans from development partners. The use of seignorage is one of last resort and is generally frowned upon as its use is an indicator of a poor state of an economy (Agenor and Montiel, 2008).

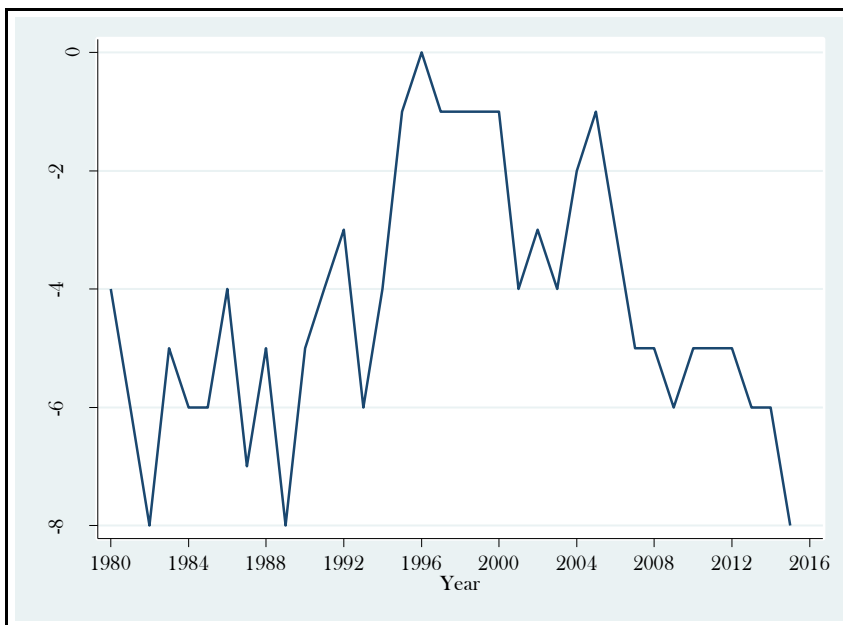


Figure 1 Trend of budget deficit in Kenya (1980 to 2015)

Source: World Bank

Figure 1 indicates that Kenya has historically recorded persistent budget deficits. The economic crisis of the 1980s coupled with financial indiscipline and inability to control expenditure may have contributed to the worsening of the budget deficits during this period, while the repayment of domestic and foreign debts in the early 1990s may have contributed to high deficits (Swamy, 1994). During the mid-1990s, the government paid more attention to the implementation of economic reforms (such as budget rationalization, retrenchments of civil servants) spearheaded by World Bank and IMF as part of the conditions that were to be met before advancement of loans. This contributed to the slight improvement of the fiscal position. The budget deficit continued to grow from 2000 to ease budgetary pressure emanating from low revenue collection, establishment of the County Governments, implementation of key development projects in the transport sector, power generation and distribution, free primary education, security operations in Somalia, mitigation of drought and other key flagship projects contained in the Kenya Vision, 2030.

The Government has however put in place policies to contain the budget deficits. They include the introduction of Programme Based Budget which emphasizes on results and prioritization of projects, introduction of Public Finance Management Act, 2012 to instill financial discipline, budget rationalization, creation of new independent offices (Office of Controller of Budget) to curb government wastage of public resources and the introduction of new tax objects (capital gains, turnover tax) to increase revenue collection. Although the IMF regards Kenya to be at a low risk of debt distress due to the country's strong quality economic policies and institutions (Battaile et al 2015), there is growing concern over the country's capacity to repay debt emanating from budgetary financing gap.

1.1.3 Current Account Position in Kenya

The current account deficits in Kenya are attributed to deterioration in the visible trade account of the trade account, in the presence of invisible trade surpluses. The deterioration is a result of Kenya's overreliance in agriculture as a major foreign exchange earner, lack of diversification and expansion of export commodities. The deficits are largely financed from short-term flows and small capital account inflows, and borrowing from private sources (Mwega, 2007 & Swamy, 1994). Other causes include poor commodity prices and limited value addition on export commodities.

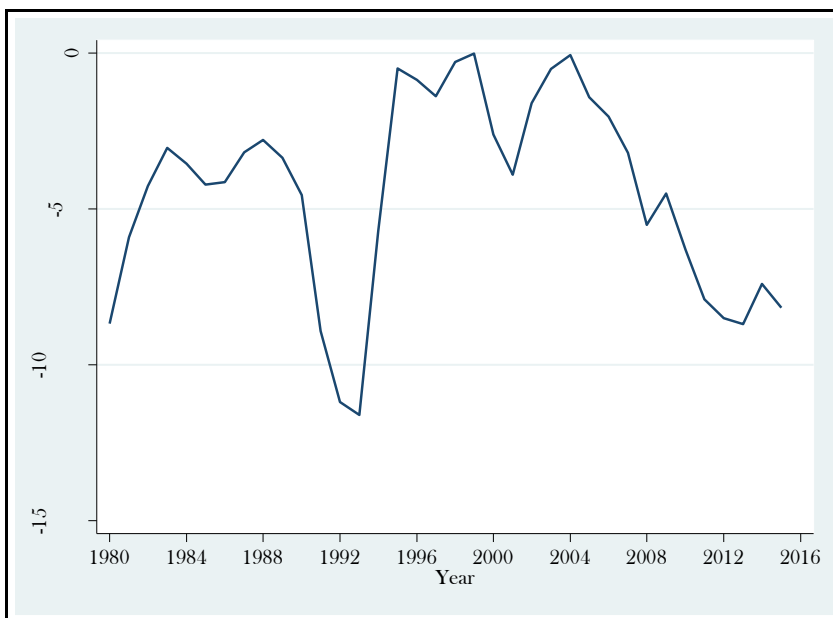


Figure 2 Trend of Current Account Position (deficits) in Kenya (1980 to 2015)

Source: World Bank

As shown in Figure 2 above, current account deficits are observed for the whole period. The trade reforms introduced from the 1970s to 1990s with the aim of export diversification and expansion to new markets were marked with piecemeal implementation, policy reversals and a lack of commitment by the Government. This did not yield the anticipated results. This may have contributed to the persistence of the deficit. The worsening of the deficit in the early 1990s is attributed to the suspension of aid by most development partners (Swamy, 1994), while the improvement of the current account deficits in the rest of the 1990s and 2004 was attributed to improved export earnings arising from improved commodity prices and improved net tourism earnings (Republic of Kenya, Economic Surveys (various issues)). The improvement of the current account balance observed in 1998 and 1999 was attributed to improved tourism earnings and higher export volumes (Economic Survey, 2000). The decline of the current account deficit from 2005 to date was attributed to an increase in merchandise trade deficit due to high import bills, effects of post-election violence in 2007, global financial crisis in 2008, low tourism earnings and falling export prices relative to those of imports (Republic of Kenya, Economic Surveys: 2006-2016).

