THE TWIN DEFICITS HYPOTHESIS IN EAST AFRICAN COUNTRIES

CHEGE VICTORIA WAMBUI

X50/73149/2014

A Research Paper Submitted In Partial Fulfillment for the Degree of Master of Arts Economics, in the School of Economics, in the University of Nairobi

2016

DECLARATION

This research paper is my original work and has not been presented for a degree in any other University.

Signature…………………   Date………………

Chege Victoria Wambui

X50/73149/2014

APPROVAL

This research paper has been submitted for examination with my approval as University supervisor.

Signature……………………   Date…………………..

Dr. Anthony Wambugu

DEDICATION

I dedicate this work to my family that had to bear with my absence during the course of my study. I owe the successful completion of this course to my husband and our two boys for their support morally and financially.

ACKNOWLEDGEMENT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ARDL	Auto Regressive Distributive Lag
ASEAN	Association of South East Asia Nations
CA	Current Account
GDP	Gross Domestic Product
GARCH	Generalized Auto Regressive Conditional Heteroskedasticity
GMM	Generalized Method of Moment
HIPC	Heavily Indebted Poor Countries.
LM	Langragian Multiplier
ODA	Official Development Assistance
OECD	Organization for Economic Development
SAARC	South Asian Association for Regional Cooperation.
SEACEN	South East Asian Central Bank
VAR	Vector Auto Regression
TVAR	Threshold Vector Auto Regression

ABSTRACT

The twin deficits hypothesis asserts a positive relationship between current account balances and fiscal balances in an economy. Previous tests of the hypothesis have generated mixed findings. Some support the hypothesis while others do not. The mixed results could be because most studies failed to account for structural breaks and volatility clustering. This study aimed at testing the twin deficits hypothesis in East African Countries Kenya, Uganda and Tanzania on time series data for a period of thirty seven years from 1980 to 2016 while allowing for structural breaks and conditional heteroskedasticity. The study used the Bai and Perron Global Optimization method to identify the number and location of structural breaks in each country's data. The VAR-GARCH technique was then used to test the relationship between fiscal balances and current account balances. This technique improves the validity of the tests and hence reliability of the results. The results of the Bai and Perron test showed that structural breaks existed in all the countries with Uganda having more number of breaks. The results of the VAR GARCH analysis revealed that the Kenya and Tanzania had a positive and significant relationship between fiscal balances and current account balances. The results also revealed that Uganda had a positive but insignificant relationship between fiscal balances and current account balances. The results emphasize on the need for governments to maintain favorable fiscal balances in order to improve their current accounts. Allowing for structural breaks in the model makes the use of VARs appropriate since failure of unit root tests is minimized. Allowing for conditional heteroskedasticity in the model results to efficient coefficients, which can be relied upon for policy implementation.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Many economies in the world are faced with a major problem of how to maintain favorable internal balances as well as external balances. Internal balances are captured by fiscal external balances (difference between revenue and expenditure) while external balances are captured by current account balances (difference between exports and imports) in an economy (Grier and Ye, 2009). An economy may experience fiscal deficits and current account deficits, a phenomenon known as the twin deficits hypothesis (Baro, 1989). The East African countries of Kenya, Uganda and Tanzania have experienced current account deficits for the past two decades.

Figure 1: The trend of current account balances in East Africa

(Data Source: www.worldbank.org)

Current account deficits have been declining as shown in the figure above because of three major reasons. First the three countries are net importers of consumer and producer goods (Khalid and Guan, 1999). Secondly they have low savings rates and hence weakening exchange rates meaning that changes in international prices of commodities, for example changes in crude oil prices heavily affects the three economies in form of deteriorating current account balances (Khalid and Guan, 1999). Thirdly the countries rely heavily on both internal and external financing in form of loans which contributes to deterioration of current account deficits (Ekpenyong and Ogbuagu, 2015). Kenya, Uganda and Tanzania have experienced fiscal deficits in the past two decades.

Figure 2: The trend of fiscal balances in East Africa

(Data Source: www.worldbank.org)

The countries are underdeveloped and they have been spending heavily on modern transport and communication infrastructure (Ahmad and Aworinde, 2015). Investment commitments in infrastructure projects were 4,768.3 million dollars for Kenya, 2,272.9 million dollars for Uganda and 3,172million dollars for Tanzania for the years 2006 to 2014 (World Bank, 2016). The governments have also been spending heavily on social programs aimed at improving the livelihoods of their citizens such as provision of free education to reduce the high illiteracy levels and free medical services (World Bank, 2016). In the year 2010 Kenya, Uganda and Tanzania spent 20.6%, 13.5%, 19.6% respectively of total expenditure on education (World Bank, 2016). Seemingly, the revenue base of these governments is narrow coupled with loopholes and corruption in revenue collection and improper taxation policies, government revenue has been lower than planned expenditures (World Bank, 2016).This can be deduced from figure 1.2 that shows the declining negative fiscal balances

Figure 1.2 suggests that the countries have been experiencing fiscal deficits in the past two decades. This is mainly attributed to expenditures falling short of government revenues due to limited resources, low economic performance and poor revenue collection strategies leading to bottlenecks in revenue collection (Baro, 1989). Uganda posted a fiscal surplus between 2003 and 2007 due to external debt relief (Namanya, 2014). Seemingly the countries posted current account deficit trends in the past two decades with slight improvements between 2003 and 2004 (Ekpenyong and Ogbuagu, 2015) .This improvements were attributed to debt relief programs like HIPC initiative and ODAs initiative (Epkeyong and Ogbuagu, 2015). There were also policy advices issued by the World Bank to Kenya to adopt a flexible exchange rate regime (Njoroge et al, 2014).

Figure 1.1 suggests that Kenya, Uganda and Tanzania have been experiencing current account deficits. Current account deficits in these countries are attributed to low levels of foreign investments, overreliance on foreign finances and the fact that the countries are net importers of consumer goods and services (Mugume and Obwona, 1998). Kenya and Uganda also relied heavily on coffee exports for foreign exchange, hence the decline of

coffee exports in both countries resulted to a fall in their foreign exchange reserves and worsening of their current accounts (Mugume and Obwona, 1998).

Many researchers have studied the twin deficits hypothesis, though many of those studies did not allow for structural breaks in the time series data. A structural break is a sudden unexpected change in any macroeconomic data (Ndirangu et al, 2014). These shifts may be caused by several shocks arising from various factors among them policy changes, regime shifts and commodity price shocks. If structural breaks are not allowed for in a time series, the resulting model may be biased leading to forecasting errors (Ndirangu et al, 2014).Many of the studies on the twin deficits hypothesis did also not allow for conditional heteroskedasticity. This is volatility clustering in the data whereby the variability in a certain time period is positively related to the variability in one or more previous time periods (Grier and Ye, 2009).Failure to allow for conditional heteroskedasticity results to inefficient VAR coefficients.

1.2 Statement of the problem

Figure 1.1 and 1.2 suggests that in the past two decades there has been a deterioration of balances in both the fiscal and current accounts in Kenya, Uganda and Tanzania. The twin deficits hypothesis proposes a positive causal relationship between fiscal deficits and trade account deficits (Njoroge et al, 2014). Many studies have researched on the existence of twin deficits. Some studies carried out have concluded that fiscal deficits improve current account deficits (Soyoung and Roubini, 2006). Other studies found out that a change in fiscal deficits affects current account balances (Ekpenyong et al, 2015). Some Researchers found a positive short run relationship, but there was no evidence of any long run relationship (Grier and Ye, 2009). Ahmad and Aworinde (2015) observed a positive effect of fiscal deficits on current account deficits in Tanzania, but they found the relationship negative in Uganda and Kenya.

The mixed findings in the studies may be attributed to the use of different econometric techniques in the analysis, different variables and different samples of data. Some studies

used OLS in analyzing the data. Others applied various VAR techniques whereas other studies used error correction method, cointegration analysis or the VAR granger causality technique. Some studies used panel data while others used quarterly time series data. Other studies used quarterly seasonally adjusted data. These variances in the techniques of analysis used and the type of data may have led to mixed results. It has therefore been difficult to obtain any relationship between the negative balances in the fiscal and current accounts. This may be because the studies did not allow for structural shifts and conditional heteroskedasticity. The study therefore sought to answer the question: Allowing for structural breaks and conditional heteroskedasticity, does fiscal deficits have an impact on the current accounts in East Africa?

1.3 Objectives of the study

The main objective of the study is to determine the validity of the twin deficits hypothesis in Kenya, Uganda and Tanzania.

The specific objectives of the study are;

a) To establish the locations and number of structural breaks in fiscal deficits and current account deficits time series data.
b) To examine the relationship between fiscal deficits and current account deficits in Kenya, Uganda and Tanzania.

