

**TESTING THE FISCAL, CURRENT AND FINANCIAL ACCOUNT DEFICITS NEXUS
(TRIPLET DEFICITS HYPOTHESIS) FOR KENYA
1980-2014**

**KARIUKI NJOROGE SAMUEL
K102/CTY/PT/23468/2012**

This master's project is presented to the Department of Economic Theory, in partial fulfillment of the requirements for the award of Degree of Master of Economics (Policy and Management) of Kenyatta University

November 2017

DECLARATION

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

Signature:

Date:

Kariuki Samuel Njoroge

Reg. No.: K102/CTY/PT/23468/2012

This project has been submitted for examination with our approval as University
Supervisors

Signature:

Date:

Name: Dr. George Kosimbei

Position: Senior Lecturer, Department of Economic Theory

DEDICATION

Dedicated to my dear mother Bernice Nyokabi, daughter Joedee Nyokabi, and Son Jabali.

ACKNOWLEDGEMENT

I wish to express my sincere gratitude to my Supervisors Dr. George Kosimbei and the late Dr. Steve Makori, for their support during the writing of this project and for being generous with their expertise, precious time, guidance, and patience.

I also wish to thank all the lecturers from the School of Economics for teaching me most of the economics I know, from undergraduate level up to now. Thank you.

Finally, I take this opportunity to thank my class colleagues for reading through the project to ensure errors and omissions are minimized.

TABLE OF CONTENT

DECLARATION.....	II
DEDICATION.....	III
ACKNOWLEDGEMENT.....	IV
TABLE OF CONTENT.....	V
LIST OF FIGURES.....	VIII
LIST OF TABLES.....	IX
LIST OF ACRONYMS AND ABBREVIATIONS.....	X
OPERATIONAL DEFINITIONS.....	XI
ABSTRACT.....	XII
CHAPTER ONE: INTRODUCTION.....	1
1.1 BACKGROUND OF THE STUDY.....	1
1.1.1 THE TRIPLET DEFICITS HYPOTHESIS TRANSMISSION MECHANISM.....	3
1.1.2 TRENDS IN TRIPLET DEFICITS HYPOTHESIS VARIABLES IN KENYA.....	4
1.2 STATEMENT OF THE PROBLEM.....	9
1.3 RESEARCH QUESTIONS.....	11
1.4 OBJECTIVES OF THE STUDY.....	11
1.5 SIGNIFICANCE OF THE STUDY.....	11
1.6 SCOPE AND LIMITATIONS OF THE STUDY.....	12
1.7 ORGANIZATION OF THE STUDY.....	13
CHAPTER TWO: LITERATURE REVIEW.....	14
2.1 INTRODUCTION.....	14
2.2 THEORETICAL LITERATURE.....	14
2.2.1 KEYNESIAN/ CONVENTIONAL PROPOSITION.....	14

2.2.2	RICARDIAN EQUIVALENCE HYPOTHESIS	15
2.2.3	THE MUNDELL FLEMING APPROACH.....	17
2.3	EMPIRICAL LITERATURE	17
2.3.1	EMPIRICAL LITERATURE IN OTHER COUNTRIES	18
2.3.2	EMPIRICAL LITERATURE IN KENYA.....	21
2.4	OVERVIEW OF LITERATURE	22
CHAPTER THREE: RESEARCH METHODOLOGY		23
3.1	INTRODUCTION	23
3.2	RESEARCH DESIGN	23
3.3	THEORETICAL MODEL.....	23
3.4	EMPIRICAL MODEL SPECIFICATION	26
3.5	DEFINITION AND MEASUREMENT OF VARIABLES	28
3.6	DATA COLLECTION	29
3.7	DATA ANALYSIS.....	29
CHAPTER FOUR:DATA ANALYSIS.....		31
4.0	INTRODUCTION	31
4.1	DESCRIPTION OF DATA	31
4.2	STATIONARITY	34
4.3	COINTEGRATION.....	36
4.4	VECTOR AUTOREGRESSIVE (VAR) ANALYSIS AND RESULTS	38
4.5	POST-ESTIMATION DIAGNOSTICS	52
CHAPTER FIVE: CONCLUSION AND POLICY RECOMMENDATION		54
5.1	INTRODUCTION	54
5.2	SUMMARY.....	54
5.3	CONCLUSIONS.....	56

5.4	POLICY IMPLICATIONS	57
5.5	AREAS FOR FURTHER RESEARCH.....	59
	REFERENCES.....	60
	APPENDIX: DATA	69

LIST OF FIGURES

FIGURE 1.0: ANNUAL FISCAL ACCOUNT BALANCES, CURRENT ACCOUNT BALANCES AND NET SAVINGS (S-I), % GDP (1980-2014)	4
FIGURE 1.1: KENYA FISCAL BALANCE AS A PROPORTION OF GDP (1970-2014).....	5
FIGURE 1.2: KENYA TRADE BALANCE AS A PROPORTION OF GDP (1970-2014).....	6
FIGURE 1.3: KENYA SAVINGS-INVESTMENT IMBALANCE AS A PROPORTION OF GDP (1975-2014)..	7

LIST OF TABLES

TABLE 3.0: VARIABLES DEFINITIONS, MEASUREMENTS AND DATA SOURCES	28
---	----

LIST OF ACRONYMS AND ABBREVIATIONS

CBK	Central Bank of Kenya
ECM	Error Correction Model
GDP	Gross Domestic Product
IFS	International Financial Statistics
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
OLS	Ordinary Least Squares
SVARs	Structural Vector Autoregressive Models
TDH	Triplet Deficits Hypothesis
VECM	Vector Error Correction Model

OPERATIONAL DEFINITIONS

Fiscal policy: Changes in government spending and tax collections implemented by government with the aim of either increasing or decreasing aggregate demand to achieve the macroeconomic objectives of full employment and price level stability.

Monetary policy: The central bank's manipulation of the supply of money aimed at raising or lowering interest rates to stimulate or contract the level of aggregate demand to promote the macroeconomic objectives of price level stability and full employment.

Floating exchange rate: When a currency's price relative to other currencies is determined by the free interaction of supply and demand in international forex markets.

External Debt: The portion of a country's debt that is borrowed from foreign lenders including private commercial banks, governments or international financial institutions such as the International Monetary Fund (IMF).

Public sector: Refers to the activities undertaken by the government or the state.

Inflation: Rate of price change in the economy as a whole.

External Debt Servicing: Refers to debt payments in respect of both principal and interest.

Tax incidence: The manner in which the burden of a tax is shared among participants in market

Progressive tax: A tax on income that increases in percentage as an individual's income increases.

Recession: A decrease in the total output of goods and services in a nation between two periods of time. Could be caused by a decrease in aggregate demand or in aggregate supply.

ABSTRACT

Macro-economic theory suggests that there exists a causal relationship that runs from the Budget Deficit to Current account deficit, a concept referred to as the Twin Deficits Hypothesis. Further analysis has pointed towards an extension of this relationship running up to the Financial Account through the Savings-Investment Imbalance, a concept known as the Triplet Deficits Hypothesis. Presence of the triplet deficits implies that all the accounts are in deficit making internal balance in the budget account and external balance in the BoP account major problems with undesirable effects on economic growth, domestic prices, interest rates, and balance of payment. This study contributes to this growing literature by testing validity of the Triplet Deficits Phenomena in Kenya from 1980 to 2014. The specific objectives are to establish if there is a relationship between the Fiscal Balance, the Current Balance, and Financial Balance; and to establish direction of causality between the three balances. Identifying the connection of the three deficits would help provide appropriate policy recommendations on the specific deficit to target in order to reduce the deficits. In addition, investigation on this issue is essential since fiscal policy is used as a tool for managing economic imbalances, and if the triplet deficits hypothesis exists, it can be used to influence the budget and trade account balance, along with the financial account balance, all which are major determinants of Economic Growth. The findings of this study will assist design policies that aim at addressing the budget and current accounts deficits, the burgeoning external debts and the reduction in international reserves. Kenya provides an ideal scenario for studying the relationship of the deficits not only because it is a developing nation but also because it has been running the deficits for several decades. To estimate if a relationship exists between the variables, the study estimated the cointegration properties by employing the Johansen & Juselius model. The study also applied the structural VAR model to estimate IRF and Variance Decomposition. Finally, the study investigated the causal relationship of the three deficits in the framework of Toda-Yamamoto MWALD test for causality. The overall finding using a VAR Model on three equations was that the Budget Balance increases both the Current Account Balance and Savings-Investment imbalance; the Current Account Balance on the other hand increases the Budget Balance, but decreases the Financial Account Balance. Lastly, the Financial Account Balance increases the Budget Balance but is negative on the Current Account Balance. The Toda-Yamamoto MWALD test for causality indicated that a Financial Account Balance causes a Budget Balance while Budget Balance and Current Account Balance cause Financial Account Balance. An analysis of these findings evidence validity of the Triplet Deficits Hypothesis for the Kenyan case. Therefore, the study recommends that the government should strive to keep the three balances in sustainable levels, but especially the budget balance for its causal effect on both the current account balance and financial account balance. This will in effect reduce the negative effects of Current Account deficits and Savings-Investment Imbalances on the economy by improving the terms of trade and reducing overreliance on external funding. This can be achieved through having proper and efficient tax collection and administration systems, observing fiscal discipline in the budgeting process, encouraging a saving culture, restructuring banking sector about credit arrangement and sectorial credits, interest rates and exchange rates counter measures that are favorable to foreign investments, and encouraging external debts at concession rates.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The Twin Deficits Hypothesis that posits that a growing budget deficit goes together with a growing current account deficit, has been extensively empirically and theoretically investigated by researchers as a central area in open macroeconomics (see, (Kosimbei, 2002); (Egwaikhide, 2002), (Kaiba, 2013)). By extending the Twin Deficits Hypothesis, this research paper proposed a new testable hypothesis- the Triplet Deficits Hypothesis from the general equilibrium perspective, which takes into consideration the third deficit of Financial account of the balance of payment account. The hypothesis posits that the fiscal balance, the current account balance, and the financial account balance move together in the long-run, or to say that they are cointegrated.

Since the time of independence, the economy of Kenya has been facing problems of uncertainty and economic instability. Towards addressing this, the Government of Kenya has been concerned with structural policies that pertain to economic growth, creation of employment opportunities, inflation management, and commercial policies directed towards ensuring Kenya becomes economically a viable state. Like any other country, Kenya is prepared to achieve both internal balance (domestic full employment with price stability); and External balance (equilibrium in the balance of payment), with fiscal and monetary policies being the principal instruments for achieving economic stability in Kenya.

According to Egwaikhide *et al.*, (2002), one of the most important policy that facilitates rapid economic growth in developing countries is allocation of a significant share of national income to investments. Domestic savings which finance the investments for development are the internal bottleneck for these economies. Because of insufficient savings occasioned by deficiency of

national income, investments cannot be augmented, level of productivity remains low and low level of national income keeps happening. As a result, inadequate savings cannot fully finance domestic investments, hence the problem of fiscal deficit arises. Foreign exchange deficit is an important external bottleneck, as well, as the saving deficit in economic development. For an economy to experience growth, it first needs to import capital goods. However, because in developing countries a large proportion of foreign exchange revenues are contingent on export of primarily unprocessed agricultural goods, the level of these revenues remains far below the level required by targeted growth rate. This results in a trade account deficit in the economy (Zengin, 2000). Thus, to sustain the fiscal deficit and trade deficit, total national savings need to more than proportionately increase (Langdana, 1990). The addition of the savings-investment inequality and its interaction with the twin deficits brings in the Triplet Deficits Concept.

The reason for emergence of the Triplet Deficits Hypothesis in the literature is that in recent years current account deficits tend to increase, while the budget deficit also increases. With the liberalization of capital mobility globally, and opening up of financial markets in most economies, the necessity that domestic investments be restrained to the level of domestic savings receded. In economies where domestic investments are higher relative to domestic savings, the financing of the resultant savings-investment (S-I) gap from outside forces the S-I balance to be a factor. This means that the fiscal, Trade and savings-investment balance of an economy are all in deficit. In the literature, this scenario is what is referred to as the Triplet Deficits Hypothesis.

Establishing whether the Triplet Deficits hypothesis is valid for an economy is critical for policy selection. In economies like Kenya, where imbalances at the macroeconomic level are at serious levels (high unemployment rate, huge budget deficit, high inflation rate, trade deficit, increased ownership of domestic assets by foreigners, and lowest economic growth rate among East Africa

economies), determining the validity of the triplet deficits hypothesis and to what extent it occurs is important. Policymakers can make better and more informed policy decisions to manage the deficits, going for either public or external borrowing or adjustment of tax rates, or promotion of a saving culture to finance the deficits. In Kenya this study would not have come at a better time, the government is under intense pressure to cap its borrowing (International Monetary Fund, 2015) after raising the external debt ceiling from Ksh1.2 trillion to Ksh2.5 trillion (Kenya National Assembly Hansard , 2014) to finance its budgetary obligations and key flagship infrastructure projects. This risks a high external interest rate payment in the future, and a weakening of the currency during repayment. Further, Kenya's gross national savings rate (%GDP) stands at 11.578% far below the world average of 18.06% (The World Bank, 2016) thus investments cannot be augmented, level of productivity remains low and low level of national income keeps going.

1.1.1 The Triplet Deficits Hypothesis Transmission Mechanism

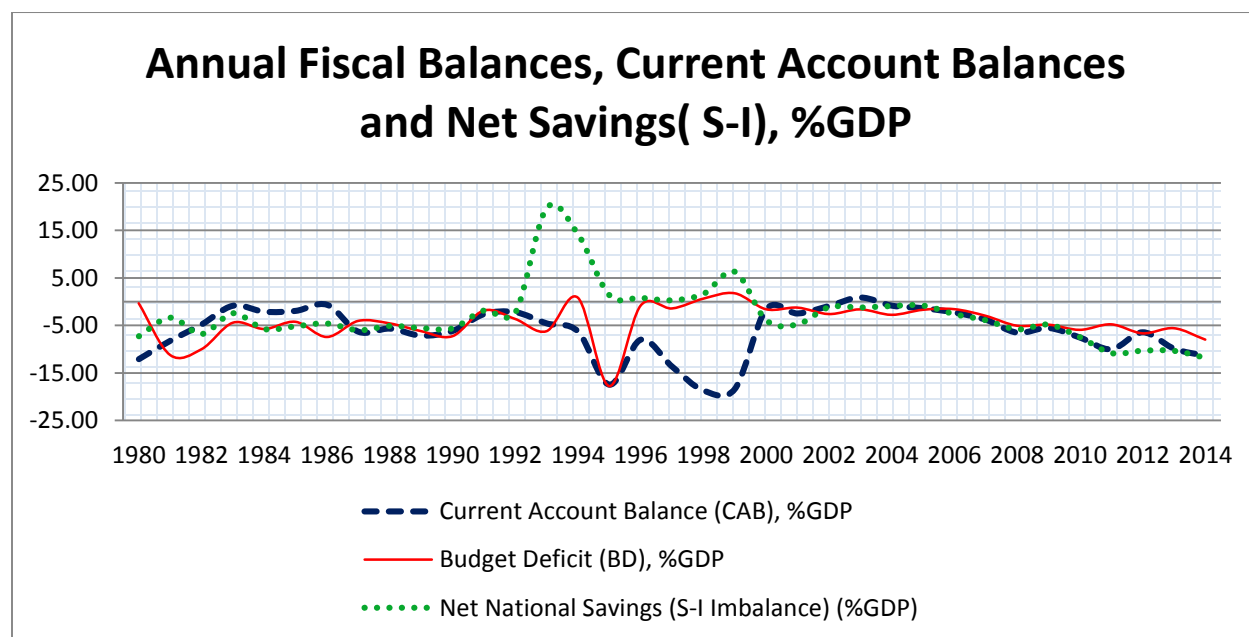
An explanation of the Triplets Deficits Phenomenon can be initiated within the Keynesian thought conventional framework. *Ceteris paribus*, the Twin Deficits may bring about two possible explanations for the 'third' deficit, that is, the financial account deficit. The first view is that state dis-savings will result in a rise in real interest rates, and as a result of the expected higher yields, domestic financial assets will become more attractive. This will have the effect of encouraging more capital inflows into the country while lowering the outflows, improving the financial account balance. This can also be as a result of government borrowing from abroad to fund its budget deficits. The second outcome of the twin deficits on the financial account is depicted by the exchange rate channel. An appreciation of the real exchange rate in the foreign exchange market as a result of the twin deficits, *ceteris paribus*, foreign assets become inexpensive for domestic residents but domestic financial assets become more expensive for foreigners. This drives the

financial account into deficit as there is increased outflow of capital in pursuit of cheaper foreign financial assets, and reduced capital inflows as domestic financial assets are less attractive to foreign investors. The tri-deficits nexus holds if and only if the exchange rate channels is stronger, or more efficient relative to the interest rate channel. Empirically, it points towards unidirectional causation. First, from Fiscal deficit to Trade account deficit then to financial account deficit ($BB > CA \rightarrow FA$), Second, from Fiscal deficit to financial account deficit ($BB \rightarrow FA$ “- \rightarrow ” implies “Granger-cause”), or both.