The Government in recognition of the negative effects of current account deficits on the economy has put in place measures to address the persistent current account deficits. Among them was the introduction of a strategy for economic recovery through wealth and employment creation in 2003 which was aimed at; limiting the growth of the current account deficit to an average of 6.2% of the Gross Domestic Product, increasing the official exchange reserves from USD1.1 billion to USD1.7 billion in 2007, and enhancing growth in domestic savings (Government of Kenya, 2003).

1.1.4 Exchange rate in Kenya

An exchange rate is used in translating the value of exports and imports. A currency appreciation renders imports cheaper compared to exports while currency depreciation encourages exports relative to imports. A currency appreciation, therefore, leads to worsening of the current account deficit due to increased importation of goods while currency depreciation makes exports relatively cheaper thus reducing negative current account balances.

This study includes the exchange rate as one of the variables influencing the current account position in Kenya.

1.2 Statement of the Problem

Figure 1 and 2 above indicate persistent budget deficits and current account deficits in Kenya. This is a major area of concern among researchers, policy makers and Government financiers due to their impact on the economy. High budget deficits worsen public debt and undermine economic growth due to its effects on domestic investments, inflation, creditworthiness, local currency among others. On the other hand, persistent current account deficits imply that a country is spending beyond its means. This means that the Government may have to borrow more (run higher budget deficits) to finance the revenue shortfall in exports.

Although the IMF indicates that Kenya is at low risk of debt distress, there is growing concern about the country's ability to repay debt incurred to close the budget financing gap. In addition, empirical studies indicate that the current account deficits are unsustainable in Kenya (Mutuku and Gichuki, 2013). It is in this regard, that the Government through the annual Budget Policy Statement and Debt Management Strategy Paper enumerates strategies to reduce the two deficits. However, the public reforms aimed at reducing the two deficits have largely not generated expected

results. For instance, the adoption of MTEF process and Programme Based Budgeting as one of the public reforms aimed at addressing budget deficits has not achieved expected results (Government of Kenya, 2007).

Research on the relationship between the budget and current account deficits have yielded mixed results; a study by Sakyi and Opoku (2016) in Ghana established a negative long run relationship between the two, Egwaikhede (1997) established that budget deficits gave rise to current account deficit in Nigeria while Mumtaz and Munir (2016) established no relationship between the two deficits in India and Pakistan. The varied findings may be attributed to different use of econometric techniques (OLS), VAR, VAR GARCH), different type of data (quarterly, seasonal, panel or time series) or failure to incorporate shocks (structural breaks) in the time series data. There is need therefore to examine the effect of budget deficits on the current account while taking into account of structural breaks to facilitate policy formulation geared at addressing both deficits.

1.3 Objectives of the Study

The central objective of this study is to investigate the effect of budget deficits on current account deficits in Kenya, taking into account of structural breaks in the time series data.

1.4 Justification of the Study

Kenya has experienced high deficits (current account and fiscal deficits) over the years. Persistent budget deficits may lead to reduced investments locally, public debts crises, inflation and current account deficits. In addition, rising current account deficits have contributed to the rising public debt in Africa (Battaile et al 2015). It implies that economic stability of a country lies on reducing the two deficits to sustainable levels, among others.

Empirical studies investigating the relationship between the two have yielded different results implying that the findings to the twin deficit problem remains inconclusive. Most of these studies have not taken into account of structural breaks. By examining the effect of budget deficits on the current account deficits in Kenya and taking into account of possible structural breaks, this study will add to the existing knowledge and aid in policy formulation geared towards reducing the levels of both deficits.

1.5 Scope of the study

This study utilized annual time series data from 1980 to 2015.

1.6 Organization of the study

The remaining chapters on the study are organized as follows; Chapter two examines the theories and empirical studies done on the subject. Chapter three enumerates the methodology and research design. Chapter four focuses on the techniques employed while Chapter five gives a summary on the research findings, conclusions, and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviewed literature from theory and empirical studies on the effect of budget deficits on the current account deficit. The theoretical literature enumerates economic theories linking the two deficits. Empirical literature highlights the methodology, variables, techniques and findings from studies undertaken. An overview on the same is also given.

2.2 Theoretical Literature Review

There are three main views that give insight to the link between current account deficit and budget deficit namely the Ricardian equivalence, Keynesian view and the Mundell Fleming Framework.

2.2.1 Ricardian equivalence

Under the Ricardian equivalence hypothesis, Budget deficits and taxes have an opposite and equivalent effect on savings so that the current account position does not change. If a Government substitute's budget deficit for taxation, rational thinking individuals will expect future increases in taxation to repay the deficit. They will, therefore, increase their savings arising from the increased disposable income by an amount equivalent to the expected taxation. Increases in budget deficit are therefore offset by savings of an equal amount (Barro, 1989 & Agenor, 2007). As a result, budget deficits have no influence on current account deficits.

Commented [P1]:

2.2.2 The Keynesian Income expenditure approach

Under this approach, an act of expenditure generates income. Increases in government expenditure (budget deficit) increase domestic absorption. Assuming that aggregate supply (domestic output) remains unchanged, there will be importation of goods to fill the output gap arising from a rise in aggregate demand. Ultimately, the increase in imports relative to exports will worsen the trade balance and lead to a rise in the current account deficit. The impact on the current account balance by the budget deficit is therefore direct.