1.4 Justification of the study

Considering the severity of twin deficits in each of the East African countries, it is important to understand the dynamics of the deficits so as to inform governments and policy makers. These deficits are a burden to future generations since they cause economic imbalances which in turn affect the economic development of every nation. The balances also make the countries to be heavily indebted (IMF, 2016). To finance the fiscal deficits these countries borrow domestically and externally. In Kenya the public debt is 49.9% of GDP and $508.74 per person (IMF, 2016). In Uganda, the public debt as a percentage of GDP is 27.1% and

$205.87 per person (IMF, 2016). In Tanzania, the public debt is 27.6% of GDP and $264.74 per person (IMF, 2016). Borrowing to finance fiscal deficits may result to decreasing current account balances in the three countries. This matters to the governments because a huge government debt resonates to more government influence in the economy and more taxes to its citizens' in future economic periods (World Bank, 2016). Increased Government borrowing leads to crowding out of private sector borrowing thus reducing investment spending (Koutsoyiannis, 1979).

It is important to understand the effects of fiscal deficits on current account balances while allowing for structural breaks and conditional heteroskedasticity. Failure to do so in the model contributes to major distortions in the results making them unreliable for policy formulation and interpretation (Hendry, 1995).

The mixed results in the findings pose a challenge because they cannot be relied on for policy formulation and direction. The study is therefore aimed at providing a policy direction to the government and its stake holders since this is an issue that requires urgent attention if Kenya, Uganda and Tanzania are aiming at improving their macroeconomic situation.

1.5 Scope of the study

The study covered Kenya, Uganda and Tanzania over a period of 37 years since 1980 to 2016.The analysis was based on time series data.

1.6 Organization of the proposal

The remainder of the research project is organized as follows. Chapter two is a review of some of the existing literature focusing on the methodology used and the results of the tests of the twin deficits hypothesis. Chapter three presents the tests that were carried out, the data

sets and also the basic model that shows how internal balances affect external balances. The chapter also sets out the VAR-GARCH model that was used in the analysis.

CHAPTER TWO

LITRATURE REVIEW

2.1 Introduction

Fiscal balances and current account balances may be viewed as the key measures of the macroeconomic stability of an economy (Koutsoyiannis, 1979). This chapter discuses the theoretical and empirical literature reviews of studies done about the twin deficits hypothesis. The theoretical literature review focuses on the main theories which are the Keynesian absorption theory, the Ricardian equivalence theory, the Mundell Fleming theory and the risk premium hypothesis approach. The empirical literature review discusses several studies carried out showing the different methodologies used and the results obtained using different econometric techniques. The last bit of this chapter is the over view of the literature review which gives a portrait of the development in testing the twin deficits hypothesis and how the various studies are related.

2.2 Theoretical Literature Review

The twin deficits theory is a proposition that purports there exists a strong positive relationship between budget deficits also known as fiscal deficits and trade account deficits (Navaratnam and Saroja, 2015). It theorizes the causal relationship between fiscal deficits and current account deficits (Navaratnam and Saroja, 2015). There are four main theoretical approaches to the twin deficits theory. The Keynesian Absorption theory, the Ricardian Equivalence theory, the Risk Premium theory and the Mundell Fleming theory.

The Keynesian theory postulates that a rise in budget deficits through a decrease in taxes or increase in public spending increases domestic absorption (Ahmad and Aworinde, 2015). This increases imports resulting to worsening of current account balances. Therefore the Keynesian view is that a fiscal deficit results to a current account deficit (Ahmad and Aworinde, 2015).

The Mundell-Fleming theory uses exchange rates and interest rates to link budget deficits and current account deficits. This theory postulates that an upward change in fiscal deficits exerts pressure on domestic interest rates (Ahmad and Aworinde, 2015). As a result, capital inflows increase hence exchange rate appreciation (Ahmad and Aworinde, 2015). Appreciation of the exchange rate makes imports cheaper than exports. The increase in imports and decline in exports results to worsening current account balances, thus the Mundell Fleming view is that there is an indirect relationship from fiscal balances to domestic interest rates then to exchange rate appreciation and finally to current account balances (Ahmad and Aworinde, 2015).

The Ricardian Equivalence theory was advanced by Barro (1989).It purports that a rise fiscal deficits because of an upward movement in fiscal expenditure is compensated for either in the current or future economic periods (Ahmad and Aworinde, 2015). The theory postulates that domestic revenue increase I form of taxes would reduce fiscal deficits but not necessarily affect current account balances (Normandin, 1999). This theory argues that budget deficits and current account balances have no relationship.

The fourth approach is the risk premium approach. It argues that strengthening of domestic currency vis a vis foreign currency as a result of an increase in domestic interest rates due to an rise in fiscal deficits, results to an increase in the purchasing power of the domestic income, thereby increasing consumers appetite for imported goods (Ahmad and Aworinde, 2015).The increased appetite for imported goods leads to a rise in value of other assets held by domestic residents like financial assets and real estate assets (Ahmad and Aworinde, 2015). The end result is that domestic savings fall, due to increased appetite and purchase of assets while consumption increases. This results to a decline in the demand of a country's exports in international markets, hence resulting to worsened current account deficits (Ahmad and Aworinde, 2015). The theory therefore postulates that twin deficits are real.

The theoretical literature gives mixed theories, some of them suggesting the existence of twin deficits (Keynesian approach, the Mundell Fleming approach and the risk premium approach), while the Ricardian equivalence approach postulates that twin deficits do not exist.

2.3 Empirical Literature Review

Current account deficits may be considered as one of the causes of a country's economic imbalances which has serious consequences for both current and future generations. Most Researchers have tried to establish the relation between budget deficits and current account deficits, a phenomenon identified as "twin deficits". The results of these studies are mixed, with some supporting the twin deficits hypothesis while others conclude that there is no relationship between the deficits.

Tuk Cheong (2015) used the income expenditure equilibrium perspective to study twin deficits in the United States. The researcher's empirical model was derived from the general equilibrium model of demand and supply and specifically the demand side. The study focused on quarterly time series data for the years 1970 to 2011. The Researcher used co-integration tests and OLS regression estimation on quarterly time series data. The results of the study showed evidence of twin deficits in America .The causality tests showed an indirect causality moving from budget deficits to interest rates in the short run to income and then to current account balances. The study supported the Keynesian absorption theory. According to Milne (1977) there exists a significant relationship between negative fiscal balances and negative current account balances which is positive. The study used OLS regressions on cross country data. This study failed to consider structural breaks in the variables when examining the time series data (Grier and Ye, 2009).

Some studies used the GMM technique in studying the effects of fiscal deficits on current accounts. Giovanni (2000) observed that a current account deficit benefits many of the

developed countries. The Researcher studied changes in current accounts and the corresponding anticipated future fiscal deficits in OECD countries. This researcher's study sought to establish if huge and continuous fiscal deficits had an impact on current accounts. An econometric model was estimated to show how current account balances reflected the dynamics of the expected future fiscal deficits. The study used the Dickey fuller unit root tests and GMM estimation techniques on time series data beginning 1970 to 1997.The resulting analysis supported the twin deficits hypothesis when future anticipations of budget deficits were taken into account.

Ekpenyong and Ogbuagu (2015) researched on twin deficits in Sub Saharan Africa. The study used the GMM estimation technique on annual panel data for the years 1970 to 2013.The outcome of the analysis was that there was a perfect relationship which was positive between deficits in the governments' budgets and deficits in the countries' current accounts in Sub Saharan Africa, hence supporting the Keynesian or conventional theory of twin deficits. Though the GMM technique of estimation takes care of serial colleration between variables, the Researchers did not allow for conditional heteroskedasticity and structural breaks in their models, hence the estimated coefficients may have been inappropriate for use in policy interpretation and formulation.

Ahmad and Aworinde (2015) studied twin deficits in twelve countries in African among them Tanzania, Kenya and Uganda. The study examined quarterly data from 1980 to 2009. The Autoregressive distributive lag testing approach on individual country data was used, taking into account structural breaks. LM test for structural breaks showed the existence of structural shifts in every data set. The results were that long run positive relationships existed between negative fiscal balances and negative current account balances in several African countries including Tanzania hence supporting the Keynesian Absorption theory. The results for Kenya and Uganda showed that fiscal deficits did not have an effect on current account deficits. Though the study allowed for structural breaks, the use of ARDL

testing approach may result to multicollinearity which makes the estimates unreliable (Grier and Ye, 2009).

Apparently, most researchers have used VAR techniques to study the effects of negative fiscal balances on current accounts. Khalid and Guan (1999) studied selected developing and developed countries, five countries in each category. The study analyzed annual time series data and used the Johansen and Juselius technique and the Engle and Granger causality test. The Researchers observed that in every four of five developing countries, there was a causal relationship. The developed countries did not reject such a relationship. The result of the study was that causality is mainly from fiscal deficits to current account deficits. Factors that led to such relationships in the developing countries included inefficient revenue mobilization systems and undeveloped stock markets thereby leading to fiscal deficits and no ways of financing these deficits (Khalid and Guan, 1999).The study therefore supported the Keynesian theory of the twin deficits hypothesis.

Lwanga and Mawejje, (2014) examined the interaction between fiscal deficits and other macro-level variables using the VAR-VECM econometric approach. The Researchers analyzed quarterly time series information from 1999 to 2011.Their study concluded that un-sustainable budget deficits had implications on public external and monetary sectors. The results showed that budget deficits in Uganda were responsible for widening negative current account balances and rising interest rates. The study therefore supported the Keynesian theory of the twin deficits proposition.