1.1.2 Trends in Triplet Deficits Hypothesis Variables in Kenya

Figure 1.0 presents the annual data trends for the fiscal account balance, Current account balance, and Net-Savings balance over the period of the study. The figure shows that for most of the period the three accounts were in deficit with a few years registering a positive account balance (Surplus).

Figure 1.0: Annual Fiscal Balances, Current Account Balances and Net Savings (S-I), % GDP (1980-2014)



Source: International Financial Statistics, IMF (various issues)

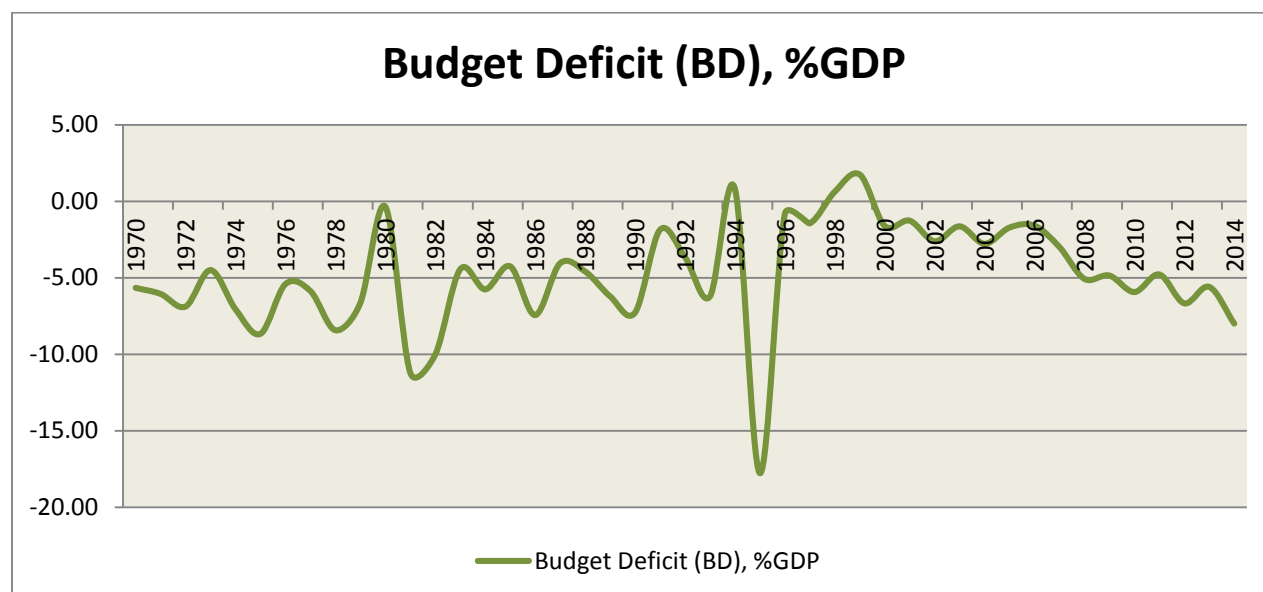
The parallel negative balances of fiscal, trade and financial account over the study period 1980-2014 inform Kenya experience of the Triplet Deficits (see Figure 1.0). The evidence of the Triplet Deficits is apparent that the years have budget balance, current account and Savings-Investment balance in deficit. Stephen (2010) noted that to attain sustained economic growth and macroeconomic stability, the deficits have to be kept in control. The World Bank adds that deficits in the three accounts have undesirable effects on the domestic prices, interest rates, balance of payment, value of the shilling and slow growth of the economy.

1.1.2.1 Trend in the Fiscal Account Balances in Kenya

Figure 1.1 presents the annual account balances for Kenya budget account. From the graph, it is evident that except for 1994, 1998, and 1999, Kenya has been running chronic budget deficits. According to international financial statistics data (IMF, various issues), while the Kenya government spells its fiscal policy as one that aims at reducing further the budget deficit as a proportion of GDP and to eventually eliminating it (Republic of Kenya, 1997a), Kenya has been running chronic fiscal deficits in the last three decades. The exception was in 1994, 1998, and 1999 when it attained a surplus of 0.82, 0.63, and 1.75 percent of GDP respectively (see figure 1.1). The budget surplus of 1994 is attributable to fiscal austerity measures carried out by the Kenya government under the auspices of the Bretton Woods institutions as a precondition for financial support. Similarly, the 1998 and 1999 budget surpluses can be attributed to the austerity budgets that made a possible 20% cut in shilling spending and huge domestic borrowing.

Fiscal deficits have various adverse effects on the economy. These include increase in national debt, which might lead to increased ownership of domestic assets by foreigners, higher debt interest repayments, crowding out of the private sector, higher interest rates, future tax rises as well as inflation.

Figure 1.1: Kenya Fiscal Balance as a proportion of GDP (1970-2014)



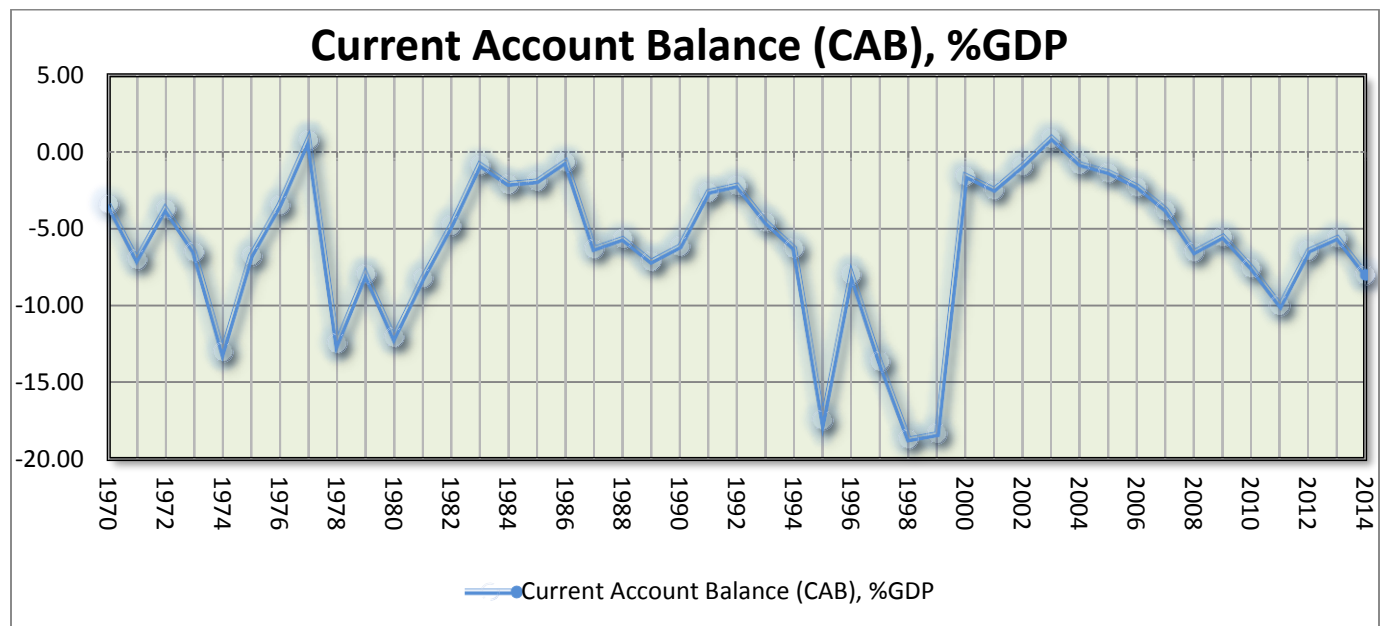
Source: IMF, World Economic Outlook Database, 2016

The Fiscal deficits in Kenya are attributable to the macroeconomic policies adopted after independence in 1963. The policies were based on the sessional paper number 10 of 1965 on African Socialism and its Application to Planning in Kenya that promoted for a bigger and economically active government. Fiscal deficits can also be attributed to inefficient tax collection and administration (Koori, 1992), macroeconomic shocks such as the 1973/1974 and 1979/80 oil price shocks, the world recession in the 1980s and 2008, the drought of 1984, and the 2007/2008 Post Election Violence. They can also be attributed to deteriorating terms of trade for the country's export that meant export earnings were either low or insatiable in many cases (Lesiit, 1990), and poor budgetary processes coupled with limited resources (Wawire, 2006). To address the budget deficit, the government needs to practice sound budgetary practices such as fiscal discipline where the budget is balanced between revenue streams and expenditures.

1.1.2.2 Trend in the Current Account Balance in Kenya

Figure 1.2 presents Kenya Current account balance as percentage of GDP. From the graph, it is evident that Kenya experienced a protracted trade deficit over the period of the study. The export sector has also performed poorly since the 1960s. Figure 1.2 shows that there were only two years which Kenya attained a surplus in net exports, 1977 (US\$ 18.1 million) and 2003 when the trade balance was in surplus, 0.78% and 0.89% of GDP respectively. The trade surplus of 1977 was buoyed by a significant rise in coffee prices attributable to the coffee boom, which more than quadrupled, between 1975 and 1977 (Bevan, Collier, & Gunning, 1999). The worst performance year in the trade account was in the export component in 1980 when it recorded a deficit in net exports of 10.724 percent of GDP. During this period, Kenya relied heavily on imported intermediary inputs and heavy machineries for its domestic production that caused imports to exceed exports.

Figure 1.2: Kenya Trade Balance as a proportion of GDP (1970-2014)



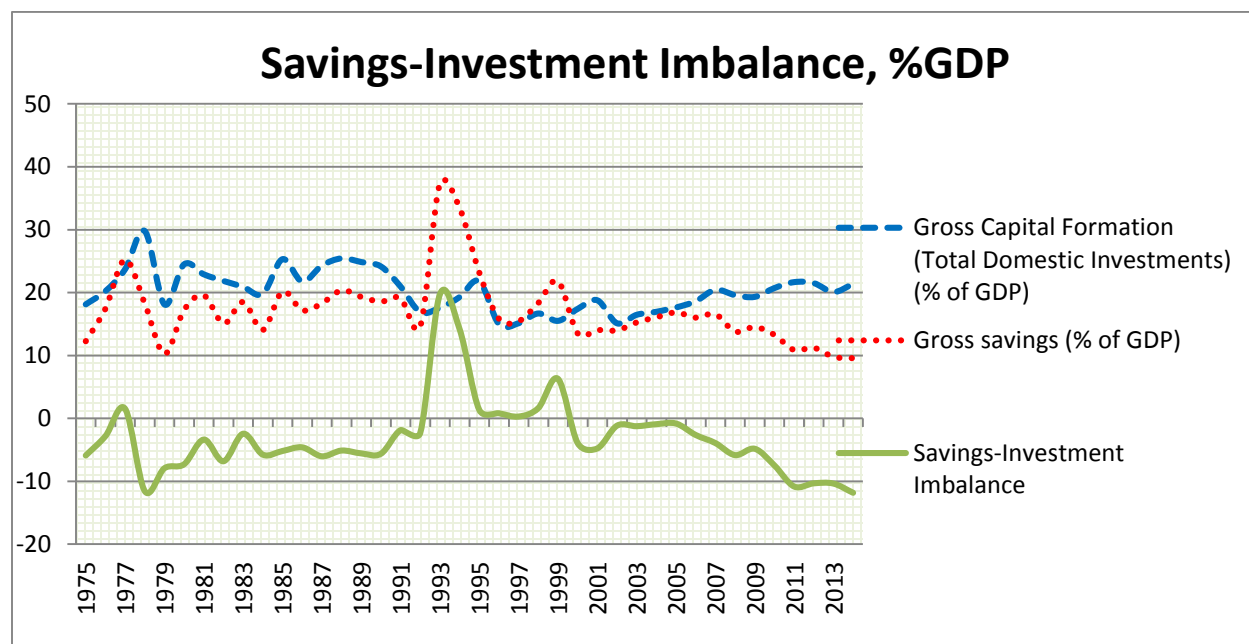
Source: IMF, World Economic Outlook Database, 2016

It is not desirable that the current account of countries such as Kenya be in balance or surplus, since it depends on the country's investment strategies and development plans (Lesiit, 1990). What is essential for a country is to maintain a sustainable position on the current account where the economy remains competitive and does not rely on consumer spending, there is no loss of confidence by foreign investors, and the borrowing used to finance the deficit is sustainable (Lesiit, 1990). This will ensure that the economy remains solvent.

1.1.2.3 Trend in the Savings-Investment Imbalance in Kenya

The levels of investment and savings are important determining factors of the attainable rates of employment and economic growth. Figure 1.3 shows that Kenya has been running a savings-investment gap that has had to be offset by inflow of foreign capital through the financial account.

Figure 1.3: Kenya Savings-Investment imbalance as a proportion of GDP (1975-2014)



Source: IMF, World Economic Outlook Database, 2016

According to Muthui, Kosimbei, Maingi, and Thuku (2013) Kenya's savings investment gap has steadily risen from about 3.2% of GNP in 1965-69 to 6% in the 1980's making the economy

become increasingly reliant on external funds to finance its capital formation. The authors attribute this widening gap to the large fiscal deficits experienced by the public sector which has increased from 4.9% of GDP in 1969-73 to 9.4% in 1979-83 and about 5.0% in 1989-1990. Muthui et al (2013) further state that a phasedown in available net foreign capital inflows would negatively impact economic growth, whereas high reliance on external funding would give rise to large outflows of investible resources in the form of debt repayments. From Government of Kenya various Annual Economic Surveys, Kenya's Medium Term Plan (MTP) 2008-2012 had aimed to achieve an investment rate of 23.2 per cent in 2008/09, rising to 24.6% in 2009/10, 27% in 2010/11, 29.7% in 2011/12 and 32.6% in 2012/13. MTP 2008-2012 had a gross national savings target of 16.2 per cent in 2008/09, 18.5% in 2009/10, 21.4% in 2010/11, 24.4% in 2011/12 and 27.7% in 2012/13. However, actual performance of these targets was not achieved during the MTP period. This failure, KIPPRA (2013), attributes to a combination of factors, including slow economic growth, the global financial crisis, internal and external shocks such as the 2007/08 political crisis and 2008 global recession, as well as slow implementation of planned reforms. This necessitated the need for increased external capital inflow which in the long run may make the economy dependent on external capital and therefore insolvent in the long term.