Mundell (1996) extended the Keynesian view by including two more variables namely the rate of interest and exchange rate. A rise in government expenditure pushes the local interest rate up relative to the rates in the international market. The interest rate differential attracts capital inflows (foreign investments) from abroad thereby making the local currency attractive. This renders imports relatively cheaper when compared to exports thereby aggravating the current account deficit. The influence of the budget deficits on the current account deficits is therefore indirect.

2.3 Review of Empirical Literature

Pua et al (2010) investigated the budget and current account deficits link in Malaysia using the Johansen-Juselius Cointegration approach and time series data for the year 1970 to 2005. Findings indicated a long term relationship between the two deficits. Current account deficits were observed to worsen the budget deficit. Causation running from negative current account balances to budget deficits was also established. They recommended a wide range of economic policies namely budget cuts, exchange rate targeting, export promotion to enhance earnings and established that the monetary policy was important in containing the current account deficits to manageable levels and by extension the budget deficit.

Abbus et al (2010) analyzed fiscal policy and the current account relationship for 124 countries under the categories of low income, emerging and advanced countries from 1985 to 2007. Using Panel vector autoregression, they found a statistically positive long run relationship between the two in all the categories, with countries registering higher outputs beyond the expectations showing a stronger relationship. A decline in the fiscal deficit equivalent to a one percentage point of GDP was seen to improve the current account by 0.3 percent. These findings imply the presence of twin deficits in the countries earmarked for the study.

Sakyi and Opoku (2016) investigated the twin deficit hypothesis in Ghana using the Gregory and Hansen cointegration approach. Using annual data from 1960 to 2012 and allowing for structural breaks, they established a significant negative long run association between the two deficits. An increase in budget deficit improved the negative current account position (twin divergent hypothesis.) This was attributed to a rise in domestic interest rates as a result of domestic financing of the fiscal deficit. High-interest rates crowded out investments and encouraged savings implying that imports were less. This led to an improvement in the current account position. They, however, recommended the use of budget deficits to improve the current account deficit with a lot of caution given the other drawbacks that may arise from large budget financing gaps on the economy. Specifically, they recommended increased spending only in the short run and for productive purpose.

Using the OLS method, Egwaikhide (1997) analyzed the impact of budget deficits on the current account balance in Nigeria for a period of twenty years starting 1973. Assuming that 3 percent of the budget deficit was financed solely by Central Bank credit in the first instance, and solely by external financing in the second instance, he found that irrespective of the mode of financing, increases in the current account deficit were as a result of changes in the budget deficit, with the

effect of central bank credit on the current account balance been larger. He recommended the proper use of budgetary resources as a possible solution to the negative current account balances

Endegnanew et al (2012) investigated the connection of fiscal policy to the current account balance on 155 countries with a special focus on 42 countries with a population of two million people and below. Using data from 1970 to 2009 and panel Vector autoregressive technique, they observed that increases in government expenditure led to an increase in the negative current account balances in the short run, with the impact on the current account deficit been traced to appreciation of the exchange rate. They concluded that fiscal policy in those countries had minimal impact on the current account balance beyond the direct effect on imports.

Mumtaz and Munir (2016) analyzed the twin deficits hypothesis and Ricardian equivalence in Bangladesh, Pakistan, Sri Lanka and India using 1981-2014 time period annual data. Using the ARDL bound test approach to test for a long run relationship between the two deficits; the study established absence of the twin deficit hypothesis (positive relationship between budget deficits and current account deficits) in the four countries. This implies that budget deficits and private savings investment gap had no effect on the negative current account balances in the four countries. In the short run, the absence of causality among the budget deficit, negative current account balances and private savings investments gap was established in Sri Lanka, Pakistan and India. A bidirectional causal relationship running from budget deficits to current account deficits and vice versa was observed in Bangladesh. Tests on the Ricardian Equivalence established that citizens in Pakistan and India were Ricardian. Those of Bangladesh and Pakistan were not. Confirmation that the citizens of Pakistan and Indian were Ricardian imply that fiscal policy would do little in addressing the negative current account balances.

Neaime Simon (2008) investigated the association between the budget deficit and negative current account balances in Lebanon by means of Johansen cointegration and 1970 to 2006 annual data. Findings of the study indicated that budget deficits do not influence current account balance in the long run. In the short term, a rise in proportion of the total budget deficit channeled to recurrent expenditure was found to increase the negative current account balances through the interest rate and currency appreciation channels. He recommended a reduction in domestic interest rates and budget deficits as one of the measures to enhance national savings.

Easterly and Hebbel (1993) studied the effect of fiscal policy on macroeconomic performance namely on the trade deficit, real exchange rate, real interest among others in 10 countries. Results of the study indicated that budget deficits led to current account deficits, while current deficits led to real exchange rate depreciation. Findings indicated that both the budget deficit and trade deficit had an effect on the real exchange rate; increments in trade surplus led to loss of value of the currency in Cote d'Ivoire, Morocco, and Zimbabwe; in Ghana, widening of Government expenditure-revenue gap rise led to an appreciation of the currency thereby confirming the view by Edwards (1989) that exchange rates had a close association with fiscal deficits in developing countries. Overall, he established that the exchange rate (real) is influenced by external variables with fiscal policy been the main determinant.

Calderon et al (2000) examined the current account deficit and selected economic variables (exchange rate, income, and saving) relationship in 44 developing countries using annual data from 1966 to 1995 and a reduced form approach to the analysis. Findings indicated a significant relationship between the exchange rate and current account deficit. Depreciation of the local currencies eased the current account deficit. Internal and external shocks attributable to a rise in the

terms of trade and appreciation of the exchange rate (real) aggravated the current account deficit. Increases in domestic output were also seen to increase the current account deficit.