Normandin (1999) tested the effects of budget deficits persistence on twin deficits hypothesis in America and Canada induced by the Blanchard model. He argued that the responses of external deficits to budget deficits are positively influenced by birth rates and the degree of persistence of budget deficits. He used the Blanchard model to first measure the behavior of consumers on quarterly seasonally adjusted data from 1951 to 1992.According to the Researcher, omitting consumers extra information could lead to a

misrepresentation of the effects of government budget deficits on current accounts. To counter this problem, the researcher used the VAR technique to establish the appropriate lag structure. The researcher found out that although the birth rates are small, the response of current account deficits to fiscal deficits were numerically large and statistically positive, therefore supporting the Keynesian theory of the twin deficits hypothesis.

Njoroge et al (2014) analyzed twin deficits theory for Kenya using quarterly time series data beginning 1972 to 2012.They used VAR techniques and Toda Yomamoto granger causality test. The empirical study observed that the relationship between fiscal deficits and current account deficits was consistent with the Mundell-Fleming framework that current account deficits and budget deficits move together indirectly through interaction of interest rates and exchange rates. The researchers found observed that the deficits were not directly co-integrated. However, when interest rates and exchange rates were included in the model, a significant long run co-movement between the fiscal deficits and current account deficits was established. The results revealed that these two deficits were co-integrated with other macroeconomic variables such as interest rates and exchange rates suggesting underlying equilibrium relationships binding these macro-economic variables, hence supporting the twin deficits hypothesis.

Baharumshah et al (2006) studied nine SEACEN countries. The Researchers used VAR techniques on panel data which included interest rates and exchange rates in bridging the link between fiscal deficits and current account deficits. They found a two way causal relationship among the deficits, directly from budget deficits to current account deficits and indirectly from changes in fiscal deficits which led to changes in domestic interest rates and then to changes in exchange rates that resulted to changes in current account deficits. Baharumshah (2009) examined twin deficits hypothesis for India, Malaysia, Thailand and Philippines (the ASEAN countries). They studied the causal relationship between fiscal deficits, current account deficits and investments. The study used the VAR technique and variance decomposition technique on quarterly data from 1976 quarter one to 2004 quarter

four. They observed an equilibrium long run relationship linking budget deficits, interest rates, exchange rates and current account deficits together. The results also revealed a two way causal relationship. A direct relationship from budget deficits to current account deficits and an indirect relationship running from budget deficits to interest rates to exchange rates and then to current account deficits, hence supporting both the Keynesian theory and the Mundell Fleming theory of the twin deficits hypothesis.

Soyoung and Roubini (2006) studied the impact of government fiscal policies on current accounts and real exchange rates during periods of flexible exchange rate regimes in the United States. The Researchers used VAR techniques on quarterly time series data and observed that twin divergence rather than twin deficits seemed to be the regular pattern in the data that was analyzed. The researchers observed that fiscal policy shocks improved current accounts and depreciated real exchange rates. These findings did not support the twin deficits hypothesis but postulated a twin divergence scenario thereby supporting the Ricardian Equivalence theory that there is no relationship between fiscal deficits and current account deficits.

Olesegun, (2015) researched on the effects of negative fiscal balances on current account deficits in Nigeria, which is an oil rich economy. The Researchers used Johansen and Juselius cointegration technique and the reduced VAR-VECM techniques on time series data. The research was based on annual time series data beginning 1970 to 2012. The results of the study showed there exist a positive and stable relationship between government budget surpluses and current account balances in the overall economy. In the non oil industries, there was evidence of twin deficits, though the deficits were covered by revenue generated from oil. The conclusion was that Nigeria heavily relied on the oil sector for the stability of its current account balances, which raises questions of its sustainability since oil is non-renewable resource.

14

Osoro et al (2014) applied granger causality technique in identifying the linkage between fiscal deficits and current account deficits. The Researchers applied the Johansen and Juselius technique which is based on a VAR model to identify multiple cointegration relationships. The researchers observed that causality runs from government budget deficits to current account deficits hence befitting the Keynesian theory. The normalized co-integration coefficients suggest that current account deficit is positively related to interest rates and GDP and negatively related to money supply. The Researchers observed that current account deficits occur in two main channels. The first channel is direct causality from budget deficits to current account deficits coinciding with Keynesian theory of twin deficits and the second channel is indirect causal link which runs from budget deficit to higher interest rates, which leads to appreciation of Kenyan currency and in turn worsening current account balances, coinciding with the Mundell Fleming theory of twin deficits.

Abdurrahman and Akseki (2015) investigated the effect of fiscal deficits on the current account in Turkey. The main idea was to test the movement of both deficits taking into account cyclical fluctuations of output. Using a VAR-TVAR analysis on time series data from 1994 to 2012, the Researchers observed twin deficits only occur if the economy is operating at its optimum output level. They also observed that if the economy is operating below its potential output level, twin deficits show divergent movements. The Researchers found that output volatility plays a critical role in determining the effects of fiscal deficits on current account deficits. The outcome of the study suggested that a stringent fiscal policy does not reduce current account deficits. The effectiveness of a tight fiscal policy can only be positive if the economy has acquired a sustainable optimal growth rate. The model however separated the economy into only two distinct regimes, the upper level regime and the lower level regime which is not an ideal situation of any economy.

According to Navaratnam and Saroja (2015), budget deficits leads to current account deficits. The study tested the twin deficits hypothesis in five SAARC economies namely Pakistan, Sri-Lanka, India, Bangladesh and Nepal. Using the error correction method, the

15

granger causality test and co-integration analysis, results indicated that a negative budget balance leads to a negative current account balance in Sri-Lanka and Pakistan. For the case of Nepal, India and Bangladesh, the outcome of the research indicated a unidirectional causality running from current account deficits to budget deficits. The results of this study coincided with the Keynesian theory of twin deficits hypothesis.

Many studies have used the VAR approach in their analysis. The major disadvantage of using these other VAR approaches is that they are most effective when estimated to low order systems (Hendry, 1995).This means that the residuals will contain all the omitted variables and hence major distortions may occur in the results making them unreliable for policy interpretation (Hendry, 1995).

Grier and Ye (2009) studied the relationship between fiscal deficits and current account deficits in the United States. VAR-GARCH technique was used. The study included structural breaks and conditional heteroskedasticity in the model. The Researchers' analyzed quarterly data from 1948 quarter one to 2005 quarter one. The results showed no indications of the existence of a long run relationship between current account deficits and fiscal deficits when structural breaks are included. When conditional heteroskedasticity was present, the study found a persistent and positive effect in the short run of fiscal shocks on current account balances.

2.4 Overview of the empirical Literature Review

Research on twin deficits hypothesis is mainly based on four theoretical approaches. The Keynesian absorption theory or the conventional theory which postulates that fiscal deficits increases domestic consumption which results to worsening of current account balances. The Ricardian equivalence theory, which postulates that current account balances do not respond to changes in fiscal balances. The Mundell Fleming theory which postulates that fiscal balances relates to current account balances through domestic interest rates and

16

exchange rates and the risk premium hypothesis which purports that an increase in fiscal deficits results to an appreciation of the real exchange rate hence increasing consumers preference for imported goods and therefore resulting to worsened current account balances.

The empirical literature review shows mixed results. This could be due to the methods of analysis used and the type of data. Most empirical Researchers have used VAR analysis techniques, others have used the GMM techniques and others used the ordinary least squares regression analysis technique. On the data type, some Researchers used panel data others quarterly data and others annual time series data. Ekpenyong and Ogbuagu (2015) used the GMM technique on panel data and observed a positive relationship. Njoroge et al (2014) used VAR technique on quarterly data and observed that the relationship between the two deficits is indirect from fiscal deficits to domestic interest rates to exchange rates to current account deficits. Ahmad and Aworinde (2015) used the ARDL technique on quarterly data from twelve African countries and observed that in some countries, the relationship was positive meaning a positive change in fiscal deficits resulted to a positive change in current account deficits, while in other countries a positive change in fiscal deficits resulted to a negative change in current account deficits. In other countries there was no relationship. Despite the data type or technique of analysis used the results of the tests carried out on fiscal deficits and current account deficits cannot be relied upon for policy formulation and decision making.

A major observation of the empirical literature review is that the studies did not allow for structural breaks except for Grier and Ye (2009) and Ahmad and Aworinde (2015).This poses a challenge since omitting structural breaks may have resulted to a failure in the unit root tests and this makes the use if the VARs inappropriate (Grier and Ye, 2009). Additionally, the studies except Grier and Ye (2009) did not allow for conditional heteroskedasticity, which arises from the presence of volatility clustering in the data sets hence inefficient coefficients in the VAR models (Grier and ye, 2009). Majority of studies on twin deficits have concentrated on Granger causality tests, to test for causality of the two

deficits. The granger causality test is done on an environment of the Error Correction Methods such as Johansen and Julius vector error collection models and Engels granger error collection model. This error correction models are sensible to the values of nuisance parameters hence making the results unreliable (Njoroge et al, 2014).

Given these weakness, this study sought to improve understanding of twin deficits hypothesis by allowing for structural breaks and conditional heteroskedasticity on time series data for the three East African Nations Kenya, Uganda and Tanzania.