1.2 STATEMENT OF THE PROBLEM

One of the main focuses of the Kenyan government has been to achieve external balance in its balance of payments and internal balance in its budget account, alongside other objectives such as sustainable economic growth, improved living standards and increased employment. In order to enhance stable internal and external balance, policies including structural adjustment programmes (SAPs), import substitution, financial sector policy reforms, government budget rationalization, parastatal reforms, strengthening of political system, civil service reforms and privatization were

adopted (Kaiba, Kosimbei, & Korir, 2014). These policies were intended to spur economic activities, gain low inflation rates, create positive real interest rates, achieve stable nominal exchange rates, attain price stability, and create an enabling environment for accumulation and efficient utilization of financial resources that finally translate to viable economy. Despite these policies, there are still persistent imbalances in the fiscal account, current account and a widening Savings-Investment gap (Muthui, Kosimbei, Maingi, & Thuku, 2013). There have been continuous deficits in these accounts making internal and external balance sustainability a major problem. Instability in these accounts is a problem because it can lead to a decline in economic growth and higher level of poverty by creating unemployment and unstable macroeconomic environment (Akıncı & Yılmaz, 2012).

The parallel negative money balances of fiscal account, trade account, and Savings-Investment gap (See Figure 1.0) over the period 1980- 2014, inform the Kenya experience of the Triplet Deficits. The indication of Triplet Deficits is evident that the period had the three accounts in deficit. This preliminary observation motivated this study. Despite variety of studies on the Twin Deficits in Kenya (See Kaiba (2013), Kosimbei (2002), Egwaikhide *et al.*, (2002)), studies on TDH are limited. Studies on the Kenya economy have focused on Budget and Trade deficits, while the savings-investment balance and its impact on the formation of the Trade balance is ignored. Additionally, from the literature, it can be noted that past studies on the Triplet Deficits Hypothesis suffer from various shortcomings, like use of cross-sectional data which may not address country specific issues (See Baxter and Crucini (1993); and Freund (2005)). This study fills this gap of the literature by testing the Triplet Deficits phenomenon in Kenya using time series data for the period 1980-2014.

1.3 RESEARCH QUESTIONS

The study sought to find answers to the following questions:

- i. What is the relationship between the Fiscal Balance, the Current Account Balance and the Financial Account Balance?
- ii. What is the direction of causality between the Fiscal Balance, the Current Account Balance and the Financial Account Balance?

1.4 OBJECTIVES OF THE STUDY

1.4.1 General Objective

The general objective of the study was to test for the validity of the Triplet Deficits Phenomena (Fiscal, Current, and Financial accounts deficits nexus) in Kenya.

1.4.2 Specific Objectives

The specific objectives were to:

- i. To establish if there is any relationship between the Fiscal Balance, the Current Account Balance and the Financial Account Balance
- ii. To establish the direction of causality between the Fiscal Balance, the Current Account Balance and the Financial Account Balance;

1.5 SIGNIFICANCE OF THE STUDY

The study was motivated by the observation that there was thought to be some parallel between the fiscal, trade and financial balances. Kenya's long-term development plan, Vision 2030, targets at growing Kenya into an "industrializing, middle-income country by the year 2030". One key pillar is to maintain a sustained economic growth of at least 10%. The vision acknowledges that a stable macroeconomic environment is the only way in which confidence among investors can be maintained. With a 10% GDP growth target, managing the three deficits is key.

This study is thus significant to policy makers in Central Bank and the National Treasury seeking to identify an appropriate solution to the deficits problem. Identifying the connection between the three deficits will help to provide an appropriate policy recommendation on the specific deficit to target in order to reduce the deficits. In addition, investigation on this issue is essential since fiscal policy is used as a tool for managing economic imbalances, and if the triplet deficits hypothesis exists, it can be used to influence the budget and trade account balance, along with the financial account balance, all which are major determinants of Economic Growth. The findings of this study will assist design policies which aim at addressing the budget and current accounts deficits, the burgeoning external debts and the reduction in international reserves. If it is the case that budget deficits do cause current account and financial account deficits, then policy makers would understand that persistent current account deficit can be controlled by cutting down on fiscal deficit expansion and vice versa. Kenya provides an ideal scenario for studying the relationship between the deficits not only because it is a developing nation but also because it has been running the deficits for several decades. To researchers, the findings of the study will form a good source of empirical theory for their studies.

1.6 SCOPE AND LIMITATIONS OF THE STUDY

1.6.1 Scope of the Study

The objective of the study was to test for the existence of the Triplet Deficits Phenomena by investigating the Fiscal, Current, and Financial accounts deficits nexus in Kenya over the 1980-2014 period. The study employed a three-decade secondary data spanning 1980 to 2014. Data for Fiscal, Trade and Financial Accounts balance was collected from the KNBS, CBK, IMF and World Bank's World Economic Outlook Database.

1.7 ORGANIZATION OF THE STUDY

The paper is structured as follows; chapter one is an introduction that provides relevant information on the Triplet Deficits Hypothesis Concept. The second chapter presents related empirical and theoretical literature. The theoretical literature begins by explaining possible directions of causality for the fiscal, current, and financial account balances. The empirical literature reviews and presents past studies that have examined the problem of the Triplet Deficits not only in Kenya but the rest of the world. The chapter concludes by presenting a general summary of reviewed literature where a highlight of knowledge gap and relevance of the literature is expounded. The third chapter presents the methodology employed. The research design and theoretical framework are discussed. The models specification and definition of variables are explained. The chapter finalizes by explaining the set of econometric tests that will be undertaken. Chapter four presents the data analysis results. It starts with the basic descriptive statistics and graphical presentation. Then it proceeds to unit root tests, cointegration test, VAR model results and lastly Toda and Yamamoto MWALD test results. Chapter Five completes the study with a summary of empirical findings followed by conclusion, policy implication, and finally, areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This section presents a discussion of existing theoretical literature and later reviews a selection of past literary works in order to appreciate how far we have come. At the end of this section, a critique of the empirical literature is provided, while identified research gaps that the study sought to address are pointed out.

2.2 THEORETICAL LITERATURE

Majority of past literature on the Triplet Deficits Hypothesis have generally concentrated on two testable hypotheses namely, the Keynesian Income-Expenditure Approach and the Ricardian Equivalence Hypothesis. Other approaches like the Mundell Fleming and Current Account Targeting approaches have also been suggested in relation to the study of the three deficits. However, some studies have discredited their use, noting that they are simply duplications of the Keynesian Income-Expenditure Approach and the Ricardian Equivalence Hypothesis.

2.2.1 Keynesian/ Conventional Proposition

The first approach is based on the Keynesian/ Conventional macroeconomic model developed in the 1930s by John Maynard Keynes that demonstrates how budget deficit would indirectly result in the other two deficits. According to the Keynesian Approach, expansionary fiscal policies such as reduced taxes or increased public expenditure will result in a decrease in national savings, an increase in the fiscal deficit and rise in disposable income. The rise in income subsequently leads to a growth in aggregate demand for domestic and imported goods. Due to borrowing to finance the budget deficits, domestic interest rates increase, attracting foreign capital making the domestic currency appreciate. The appreciated domestic currency makes imports cheaper and export

expensive depending on the elasticities. This leads to a decrease in the volume of exports and increase in the volume of imports making the trade account balance go into deficit. This relationship is explained as the Twin Deficit Proposition. An explanation of the Triplet Deficits Hypothesis is founded on the conventional framework of Keynesian thought, *ceteris paribus*, that the twin deficits may result in two possible reasons for the third deficit.

Real Interest Rate channel: The first view is that budget deficits drive the real interest rates up due to increased borrowing to finance the deficit. The higher real interest rates make domestic financial assets more attractive to foreigners due to the higher expected yields. This encourages capital inflow while at the same time lowers capital outflows improving the financial account.

The Exchange Rate channel: The exchange rate channel captures the second outcome of the twin deficits on the financial account balance. An appreciation of the domestic currency as a result of the twin deficits makes foreign assets cheaper for domestic residents, while domestic assets become more expensive for foreigners. This pushes the financial account into deficit as more domestic residents chase for foreign assets resulting in more capital outflows, while capital inflows shrink as domestic financial assets have become less attractive to foreign investors.

The tri-deficits phenomenon holds when the exchange rate channel is more efficient or stronger relative to the interest rate channel. Empirically, it infers twofold unidirectional causations, from fiscal deficit to Trade deficit then financial account (BB \rightarrow CA \rightarrow FA), or from fiscal deficit directly to financial account (BB \rightarrow FA), or both. (Where ' \rightarrow ' denotes "Granger-cause",

2.2.2 Ricardian Equivalence Hypothesis

Ricardian Equivalence Hypothesis (REH) is the second approach. It was first postulated by Ricardo in 1877 and later remodeled by Barro in the 1970s. REH posits that there exists no interaction or correlation between the fiscal and trade deficit, and hence also the financial account.

Therefore, the Triplet Deficits are invalid. According to the hypothesis, given a level of public expenditures, if the fiscal deficits that resulted from a decrease in taxes are financed through government borrowing, the net effect on private sector spending will remain unaffected. It presupposes that people understand that any rise in government expenditure financed by increased borrowing ultimately will be compensated by an increase in future taxes. That is, the government is only shifting tax collection from the present to future periods (Vamvoukas, 1999). Therefore, the fiscal deficits that arise as a result of decreased taxes and public borrowings will not increase private consumption or affect consumption behavior. It presumes that economic agents know that as a result of the current period tax reduction, they have an additional tax burden in future, and as a result, they will increase their private savings. Taking into account that total domestic savings are a summation of public and private sector savings, tax reductions by the government will be met by a shrinkage of public sector savings, but will boost private sector savings (Barro, 1989). Along with the drop in savings in the public sector, a rise in private savings will also lead to a rise in gross savings that equates the budget deficit financed by the government. In consequence to the rise in private savings, there will be no need for capital inflows and, therefore, no trade account deficit (Khalid & Teo, 1999).

Critics of the REH have objected the five major assumptions which are; Capital markets are perfect; People do not live forever and as such, they do not care about future taxes; Economic agents and in particular consumers are rational and farsighted meaning that they satisfy the infinite horizon condition; Taxes are not distortionary lump-sum per capita; and Full employment exists (Barro, 1989).

Despite the presumptions, some researchers have found evidence to support this view (See for instance, Kosimbei, 2002; Ratha, 2009; Brian, 2011).

2.2.3 The Mundell Fleming Approach

The Mundell-Fleming Approach, also referred to as the IS-LM-BoP model was first developed in the 1960s by Canadian economist Robert Mundell and British economist Marcus Fleming. The Mundell-Fleming approach postulated that a reduction in government spending in a country with a flexible exchange rate would result in a reduction in aggregate domestic demand and consequently a fall in GDP. This causes a reduction in the transactional demand for money putting a downward pressure on domestic interest rates which causes a gap between international and domestic interest rates. The difference in domestic and international interest rates causes capital outflows and a rise in the demand for investment goods. Domestic currency Depreciation attributable to a higher domestic demand and relatively lower domestic interest rates results in correction in the trade and fiscal balance, as well as the rest of the macro-economy until alignment of domestic with and international interest rates is restored.

2.3 EMPIRICAL LITERATURE

Few studies have investigated the Triplet Deficits Hypothesis. However, varying positions exist on the Twin Deficits nexus. Studies that have investigated the Triplet Deficits Hypothesis have primarily been theoretical. For example, the studies by Coban & Balikçioğlu (2016), Feldstein (2008), Elwell (2007, 2010), Szokolczai (2006), Hubbard (2006), Labonte (2005), Gale and Orszag (2003), Mann (2002), Cooper (2001), Higgins and Klitgaard (1998), Milesi-Ferreti and Razin (1996), Hakkio (1995), and Fischer and Easterly (1990) can be adduced for theoretical literature on the Triplet Deficits Hypothesis.

2.3.1 Empirical Literature in Other Countries

Various empirical studies found validity of the Triplet Deficits Hypothesis. For example, Tang (2014); Şengönül, Bolat, & Değirmen (2014); Akbas, Lebe, and Zeren (2014); Gruber and Kamin (2007); Kuijs (2006); Eisner (1994); and Baxter and Crucini (1993).

Tang (2014) analyzed quarterly U.S data for the period 1960Q1–2013Q4. Using ARDL (autoregressive-distributed lag) procedure for cointegration analysis, the author tried to determine whether the budget, trade, and financial account balance move together. The findings were positive for cointegration among the deficits. The study found that trade balance granger-causes budget deficit along with the country's financial account position.

Şengönül, Bolat, & Değirmen (2014) conducted a study on the dynamics of the Triplet Deficits in 23 European economies using Panel Granger Causality Test. Employing quarterly data for 2002Q1 - 2013Q4; they found evidence for the Triplet Deficits Hypothesis.

Akbas, Lebe, and Zeren (2014) used annual data for 1960- 2012 to investigate the triplet deficits in turkey. By employing an asymmetric causality test, they found support for bi-directional causality between the trade and fiscal deficit and between the Trade deficit and savings gap. Hence, the Triplet deficit hypothesis was valid for turkey.

Akinci and Yilmaz (2012) investigated the triplet deficits hypothesis in turkey between 1975-2010. Using the Bounds test analysis to determine the cointegration relationship between the variables, cointegrated relations was established between the variables. The study established that the saving-investment gap and fiscal deficits positively affected the trade account deficit both in the short and long-run. Therefore, the triplet deficits was valid.

Sen, et al (2011) employing annual data for the years 1980 to 2010 investigated the triplet deficits concept in turkey. Using Dolado-Lutkepohl granger causality analysis and Vector Autoregressive (VAR) to examine how the variables related and affected each other; the study established that the trade deficit and fiscal deficit are causality to savings deficit. Therefore, validity of the triplet deficits hypothesis was established.

Gruber and Kamin (2007) using panel data analysis attempted to establish the determinants of the trade account deficit in 61 countries for the years 1982-2003. The study concluded that in the sampled countries a growth in savings negatively affects countries that experience a savings gap, consequently resulting in a rise in the trade deficit. The findings contend that the savings-investment gap plays a role in the advent of a trade deficit. In this context, the triplet deficits hypothesis was pointed out by the results.

Kuijs (2006), using time series analysis examined the changes in the saving–investment balance on the Chinese economy in the period of 1980 – 2005. In the empirical study, the author found that rising saving rates gave rise to both a budget and trade surplus. Accordingly, the study which was conducted on the Chinese economy showed that the Triplet deficits hypothesis applied in the reverse to the Chinese economy and called it a case of “Triplet Surpluses”.