Njoroge et al (2014) investigated the twin deficit hypothesis in Kenya using quarterly data from 1970 to 2012, with the interest and exchange rates as additional variables. Using the VAR technique, they established absence of a long-run association between the negative current account balance and budget deficit when interest rates and the exchange rate were omitted in the model. A significant co-movement of the twin deficits was however observed when interest rates and exchange rates were introduced in the model in line with the Mundell Fleming framework. No causality relationship between the variables was observed when the Granger Causality test by Toda and Yomamoto was applied. They recommended that measures be undertaken through the Central Bank to contain increases in interest rates and exchange rate emanating from budget deficits as a way of reducing current account deficit. Substitution of domestic financing for external financing was also recommended as one of the measures of reducing the surge in domestic interest rates.

Kosimbei (2009) investigated the link between budget deficits and macroeconomic performance in Kenya with the current account balance, private consumption and investment, real GDP, money supply and Treasury bills as some of the variables using the VAR technique. Data covered 1963 to 2007 time period. Results from the Johansen cointegration test indicated a sustained link between; budget deficit and the current account, treasury bill rates and economic growth. Granger causality test revealed causation between budget deficits and current account balance run both ways, while nominal exchange rate forecasted the lending rate. He recommended the need for more fiscal discipline, wider review of the Government Budget to curtail the growing deficits. This implies that there is a need for a fiscal policy that can address the two deficits concurrently given that the two deficits influence the other.

Aworinde (2013) analyzed the twin deficits in twelve African countries (Kenya included) using the Autoregressive distributed lag approach and quarterly data from 1980 to 2009. Using the two structural break LM test by Lee and Starzicich, he established structural changes in all the data set. Results of the study revealed a twin divergence in Kenya. That is, a widening of the Government expenditure-revenue gap led to a reduction of current account deficits in Kenya, South Africa and Uganda. The research also revealed that fiscal deficits influenced current account deficits (twin deficit hypothesis) in Morocco, Nigeria, Tanzania, and Ghana. A fall in the value of the Kenya Shilling was also seen to improve the negative current account balances in Kenya.

Osoro et al (2014) investigated the link between budget deficit and current account deficit in Kenya using the Johansen Juselius technique that is centered on the VAR model and data covering the years 1963 to 2012. Other variables included in the study were nominal GDP, interest rates and money supply. Findings confirmed presence of both the Keynesian income expenditure framework where budget deficits influence the current account position directly by increasing domestic absorption, and the Mundell Fleming Framework where the budget deficit affect the current account deficit indirectly through the interest and exchange rate channels. Overall, the twin deficit hypothesis was confirmed in Kenya. A unidirectional causality running from budget deficits to the current account deficit was also observed. Increases in GDP led to increase in the current account deficit while increases in money supply led to decrease in the current account deficit.

Wambui (2016) investigated the twin deficit hypothesis in three east African countries namely Kenya, Uganda and Tanzania using annual data from 1980 to 2016. Allowing for structural breaks and conditional heteroskedasticity with the budget deficit and current account deficits as the only two variables for the study, the VAR- GARCH technique established a positive significant

relationship between budget deficits and current account deficits in Kenya and Tanzania. The Multiple test for structural breaks indicated presence of structural breaks in all the time series.

2.4 Overview of the literature.

Examination of the empirical literature as to the nature of the relationship between the two deficits indicated mixed results. Empirical findings indicate the presence of Twin divergence (Aworinde, 2013), the Keynesian view and Mundell Flemming framework (Njoroge et al, 2014), Kenya included. Possible explanations could be that the use of varying techniques of analysis, nature of the data (quarterly versus annual), failure to test for structural breaks in the data set may have contributed to the inconclusive results. The use of the VAR model is most effective when applied on low order systems. This implies that the omitted variables are registered in the residuals and may lead to distortions that can render the results unreliable for policy formulation (Grier and Ye, 2009). Further, the use of traditional unit root tests can also lead to wrong conclusions about the stationarity of the data if structural breaks exist in the data (Grier and Ye, 2009).

Most of these studies in Kenya, except those by Wambui (2016) and Aworinde (2013) did not take into account/allow for structural breaks. Wambui (2016) employed the Multiple structural breaks test by Bai and Perron (1998) while Aworinde used the two structural break LM test by Lee and Starzicich. The test for structural breaks addresses the shortcomings of the traditional unit root tests. It also ensures that a spurious regression does not occur under the two hypotheses.

This study therefore sought to reexamine the relationship between the two deficits, taking into account of possible structural changes in the data set using the multiple structural breaks test by Bai Perron with the exchange rate as an additional independent variable.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter provides information on the research methodology used for the study. It covers the theoretical framework, model, the variables used, data sources, and finally the empirical analysis.

3.2 Theoretical framework

This research is based on the National Income identity equation shown below.

$$NI = C^p + C^g + I^p + I^g + X - M \dots \dots \dots 1$$

Where,

NI denotes National Income.

C^p and I^p denotes what is consumed and invested privately respectively,

C^g and I^g denotes what is consumed and invested by Government

X is value of exports, and

M is value of imports into the country

Under the Keynesian Expenditure framework, income generated is used for private consumption (C^p), private saving (S^p) and for paying taxes (T), National Income can also be expressed as follows;

$$NI = C^p + S^p + T \dots \dots \dots 2$$

By equating Equation 1 to Equation 2, we get;

$$C^p + S^p + T = C^g + I^p + I^g + X - M \dots\dots\dots 3$$

By rearranging, it results into the following

$$(M - X) = (I^p - S^p) + (I^g + C^g - T) \dots\dots\dots 4$$

But Government expenditure (G) equals to what it invests ($I^g + C^g$), therefore,

$$(M - X) = (I^p - S^p) + (G - T) \dots\dots\dots 5$$

Where,

$(M-X)$ is the current account deficit (CAD).

$(I^p - S^p)$ denotes the private sector where private investments exceed Private savings (S^p), and $(G-T)$ is a budget deficit (BD).

From Equation 5, a current account deficit may be defined as the sum of private investments over savings and the budget deficit. A reduction in government expenditure and private investments would reduce the current account deficit. If investment and savings are identical, then;

$$CAD = BD + E_t \dots\dots\dots 6$$

Where E_t is a vector of other variables which affect the current account.