<div align="center">

CHAPTER THREE

RESEARCH METHODOLOGY

</div>

3.1 Introduction

The association between internal balances and external balances has been based on theoretical foundations and empirical studies all of which have given mixed results. The Keynesian Absorption theory postulates the association between internal and external deficits to be direct while Mundell Fleming theory and Risk Premium theory postulates that the relationship is indirect. The Ricardian equivalence theory postulates that no relationship exists between negative fiscal balances and negative current account balances. Seemingly, empirical studies also give mixed results on the association between fiscal deficits and current account deficits though the studies use different econometric techniques of analysis and different types of data.

3.2 Theoretical Framework

This study examined the association between fiscal deficits and external deficits using the national income identity equation. The Keynesian national income identity shows that an external balance is the difference between national savings and investments. This association is derived from the national income account.

$$y = c + i + g + (x - m) \text{... (1)}$$

Where;

$$y = Gross\ Domestic\ Product\ (GDP)$$

$$c = Private\ Consumption$$

$$i = Private\ Investiment$$

$$x = Exports$$

$$m = Imports$$

GDP of an economy is allocated to consumption, savings and taxes. Therefore on the expenditure side we have;

$$y = c + s + t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2)}$$

Where;

$y = Gross\ Domestic\ Product$

$c = Private\ Consumption$

$s = Private\ Savings$

$t = taxes$

According to Keynesian theory, the sources of income equal the uses of income.

$$c + i + g + (x - m) = y = c + s + t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(3)}$$

$$c + i + g + (x - m) = c + s + t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(4)}$$

$$(s - i) + (t - g) = (x - m) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(5)}$$

$(s - i) = Savings\ and\ Investiments\ balance.$

$(t - g) = Fiscal\ balance.$

$(x - m) = Current\ Account\ balance.$

Assuming that savings (s) equals investments (i), then $(t - g) = (x - m)$. Meaning current account balances are attributable to fiscal balances. This equation shows how changes in budget deficits would result to changes in current account balances. The study therefore adopted the conventional approach which is the Keynesian approach in the study of the effects of negative budget balances on current account balances.

3.3 Model Specification

The study began by determining if fiscal balances and current account balances in Kenya, Uganda and Tanzania have experienced structural shifts. To determine the break points, their location and the number, a method developed by Bai and Perron (1998) was used. This method is known as the Global Optimization Method. Its advantage is that the method exogenously determines the location of the break points and the number. A model with m breaks was estimated as follows;

$$Y_t = X_t \ \delta_j + \mu_t \qquad t = T_{j-i} + 1, \dots T_{j,} \qquad j = 1, \dots, M + 1 \dots \dots \dots (6)$$

Where;

$Y_t = \ Current \ account \ deficits \ at \ time \ t.$

$X_t = fiscal \ deficits \ at \ time \ t$

$\delta_j = Coefficient \ of \ fiscal \ deficits.$

$T_{1,} \ T_2, \dots, T_M = \ Location \ of \ break \ points..$

$\mu_t \ = Disturbance \ at \ time \ t.$

This is a partial structural change model which is advantageous because it helps obtain more precise estimates (Grier and Ye, 2009). The number of break points was determined using the $SupF_t$ (l), programming method. $SupF_t$ (l) refers to a series of **f** tests that do not have a standard **f** distribution.

After determining the breakpoints, the VAR GARCH model was used to establish the association between fiscal deficits and current account deficits. A basic GARCH model was specified as follows;

$$Y_t = \mu + \beta X_t + u_t \dots \dots \dots \dots \dots \dots (7)$$

$$u_t = \sigma_t \, \varepsilon_t \qquad\qquad \varepsilon_t \sim NID(0,1) \qquad t = 1, \dots, 37$$

Where:

Y_t $= Current\ Account\ Deficits$

μ $= Common\ Intercept$

X_t $= A\ vector\ of\ fiscal\ deficits\ of\ dimension\ k$

β $= A\ (k\ by1)\ vector\ of\ coefficients$

u_t $= Disturbance\ term$

σ_t was be established using a general GARCH process as follows;

$$\sigma_t^2 = \alpha_i + \sum_{n=1}^{p} \delta_n \, \sigma_{,t-1}^2 + \sum_{m=1}^{q} \gamma_m \, u_{,t-m}^2 \qquad \text{This equation can be re-}$$

written as follows;

$$\sigma_t^2 = \alpha + A[L, Y]u_t^2 + B[L, \delta]\sigma_t^2$$

Where;

$\alpha = Intercept\ coefficient$

$Y = vector\ of\ dimension\ q$

$\delta = vector\ of\ dimension\ p$

$A[L, Y]\ and\ B[L, \delta] = Polynomials\ of\ lag\ operator\ L.$

3.4 Data, definitions and sources of data.

The time series comprised of annual Government financial statistics of Kenya, Uganda and Tanzania obtained from their respective treasuries. The balance of payments statistics were derived from International Monetary Fund and World Bank Development Indicators. Fiscal deficits (X_t) were measured as the difference between government inflows and outflows expressed as percentages of the GDP of individual countries. Current account deficits (Y_t)

were measured as exports less imports expressed as percentages of GDP for each individual country.

3.5 Data Analysis.

Data was analyzed using EVIEWS 8 software. This study used time series data to understand the relationship between fiscal balances and current account balances. The study allowed for structural breaks and conditional heteroscekedasticy.

3.5.1 Unit root tests

Most economic variables are usually non-stationary in nature. Prior to running a regression analysis, Unit root tests were conducted using the Augmented Dickey-Fuller (ADF) test to establish whether the variables were stationary or non-stationary. The importance of having stationary data is to avoid spurious regression results. The null hypothesis is that the data has a unit root. The decision criterion is to reject the null hypothesis if the absolute value of the ADF is the highest. The higher the absolute value, the more the null hypothesis is rejected that there are unit roots. The variables were stationary at first difference.

3.5.2 Diagnostic tests

The Jarque-Bera test was carried out to test the normality of the data. The decision is to reject the null hypothesis that the distribution is normal distribution if the p value is zero. Serial correlation tests were run in order to check for correlation of error terms across time periods. Serial correlation was tested using the Breusch-Godfrey serial correlation LM test. Heteroskedasticity tests were run in order to test whether the error terms were correlated across observation in the data.

3.5.3 Optimal lag selection.

The optimal lag length for analysis was identified. The lag length could be selected using the information selection criteria which include; Sequential Modified Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC) and Hannan-Quinn Information Criterion (HQIC). There is no clear rule of thumb on which criterion to use for optimal lag length selection among the above methods. However, the decision rule is to choose the model with lowest value of information criteria. This study used Akaike Information Criterion to select the model since it gives the lowest value of information.

CHAPTER FOUR

EMPIRICAL, RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the results of the study. The objectives of the study were to establish the location and number of structural breaks in the fiscal deficits and current account deficits data and to examine the relationship between fiscal balances and current account balances in Kenya, Uganda and Tanzania. Section 4.1 presents the descriptive statistics of the variables, 4.2 the correlation analysis, 4.3 the unit root tests, 4.4 the diagnostic tests, 4.5 the Lag length selection, 4.6 Structural breaks analysis and 4.7 the VAR GARCH analysis.

4.1 Descriptive Statistics

This section provides measures of central tendency of variables in Table 4.1 below. The results show that the mean of current account balances for Kenya, Tanzania and Uganda was -5.339, -8.3678 and -3.849 respectively. The minimum was -16.727, -26.227 and -9.968 respectively while their maximum was 0.788, -1.129 and 1.887 respectively. Further, the results showed that the mean of fiscal balances for Kenya, Tanzania and Uganda was -3.81384, -2.2683 and -1.9566 respectively. The minimum was -11.615, -7.489 and -5.672 respectively while their maximum was 0.256, 2.333 and 0.388 respectively. The summaries of the descriptive statistics are presented in table 4.1.

Table 4.1 Descriptive Statistics

	Current account Balances			Fiscal Balances		
	KENYA	**TANZANIA**	**UGANDA**	**KENYA**	**TANZANIA**	**UGANDA**
Mean	-5.33919	-8.36784	-3.84911	-3.81384	-2.26838	-1.95662
Median	-4.409	-7.624	-3.831	-3.355	-2.732	-1.431
Maximum	0.788	-1.129	1.887	0.256	2.333	0.388
Minimum	-16.727	-26.227	-9.968	-11.615	-7.489	-5.672
Std. Dev.	4.482524	5.415635	2.99841	2.921649	2.301549	1.541919
Skewness	-0.95419	-1.38057	-0.23135	-0.98542	-0.1074	-0.631
Kurtosis	3.251748	4.906136	2.327459	3.642107	3.009029	2.489051
Jarque-Bera	5.712276	17.35493	1.027377	6.623767	0.071255	2.857797
Probability	0.05749	0.00017	0.598285	0.036447	0.965	0.239573
Sum	-197.55	-309.61	-142.417	-141.112	-83.93	-72.395
Sum Sq. Dev.	723.3487	1055.848	323.6566	307.2973	190.6966	85.59055
Observations	37	37	37	37	37	37

4.2 Correlation Analysis

Table 4.2 presents the correlation coefficients. The results revealed that the fiscal and current account balances of Kenya are negatively and insignificantly associated. ($r=-0.137$, $p>0.05$). The results also revealed that fiscal and current account balances of Tanzania are positively and significantly associated($r=0.324707$, $p<0.05$). In addition, the correlation results showed that the fiscal and current account balances of Uganda are positively and significantly associated. ($r=0.591166$, $p>0.05$).