Using data from the US economy for the period 1972-1991, Eisner (1994), investigated the correlation between public expenditures, public sector savings and foreign trade under the framework of a VAR analysis. The study established that a decline in state expenditure results in a rise in the public sector savings, shrinking budget deficits. In addition, Eisner (1994) attributed trade account deficits to an increase in government expenditure and the fiscal deficits that arise. Consequently, the author found validity of the triplet deficits hypothesis for the US economy.

Baxter and Crucini (1993) examined the relation of correlation between national saving– investment and its possible effects on the economies for 8 developed countries between 1960– 1985. The study pointed out that the correlation of saving– investment was higher in developed economies relative to developing economies and increasing the volume of the investments in developed countries would cause to raise in the trade account deficits. In this context, the authors showed the effects of the saving deficits which were the third deficit as well as the twin deficit over the economy. They therefore found support for the triplet deficits hypothesis.

Besides studies that established validity of the triplet deficits proposition, there are empirical investigations that found no causal link or limited relationship linking the variables (see Domenech, Taguas, & Varela, (2000); Winner, (1993); and Bachman, (1992)).

Subjecting U.S data for 1974-1988 to VAR analysis, Bachman (1992) found that the fiscal deficit had impacted on the economy’s trade account deficit. However, the researcher established that variations in investment were not significant enough to explain trade deficits. The author contended that while the twin deficits nexus was valid in the US economy for the period under study, it was not possible to obtain a clear conclusion concerning the Triplet Deficits Hypothesis.

Winner (1993) investigated the parallel between the budget and trade deficits through analysis of regression of the Australia economy and found validity of the Ricardian Equivalence Hypothesis (REH). Winner (1993) also established that fiscal deficits as opposed to savings gaps were as a result of diverse macroeconomic factors. Hence, it was inconclusive to conclude that trade deficits were in consequence of fiscal and saving deficits. In this context, according to the study, the triplet deficits were not valid.

Domenech et al. (2000) applied structural VAR analysis on 18 OECD economies for 1962-1994. The authors found that the cause of the fiscal deficit was not the saving deficits. Therefore, the Ricardian Equivalence Hypothesis was valid in the countries contrary to conventional approach. They arrived at the conclusion that the triplet deficits were not valid and the sources of the current account deficits should be analyzed by taking into account different variables.

Sürekcı (2011) investigated validity of TDH for Turkey by applying VAR analysis using quarterly data spanning 1987:1–2007:3. The study findings established presence of a link between budget and trade deficits. However, the causality relationship among the investment–saving rate and the trade deficit was not found. Accordingly, although the study proved the validity of twin deficits, the existence of the triplet deficits were not found.

2.3.2 Empirical Literature in Kenya

Empirical studies on the triplet deficits hypothesis in Kenya have never been conducted. However, there are three studies that focused on the Twin Deficits, See, Kaiba (2013), Kosimbei (2002) and Egwaikhide *et al.*, (2002).

Kaiba (2013) sought to examine relevance of the Twin Deficits nexus for Kenya. The study used quarterly data in a multivariate approach which included fiscal deficits, trade balance, interest rates and exchange rates. The study analyzed quarterly data for the period 1970 - 2012. To establish whether a relationship existed between the variables, the study estimated the cointegration properties using Johansen & Juselius model. The study applying the VAR model to estimate IRF and Variance decomposition and the Toda- Yamamoto's Granger causality test framework for causality concluded that the twin deficits hypothesis exists in Kenya when interest rates and exchange rates are included.

Kosimbei (2002) used annual data for 1964 to 2000 to examine the relationship involving the budget and trade account balances. The author carried out Granger causality tests which revealed no causality between the two deficits. The study concluded that REH is valid in the Kenyan case with short-run and long-run equilibrium relationships being similar. In the same year and in contrast to findings by Kosimbei (2002), Egwaikhide *et al.*, (2002) found unilateral causality that stemmed from trade deficits to the budget deficits for the Kenya case. These contradicting findings raised the need to investigate the deficits further.

2.4 Overview of Literature

From the literature, it can be noted that past studies on the Triplet Deficits Hypothesis suffer from various shortcomings, like use of cross-sectional data which may not address country specific issues (See for example Penati and Dooley (1984) who studied TDH for 19 industrialized countries; Roubini (1988) who examined TDH data for 18 OECD member states; and Freund (2005) who studied data from 25 industrialized countries.). The present study employed time series data spanning three decades. Furthermore, from the reviewed literatures, no previous study has investigated the Triplet Deficits Hypothesis in Kenya or in any developing country. Neither has there been any study on the Trade and Financial Account Interdependence. However, attempts have been made at investigating the twin deficits hypothesis for Kenya Kaiba (2013), Kosimbei (2002) and by Egwaikhide *et al.*, (2002), all with conflicting findings.

This study, therefore, improves on these Kenya-specific studies by including more recent data and including the third deficit of financial account, bringing on board recent developments on the macroeconomic front. The study therefore builds on and adds to existing literature by bridging the gaps identified herein above.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter begins by presenting the theoretical framework for the Triplet Deficits Hypothesis. This is followed by the model specification highlighting the justification for the model used. Later, the chapter presents a number of econometric tests that will be undertaken.

3.2 Research Design

The study employed longitudinal research design. Specifically, the design used was non-descriptive time series design. Annual data for the period 1980 to 2014 was used. The study used budget balance, trade balance and financial account balance as percentages of GDP as its variables of interest.

3.3 Theoretical Model

The theoretical foundations of the association between the fiscal account, the trade and financial account deficits can be traced from both the Keynesian Income-Expenditure Approach as well as the National Income Identity. Virtually, all analyses of the linkage among the fiscal and trade deficits and savings-Investment gap begin with a review of a basic national income identity. It is as follows:

$$Y=C + G + I + (X - M) \dots\dots\dots(3.1)$$

Where;

Y- National Income

C- Consumption Expenditures

I- Investment Expenditures

G- Government/Public expenditure

X-Goods and Services exports

M-Goods and Services Imports

(X - M)- Net Exports

The current account is given as

$$CA = X - M + N_{tr} \dots \dots \dots (3.2)$$

Where N_{tr} is net transfer. This component was assumed to be very small or negligible for the case of Kenya.

The national investment equation in an open economy is given as;

$$S = Y - C - G + CA \dots \dots \dots (3.3)$$

National Investment is given as

$$I = Y - C - G \dots \dots \dots (3.4)$$

Considering an open economy, the savings equation can be given as

$$S = I + CA \dots \dots \dots (3.5)$$

Equation (3.5) depicts that an open economy can source for capital for investment from both domestic and international sources. That is, borrowing can allow domestic investments to exceed domestic savings. Savings can also be separated into government savings (S^g) and private savings (S^{pr}) to get

$$S = S^{pr} + S^g \dots \dots \dots (3.6)$$

$$S^{pr} = Y^d - C \dots \dots \dots (3.7)$$

Private savings is given by the part of disposable income (Y^d) that is saved after consumption. The government savings on the other hand is given as government revenue in terms of taxes less expenditure in terms of expenditure (G) and government transfers (T_r) as given in equation (3.8).

$$S^g = T - G - T_r \dots \dots \dots (3.8)$$

Rising from the above identities, and having separated private savings from government savings, equation (3.9) holds.

$$S = S^{pr} + S^g = I + CA \dots\dots\dots (3.9)$$

Equation (3.9) provides a possibility for re-writing previous equations to a form that is useful for analyzing the impact of state savings on an open economy.

$$S^{pr} = I + CA - S^g = I + CA - (T - G - T_r) \dots\dots\dots (3.10)$$

Re-arranging equation (3.10)

$$CA = S^{pr} - I - (G + T_r - T) \dots\dots\dots (3.11)$$

Where, $(G + T_r - T)$ in equation 3.11 represents consolidated public sector budget deficit. It represents the degree to which the state is borrowing to finance its expenses.

Equation (3.11) helps in establishing the relationship among fiscal and trade deficit, and savings gap. The equation in 3.11 above can be expressed in a simplified form as:

$$(X - M) = (S - I) + (T - G) \dots\dots\dots (3.12)$$

Where $(T - G)$ is the fiscal balance, $(X - M)$ is the trade account balance, and $(S - I)$ the saving-investment balance.

Equation (3.12) indicates that a summation of the fiscal balance and saving gap is equivalent to the trade balance. Rephrased, equation (3.12) can be expressed as:

$$\text{Current Account Deficit (CA)} = \text{Savings Gap (SA)} + \text{Budget Deficit (BA)} \dots\dots\dots (3.13)$$

From Equation 3.12 and 3.13, $CA = f(FA, BB)$

Equation 3.12 presents the framework under which variations in the fiscal balance would result in changes in the trade balance and the financial account. The summation of the fiscal and savings gap balances on equation (3.12) right side determines the internal balance of an economy, while the equation (3.12) left side defines the external balance. That is, the external and internal sides are equivalent, implying that the further external balance has a deficit, the

further the internal side has a deficit (Eğilmez, 2006). In the study's context, a rising savings-investment gap as a result of domestic savings being relatively less to domestic investments results in the triplet deficits (Szakolczai, 2006). That is, if private and public sector savings balance (right side of equation 3.13) has a deficit and it goes along with a trade balance deficit, the twin deficit is valid. If both of the internal economic balances are in deficit, the Triplet Deficits is valid. Equation (3.12) therefore, establishes the theoretical foundation of the study as well as the basis of the empirical model. Critics dismiss equation 3.12 as a simple identity and its approximation irrelevant. Others consider its estimation misspecified to the scope that other perceived significant variables for example, interest rates and exchange rate, have been excluded, and their role as transmission variables overlooked.

3.4 Empirical Model Specification

Equation 3.12 from the theoretical model forms the basis for the empirical model. It presents the framework under which variations in the fiscal balance would result in changes in the trade balance and the financial account balance. From the equation, $CA = f(FA, BB)$; $FA = f(CA, BB)$; and $BB = f(CA, FA)$.

The study utilized a structural Vector Auto Regressive (VAR) model which unlike other models does-not-than necessary impose restrictions to identify the system. Sims (1980) described the other models as "in-credible". The structural VAR's model is especially important because the variables are treated symmetrically in a structural sense with each individual variable having an equation that explains its evolution based on its own lags and the lags of the other variables in the model. Also, no priori knowledge about the variables is required. VAR's modeling is also advocated for because it is a theory-free technique (Sims, 1980). The model has characteristic of simplicity and accuracy (Gordon, 1985). Additionally, VAR models handle all the economic notions as a whole.

That is, variables subjected to the model are estimated simultaneously. Structural VARs are able to return dynamic relationships without any limitation on the structural model, hence are often used for time series (Keating, 1990). Structural VAR models do not require any differentiation (Charemza and Derek, 1992). Also, in structural VAR developed by Sims (1980) variables are treated as dependent variables in order. The dependent variable is regressed with an optimal delay length over the delayed values of itself and other variables. This makes it possible to make strong predictions about future (Kumar, et. al, 1995), thus, their preference in this study.

Therefore, in this study with three variables, the structural VAR system took the form:

$$\Delta BB_t = c + \sum_{p=1}^n \beta_{1p} \Delta FA_{t-p} + \sum_{p=1}^n \mu_{1p} \Delta CA_{t-p} + \sum_{p=1}^n \delta_{1p} \Delta BB_{t-p} + \varepsilon_{1t} \dots \dots \dots (3.14)$$

$$\Delta CA_t = c + \sum_{p=1}^n \delta_{2p} \Delta BB_{t-p} + \sum_{p=1}^n \beta_{2p} \Delta FA_{t-p} + \sum_{p=1}^n \mu_{2p} \Delta CA_{t-p} + \varepsilon_{2t} \dots \dots \dots (3.15)$$

$$\Delta FA_t = c + \sum_{p=1}^n \mu_{3p} \Delta CA_{t-p} + \sum_{p=1}^n \delta_{3p} \Delta BB_{t-p} + \sum_{p=1}^n \beta_{3p} \Delta FA_{t-p} + \varepsilon_{3t} \dots \dots \dots (3.16)$$

Where;

CA- Current Account Balance

BB- Budget Balance

FA-Financial Account Balance

ε - Error Term

μ, β, δ -coefficient of variables

The structural VAR model represented by equations 3.14, 3.15, 3.16 was derived from Equation 3.12 from the theoretical model presenting the framework under which variations in the fiscal balance would result in changes in the trade balance and the financial account balance. The

structural VAR model was also employed by Tang (2013) in the study of the Triplet Deficits phenomenon in the USA economy, and also by Sen, Senturk, Sancar and Akbars (2014) in their study of the Triplet Deficits Hypothesis for the Turkey economy. They stated that the model was appropriate for the testing of the triplet deficits hypothesis for the reason that they are an attractive approach to estimating the variables of interest. They further add that the model coaxes interesting patterns from the data. Moreover, the authors add that the model is easy to estimate, being possible to do so even with the addition of other intervening variables such as exchange rates and interest rates. The authors conclude by stating that the model will allow for understanding of aggregate fluctuations and economic shocks, thereby, justifying the use of this specific model.

3.5 Definition and Measurement of Variables

The study utilized time series data spanning from 1980 to 2014 which included budget balance, trade balance and financial account balance.

Table 3.0: Variables definitions, measurements and data sources

S. No	Variable	Definition	Measurement	Data Source
1	Budget Balance- (BB)	This is the net difference of the national government revenues and expenditures	Annual Data expressed as a percent of GDP	IFS, KNBS, Statistical Abstracts, Economic Surveys
2	Current Account Balance- (CA)	This is the net difference of a country's value of total imports and value of total exports	Annual Data expressed as a percent of GDP	IFS, KNBS, Statistical Abstracts, Economic Surveys
3	Financial Account Balance (FA)	This is the net difference in ownership of a country's assets	Annual Data expressed as a percent of GDP	IFS, KNBS, Statistical Abstracts, Economic Surveys

3.6 Data Collection

Annual time series data spanning 1980 to 2014 was used. Data for Trade balance, Financial balance, Fiscal Balance, and GDP data was taken from statistical abstracts and economic surveys from the Kenya National Bureau of Statistics, and IMF's International Financial Statistics. The data was measured in Kenya shillings, and was scaled by GDP to offset the price element.

3.7 Data Analysis

The study undertook various empirical tests subject to time series econometric techniques. Diagnostics test such as unit roots were estimated. To establish relationship between variables and to determine the degree to which the study's variables affect each other, VAR analysis was used to estimate variance decomposition and IRF, before undertaking cointegration analysis using Johansen & Juselius model. The study utilized Toda and Yamamoto (1995) MWALD testing procedure to test for the causal inferences of the variables. Toda & Yamamoto (1995) proposed a procedure that allows for causal inferences to be made at level VARs that may not be stationary without use of the rigorous pretests and strict reliance upon cointegration and integration properties. They propose a modified WALD –MWALD- for testing granger non-causality which imposes nonlinear restrictions in the properties of the VAR models needless to test for unit roots and cointegration ranks. Not only is the procedure simple, it has also been found to be superior to both the LR test, (Moscani & Gianni, 1992) and the Wald test of Toda & Phillips (1993, 1994), as verified by Zapata & Rambaldi, (1997).