3.3 Sources of Data

Table 1 Description, measurement of variables and data sources

Variable	Description	Measurement	Source of Data
Budget Deficit	Excess of Government expenditure over revenue	As a percent of GDP	Kenya National Bureau of Statistics and International Financial Statistical Abstracts
Current Account Deficit	Excess of imports over exports	%of GDP	World Development Indicators (World Bank)
RER	Nominal exchange adjusted for inflation	$RER = e * (CPI^{USA} / CPI^{Kenya})$ <p>Where e is exchange rate expressed in Ksh per unit of USD, CPI^{USA}, and CPI^{Kenya} are Consumer price index for the USA and Kenya respectively based on 1980 index</p>	The exchange rate and CPIs were sourced from KNBS (various Economic Surveys) and IFS Statistical Abstracts

3.4 Model specification

The model used in this study is based on the theoretical framework above which shows that budget deficits influence current account deficits. The study adopted equation 6 and modified it further to include the real exchange rate as an additional variable affecting the current account deficit. The resulting specified equation was given as:

$\alpha_4, \alpha_5, \alpha_6$ represented the long run elasticities. Before carrying out the ARDL model, the order of integration of the variables was determined. Due to this, the following diagnostic tests were conducted.

3.5 Diagnostic tests

These tests were carried out to check whether the OLS assumptions were observed and investigate for insufficiencies in the data set.

3.5.1 Stationarity tests

The Augmented Dickey-Fuller (ADF) tests were carried out to establish stationarity of the time series under the null hypothesis that the time series has a unit root. This was done so as to avoid a spurious regression. The results from a nonstationary time series can only be applied to that period of study and cannot be inferred on another as doing so may lead to misleading conclusions (Gujarati (2004).

3.5.2 Determination of lags

To select the appropriate model of the long run underlying equation, the study applied the Schwarz Bayesian Criterion (SBC), Akaike Information Criterion (AIC), Final Prediction Error (FPE) and Hannan Quinn Information Criterion (HQIC) to choose the optimal lag length for each of the underlying variables in the model, with the criterion with the lowest value of information been selected.

3.5.3 Test for Structural breaks

The ADF and PP tests for unit root fail to identify structural breaks in the time series. This may lead to a spurious regression. To address this, the multiple breaks test by Bai and Perron (1998) was used to identify the breakpoints in the time series, their number, and their location. A structural break is said to occur when there is a sudden change in the time series.

3.5.4 Cointegration Analysis

The Johansen test was used to determine whether there was a long run relationship between variables with the null hypothesis being that there is no long-run relationship.

3.6 Post-estimation tests

3.6.1 Bound Testing

The ARDL bound test by Pesaran et al, 2001 was used assess existence of a long run relationship between the variables. The test utilizes two bound levels, (upper and lower). The two critical values from the upper and lower bound is then compared with the calculated F Statistic. If the F statistic goes beyond the critical vale of the upper bound, a long run relationship is established and the null hypothesis of no cointegration is rejected. If the lower critical bound value is below the lower critical bound, no countegration in the variables exists. If the F statistics is within the upper and lower critical values the presence or absence of a long run association between the variables cannot be established.

3.6.2 Wald tests

The WALD test also known as the joint significance test was performed to check if the regression estimation coefficients jointly explain variations in the dependent variable (Wald, 1993). The test

encompasses the Chi² Statistic and the F-Statistic, and the alternative hypothesis is that all independent variable coefficients are jointly not zero.

3.6.3 Testing for serial correlation

Estimators of models with lagged dependent variables are sensitive to the autocorrelation of the error terms. To determine the lag length which also implies the elimination of autocorrelation of the error terms, the lags are added until the error term is white noise. The Durbin Watson test was used to test for autocorrelation.

3.6.4 CUSUM test

The Cumulative Sum Control Chart (CUSUM) test was used check for stability of the model. The model is considered stable when the data plot is within the critical bound values. If the model is stable, the bound test can accurately be used to assess existence of a long run relationship between the variables.

CHAPTER FOUR: EMPIRICAL ESTIMATION RESULTS

4.1 Introduction

In this chapter, the results from the empirical estimation (diagnostics and post estimation tests) and their interpretations are presented.

4.2 Descriptive statistics

A descriptive analysis to determine the statistical properties of the data was conducted. A summary of the statistics is presented in table 2 below:

Table 2 Descriptive statistics and normality test

Variable	Mean	Standard Deviation	Skewness	Kurtosis	JB statistic	Probability
Current Account Deficit	-0.45466	3.20224	-0.51011	2.36478	1.233	0.53980
Budget Deficit	-4.27778	2.18581	0.26116	2.26190	0.350	0.83925
Real Exchange Rate	53.11111	29.33139	-0.31826	1.54163	6.772	0.03384

Derived from STATA

Standard deviation measures the extent of dispersion of the series from the mean. From the low standard deviation values of the analysis, it was depicted that all the variables under study were not statistically dispersed from their mean values.

It was important to test for normality of the variables. To achieve this, the Jarque-Bera test was used. The Jarque-Bera checks for normality by measuring the difference of kurtosis and skewness of the series with that from a normal distribution. From the analysis, although the Jarque-Bera statistic rejected the null hypothesis that the real exchange rate was normally distributed, it accepts

the null hypothesis of normal distribution for current account deficit and budget deficit at 1% and 5% levels of significance. On the other hand, Kurtosis captures the distribution of the data in relation to normal distribution. Basically, it determines to tail level whether heavily or lightly tailed relative to the normal distribution curve. From our results, all the variables were found to be positive.

The analysis also showed that both Current account deficit and Real Exchange rate was skewed towards the left with negative values of -0.51011 and -0.31826 respectively, while budget deficit was positively skewed with a value of 0.26116.

4.3 Diagnostics tests

A unit root test was carried out to ascertain whether the variables had a unit root or not to avoid a spurious regression. Generally, a spurious regression occurs when two unrelated series depicts to have a statistically significant relationship when regressed. The ideal situation is when variables have a constant mean, variance and the covariance between the values of two time periods is zero. In this regard, the Augmented Dickey-Fuller test was carried out with the hypotheses listed as:

H0: Time-series has a unit root.

H1: Time-series has no unit root.