Table 4.2: Correlation matrix

Correlation	Kenya		Tanzania		Uganda	
	Current Account	Fiscal	Current Account	Fiscal	Current Account	Fiscal
Probability	Balances	Balances	Balances	Balances	Balances	Balances
Current Account Balances	1.000		1.000		1.000	
	-----		-----		-----	
Fiscal Balances	-0.13764	1.000	0.324707	1.000	0.591166	1.000
	(0.4166)	-----	(0.0499)	-----	(0.0001)	-----

4.3 Unit Root test

Most economic variables are usually non-stationary in nature and prior to running a regression analysis, Unit root tests were conducted using the Augmented Dickey-Fuller (ADF) test to establish whether the variables were stationary or non-stationary.. Results in Table 4.3 indicated that current account balances and fiscal balances are stationary at 1%, 5% and 10% levels of significance. The results showed the absence of unit root tests at first difference.

Table 4.3 Unit Root Tests at first difference

Variable name	ADF test	1% Level	5% Level	10% Level	Comment
Kenya					
Current Account Balances	-6.500598	-3.632900	-2.948404	-2.612874	Stationary
Fiscal Balances	-4.818538	-3.639407	-2.951125	-2.611532	Stationary
Uganda					
Current Account Balances	-6.690546	-3.632900	-2.948404	-2.612874	Stationary
Fiscal Balances	-6.631028	-3.632900	-2.948404	-2.612874	Stationary
Tanzania					
Current Account Balances	-5.181032	-3.632900	-2.948404	-2.612874	Stationary
Fiscal Balances	-12.42523	-3.632900	-2.948404	-2.612874	Stationary

4.4 Diagnostic tests

4.4.1 Normality test

The Jarque-Bera test was adopted in testing normality of the residuals since the test more conclusive than skewness and kurtosis tests. Table 4.4.1 indicated that the residuals originating from the model were normally distributed, since the p values were greater than zero, hence the null hypothesis that the data is normally distributed was not rejected.

Jarque-Bera Test			
	Kenya	**Uganda**	**Tanzania**
Jarque-Bera	3.353806	0.704016	20.71073
Probability	0.186952	0.703275	0.000032

4.4.2 Serial Correlation

The null hypothesis is that serial correlation does not exist. If the P value is greater than 0.05, the criteria is not to reject the null hypothesis. The P values indicate that we do not reject the null hypothesis and conclude that serial correlation does not exist. These results are presented in the table 4.4.2.

Table 4.4.2: Breush-Godfrey Serial Correlation LM Test.

Kenya			
F-statistic	13.80556	Prob. F(2,33)	0.0000
Obs*R-squared	16.85518	Prob. Chi-Square(2)	0. 1002
Uganda			
F-statistic	12.17870	Prob. F(2,33)	0.0001
Obs*R-squared	15.71242	Prob. Chi-Square(2)	0.1004
Tanzania			
F-statistic	18.54843	Prob. F(2,33)	0.0000
Obs*R-squared	19.58124	Prob. Chi-Square(2)	0.1001

4.4.3 Heteroskedasticity Test

The P values from table 4.4.3 showed that we do not reject the null hypothesis. The results for Kenya, Uganda and Tanzania all showed a p value greater than 0.05. Thus the data did not suffer from heteroskedasticity.

Table 4.4.3: Breush-pagan-Godfrey Test

Kenya			
F-statistic	8.393288	Prob. F(1,35)	0.0065
Obs*R-squared	7.156675	Prob. Chi-Square(1)	0.0750
Scaled explained SS	5.769175	Prob. Chi-Square(1)	0.0163
Uganda			
F-statistic	1.376288	Prob. F(1,35)	0.2487
Obs*R-squared	1.399886	Prob. Chi-Square(1)	0.2367
Scaled explained SS	0.829739	Prob. Chi-Square(1)	0.3623
Tanzania			
F-statistic	0.248218	Prob. F(1,35)	0.6214
Obs*R-squared	0.260554	Prob. Chi-Square(1)	0.6097
Scaled explained SS	0.513288	Prob. Chi-Square(1)	0.4737

4.5 Lag Length Selection Procedure

Table 4.5 shows AIC values for lag 1, 3 and 4 respectively. Based on the AIC values, the lowest lag value was selected for each country.

Table 4.5: Lag Length Selection

LAG LENGTH	Kenya	Uganda	Tanzania
Lag 1	9.3316	6.818910	9.357115
Lag 3	9.4167	6.872146	8.913469
Lag 4	9.1595	6.998979	8980218

4.6 Structural Break Points

The number and location of breakpoints was determined using Bai Perron multiple breakpoint test method. A structural break occurs when there is an unexpected shift in a macroeconomic time series. The results in tables show the number and location of structural breaks for Kenya, Uganda and Tanzania.

Table 4.6.1: Structural Break points-Kenya

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	1980 - 1994 -- 15 obs			
FISCAL BALANCES	-0.204014	0.179338	-1.137594	0.2646
C	-4.438424	1.737781	-2.554075	0.0162
	1995 - 1999 -- 5 obs			
FISCAL BALANCES	-3.329062	0.353744	-9.410929	0.0000
C	-15.29798	1.144525	-13.36623	0.0000
	2000 - 2010 -- 11 obs			
FISCAL BALANCES	1.097420	0.246979	4.443370	0.0001
C	-0.076241	0.728204	-0.104698	0.9173
	2011 - 2016 -- 6 obs			
FISCAL BALANCES	-0.026223	0.134502	-0.194963	0.8468
C	-9.045530	0.694734	-13.02014	0.0000

R-squared	0.815262	Mean dependent var	-5.339189
Adjusted R-squared	0.770670	S.D. dependent var	4.482524
S.E. of regression	2.146609	Akaike info criterion	4.554466
Sum squared resid	133.6300	Schwarz criterion	4.902773
Log likelihood	-76.25762	Hannan-Quinn criter.	4.677260
F-statistic	18.28273	Durbin-Watson stat	1.352056
Prob(F-statistic)	0.000000		

Note:

Break type: Bai-Perron tests of 1 to M globally determined breaks.
Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
    5, Sig. level 0.05
Breaks: 1995, 2000, 2011

Figure 3: Residual in-sample fitted data showing Structural Break Points for Kenya Data.

Table 4.6.2 Structural Break points- Tanzania

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1980 - 1989 -- 10 obs				
TANZANIA_FISCAL_BALANCES	0.052104	0.226237	0.230310	0.8195
C	-5.225414	1.001203	-5.219135	0.0000
1990 - 1995 -- 6 obs				
TANZANIA_FISCAL_BALANCES	0.058442	0.075543	0.773623	0.4454
C	-18.38988	1.220966	-15.06175	0.0000
1996 - 2004 -- 9 obs				
TANZANIA_FISCAL_BALANCES	-1.262540	0.183544	-6.878692	0.0000
C	-5.271947	1.677110	-3.143471	0.0038
2005 - 2016 -- 12 obs				
TANZANIA_FISCAL_BALANCES	0.213908	0.520427	0.411024	0.6841

	C	-7.887174	1.065293	-7.403761	0.0000

R-squared	0.826986	Mean dependent var	-8.367838
Adjusted R-squared	0.785224	S.D. dependent var	5.415635
S.E. of regression	2.509821	Akaike info criterion	4.867110
Sum squared resid	182.6768	Schwarz criterion	5.215417
Log likelihood	-82.04154	Hannan-Quinn criter.	4.989905
F-statistic	19.80231	Durbin-Watson stat	1.624037
Prob(F-statistic)	0.000000		

Figure 4: Residual in-sample fitted data showing Structural Break Points for Tanzania Data

Note:

Break type: Bai-Perron tests of 1 to M globally determined breaks

Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks
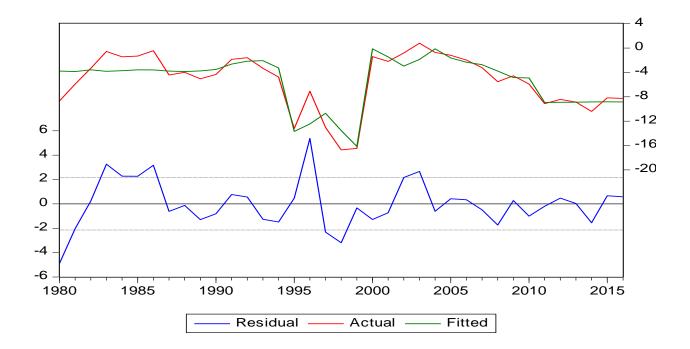
    5, Sig. level 0.05