Majority of past studies have concentrated on granger causality test to establish causality on the deficits. These tests have been blamed for concentrating on time rather than causality itself (Abdur and George, 2003). In most cases, time series data are non-stationary meaning that parameters

estimated from the non-stationary variables do not follow the standard statistical distributions for testing significance and have to be differenced. Granger causality is done in an environment of Error Correction (Granger, 1988). The Error Correction Models (ECM's) like Engel Granger ECM and the Johansen & Juselius Vector Error Correction Models help omit misrepresentation and non-inclusion of significant constraints. The ECM's are sensitive to the values of nuisance parameters in finite samples making the results unreliable (Toda & Yamamoto, 1995) and involve cumbersome process which results in loss of simplicity and ease of application (Rambald & Doran, 1996).

i) Establish the maximum order of integration (d_{max})

The Augmented Dicky-Fuller test, the Phillips-Peron test and the Kwiatkowski, Phillips, Schmidt & Shin test (KPSS) was used. Both ADF and PP tests are based on a null hypothesis of a unit root I(1) while the KPSS test is based on a null hypothesis of Stationarity I(0).

ii) Determine the optimal lag length. (k).

The optimal lag length was chosen using information criteria like the Akaike information Criterion (AIC), the Swartz Bayesian Criterion (SBC) and the Sim's modified log-likelihood test (LR) test.

iii) Set up a VAR-model in the levels. The VAR model will be of $Var(k + d_{max})^{th}$ order. This is the augmented VAR-model.

To estimate the degree to which variables affect each other, the study tested for variance decomposition.

CHAPTER FOUR

DATA ANALYSIS

4.0 Introduction

This chapter presents empirical results and findings of the study based on the relationship and the direction of causality between the budget Balance, the trade Account Balance and the Savings-Investment Balance for the period under review. To investigate these interactions, several estimation techniques were employed. The section is organized as follows:

Section 4.1 renders preliminary investigation of study data to determine its basic features. The section, therefore, presents fundamental graphical and descriptive evidence as a summary of the properties of the Budget, Trade and the Financial Account Balance. Section 4.2 is concerned with unit root tests. Section 4.3 presents lag selection process and the Johansen Test which establishes the numbers of cointegrating equations and hence, determining the existence of short run or long run relationships. Section 4.4 presents the vector autoregressive (VAR) analysis processes and results, while Section 4.5 conducts the post estimation diagnostics analysis.

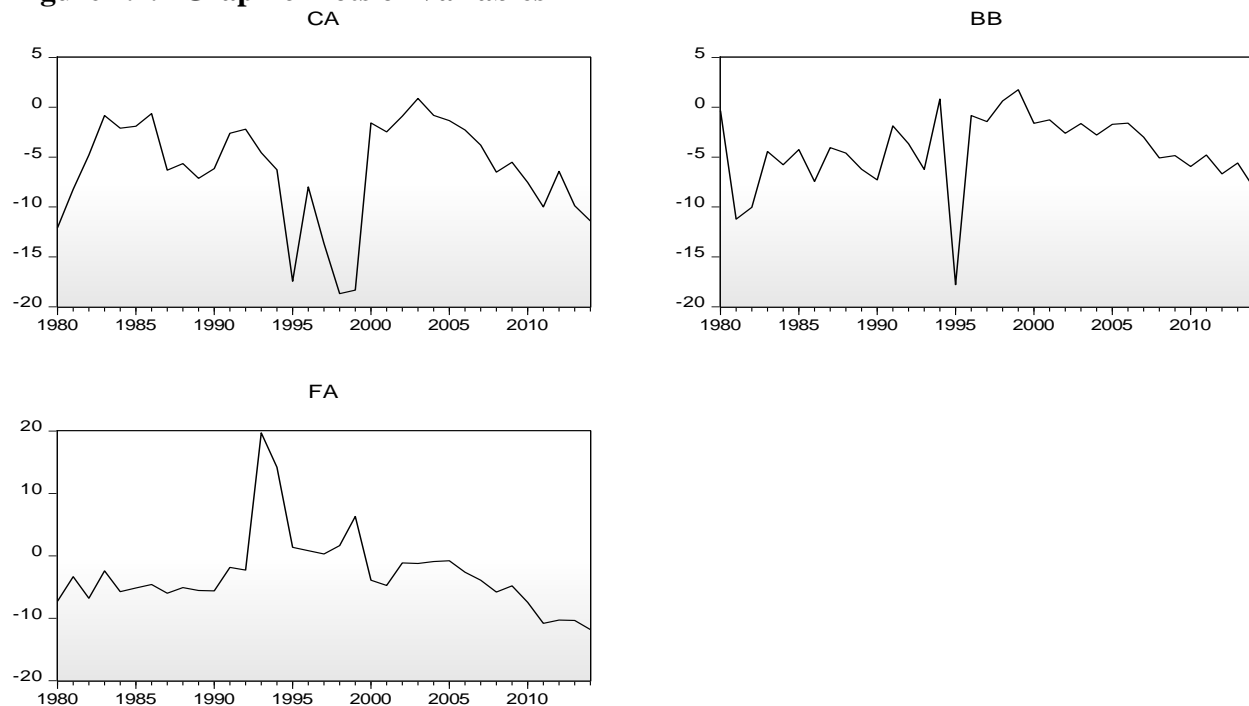
4.1 Description of Data

Preliminary inspection of data series was carried out to determine the basic properties of CA, BB and FA for the period 1980 - 2014.

4.1.1 Graphical Analysis of Data

With the aim of providing a graphical check of the study's data, each series' graphical plot was constructed. Figure 4.1.1 displays time series plots for each variable.

Figure 4.1.1 Graphic Plots of Variables



Source: Estimation Results

An assessment of figure 4.1.1 results shows that the data is tending to be stationary. Thus the study’s variables of interest exhibit mean-reverting and time-independent tendencies characteristic in stationary time series. However, section 4.2 presents the econometric stationarity tests conducted.

4.1.2 Descriptive Statistics

Table 4.1.2 presents the descriptive statistics of the data series. The series distribution can be investigated by estimating different statistical measures.

Figure 4.1.2 Descriptive Statistics Results

	CA	BB	FA
Mean	6.2030	-4.3256	-2.8053
Median	-5.6503	-4.2529	-3.9106
Maximum	0.8885	1.7519	19.7112

Minimum	-18.6719	-17.7849	-11.8124
Std. Dev.	5.1490	3.7943	6.2701
Skewness	-0.9694	-1.2839	1.7925
Kurtosis	3.2661	5.8502	7.1875
Jarque-Bera	5.5848	21.4628	44.3156
Probability	0.0613	0.0000	0.0000
Sum	-217.1048	-151.3967	-98.1871
Sum Sq. Dev	901.4309	489.4770	1336.6886
Observations	35	35	35

Source: Estimation Results

The minimum and maximum estimates show large deviations in the variables. This points towards instability of the variables over the period of the study.

It is also evident that the variables are significantly dispersed from their mean values as evidenced by their relatively high standard deviation values.

Jarque-Bera test, a more formal test for testing normality of distribution, was conducted. JB tests the joint hypothesis that the Kurtosis coefficient and skewness coefficient are respectively 3 and 0. The results of the Jarque-Bera test indicate that CA follows a normal distribution while BB and FA follow a non-normal distribution.

4.1.3 Correlation Matrix

Correlation analysis was carried out to establish the relationship between variables. The Pearson correlation coefficient is a measure of the direction and strength of a linear relationship, denoted by ρ . It was used to carry out correlation analysis. It can take a range of values from -1 to +1.

When ρ is 0, it implies no linear relationship between the two variables. Values greater ρ of than 0 indicate positive associations whereas, values less than 0 indicate negative associations.

Table 4.1.3 Correlation Matrix Coefficient Results

	CA	BB	FA
CA	1.0000	0.1078	-0.0634
BB	0.1078	1.0000	0.2496
FA	-0.0634	0.2496	1.0000

Source: Own computation

The correlation matrix, given in Table 4.1.3 indicate that all the variables had a perfect correlation with themselves as was expected ($\rho=1.0000$).

CA was weakly and positively related to BB. ($\rho= 0.1078$).

CA was weakly and negatively related to FA. ($\rho= -0.0634$)

FA was weakly and positively related to BB. ($\rho= 0.2496$)

According to Gujarati (2011), a correlation of more than 0.8 indicates presence of multicollinearity. From the results, multicollinearity may not be present as a result of less than 0.8 correlation coefficients.

4.2 Stationarity

4.2.1 Stationarity Tests

ADF and PP tests for stationarity were conducted to establish the order of integration of the variables. KPSS test was applied as a confirmatory test.

The PP and ADF unit root tests were conducted on the null hypothesis that the study's variables have a unit root (are non-stationary) while the KPSS test was used to investigate the null hypothesis that the variables have no unit root (are stationary).

In carrying out the PP and ADF tests, if the test statistic value is less than the critical value at a chosen level of significance, then the null hypothesis is rejected. Thus, no unit roots, therefore stationarity. For the KPSS test, the computed test statistic value needed to be greater than the critical value in order for its null hypothesis not to be rejected.

Table 4.2.2 presents the results that show the ADF and PP tests rejected the null hypothesis that there exists unit root at level for BB, FA and CA at 1%, 5% and 10% level of significance respectively. KPSS test confirmed that the level of integration was at level for all the variables CA, BB, and FA. Hence, the overall order of integration was zero, thus I (0). That is, the data series for CA, BB, and FA were stationary at level.

This finding suggested that there are no correlational vectors between the study's variables. Consequently the model could be used within a simple VAR framework.

Table 4.2.2 Unit Root Test Results

Variable	Test	Lag	Restriction	t-Stat/ LM-Stat	Inference
CA	ADF	0	None	-1.7849*	I(0)
	PP	0	None	-1.7289*	I(0)
	KPSS	0	Constant	0.0755	I(0)
BB	ADF	0	None	-2.7830***	I(0)
	PP	0	None	-2.7269***	I(0)
	KPSS	0	Constant	0.2182	I(0)
FA	ADF	0	None	-2.2142**	I(0)
	PP	0	None	-2.2142**	I(0)

KPSS	0	Constant	0.2062	I(0)
------	---	----------	--------	------

Notes:

***, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.**

The optimal lag lengths for the ADF tests are automatically determined by the Akaike Information Criterion (AIC).

The bandwidths for the PP and KPSS tests are automatically determined by the Newey-West Bartlett Kernel selection.

Source: Estimation Results

4.3 Cointegration

The cointegration test was conducted to determine the existence of short-run or long-run relationships between the variables. This would in turn determine whether the model would be run under a Vector Autoregressive (VAR) or Vector Error Correction Model framework.

This study employed the Johansen Test to establish presence of short-run or long run relationships between the variables. To make an inference, the trace statistic was compared to the 5% critical value. If, at a given maximum rank level, the trace statistic was greater than the 5% critical value, the null hypothesis that there is no cointegration was rejected. Hence, we would proceed to test for a long-run relationship via a vector error-correction (VECM) model. If, on the other hand, at a given maximum rank level, the trace statistic was less than the 5% critical value, we would fail to reject the null hypothesis that there is no cointegration. Hence we would proceed to test for a short-run relationship via a Vector AutoRegression (VAR) model.

Prior to estimation using Johansen test, the optimal lag length was established.

4.3.1 Lag Selection

The Akaike, Bayesian-Schwarz and Hannan-Quinn information criteria was employed to establish the optimal number of lags that are to be included in the cointegration test and succeeding VECM or VAR model. To establish the lag length, the unrestricted VAR was projected with all variables in levels with a maximum number of lags, then reduced down by re-estimating the model for one lag less down till the level at which AIC value was least.

From the Optimal Lag Length Results presented in Appendix II, the ideal lag length for this study was found to be 7. The Final Prediction Error, the Akaike criterion (AIC), Hannan-Quinn criterion (HQIC) and the Schwarz-Bayesian criterion (SBIC) all chose seven lags as indicated by * in the output.

4.3.2 Johansen Test

Table 4.3.2 Johansen Test Results

Sample (adjusted): 1988-2014
Included observations: 27 after adjustment
Trend assumption: No deterministic trend
Series: BB CA FA
Lag interval (in first differences): 1 to7
Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Eigenvalue	Trace statistic	5% Critical Value	Prob.**
No. of CE(s)				
None*	0.9821	171.1560	24.2760	0.0001
At most 1*	0.8468	62.4877	12.3209	0.0000
At most 2*	0.3551	11.8421	4.1299	0.0007

Trace test indicates 3 cointegrating equations at the 0.05 level
***denotes rejection of the hypothesis at the 0.05 level**
**** MacKinnon-Haug-Michelis (1999) p-values**

Although Johansen test indicate presence of cointegration at the 0.05 level, this will not affect VAR process as long as the standard asymptotic theory is valid (that is, as far as the order of integration of the process does not exceed the true lag length of the model) (Toda & Yamamoto, 1995).

4.4 Vector autoregressive (VAR) Analysis and Results

4.4.1 VAR Model Estimation

This section analyzes the short-run relationship existing between the study's variables under a VAR framework.

The results for VAR model are presented in table 4.4.1 below.

$$\begin{aligned}
 BB_t = C_0 + \sum_{i=1}^k \beta_{1i} BB_{t-i} + \sum_{j=k+1}^{d_{\max}} \beta_{2j} BB_{t-j} + \sum_{i=1}^k \mu_{1i} CA_{t-i} + \sum_{j=k+1}^{d_{\max}} \mu_{2j} CA_{t-j} + \sum_{i=1}^k \delta_{1i} FA_{t-i} \\
 + \sum_{j=k+1}^{d_{\max}} \delta_{2j} FA_{t-j} + \varepsilon_{1t}
 \end{aligned}
 \tag{4.1}$$

$$\begin{aligned}
 CA_t = C_1 + \sum_{i=1}^k \theta_{2i} CA_{t-i} + \sum_{j=k+1}^{d_{\max}} \theta_{2j} CA_{t-j} + \sum_{i=1}^k \pi_{1i} BB_{t-i} + \sum_{j=k+1}^{d_{\max}} \pi_{2j} BB_{t-j} + \sum_{i=1}^k \varphi_{1i} FA_{t-i} \\
 + \sum_{j=k+1}^{d_{\max}} \varphi_{2j} FA_{t-j} + \varepsilon_{2t}
 \end{aligned}
 \tag{4.2}$$

$$\begin{aligned}
 FA_t = C_2 + \sum_{i=1}^k \partial_{2i} FA_{t-i} + \sum_{j=k+1}^{d_{\max}} \partial_{2j} FA_{t-j} + \sum_{i=1}^k \gamma_{1i} BB_{t-i} + \sum_{j=k+1}^{d_{\max}} \gamma_{2j} BB_{t-j} + \sum_{i=1}^k \sigma_{1i} FA_{t-i} \\
 + \sum_{j=k+1}^{d_{\max}} \sigma_{2j} FA_{t-j} + \varepsilon_{3t}
 \end{aligned}
 \tag{4.3}$$