The results of the tested are in Table 3 below:

Table 3 Stationarity test

Variable	Levels		Order of differencing	Difference	
	Statistic	Comment		Statistic	Comment
Current Account Deficit	-1.973	Non Stationary	1	-3.823***	Stationary
Budget Deficit	-2.276	Non Stationary	1	-7.737***	Stationary
Real Exchange Rate	-0.624	Non Stationary	1	-5.366***	Stationary

Asterisk (*) = Significance at 1%; () = Significance at 5%; (***) = Significance at 10%**

Derived from STATA

The results indicate that current account deficit, budget deficit, and Real Exchange rate have unit roots. The null hypothesis could therefore not be rejected at their levels since the ADF values exceeded the critical values at the 1%, 5% and 10% levels of significance. The null hypothesis was however rejected at first difference as the variable became stationary.

4.3.1 Determination of lags

The importance of lag length determination is demonstrated by Braun and Mittnik (1993) to show that estimates of an ARDL whose lag length differs from the true lag length are inconsistent as are the impulse response functions and variance decompositions derived from the estimated model. The Akaike Information Criterion (AIC) and Schwarz Bayesian information criterion were used to determine the optimal lag lengths for the model. Under the lag length criteria, we need to use the lag length that which is selected by most of the 'lag length criteria' which is named after the econometricians who developed them such as HQ, SIC, AIC, and LR. Generally, the lag length for which the values of the most of these lag length criteria are minimized, indicated by the asterisk in the results output is selected as the optimal length. Upon carrying out the test, the following results in Table 4 were obtained:

Table 4 Lag length determination

Selection-order criteria								
Sample: 1984 - 2015				Number of obs = 32				
lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-295.958				26142.4	18.6849	18.7304	18.8223
1	-218.842	154.23	9	0.000	371.654	14.4277	14.6098	14.9773*
2	-203.337	31.011*	9	0.000	251.886*	14.021*	14.3399*	14.9829
3	-197.667	11.339	9	0.253	323.902	14.2292	14.6847	15.6033
4	-194.162	7.0107	9	0.636	496.779	14.5726	15.1647	16.359

Endogenous: cad budget_defecit rer
Exogenous: _cons

Derived from STATA

From the results, a lag length of 2 was selected since it was the minimized value under LR, FPE, AIC, HQIC, and SBIC.

4.3.2 Structural breaks test

The presence of structural breaks in the time series presents difficulty in rejection of the null hypothesis of absence of co-integration. This is because breaks introduce spurious unit root behavior in the cointegrating relationship. Therefore it was necessary to check for the structural breaks before proceeding to carry out a cointegration test. Pearson test structural breaks were employed to identify the breakpoints, their number, and their location. This method exogenously determines the number and location of the breakpoints. The results are as shown table 5 below.

Table 5 Test for structural breaks

```
Test for a structural break: Unknown break date

                                Number of obs =          36

Full sample:                    1980 - 2015
Trimmed sample:                 1986 - 2010
Estimated break date:          1994
Ho: No structural break

   Test           Statistic           p-value
-----
   swald          41.4393             0.0000

Exogenous variables:           budget_defeceit rer
Coefficients included in test: budget_defeceit rer _cons
```

Derived from STATA

The results indicate a test statistic of 41.4393 and a p-value of 0.000. The p value being lower than the 0.05 criterion for the significance led to the rejection of the null hypothesis that there is no structural break. This led to the conclusion that there was a structural break which is observed in 1994. This could be as a result of introduction of economic reforms introduced in 1994 to address poor results from the structural adjustments introduced in the 1980s. Upon confirming this, we proceeded to carry out a cointegration test.

4.3.3 Cointegration test

One main condition before using ARDL model is that the variables under study are non-stationary at the level and achieve stationarity upon first differences. The model further requires that the variables are integrated of order one and below. Due to these conditions, it was necessary to carry out a cointegration test for our variables under study. To achieve this, a Johansen test for

cointegration was adopted for the study. The test is carried out under the null hypothesis of absence of cointegration. The results are shown in table 4 below followed by a brief discussion of the same.

Table 6 Cointegration test

Johansen tests for cointegration						
Trend: constant				Number of obs =	34	
Sample: 1982 - 2015				Lags =	2	
maximum				trace	5%	
rank	parms	LL	eigenvalue	statistic	critical	value
0	12	-230.01806	.	24.5517*	29.68	
1	17	-219.30644	0.46746	3.1285	15.41	
2	20	-217.97373	0.07540	0.4631	3.76	
3	21	-217.7422	0.01353			

Derived from STATA

At the 5% significance level, the null hypothesis of no cointegration at levels, that is, I (0) was not rejected. This is because the value of the trace statistic was less than the critical value and significant at 5%. We, therefore, concluded that all the variables under study were integrated at levels and therefore appropriate to apply the ARDL model for this study.

4.3.4 Summary of Diagnostic tests

The diagnostic test is key in determining the time series properties of the data before estimation and also in determining the model to be used for estimation. The study began by examining the stationarity properties of variables under study. Upon carrying out the necessary tests, it was determined that all the variables were non-stationary at the level and attained stationarity at first difference. After the stationarity test, we proceeded to determine the optimal lag lengths for the variables, at it was indicated that the optimal lag length was two lags.

Before carrying out a cointegration test, a structural breaks test for the variables was carried out and one structural break established in 1994. A cointegration test was then carried out. Upon carrying out this test, it was determined that all the variables under study were integrated at levels, that is, $I(0)$. This was appropriate before applying the ARDL model. Having done this, we proceeded to carry out an ARDL model and then a discussion of the results as indicated below.

4.4 The model

Upon carrying out the ARDL model estimations, the results in table 6 below were obtained, followed by a comprehensive discussion of the same.