Breaks: 1990, 1996, 2005

Table 4.6.3 Structural Break points -Uganda

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1980 - 1986 -- 7 obs				
UGANDA_FISCAL_BALANCES	-0.295017	0.248896	-1.185304	0.2470
C	-0.674692	0.517717	-1.303206	0.2044
1987 - 1991 -- 5 obs				
UGANDA_FISCAL_BALANCES	1.690400	0.206365	8.191306	0.0000
C	-2.350101	0.576789	-4.074454	0.0004
1992 - 1996 -- 5 obs				
UGANDA_FISCAL_BALANCES	0.329676	0.190572	1.729928	0.0960
C	-2.497790	0.779092	-3.206026	0.0037
1997 - 2002 -- 6 obs				
UGANDA_FISCAL_BALANCES	-1.702636	0.090991	-18.71211	0.0000
C	-6.305085	0.120860	-52.16833	0.0000
2003 - 2009 -- 7 obs				
UGANDA_FISCAL_BALANCES	2.509539	0.397431	6.314405	0.0000
C	-0.192373	0.144505	-1.331256	0.1951
2010 - 2016 -- 7 obs				
UGANDA_FISCAL_BALANCES	-0.344006	0.212216	-1.621021	0.1176
C	-9.653684	1.371893	-7.036763	0.0000

R-squared	0.914670	Mean dependent var		-3.849108
Adjusted R-squared	0.877124	S.D. dependent var		2.998410
S.E. of regression	1.051052	Akaike info criterion		3.194066
Sum squared resid	27.61774	Schwarz criterion		3.716526
Log likelihood	-47.09023	Hannan-Quinn criter.		3.378258
F-statistic	24.36171	Durbin-Watson stat		2.378311
Prob(F-statistic)	0.000000			

Break type: Bai-Perron tests of 1 to M globally
determined breaks
Break selection: Unweighted max-F (UDmax),
Trimming 0.15, Max. breaks

5, Sig. level 0.05

Breaks: 1987, 1992, 1997, 2003, 2010
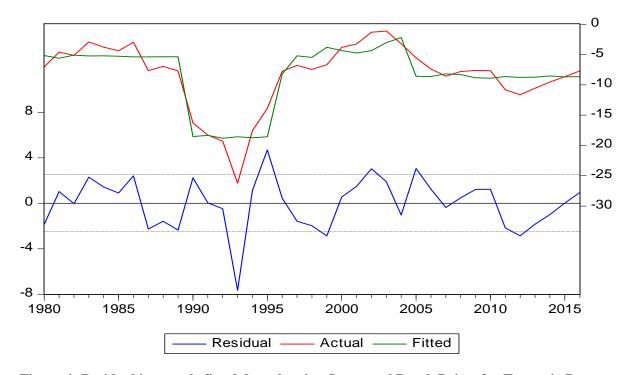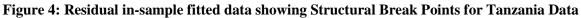
Figure 5: Residual in-sample fitted data showing Structural Break Points for Tanzania Data

Note:

Break type: Bai-Perron tests of 1 to M globally determined breaks

Break selection: Unweighted max-F (UDmax), Trimming 0.15, Max. breaks

    5, Sig. level 0.05

Breaks: 1987, 1992, 1997, 2003, 2010

The findings on structural breaks shows that Kenya ,Uganda and Tanzania has had sudden changes in their fiscal balances and current account balances between 1980 and 2016.Kenya and Tanzania has had three structural breaks whereas Uganda has had five structural breaks. These sudden changes could have been caused by policy changes, regime shifts or commodity price shocks. If structural breaks are not allowed for in a time series, the resulting estimates may be biased leading to forecasting errors.

4.7 VAR-GARCH Model

The VAR-GARCH model was used to establish the dynamics between fiscal balances and current account balances for Kenya, Uganda and Tanzania

The results of the VAR-GARCH model based on Kenya data are given in table 4.7.1. The goodness of fit (r squared) for the model was 49.54%. This means that fiscal balances explain 49.54% of the changes in current account balances in Kenya. The association between external balances and fiscal balances lagged two periods is positive and significant (0.566497, p=0.0059).

Table 4.7.1: VAR-GARCH Model- Kenya

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.634680	0.274250	2.314240	0.0207
C(2)	-0.001489	0.272011	-0.005473	0.9956
C(3)	-0.199437	0.336183	-0.593239	0.5530
C(4)	0.566497	0.300096	1.887721	0.0059
C(5)	-0.483903	1.149888	-0.420826	0.6739
C(6)	0.036076	0.141153	0.255582	0.7983
C(7)	-0.003843	0.205980	-0.018659	0.9851
C(8)	1.297051	0.340790	3.806013	0.0001
C(9)	-0.604438	0.319723	-1.890507	0.0587
C(10)	-1.033539	0.899790	-1.148645	0.2507
Variance Equation Coefficients				
C(11)	1.675979	1.974255	0.848917	0.3959
C(12)	-0.281341	1.525450	-0.184431	0.8537
C(13)	1.993940	143.4983	0.013895	0.9889
C(14)	0.984805	0.372804	2.641617	0.0083
C(15)	-0.066887	0.566050	-0.118165	0.9059
C(16)	-0.001913	26.54378	-7.21E-05	0.9999
C(17)	0.177816	195.3974	0.000910	0.9993

Log likelihood	-141.2073 Schwarz criterion	9.795872
Avg. log likelihood	-2.017247 Hannan-Quinn criter.	9.301200
Akaike info criterion	9.040418	

Equation: CURRENT ACCOUNT BALANCE = C(1)* CURRENT A
    CCOUNT_BA(-1) + C(2)*KENYA_CURRENT_ACCOUNT_BALANCE(-2) + C(3)
    * FISCAL BALANCES(-1) + C(4)*KENYA_FISCAL_BALANCES(
    -2) + C(5)

R-squared	0.495498	Mean dependent var	-5.227714
Adjusted R-squared	0.428231	S.D. dependent var	4.574419
S.E. of regression	3.458966	Sum squared resid	358.9333
Durbin-Watson stat	1.990469		

Equation: FISCAL BALANCES = C(6)* CURRENT_ACCOU
    NT_BA(-1) + C(7)* CURRENT_ACCOUNT_BALANCES(-2) + C(8)
    * FISCAL_BALANCES(-1) + C(9)* FISCAL_BALANCES(
    -2) + C(10)

R-squared	0.770787	Mean dependent var	-3.861257
Adjusted R-squared	0.740225	S.D. dependent var	2.998841
S.E. of regression	1.528454	Sum squared resid	70.08514
Durbin-Watson stat	1.690338		

Covariance specification: Diagonal BEKK
GARCH = M + A1*RESID(-1)*RESID(-1)'*A1 + B1*GARCH(-1)*B1
M is an indefinite matrix
A1 is a diagonal matrix
B1 is a diagonal matrix

Transformed Variance Coefficients

	Coefficient	Std. Error	z-Statistic	Prob.
M(1,1)	1.675979	1.974255	0.848917	0.3959
M(1,2)	-0.281341	1.525450	-0.184431	0.8537
M(2,2)	1.993940	143.4983	0.013895	0.9889
A1(1,1)	0.984805	0.372804	2.641617	0.0083
A1(2,2)	-0.066887	0.566050	-0.118165	0.9059
B1(1,1)	-0.001913	26.54378	-7.21E-05	0.9999
B1(2,2)	0.177816	195.3974	0.000910	0.9993

The estimates of the VAR-GARCH model in table 4.7.2 indicated that the goodness of fit (r squared) for the short run models was 74.04%. This means that fiscal balances explain 74.04% of the changes in current account balances in Tanzania. The relationship between the current account balances and fiscal balance lagged one period is positive and significant (0.576578, p=0.0031).

Table 4.7.2: VAR-GARCH Model: Tanzania

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	1.108925	0.326660	3.394739	0.0007
C(2)	-0.428553	0.270305	-1.585443	0.1129
C(3)	0.576578	0.195117	2.955042	0.0031
C(4)	-0.040952	0.319143	-0.128318	0.8979
C(5)	-1.037529	1.035370	-1.002085	0.3163
C(6)	0.210225	0.135901	1.546896	0.1219
C(7)	-0.092011	0.150862	-0.609901	0.5419
C(8)	0.047513	0.296736	0.160120	0.8728
C(9)	0.187599	0.315150	0.595269	0.5517
C(10)	-0.983053	1.819224	-0.540370	0.5889

Variance Equation Coefficients				
C(11)	0.066304	0.387890	0.170935	0.8643
C(12)	-0.061509	0.162295	-0.378996	0.7047
C(13)	-0.474568	1.037317	-0.457495	0.6473
C(14)	0.934510	0.447991	2.085999	0.0370
C(15)	-0.035859	0.445556	-0.080481	0.9359
C(16)	0.647187	0.259112	2.497708	0.0125
C(17)	1.028392	0.095870	10.72693	0.0000

Log likelihood	-144.3958	Schwarz criterion	9.978071
Avg. log likelihood	-2.062797	Hannan-Quinn criter.	9.483399
Akaike info criterion	9.222617		

Equation: TANZANIA_CURRENT_ACCOUNT = C(1)*TANZANIA_CURRENT
_ACCOUNT(-1) + C(2)*TANZANIA_CURRENT_ACCOUNT(-2) + C(3)
*TANZANIA_FISCAL_BALANCES(-1) + C(4)*TANZANIA_FISCAL_BALA
NCES(-2) + C(5)