Table 4.4.1: VAR Estimation Results

Sample (adjusted): 1987- 2014	Standard Errors in () and t-statistics in []		
	BB	CA	FA
BB(-1)	-0.3071 (0.3338) [-0.9202]	-0.0221 (0.4612) [-0.0479]	-0.6424 (0.5864) [-1.0955]
BB(-2)	-0.2588 (0.3169) [-0.8167]	-0.3820 (0.4378) [-0.8725]	-0.2463 (0.5568) [-0.4424]
BB(-3)	-0.2494 (0.2364) [-1.0548]	-0.1496 (0.3266) [-0.4580]	-1.0350 (0.4156) [-2.4920]
BB(-4)	-0.3253 (0.2633) [-1.2357]	-0.0503 (0.3638) [-0.1384]	-2.2400 (0.4625) [-4.8429]
BB(-5)	-0.4346 (0.2632) [1.5423]	-0.7063 (0.3893) [-1.8142]	-0.9961 (0.4951) [-2.0121]
BB(-6)	-0.0142 (0.1983) [-1.5423]	-0.0195 (0.2740) [-0.0711]	0.9413 (0.3485) [2.7013]
CA(-1)	0.5799 (0.2830) [2.0487]	0.9135 (0.3911) [2.3360]	1.8329 (0.4973) [3.6861]
CA(-2)	0.0200 (0.2835) [0.0707]	0.4196 (0.3916) [1.0714]	1.8329 (0.4973) [3.6861]
CA(-3)	0.2495 (0.1776) [1.4048]	0.4839 (0.2454) [1.9719]	0.2331 (0.3121) [0.7470]
CA(-4)	-0.3141 (0.1896) [-1.6570]	-0.3665 (0.2619) [-1.3993]	-0.8064 (0.3330) [-2.4214]
CA(-5)	0.1281	-0.1972	0.2300

	(0.1541) [0.8315]	(0.2129) [-0.9264]	(0.2707) [0.8497]
CA(-6)	0.0097 (0.1639) [0.0596]	-0.0578 (0.2265) [-0.2550]	-0.2539 (0.2880) [-0.8815]
FA(-1)	0.1725 (0.1209) [1.4269]	-0.1657 (0.1670) [-0.9923]	0.3545 (0.2124) [1.6695]
FA(-2)	-0.5239 (0.1759) [-2.9791]	-0.3641 (0.2430) [-1.4983]	0.4279 (0.4505) [1.5672]
FA(-3)	0.7870 (0.2564) [3.0696]	1.0230 (0.3543) [2.8878]	0.7060 (0.4505) [1.5672]
FA(-4)	-0.3309 (0.2309) [-1.4334]	-0.6814 (0.3190) [-2.1361]	-0.0659 (0.4056) [-0.1624]
FA(-5)	0.6369 (0.2397) [2.6568]	0.3133 (0.3312) [0.9459]	0.5827 (0.4211) [1.3837]
FA(-6)	-0.0175 (0.2397) [-0.0844]	-0.0650 (0.2873) [-0.2264]	-0.2595 (0.3653) [-0.7104]
C	-3.0447 (1.8989) [-1.6035]	-0.4051 (2.6236) [-0.1544]	0.9113 (3.3361) [0.2732]
BB(-7)	0.1888 (0.1857) [1.0168]	0.0444 (0.2566) [0.1796]	-0.3585 (0.3263) [-1.0987]
CA(-7)	0.0478 (0.1693) [0.2820]	0.4203 (0.2340) [1.7961]	0.7404 (0.2976) [2.4879]
FA(-7)	0.4216 (0.2110)	0.7682 (0.2915)	0.9656 (0.2976)

	[1.9987]	[2.6357]	[2.6052]
R-squared	0.9300	0.9340	0.9363
Adj. R-squared	0.6850	0.7029	0.7134
Sum sq. residuals	26.2868	50.1819	81.1398
S.E equation	2.0931	2.8920	3.6774
F-statistic	3.7959	4.0419	4.2004
Log likelihood	-38.8464	-47.8986	-54.6258
Akaike AIC	4.3462	4.9928	5.4738
Schwarz SC	5.3929	6.0395	6.5200
Mean dependent	-3.8532	-6.6612	-2.2435
S.D. dependent	3.7294	5.3058	6.8692
Determinant residual covariance (dof adj.)		356.2381	
Determinant residual covariance		3.5053	
Log likelihood		-136.7505	
Akaike Information Criteria		14.4822	
Schwarz criterion		17.6224	

$$\begin{aligned}
BB = & - 3.0447 - 0.3071BB(-1) - 0.2588BB(-2) - 0.2494BB(-3) - 0.3253BB(-4) - 0.4346*BB(-5) \\
& - 0.0142BB(-6) + 0.1888BB(-7) + 0.5799CA(-1) + 0.0200CA(-2) + 0.2495CA(-3) - 0.3141CA(-4) \\
& + 0.1281CA(-5) + 0.0098CA(-6) + 0.0478CA(-7) + 0.1725*FA(-1) - 0.5239FA(-2) + \\
& 0.7870FA(-3) - 0.3309FA(-4) + 0.6369FA(-5) - 0.01755FA(-6) + 0.4216FA(-7) \dots \dots \dots (4.4)
\end{aligned}$$

$$\begin{aligned}
CA = & - 0.4051 - 0.0221BB(-1) - 0.3820BB(-2) - 0.1496BB(-3) - 0.0503BB(-4) - 0.7063BB(-5) - \\
& 0.0195BB(-6) + 0.0444BB(-7) + 0.9135CA(-1) + 0.4196CA(-2) + 0.4839CA(-3) - 0.3665CA(-4) \\
& - 0.1972CA(-5) - 0.0578CA(-6) + 0.4203CA(-7) - 0.1657FA(-1) - 0.3641FA(-2) + 1.0230FA(-3) \\
& - 0.6814FA(-4) + 0.3133FA(-5) - 0.0650FA(-6) + 0.7683FA(-7) \dots \dots \dots (4.5)
\end{aligned}$$

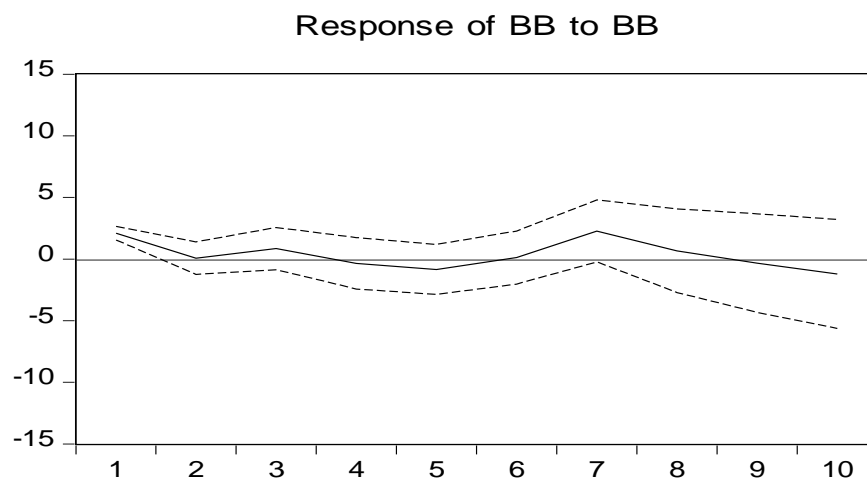
$$\begin{aligned}
FA = & 0.9113 - 0.6424BB(-1) - 0.2463BB(-2) - 1.0350BB(-3) - 2.2400BB(-4) - 0.9961BB(-5) + \\
& 0.9413BB(-6) - 0.3585BB(-7) + 1.8329CA(-1) + 0.5807CA(-2) + 0.2331CA(-3) - 0.8064CA(-4) \\
& + 0.2300CA(-5) - 0.25389CA(-6) + 0.7404CA(-7) + 0.3545FA(-1) + 0.4279FA(-2) + \\
& 0.7060FA(-3) - 0.0659FA(-4) + 0.5827FA(-5) - 0.2595FA(-6) + 0.9656FA(-7) \dots \dots \dots (4.6)
\end{aligned}$$

4.4.2 Impulse Response Function

IRF establishes the responsiveness of dependent variables in the VAR when a shock is placed on the error term.

The IRF results of the unrestricted VAR model were presented to reveal the relationship between BB, CA and FA and to enable achievement of study's hypotheses. These results were shown below, covering a ten year period.

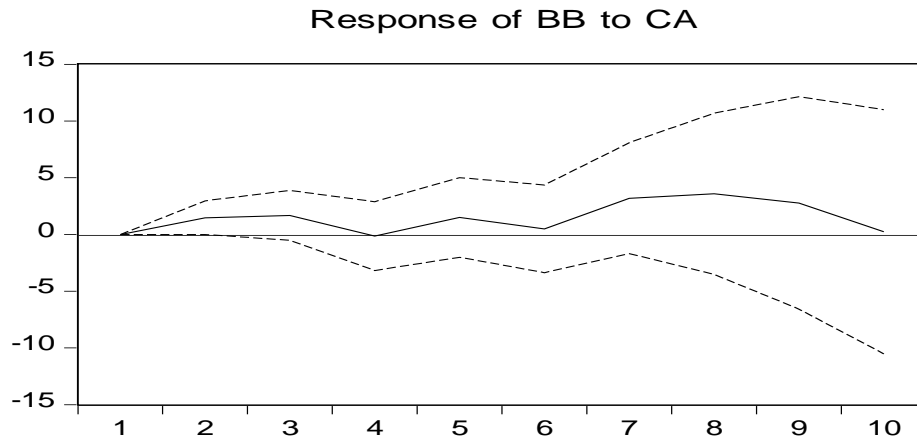
Figure 4.3(a) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

From the figure 4.3(a) above, it was shown that BB responds to a 1 per cent standard deviation shock to BB in an oscillatory manner. Thus, BB drops from 2.1 per cent in the first year to 0.1 per cent in the second year, rises to 0.8 per cent in the third year and then drops to -0.4 per cent in the fourth year. It further drops to -0.5 per cent in the fifth year before rising again to 0.1 per cent and 2.3 per cent in the sixth and seventh years respectively. On the eighth, ninth and tenth year it drops as follows: 0.7 per cent to -0.3 per cent to -1.2 per cent.

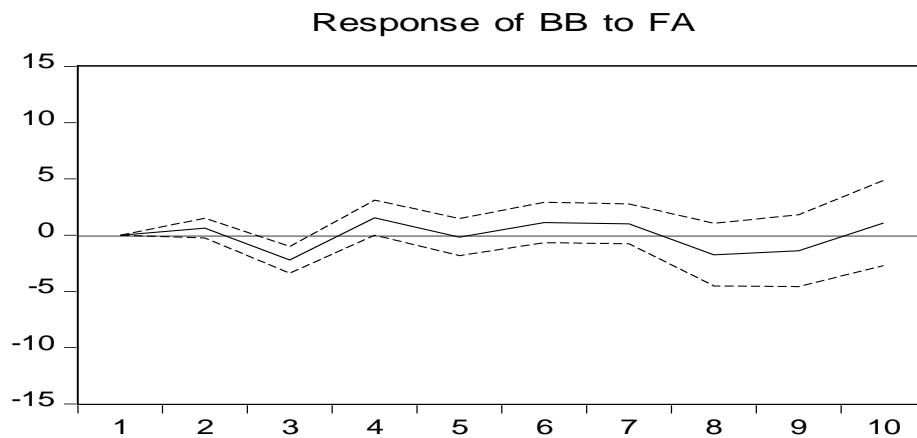
Figure 4.3(b) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

From the figure 4.3(b) above, it was shown that BB responds to a 1 per cent standard deviation shock to CA in an oscillatory manner. Thus, in the first year BB does not respond to shocks on CA. During the second year, shocks on CA cause BB go up to 1.5 per cent, then farther to 1.7 per cent in the third year and then drop to -0.2 per cent in the fourth year. In the fifth year, BB goes up again to 1.5 per cent before dropping to 0.5 per cent in the sixth year. In the seventh and eighth years, BB goes up again to 3.2 and 3.6 per cent before declining to 2.8 and 0.2 per cent in the ninth and tenth years respectively.

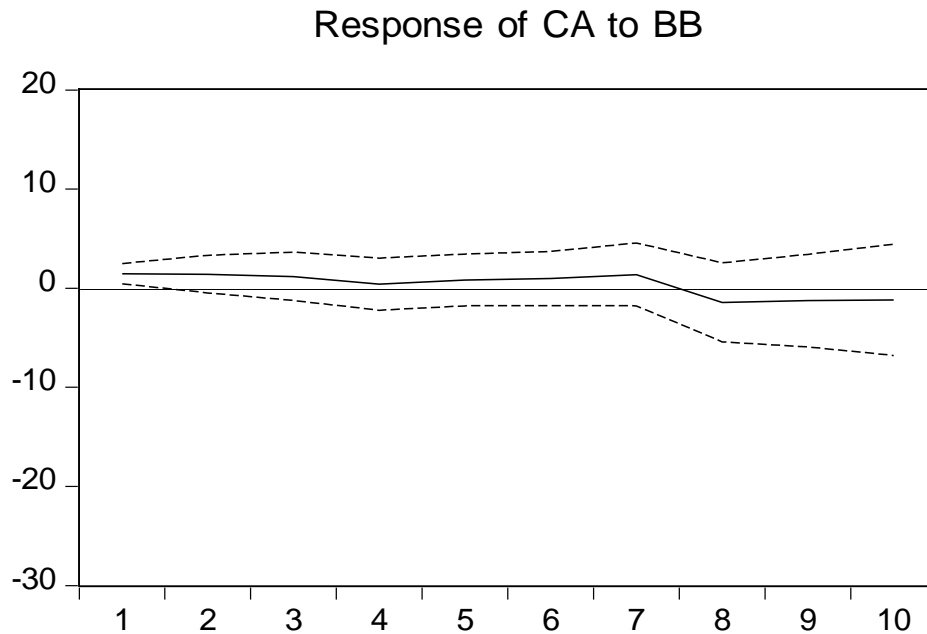
Figure 4.3(c) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

From the figure 4.3(c) above, it was shown that BB responds to a 1 per cent standard deviation shock to FA in an oscillatory manner. Thus, in the first year BB does not respond to shocks on CA. During the second and subsequent years, a 1 per cent standard deviation shock on FA causes BB to fluctuate in the negative and positive with the lowest percentage being -2.2 per cent in the third year and highest of 1.5 per cent in the fourth year.

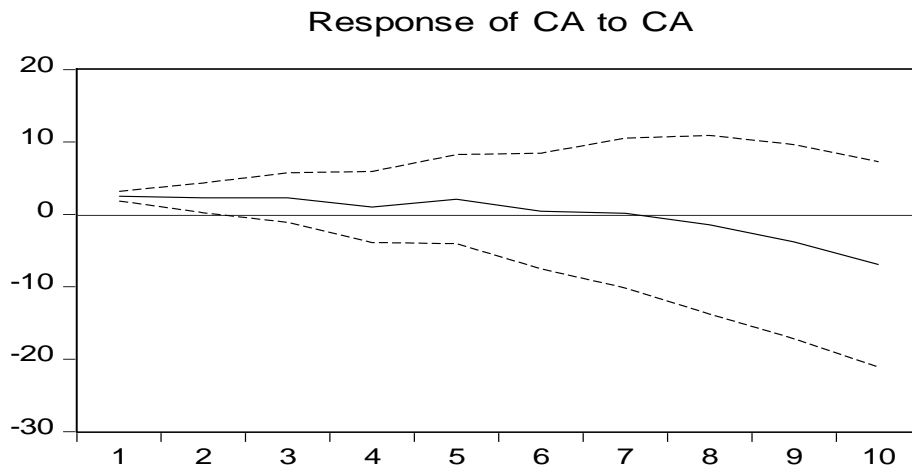
Figure 4.3(d) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

When a 1 per cent standard deviation shock is on BB, CA seems to stabilize between 0.0 and 1.0 per cent in the first seven years. In the eighth year CA drops from 1.0 per cent to -1.0 per cent and then stabilizes thereafter.