Table 7 ARDL model Results

ARDL regression						
Model: ec						
Sample: 1984 - 2015						
Number of obs = 32						
Log likelihood = -48.689533						
R-squared = .68402028						
Adj R-squared = .5741143						
Root MSE = 1.3069945						
	D.cad	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ADJ						
	cad					
	L1.	-.555871	.1044393	-5.32	0.000	-.7719201 - .3398219
LR						
	budget_defeceit	1.250018	.2711502	4.61	0.000	.6891015 1.810935
	rer	-.0449878	.0187694	-2.40	0.025	-.0838153 -.0061604
SR						
	cad					
	LD.	.6512214	.1444782	4.51	0.000	.3523456 .9500972
	budget_defeceit					
	D1.	-.7035709	.2273156	-3.10	0.005	-1.173809 -.2333328
	LD.	-.7615414	.1936729	-3.93	0.001	-1.162184 -.3608986
	L2D.	-.2959836	.1634836	-1.81	0.083	-.6341751 .0422079
	rer					
	D1.	-.1026927	.0439528	-2.34	0.029	-.1936159 -.0117695
	_cons	2.14892	1.103363	1.95	0.064	-.1335597 4.431399

Derived from STATA

Results indicate an R-squared of 0.6840 which meant that the independent variables explained 68.4% of the dependent variable variation. The long run and short run results of the model are enumerated herein below.

In the long run, the budget deficit was found to positively and significantly affect the current account deficit. The results indicated that a one percent growth in the budget deficit will lead to

1.25 percent growth in the current account deficit. These findings were similar to that of Pua et al (2010) in Malaysia which indicated a long run relationship between the two deficits. This finding also coincide with those of Egwaikhide1997, and Kosimbei 2009 who established that budget deficits affected the current account deficits in the long run. Findings by Aworinde 2013, also established the twin deficit hypothesis in Nigeria and Tanzania. The finding however differ with those of Aworinde (2013) who established existence of the twin divergence in Kenya, Uganda, Ethiopia and South Africa and those of Neaime (2008) which found no long run association between the deficits.

The real Exchange rate was found to be negatively related to current account deficit. The result indicates that a one percent increase in the Real Exchange rate led to the decrease in current account deficit by 4.50%. This was in in line with Calderon, Chong, and Loayza (2000) who found a strong link between the real exchange rate and current account deficit. An appreciation of the exchange rate led to a rise in the current account deficit while depreciation of the exchange rate led to a decline in the current account deficit. On the same note, Easterly and Hebbel (1993) on their research on the effect of fiscal policy on macroeconomic performance namely on the trade deficit, real exchange rate, real interest among others in 10 countries results, indicated for Ghana that; a rise in the budget deficit directly led to real exchange rate appreciation thereby confirming findings by Edwards (1989) that real exchange rates are closely correlated with fiscal deficits in developing countries in the 1980s.

The short run model indicated that both budget deficit and Real Exchange rate were negatively related to current account deficit *ceteris paribus*. The results in the short run model indicated that a one percent increase in the budget deficit in first difference will lead to 0.7035 percent decrease in the current account deficit and first lag of the first difference will decrease by 0.7615 and this was

significant at 5% significant level. The second lag of the budget deficit will decrease the current account deficit by 0.2960 percent though not significantly. Similarly, a one percent increase in the real exchange rate in the first difference would lead to the decrease of the current account deficit by 0.1027 percent significantly tested at 5% significance level.

4.5 Post- Estimation tests

4.5.1 Bound Testing

Bound testing as an extension of ARDL modeling which uses F and t-statistics to test the significance of the lagged levels of the variables in a univariate equilibrium correction system when it is unclear if the data generating process underlying a time series is a trend or first difference stationary. The results of the bound test were presented in table 8 below:

Table 8 Bound Testing

Pesaran/Shin/Smith (2001) ARDL Bounds Test								
H0: no levels relationship			F = 9.469			t = -5.322		
Critical Values (0.1-0.01), F-statistic , Case 3								
	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_2	3.17	4.14	3.79	4.85	4.41	5.52	5.15	6.36
accept if F < critical value for I(0) regressors								
reject if F > critical value for I(1) regressors								
Critical Values (0.1-0.01), t-statistic , Case 3								
	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_2	-2.57	-3.21	-2.86	-3.53	-3.13	-3.80	-3.43	-4.10
accept if t > critical value for I(0) regressors								
reject if t < critical value for I(1) regressors								
k: # of non-deterministic regressors in long-run relationship								
Critical values from Pesaran/Shin/Smith (2001)								

Derived from STATA

From the results, the F-statistic and the t-statistic, which are dependent on the specification of the model deterministic, were displayed along with critical values of the associated non-standard distributions provided by PSS (large sample critical values) and NAR (small sample critical values). This test mainly confirms the existence of long-run relationship as a post-test. From the study results, the F statistic was higher than the upper critical bound and this led to the null hypothesis being rejected and inferences that the confirmation of the long run relationship.

4.5.2 Wald test

The WALD test was performed to evaluate if the estimation coefficients jointly explain any of the variation in the dependent variable. Results on the same are shown in table 8 below, followed by a brief discussion.

Table 9 Wald test for coefficients

(1)	budget_defeceit = 0
(2)	rer = 0
	F(2, 33) = 6.14
	Prob > F = 0.0054

Derived from STATA

The Wald test was done by equating all the coefficients of the lagged explanatory variables to zero. From table 9 above, the F statistic was found to be 6.14 and p-value and was 0.054. The p-value was found to be less than the used criterion of 1% significance level. This leads to the rejection of the null hypothesis that all variables were jointly equal to zero. The implication here is that removing one of the variables from the equation will substantially affect the model fitted. Consequently, both budget deficit and real exchange rate affect the model fit substantially and thus should not be removed.

4.5.3 Serial correlation test

To confirm that there was no autocorrelation between the errors terms, a serial correlation test Durbin Watson test for Autocorrelation was employed to test for serial correlation. Serial

correlation is the relationship between a given variable and itself over various time intervals. Upon carrying out the test, the following results were obtained.

Table 10 Serial Correlation test

Durbin's alternative test for autocorrelation			
lags (p)	chi2	df	Prob > chi2
1	23.016	1	0.0000

H0: no serial correlation

Derived from STATA

From the test, the p-value of 0.00, which is less than 5 % significance leveled to the conclusion of no serial correlation after failing to reject the null hypothesis.