R-squared	0.740413	Mean dependent var	-8.514057
Adjusted R-squared	0.705802	S.D. dependent var	5.528038
S.E. of regression	2.998411	Sum squared resid	269.7140
Durbin-Watson stat	2.106204		

Equation: TANZANIA_FISCAL_BALANCES = C(6)*TANZANIA_CURRENT_A
CCOUNT(-1) + C(7)*TANZANIA_CURRENT_ACCOUNT(-2) + C(8)
*TANZANIA_FISCAL_BALANCES(-1) + C(9)*TANZANIA_FISCAL_BALA
NCES(-2) + C(10)

R-squared	0.137496	Mean dependent var	-2.209800
Adjusted R-squared	0.022495	S.D. dependent var	2.123193
S.E. of regression	2.099176	Sum squared resid	132.1962

Durbin-Watson stat   1.588415

Covariance specification: Diagonal BEKK
GARCH = M + A1*RESID(-1)*RESID(-1)'*A1 + B1*GARCH(-1)*B1
M is an indefinite matrix*
A1 is a diagonal matrix
B1 is a diagonal matrix

	Transformed Variance Coefficients		
	Coefficient	Std. Error	z-Statistic	Prob.
---	---	---	---	---
M(1,1)	0.066304	0.387890	0.170935	0.8643
M(1,2)	-0.061509	0.162295	-0.378996	0.7047
M(2,2)	-0.474568	1.037317	-0.457495	0.6473
A1(1,1)	0.934510	0.447991	2.085999	0.0370
A1(2,2)	-0.035859	0.445556	-0.080481	0.9359
B1(1,1)	0.647187	0.259112	2.497708	0.0125
B1(2,2)	1.028392	0.095870	10.72693	0.0000

* Coefficient matrix is not PSD.

The estimates of the VAR-GARCH model in table 4.7.3 indicated that the goodness of fit (r squared) for the short run models was 76.15%. This means that fiscal balances explain 76.15% of the changes in current account balances in Uganda. The relationship between current account balances and fiscal balances was insignificant.

Table 4.7.3: VAR-GARCH Model- Uganda

	Coefficient	Std. Error	z-Statistic	Prob.
C(1)	0.813138	0.287069	2.832557	0.0046
C(2)	0.077151	0.348535	0.221359	0.8248
C(3)	0.372064	0.465145	0.799888	0.4230
C(4)	-0.453349	0.371974	-1.218767	0.2229
C(5)	-0.802856	0.651502	-1.232317	0.2178
C(6)	-0.209460	0.150821	-1.388804	0.1649
C(7)	0.469125	0.179282	2.616688	0.0089
C(8)	0.755841	0.273240	2.766220	0.0057
C(9)	-0.360487	0.229021	-1.574037	0.1155
C(10)	-0.456779	0.434270	-1.051833	0.2929

C(11)	1.468680	44.20048	0.033228	0.9735
C(12)	-0.092772	4.224609	-0.021960	0.9825
C(13)	0.016110	0.051168	0.314848	0.7529
C(14)	-0.002329	89.24579	-2.61E-05	1.0000
C(15)	-0.000983	93.93959	-1.05E-05	1.0000
C(16)	0.539557	19.82961	0.027210	0.9783
C(17)	1.033501	0.134838	7.664742	0.0000

Log likelihood	-105.8527	Schwarz criterion	7.775607
Avg. log likelihood	-1.512181	Hannan-Quinn criter.	7.280935
Akaike info criterion	7.020152		

Equation: UGANDA_CURRENT_ACCOUNT_B = C(1)*UGANDA_CURRENT
_ACCOUNT_B(-1) + C(2)*UGANDA_CURRENT_ACCOUNT_B(-2) +
C(3)*UGANDA_FISCAL_BALANCES(-1) + C(4)*UGANDA_FISCAL_BAL
ANCES(-2) + C(5)

R-squared	0.761505	Mean dependent var	-4.034572
Adjusted R-squared	0.729706	S.D. dependent var	2.969517
S.E. of regression	1.543846	Sum squared resid	71.50377
Durbin-Watson stat	1.849455		

Equation: UGANDA_FISCAL_BALANCES = C(6)*UGANDA_CURRENT_AC
COUNT_B(-1) + C(7)*UGANDA_CURRENT_ACCOUNT_B(-2) + C(8)
*UGANDA_FISCAL_BALANCES(-1) + C(9)*UGANDA_FISCAL_BALANC
ES(-2) + C(10)

R-squared	0.583202	Mean dependent var	-2.018143
Adjusted R-squared	0.527629	S.D. dependent var	1.563593
S.E. of regression	1.074646	Sum squared resid	34.64591
Durbin-Watson stat	2.143637		

Covariance specification: Diagonal BEKK
GARCH = M + A1*RESID(-1)*RESID(-1)'*A1 + B1*GARCH(-1)*B1
M is an indefinite matrix
A1 is a diagonal matrix
B1 is a diagonal matrix

Transformed Variance Coefficients

	Coefficient	Std. Error	z-Statistic	Prob.
M(1,1)	1.468680	44.20048	0.033228	0.9735
M(1,2)	-0.092772	4.224609	-0.021960	0.9825
M(2,2)	0.016110	0.051168	0.314848	0.7529
A1(1,1)	-0.002329	89.24579	-2.61E-05	1.0000

A1(2,2)	-0.000983	93.93959	-1.05E-05	1.0000
B1(1,1)	0.539557	19.82961	0.027210	0.9783
B1(2,2)	1.033501	0.134838	7.664742	0.0000

The findings of the study shows positive relationships between fiscal balances and current account balances for Kenya and Tanzania and Uganda .This is consistent with the Keynesian theory which postulates that a rise in fiscal deficits results to worsening of current account balances. The results show significant relationships for Kenya and Tanzania indicating that for every rise in fiscal deficits, the impact on current account balances is highly felt. In Uganda, the results indicate an insignificant relationship. This means that though there is a positive relationship between fiscal balances and current account balances, a rise in fiscal deficits does not necessarily result to a huge impact on Uganda's current account.

The results of the study in Kenya ,Uganda and Tanzania also shows that there is a reverse causality effect whereby there is positive and significant effects of current account balances on fiscal balances. It can also be deduced from the results of the study that current account balances of previous years does affect current account balances of the current year and fiscal balances of previous years have an effect on fiscal balances of the current year in all the three economies.

CHAPTER FIVE

SUMMARY, CONCLUSIONS & RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusions, recommendations and possible areas for further study.

5.2 Summary of findings

This section summarizes the key findings of the study. The first objective of the study was to establish the location and number of structural breaks in fiscal deficits and current account deficits data for each country Kenya, Uganda and Tanzania. The number and location of breakpoints was determined using Bai and Perron global optimization method. The study found the UDmax methodology selected multiple statistically significant breaks at 1995, 2000 and 2011 for Kenya, 1990, 1996 and 2005 for Tanzania, and 1987, 1992, 1997, 2003 and 2010 for Uganda.

The second objective of the study was to examine the relationship between fiscal deficits and current account deficits in Kenya, Uganda and Tanzania. A two variable VAR-GARCH model was estimated. In Kenya, The relationship between current account balances and fiscal balances lagged two periods is positive and significant. In Tanzania, the relationship between the current account balances and fiscal balance lagged one period is positive and significant. The findings support the twin deficits hypothesis which proposes that there exist a strong positive relationship between budget deficits also known as fiscal deficits and trade account deficits (Navaratnam and Saroja, 2015).

In Uganda, the relationship between the current account balances and fiscal balances was insignificant. This finding is consistent with the Ricardian Equivalence theory which postulates that domestic revenue increase in form of taxes would reduce fiscal deficits but not necessarily affect current account balances (Normandin, 1999). This theory argues that budget deficits and current account balances have no relationship.

41

5.3 Conclusions and Recommendations

There exist structural breaks in fiscal balances and current account balances for Kenya, Uganda and Tanzania. Kenya and Tanzania has each experienced three structural breaks. Uganda has experienced more structural breaks, five in number .These structural breaks could be mainly attributed to the financial interventions from the World Bank and the International Monetary Fund and other donor funding in form of grants and aids to the three developing countries. The relationship between current account balances and fiscal balances is positive and significant in Kenya and Tanzania while in Uganda there is no significant relationship. Causality mainly runs from fiscal balances to current account balances but there are periods when reverse causality is observed, and runs from current account balances to fiscal balances. It has also been observed from the results of the study that both fiscal balances and current account balances of the previous years' affects the fiscal balances and current account balances of the current years respectively positively and significantly.

The governments should pursue policies aimed at regulating the amount of external borrowings. Borrowing externally leads to huge current account deficits. Kenya, Uganda and Tanzania have been relying heavily on the World Bank and IMF and recently China through the Chinese African development models. This over-reliance on foreign financial assistance has accelerated the deterioration of current account balances. Governments should also promote policies that lead to growth of exports which in turn improves current accounts. Kenya, Uganda and Tanzania being net importers of goods and services, and being net borrower from international financiers', results to perennial current account deficits.