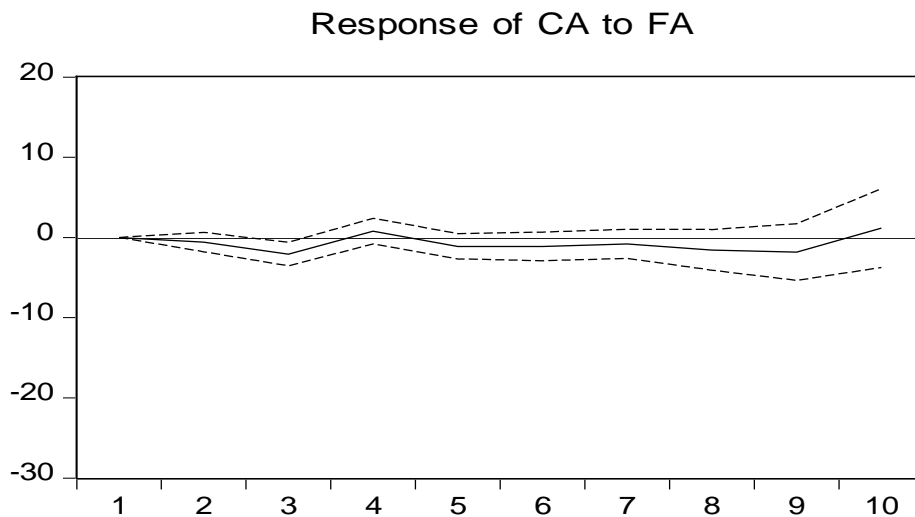
Figure 4.3(e) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

A 1 per cent standard deviation shock on CA causes CA to decline steadily from 3.0 percent in the first year to -7.0 per cent in the tenth year.

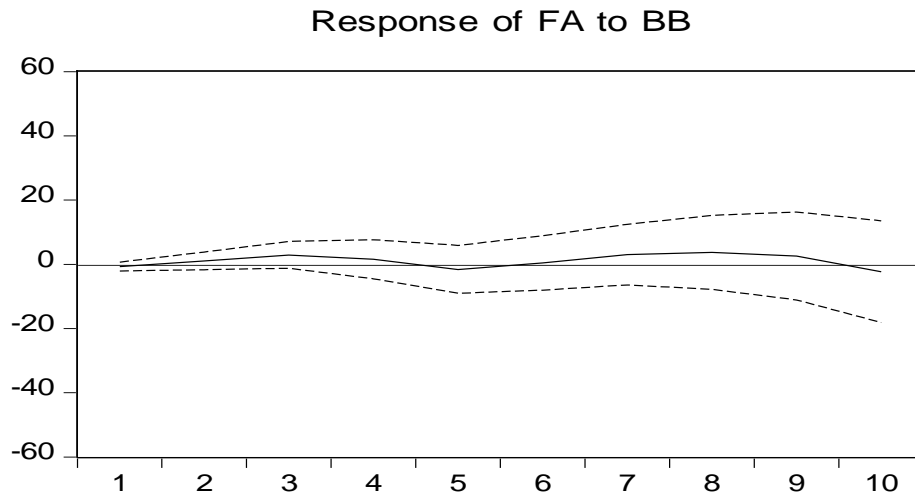
Figure 4.3(f) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

CA does not respond to a 1 per cent standard deviation shock on FA in the first year. In the subsequent years, a 1 per cent standard deviation shock on FA cause CA to fluctuate in a relatively stable manner within the range of -2.0 per cent to 1.0 per cent.

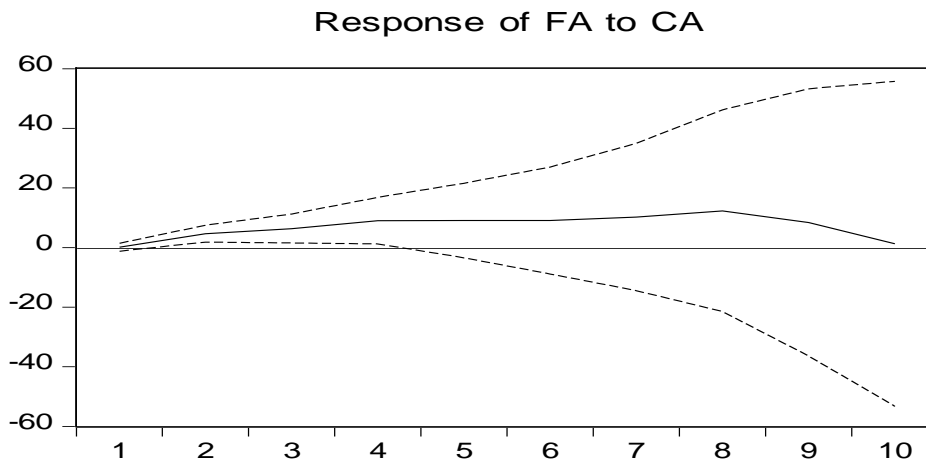
Figure 4.3(g) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

From figure 4.3(g) above, a 1 per cent standard deviation shock on BB causes FA to drop to -1.0 per cent in the first year. Over the next two years, FA rises to 3.0 per cent. In the subsequent two years (that is, fourth and fifth), BB drops to -2.0 per cent. It then rises to a maximum of 4.0 per cent in the eighth year and finally drops to 0.2 per cent in the tenth year.

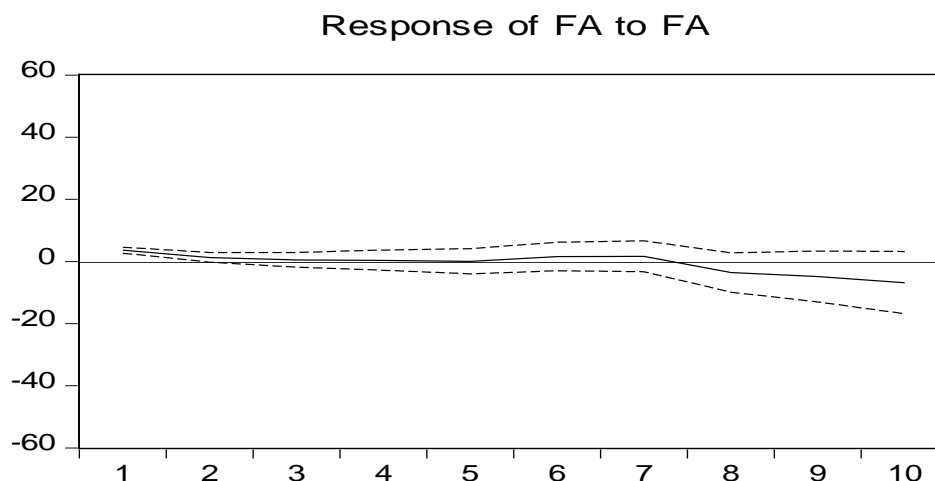
Figure 4.3(h) Response to Cholesky One S.D. Innovations ± 2 S.E.



Source: Own computation

A 1 per cent standard deviation shock on CA causes FA to rise steadily from 0.0 per cent in the first year to 12.0 per cent in the eighth year. It then declines afterwards and settles at 1.0 per cent in the tenth year.

Figure 4.3(i) Response to Cholesky One S.D. Innovations \pm 2 S.E.



Source: Own computation

FA declines steadily from 4.0 per cent during the first four years to 0.0 percent in response to 1 percent standard deviation shock on FA. During the fifth year, FA does not respond to own shocks. In the sixth and the seventh year, 1 per cent standard deviation FA shocks causes FA to stabilize at 2.0 per cent before declining to -4.0 per cent in the eighth year and further to -5.0 percent and then -7.0 per cent in the ninth and tenth year respectively.

4.4.3 Variance Decomposition

Variance decomposition touches on the conditional variance of the impulse response. It is useful in interpreting an estimated VAR model by detailing the exact percentage where each variable's forecast errors is explained by its own innovations against exogenous innovations to other variables in a VAR system.

Table 4.3.3 (a) Variance Decomposition of BB

Variance Decomposition of BB:				
Period	S.E	BB	CA	FA
1	2.0931	100.0000	0.0000	0.0000
2	2.6303	63.3934	31.0288	5.5778
3	3.9103	33.3444	32.3690	34.2866
4	4.2235	29.2899	27.8718	42.8382
5	4.5625	28.5603	34.5827	36.8570
6	4.7235	26.7123	33.3056	39.9822
7	6.2169	28.8207	45.5345	25.6448
8	7.4131	21.0691	55.3407	23.5902
9	8.0411	18.0893	58.8823	23.0284
10	8.2076	19.5629	56.5967	23.8405

Source: Own computation

From table 4.3.3 (a), it give the impression that BB is largely influenced by its own shocks, ascribing 100 per cent in the first year. Shocks on BB seem to account for the significant variations in BB fluctuations in the first two years (that is 100 and 63.3934 per cent).

From year three to year six, FA emerges as a significant driver of BB, accounting to between 34.286 and 42.8382 per cent.

From year seven to year ten CA plays a considerable role in shaping the variations in fluctuation of BB, increasing gradually to a substantial contribution of between 45.5345 and 56.5967.

Table 4.3.3 (b) Variance Decomposition of CA:

Period	S.E	BB	CA	FA
1	2.8920	25.0599	74.9401	0.0000
2	3.9808	25.5675	72.1843	2.2448
3	5.1837	20.2505	62.2922	17.4572
4	5.3566	19.4932	61.9519	18.5549
5	5.9166	17.9441	63.3160	18.7400
6	6.1160	19.2949	59.7738	20.9313
7	6.3226	22.7455	55.7738	21.2559
8	6.8262	23.9521	52.5912	23.4567
9	8.1178	19.3779	58.9743	21.6479
10	10.8044	12.1366	74.4603	13.4031

Source: Own computation

From table 4.3.3(b), it is clear that CA is mainly driven by its own shocks, accounting for 74.9401 per cent in the first year which gradually falls to 52.5912 per cent in the eighth year and rise again to 74.4603 in the tenth year.

Shocks on FA influence up to 23.4567 per cent variation on CA during the forecast period.

Shocks on BB account for 25 per cent of variation of fluctuations in CA in the first two years. This gradually decline to 12 per cent in the tenth year.

Table 4.3.3 (c) Variance Decomposition of FA:

Period	S.E	BB	CA	FA
1	3.6774	4.0232	0.0452	95.9316
2	6.1289	4.3692	56.7536	38.8772
3	9.3038	11.6100	71.2288	17.1612
4	13.0202	7.3277	83.8304	8.8419
5	15.9292	5.9143	88.1781	5.9076
6	18.3873	4.4822	90.3508	5.1671
7	21.3141	5.3239	90.2239	4.4522
8	25.1365	5.9779	88.7846	5.2375
9	27.0609	6.0520	86.2055	7.7424
10	29.0378	6.3355	80.4979	13.1866

Source: Own computation

From Table 4.3.3 (c) own shocks on FA are the main drivers of variance in FA accounting for 95.9 % in the first year.

From year two, shocks on CA emerge as the main driver of FA contributing 56.8 per cent in year two which gradually increases to 90 percent in year seven and then slightly falls to 80 per cent in the tenth year.

Shocks on BB seem to be insignificant in influencing variation in fluctuation of FA, contributing only between 4 and 11 per cent during the forecast period.

4.4.4 Granger Causality Tests

A modified WALD (MWALD) tests for restrictions on the parameters of a VAR (7) was done using the Toda & Yamamoto Procedure. The null hypothesis that an independent variable does not Granger causes a dependent variable was tested against an alternative hypothesis that the independent variable Granger causes a dependent variable. The rejection of the null hypotheses was grounded on chi-square (χ^2) test of the Wald criterion. The null hypothesis would be rejected if the probability value study of chi-squared was less than 5 per cent. The rejection of the null hypothesis points towards evidence of causality. The results are presented in table 4.3.4.

Table 4.4.4: VAR Granger Causality Results

VAR Granger Causality/ Block Exogeneity Wald Tests Sample 1980-2014

Dependent variable: BB			
Excluded	Chi-sq	df	Prob.
CA	6.4608	6	0.3736
FA	43.4103	6	0.0000
All	56.4646	12	0.0000
Dependent variable: CA			
Excluded	Chi-sq	df	Prob.
BB	5.0559	6	0.5367
FA	9.9361	6	0.1274
All	25.2808	12	0.0135
Dependent variable: FA			
Excluded	Chi-sq	df	Prob.
BB	28.8740	6	0.0001
CA	22.9948	6	0.0008
All	39.4695	12	0.0001

Source: Own computation

With reference to the above results, FA granger causes BB. BB and CA granger cause FA.

4.5 Post-Estimation Diagnostics

4.5.1 Autocorrelation Test

A test for autocorrelation of residuals was conducted and the null hypothesis of no serial correlation was tested against the alternative hypothesis of serial correlation. Table below reports the results from the test.

Table 4.5.1: Autocorrelation Test Results

VAR Residual Serial Correlation LM Test		
Null Hypothesis: no serial correlation		
Lags	LM-Stat	Prob
1	11.0598	0.2716
2	8.8233	0.4537
3	4.2211	0.8963
4	9.4263	0.3989
5	7.9263	0.5416
6	10.6667	0.2992
7	16.4768	0.0576

Probability from chi-square with 9 df

From the above table, it was clear that the residuals of the model had no serial correlation, as indicated by the p-values greater than 5% levels of significance.

4.5.2 Normality Test

Normality test was conducted to establish the predictive accuracy of the model. The Jarque-Bera test applied determined whether the series residual were normally distributed by measuring the difference of the skewness and the kurtosis of the series residuals with those from the normal distribution.

Table 4.5.2: Normality Test Results

VAR Residual normality test

Null Hypothesis: Residuals are multivariate normal

Variable	Jarque-Bera	df	Prob.
BB	3.1511	2	0.2069
CA	5.1756	2	0.0752
FA	2.6978	2	0.2595
Joint	11.0245	6	0.0876

It was clear from the result that residuals were multivariate normal since their respective probability values (that is, 0.2069, 0.0752 and 0.295) of the Jarque-Bera statistics were greater than 5 per cent level of significance.

CHAPTER FIVE

CONCLUSION AND POLICY RECOMMENDATION

5.1 Introduction

This chapter presents a summary of the study, giving conclusion informed by the study's findings. It is composed of four sections. Section 5.2 presents a summarization of the study and discussing its empirical findings. This is followed by conclusion in section 5.3 and then policy implication in section 5.4. Areas for further research in section 5.5 complete the chapter.

5.2 Summary

The objective for the study was to test for the validity of the Triplet Deficits Phenomena by investigating the Fiscal, Current and Financial account deficit nexus in Kenya. The specific objectives were to: establish if there is any relationship between the budget, Current, and the Financial Account Balance; and to establish the direction of causality between the three Balances. These objectives were complimented by two major research questions; how the budget, Trade and Financial Account Balance relate and how they cause one another.

The structural VAR model in form of three equations was used in analysis. The first equation had the Budget Balance as the dependent variable while Current Account Balance and Financial Account Balance were the independent variables. The second equation had the Current Account Balance as the dependent variable while Budget Balance and Financial Account Balance were the independent variables. The third equation had the Financial Account Balance as the dependent variable while Current Account Balance and the Budget Balance were the independent variables.