4.5.4 CUSUM test results

The CUSUM test involves taking samples of size n and plotting the cumulative sums. The test is efficient in detecting small shifts in the mean of a process. If the distance between a plotted point and the lowest previous point is equal to or greater than h, one concludes that the process mean has shifted (increased) otherwise not shifted or decreased. Results of the test are shown in figures 3 and 4 below.

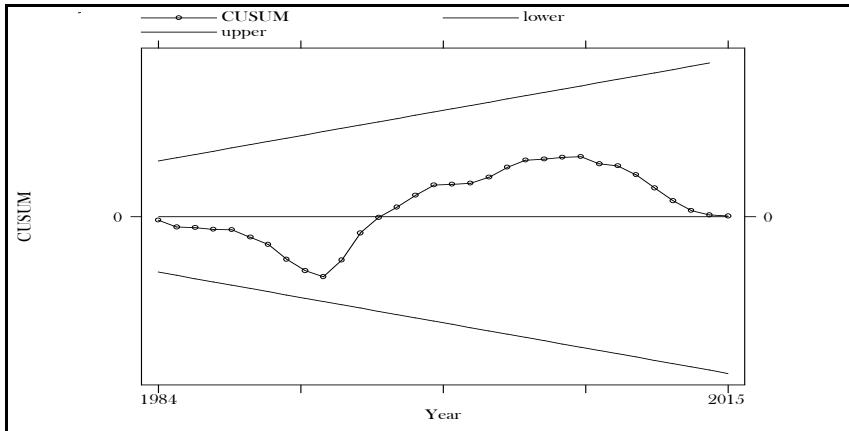


Figure 3 CUSUM

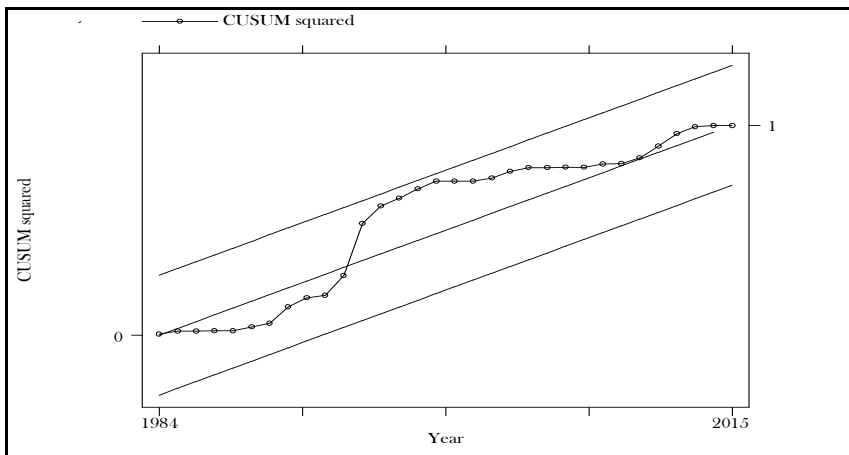


Figure 4 CUSUM Squared

From the charts above, it can be clearly be seen that the process mean did not show a decrease or an increase. The figure 5 above represents the CUSUM while Figure 6 represents CUSUM squared. From both the figures, process mean did not shift and lies within the upper and lower limits. This means that the model is stable.

CHAPTER FIVE: SUMMARY AND CONCLUSION

5.1 Introduction

The section gives a summary on the research, conclusions, policy implication, limitation of the study. It also suggests further areas of research.

5.2 Summary and Conclusion

This study examined the effect of the budget deficit on the current account deficit in Kenya following the continuing fluctuations of the two deficits since independence. The study used annual time series data from 1980 to 2015 in the analysis to answer the main objectives of the study. The study took into account of possible structural breaks in the time series. To test for the long run relationship between the dependent variable (current account deficit) and independent variables budget deficit in addition to Real Exchange rate, a cointegration test was carried out using Johansen test and established that there was a long run relationship in the variables.

This study sought to specifically find out the relationship between the Budget deficit and Real exchange rate which are the independent variables on current account deficit (the dependent variable). This was achieved by running an ARDL model which gave the results both for the Long run and short run. The long-run relationship indicated that budget deficit positively and significantly affected the current account deficit. Real Exchange rate negatively and significantly influenced the current account deficit. On the other hand, the short run model indicated that both budget deficit and Real Exchange rate were negatively related to current account deficit *ceteris paribus*. The short-run model indicated that a one percent increase in the budget deficit in first

difference will lead to 0.7035 percent decrease in the current account deficit and first lag of the first difference will decrease by 0.7615 and this was significant at 5% significant level. The second lag of the budget deficit will decrease the current account deficit by 0.2960 percent though not significantly. Similarly, a one percent increase in the real exchange rate in the first difference would lead to the decrease of the current account deficit by 0.1027 percent. Structural breaks was also established in 1994.

5.3 Policy Implication

The study results indicated that budget deficit and real exchange rate play an important role in the current account deficit and therefore necessary for the government to put in place measures to correct the current account deficit problem which has been deteriorating since independence.

First, the budget deficits were found to be positively related to the current account deficit. The policy implication is that policymakers should always ensure that they avoid excessive budgets because this leads to borrowing which results to deteriorating current account deficit. This study recommends of restrained budgets which can be financed domestically through taxation and domestic borrowing.

Secondly, the Real Exchange rate was found to be negatively related to the current account deficit. This study recommends that policymakers should ensure proper management of the exchange rate; they should ensure they devalue and depreciate the local currency to make the exports competitive in the global market. This way more exports can be achieved hence addressing the problem of current account deficit.

5.4 Study Limitation

The problem of current account deficit seems to be affected by many factors other than the ones covered in this study despite them being key to affecting it. Therefore this study has not exhausted all the factors that could be affecting the current account deficit. This study relied on time series data from 1980 to 2015 and perhaps using panel data could bring more reliable results.

5.5 Area of Further Research

Current account deficit is one of the serious macroeconomic concerns because it determines the willingness of the foreigners to invest in the nation. This study proposes a further study on the role of institutions and political climate on the current account deficit.

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