Though punitive to their citizens the Governments should endeavor to rely more on domestic revenue collection through increasing taxes to finance their expenditures. Seemingly the governments should pursue various austerity measures aimed at reducing public expenditures especially the recurrent expenditures. The Governments should curb their high recurrent expenditures on items like hospitality, foreign travel, stationeries and expenses on utilities as well as tackle the issue of corruption all which results to increased governments budgets yet the value for money of those expenses is questionable. Other

42

important aspects that the three governments should consider with the aim of maintaining favorable current account balances is sealing their revenue loopholes and controlling illegal financial flows.

Fiscal deficits and current account deficits are a burden to future generations since they cause economic imbalances which in turn affect the economic development of Kenya, Uganda and Tanzania. Therefore any policies that results improved fiscal and current account balances should be prioritized by the three economies.

5.4 Suggestions for further research.

The study sought to determine the validity of the twin deficits hypothesis in Kenya, Uganda and Tanzania. Therefore, similar study can be conducted on other African countries for comparison purposes.

This study used fiscal balances as the only variable explaining current account balances. Future studies can use other predictors like exchange rates, interest rate and inflation rates while allowing for structural breaks and conditional Heteroskedasticity.

REFERENCES

Abdurrahman, N., Akseki, U (2015). "A Non Linear Investigation of the Twin Deficits hypothesis over the Business Cycle". Evidence from Turkey. *Economic Systems, Vol.39, No.4, pp.181-196.*

Ahmad, H., Aworinde, O (2015). "Structural Breaks and Twin Deficits in African Countries". *Economic Change Restruct , Vol.48, No.1, pp.1-35.*

Baharumshah, A., Lau, E. and Ismail, H (2006). "Twin deficits and Capital Mobility: The ASEAN-5 perspective". *Jurnal Pengurusan, Vol.29, No.1, pp. 15-32.*

Baharumshah, A., Lau, E. and Khalid, A. M. (2009)."Testing twin deficits hypothesis using VARs and Variance Decomposition". *Journal of the Asian Pacific Economy, Vol.11, No.3, pp.331-354.*

Bai, J., Perron. P (1998). "Estimating and Testing Linear Models with Multiple Structural Changes". *Econometrica, Vol.66, No.1, pp.47–78.*

Barro R. J (1989). "The Ricardian Approach to Budget Deficits". *Journal of Economic Perspectives, Vol.3, No.2, pp.37- 54.*

Ekpenyong, U., Ogbuagu, M (2015). "An empirical investigation of the twin deficits hypothesis in Sub-Saharan Africa. A dynamic panel approach". *American Journal of Economics, Finance and Management, Vol.1, No.4, pp 236-241.*

Giovanni,P (2000). "Current Account Dynamics and Expected Future Budget Deficits. Some International Evidence". *Journal of International Money and Finance, Vol.1, No.19, pp 255-271.*

Grier, K., Haichun,Ye (2009). "Twin Sons of Different Mothers. The Long and Short of Twin Deficits Debate". *Economic Inquiry, Vol.47, No.4, pp.625-638.*

Hendry,D., Juselius, K (2000). "*Explaining Cointegration Analysis*". University of Copenhagen Press, pp 3-7.

Khalid A., Guan T (1999). "Causality Tests of Budget and Current Account Deficits. Cross Country Comparison". *Empirical economics, Vol.24, No.3, pp.389-402.*

Koutsoyiannis, A (1979). *"Modern Macroeconomics"*. Macmillan Publishers, London, pp 49-98.

Lwanga, M., Mawejje, J (2014). "Macroeconomic Effects of Budget Deficits in Uganda: A VAR-VECM approach". *Economic Policy Research Centre*, *Vol.1, No.117, pp 1-28.*

Milne, E (1977). "*Fiscal Approach to Balance of Payments*". Economic Notes, pp. 89 – 107.

Mugume, A., Obwona, M., (1998). "Public Sector Deficits and Macroeconomic Performance in Uganda". *Economic Policy Research Centre, EPRC Research Series, Vol.1, No.7, pp 1-25.*

Namanya, C., Langford, Ben (2014)."Financing Fiscal Deficits in Uganda: Options and Strategies". *International Growth Centre, Working Paper, Vol.1, No.1, pp.7-47.*

Navaratnam, R., Saroja, S (2015). "The Twin Deficits Hypothesis in the SAARC Countries. An empirical Investigation". *Journal of the Asian Pacific Economy, Vol.1, No.2, pp 1-16.*

Ndirangu,L.,Garcia., Gitau, C (2014)."*Evidence of Structural Breaks in Kenya Macroeconomic variables"*. University of Nairobi Press, pp. 2-5.

Njoroge, E., Kosimbei, G., Korir, J (2014). "Testing the Twin Deficit Hypothesis for Kenya 1970-2012". *International Journal of Business and Economics Research, Vol.3, No. 5, pp. 160-169.*

Normandin, M (1999). "Budget Deficits Persistence and the Twin Deficits Hypothesis". *Journal of International Economics, Vol.49, No.1, pp. 171-193.*

Olesegun, A (2015). "*Fiscal Policy and Current Account in an Oil Rich Economy. The Case of Nigeria"*. University of South Africa Press, pp.1563-1585.

Osoro, K., Seth, Gor., Mbithi, M (2014)."The Twin Deficits and Macro Economic Variables in Kenya". *International Journal for Innovation Education and Research, Vol.2, No.9, pp. 64-73.*

Soyoung, K., Roubini, N (2006)."Twin Deficit or Twin Divergence. Fiscal Deficits, Current Accounts and Real Exchange rate in US". *Journal of International Economics, Vol.74, No.1, pp.362-388.*

Tuk Cheong (2015). "General Equilibrium Perspective on Twin Deficit Hypothesis. An Empirical Study with US Results". *Global Perspective Review: Perspective on East Asian Economies and Industries, Vol.44, No.2, pp. 184-201.*

ANNEX I

Table of fiscal balances and current account balances in Kenya Uganda and Tanzania

	AS A PERCENTAGE OF GDP					
	FISCAL BALANCES			CURRENT ACCOUNT BALANCES		
YEAR	KENYA	UGANDA	TANZANIA	KENYA	UGANDA	TANZANIA
1980	-3.181	-0.969	0.902	-8.676	-1.49	-7.032
1981	-2.787	-0.791	-7.489	-5.904	0.283	-4.586
1982	-4.258	-1.431	2.333	-3.334	-1.121	-5.141
1983	-3.036	-0.706	-0.039	-0.558	-1.013	-2.922
1984	-3.552	-1.125	0.161	-1.444	1.887	-3.785
1985	-4.224	-2.341	-1.154	-1.315	0.092	-4.383
1986	-4.129	-1.097	-3.009	-0.433	-0.865	-2.967
1987	-3.181	0.388	-2.953	-4.409	-1.389	-7.642
1988	-2.787	-0.193	-2.868	-3.992	-2.336	-6.958
1989	-3.355	-0.728	-2.732	-5.044	-3.831	-7.716
1990	-4.545	-0.939	-2.531	-4.328	-4.765	-16.293
1991	-8.908	-2.341	0.902	-1.855	-5.875	-18.293
1992	-11.203	-4.198	-7.489	-1.59	-3.546	-19.304
1993	-11.615	-4.809	-3.066	-3.328	-4.564	-26.227
1994	-5.711	-4.533	-5.645	-4.765	-3.362	-17.575
1995	-0.486	-3.547	-3.179	-13.214	-4.356	-13.875
1996	-0.852	-2.402	2.333	-7.086	-3.086	-7.772
1997	-1.379	-0.969	-0.039	-13.03	-4.387	-6.8
1998	-0.529	-0.791	0.161	-16.727	-4.961	-7.45
1999	0.256	-1.431	-1.154	-16.479	-4.335	-6.685
2000	-0.047	-0.706	-0.727	-1.41	-5.236	-3.799
2001	-1.269	-1.125	-0.409	-2.203	-4.161	-3.259
2002	-2.628	-2.341	-0.722	-0.797	-2.214	-1.318
2003	-1.638	-1.097	-1.772	0.788	-0.665	-1.129
2004	-0.046	0.388	-2.438	-0.729	-0.152	-3.217
2005	-1.405	-0.193	-3.323	-1.201	0.358	-5.539
2006	-2.042	-0.728	-3.434	-1.976	-2.565	-7.381
2007	-2.418	-0.939	-1.465	-3.229	-3.702	-8.57
2008	-3.379	-2.459	-1.947	-5.523	-6.787	-7.814
2009	-4.34	-2.089	-4.482	-4.561	-5.694	-7.624
2010	-4.411	-5.672	-4.768	-5.922	-8.034	-7.674
2011	-4.117	-2.661	-3.564	-9.13	-9.968	-10.819
2012	-5.032	-2.997	-4.118	-8.441	-6.767	-11.619
2013	-5.714	-4.03	-3.919	-8.869	-7.05	-10.562
2014	-7.452	-3.461	-3.027	-10.403	-9.538	-9.531
2015	-8.381	-2.942	-3.694	-8.16	-8.865	-8.655
2016	-7.331	-4.39	-3.566	-8.273	-8.357	-7.694

(Data Source: www.worldbank.org)