Preliminary investigation of the data was done through summary/descriptive statistics, graphical review and correlation matrix. This was followed by unit root tests, which were conducted through ADF, PP and KPSS tests. KPSS test was applied as confirmatory test of the ADF and PP results. Then, it proceeded to test for cointegration. The lag selection was first established and then a Johansen Test was run, followed by a vector autoregressive (VAR) analysis. To be specific, the short-run dynamics and causality between the variables were conducted using the impulse response function (IRF) and the variance decomposition tests within the VAR framework. The Toda and Yamamoto (1995) MWALD testing procedure was used to test for causality among variables. Lastly, post estimation diagnostics analysis was done i.e. test for autocorrelation and normality.

The overall findings are that a deficit in the Fiscal account increases the Current Account deficit and widens the Financial Account Balance through the Savings-Investment imbalance. Current Account Balance, on the other hand increases Budget Balance but decreases Financial Account Balance. Financial Account Balance increases Budget Balance but is negative on the Current Account Balance. The Budget Balance is mainly driven by its own shocks in the first two years. Financial Account Balance drive Budget Balance shocks between the third and sixth year while Current Account Balance drives Budget Balance shocks between the seventh and tenth year. The Current Account Balance is mainly driven by its own shocks from the first to the tenth year. Financial Account Balance is only driven by its own shocks in the first year. However, Current Account Balance drives Financial Account Balance shocks from the second to the tenth year. Budget Balance causes no shocks on Financial Account Balance.

In terms of causality, Financial Account Balance causes Budget Balance while Budget Balance and Current Account Balance cause Financial Account Balance. This evidences the validity of the Triplet Deficits Hypothesis for the Kenya case.

These findings are in support of the Keynesian/Conventional approach that demonstrates how the three deficits in the budget account, trade account and financial account draw a parallel. The approach posits that a budget deficit would indirectly result in the other two deficits. The findings of the study indicate that a deficit in the budget account results in an increase in the current account deficit and widens the financial account balance. Based on these findings, the exchange rate channel in the transmission mechanism under the Keynesian/Conventional approach is more efficient or stronger relative to the real interest rate channel.

Post estimation diagnostic tests established that residuals are normal and they are not auto correlated.

5.3 Conclusions

The study was interested in investigating the triplet deficits hypothesis for Kenya by investigating the Fiscal, Current and Financial Accounts deficit nexus. The overall finding is that Fiscal deficit increases both Current Account deficit and Financial Account Balance. Current Account deficit on the other hand increases fiscal Balance but decreases Financial Account Balance. Financial Account Balance increases the fiscal Budget Balance but is negative on the Current Account Balance. In terms of causality, Financial Account Balance causes Fiscal Balance, while fiscal Balance and Current Balance cause Financial Account Balance. These findings evidence validity of the Triplet Deficit Hypothesis for the Kenyan case, and an indication of verification of the Keynesian/Conventional approach.

The study recommends that the state should formulate fiscal and monetary policies that manage the government's revenue and expenditure. This can be achieved by the state looking into ways of boosting its revenue stream while shrinking expenditures. Addressing this deficit in the Fiscal account will improve the economy's current account balance; while at the same time reduce the country's overreliance on external funding as reflected in the country's Savings-Investment imbalance. Fiscal Deficit can be addressed through various ways. For example, having proper and efficient tax collection and administration systems (Koori, 1992); putting mechanisms to safeguard the economy from macroeconomic shocks and improving the terms of trade for Kenya's exports (Lesiit, 1990), and having fiscal discipline in form of good budgetary processes (Wawire, 2006).

Also, that the findings indicate that Financial Balance increases Budget Balance but is negative on the Current Account Balance, points towards insufficient savings in the economy failing to fully finance investments, and thus resulting in a rise in the budget deficit. This can be addressed by promoting economic growth, which will allow for increased savings and the promotion of a saving culture.

5.4 Policy Implications

The findings of this study have important policy implications for the economic growth strategies and plans that the Kenyan Government implements.

- (a) First, that a Budget Balance increases both the Current Account Balance and Financial Account Balance, the government and policy makers need to control the budget deficits as a way of reducing its adverse effect on the country's terms of trade through the current account balance and overreliance on external funding through the Financial Account Balance. This can be achieved through having proper and efficient tax collection and administration

systems, having in place mechanisms to safeguard the economy from macroeconomic shocks such as having adequate foreign-exchange reserves, improving the terms of trade for Kenya's exports, and having fiscal discipline in the budgetary process.

- (b) Second, there is need for the government to put in place policy measures that encourage domestic savings. This will have the effect of improving the budget deficit as well as help augment domestic investments. Increasing total savings will play a significant role in ensuring a sustainable budget and Trade deficit. Policies that can help encourage domestic savings include reducing the amount of credits by use of interest rates, which is an important instrument for raising the savings rate, and monetary policy instruments such as rediscount ratios and reserve ratios. In addition, the state should prioritize practices such as financial sector restructuring especially with reference to sectorial credits and credit arrangements. Towards this, the monetary policy authority has an important role to play.
- (c) Thirdly, need to carry counter measures by the central bank to manage either interest rate or exchange rates in response to increase in government expenditure. For instance, when budget deficit increases, central bank can increase money supply to reduce interest rate as counter measure. Interest rates are also important in attracting foreign investment which finances the trade account deficits. High interest rate can negatively impact economic growth by way of reducing investment and consumer spending, and in parallel with increasing savings. In this context, there can occur the saving paradox. Thus, any austerity measures or cutback in expenditures should be undertaken via consumer spending to reduce the trade deficit. This shrink in consumer spending in the short run makes significant contribution in reducing trade deficit by boosting investments in the long run.
- (d) Lastly, the governments can be encouraged to borrow money on concession rates offshore

to reduce the need for domestic borrowing. Increased domestic borrowing crowds out domestic investment resulting in a drop in GDP growth.

5.5 Areas for Further Research

One area for further research would be the use of alternate testing approaches such as the Dolado-Lutkepohl Granger Causality, Asymmetric Causality Test, ARDL Approach or Bounds Test Approach. This is for the reason that different methodological approaches have been found to give different results. For example, Sen, Senturk, Sancar and Akbas (2011); Akinci and Yilmaz (2012); Akbas, Lebe, and Zeren (2014); and Sürekçi (2011) investigated the validity of TDH for the turkey economy using different methodological approaches and obtained contradictory findings.

Another area for further research is investigation of the TDH in a multivariate approach incorporating interest rates and exchange rates as intervening variables. Leachman and Francis (2002), argued that transmission of the three deficits varies across exchange rate regimes, as such, further studies can be conducted on the Triplet Deficits phenomena across exchange rate regimes, or within the context of exchange rates and interest rates.

References

- Adedeji, O. S. (2001). The Size and Sustainability of Nigerian Current Account Deficits. *IMF Working Papers, 01/87*.
- AKBAŞ, Y. E., Lebe, F., & Zeren, F. (2014). Testing the Validity of the Triplet Deficit Hypothesis for Turkey: Asymmetric Causality Analysis. *Journal of Business and Economics, 7(14)*, 137-154.
- Akıncı, M., & Yılmaz, Ö. (2012). Validity of the Triple Deficits Hypothesis in Turkey: Bounds Test Approach. *Istanbul Stock Exchange, 13(50)*, 1-28.
- Anoruo, E., & Ramchander, S. (1998). Current Account and Fiscal Deficits: Evidence from Five Developing Economies of Asia. *Journal of Asian Studies, 9(3)*, 487-501.
- Asteriou, D., & Hall, S. G. (2007). *Applied Econometrics: A Modern Approach using EViews and Microfit* (Revised ed.). New York, NY: Palgrave MacMillan.
- Bachman, B. (1992). Current Account Deficit Unrelated to Budget Surplus. *National Centre for Policy Analysis*.
- Barro, R. J. (1989). A Cross-Country Study of Growth, Saving, and Government. *National Bureau*, 271 - 304.
- Bartolini, L., & Labiri, A. (2006). Twin Deficits, Twenty Years Latter. *Current Issues in Economics and Finance, 12(7)*, 1-7.
- Baxter, M., & Crucini, M. (1993). Explaining Saving-Investment Correlations. *American Economic Review, 83(3)*, 416-36.

- Bevan, D. L., Collier, P., & Gunning, J. W. (1999). *The political economy of poverty, equity, and growth : Nigeria and Indonesia. A World Bank comparative study*. New York: Oxford University Press.
- Calderon, C., Chang, A., & Loayza, N. (2000). Determinants of Current Account Deficits in Developing Countries. *World Bank Policy Research Working Paper*, 2398.
- Calderon, C., Chong, C., & Zanforlin, L. (2007). Current Account Deficits In Africa: Stylized Facts and Basic Determinants. *Economic Development and Cultural Change*, 56(1), 191-221.
- Carranza, L., & Wong, C. H. (1999). Policy Responses to External Imbalances in Emerging Market Economies: Further Empirical Results. *IMF Staff Papers*, 46(2), 225-237.
- Cavallo, M. (2005). Understanding the Twin Deficits: New Approaches, New Results. *FRBSF Economic Letter*, 1-4.
- Chowdhury, K., & Saleh, A. S. (2007). Testing the Keynesian Proposition of Twin Deficits in the Presence of Trade Liberalisation: Evidence from Sri Lanka. *Faculty of Business Economics Working Papers*, 2-35.
- Coban, H., & BALIKÇIOĞLU, E. (2016). TRIPLE DEFICIT OR TWIN DIVERGENCE : A DYNAMIC PANEL ANALYSIS. *The International Journal of Economic and Social Research*, 12(1), 271-280.
- Coughlin, C. C., Pakko, M. R., & Poole, W. (2006). How dangerous is the U.S. current. *Regional Economics*.

- Daly, V., & Siddkki, J. U. (2009). The Twin Deficits in OECD Countries: Cointegration Analysis with Regime Shifts. *Applied Economic Letters*, 16(11), 1155-1164.
- Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 74(366), 427-431.
- Dolado, J. J., & Lutkepohl, H. (1996). Making WALD Test Work for Cointegrated VAR Systems. *Econometric Theory*, 15.
- Domenech, R., Taguas, D., & Varela, J. (2000). The Effects of Budget Deficit on National Saving in the OECD. *Economics Letters*, 69(3), 377-383.
- Dooley, M., & Penati, A. (1984). Current Account Imbalances and Capital Formation in Industrial Countries, 1949-81. *Staff Papers-International Monetary Fund*, 1-24.
- Egwaikhide, F. O., Ayodele, S. O., Oyeranti, O. A., & Tchokote, J. (2002). Causality between Budget Deficit and the Current Account Balance in African Countries. *West African Journal of Monetary and Economic Integration*, 2(2), 10-41.
- Eichengreen, B. (2006). Global Imbalances: The New Economy, The Dark Matter, The Savvy. *Journal of Policy Modelling*, 28(6), 645-652.
- Ender, W. (2010). *Applied Econometric Time Series*. New York, NY: John Wiley & Sons.
- Engle, R. F., & Granger, C. W. (1987). Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55(2), 251-276.
- Fausten, D. K. (1990). Current and Capital Account Interdependence. *Journal of Post Keynesian Economics*, 12(2), 273-292.

- Feldstein, M. S. (2008). Resolving the Global Imbalance: The Dollar and the U.S. Saving Rate. *NBER Working Paper No. 13952*.
- Granger, C. W. (1988). Some Recent Developments in a Concept of Causality. *Journal of Econometrics*, 39(1), 199-211.
- Gruber, J. W., & Kamin, S. B. (2007). Explaining the global pattern of current account imbalances. *Journal of International Money and Finance*, 26(4), 500-522.
- Gujarati, D. N. (2004). *Basic Econometrics* (4th ed.). Tata: McGraw Hill.
- Gujarati, D. N. (2011). *Econometrics by Example*. Hampshire: Palgrave MacMillan.
- Higgins, M., & Klitgaard, T. (1998). Viewing the Current Account Deficit As a Capital Inflow. *Current Issues In Economics and Finance*, 4(13), 1-6.
- Hoffmann, M. (2001). The Relative Dynamics of Investment and the Current Account in the G- & Economies. *The Economic Journal, Conference Papers*, 111(471), 148-163.
- Holmes, M. J. (2003). Are the Trade Deficits of Less Developed Countries Stationary? Evidence for African Countries. *Applied Econometrics and International Development*, 3(3), 7-24.
- International Monetary Fund. (2015). *Debt Sustainability Analysis (DSA)- Kenya*. New York, NY: The IMF.
- Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control*, 12, 231-254.

- Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration with Applications to Demand for Money. *Oxford Bulletin of Economics and Statistics*, 52, 169-210.
- Kaiba, E. N., Kosimbei, G. N., & Korir, J. (2014). Testing the twin deficit hypothesis for Kenya 1970 - 2012. *International Journal of Business and Economics Research*, 3, 160-169.
- Kenya National Assembly Hansard . (2014). *Kenya National Assembly Hansard*. Nairobi: Kenya National Assembly.
- Khalid, A. M., & Teo, W. G. (1999). Causality Test of Budget and Current Account Deficits: Cross- Country Comparisons. *Empirical Economics*, 24, 389–402.
- Kim, W. (2003). Review of Ricardian Equivalence: Theoretical and Empirical Studies. *Economics*, 413, 1-19.
- Koop, G. (2013). *Analysis of Economic Data* (4 ed.). Chichester: John Wiley & Sons.
- Koori, A. W. (1992). *Macroeconomic effects of budget deficits in Kenya: 1967-1992*, Unpublished M.A research paper. Nairobi: University of Nairobi.
- Kosimbei, G. (2002). The Relationship between Fiscal Deficits and Current Account Balance in Kenya, 1965 to 2000. *Unpublished Masters Research Paper: Kenyatta University*.
- Kremers, J. J., Ericsson, N. R., & Dolado, J. J. (1992). The Power of Cointegration Tests. *Oxford Bulletin of Economics and Statistics*, 54(3), 325-348.
- Kuijs, L. (2006). How Will China's Saving-Investment Balance Evolve? *World Bank Policy Research Working Paper No. 3958*.

- Lau, E., & Nelson, F. (2011). Financial and Current Account Interrelationship: An Empirical Test. *Journal of Applied Economic Sciences*, 6(1), 34-42.
- Lau, E., & Tang, T. C. (2009). Twin Deficits in Cambodia: An Empirical Study. *Economics Bulletin*, 29(4), 2789-2800.
- Lesiit, L. M. (1990). *Determinants of the current account of the balance of payments: An analysis for Kenya, 1973-1988*. Nairobi: University of Nairobi.
- Lutkepohl, H. (1993). *Introduction to Multiple Time Series Analysis*. Springer. New York, NY.
- Lutkepohl, H., & Kratzig, M. (2004). *Applied Time Series Econometrics*.
- Lutkepohl, H., & Markus, K. (2004). *Themes in Modern Econometrics; Applied Time Series Econometrics*. New York, NY: Cambridge University press.
- Milessi-Ferretti, G., & Razin, A. (1996). Sustainability of persistent current account deficits. *NBER working paper*.
- Miller, S. M., & Russek, F. S. (1989). Are the twin deficits really related? *Contemporary Policy Issues*, 7(4), 91-115.
- Mukhtar, T., Zakaria, M., & Ahmed, M. (2007). An Empirical Investigation for the Twin Deficits Hypothesis in Pakistan. *Journal of Economic Cooperation*, 28(4), 63-80.
- Muthui, J. N., Kosimbei, G., Maingi, J., & Thuku, G. K. (2013, April). The Impact of Public Expenditure Components on Economic Growth in Kenya 1964-2011. *International Journal of Business and Social Science*, 4(4), 233-253.

- Njuguna, S. N., Ngugi, W. R., Benjamin, O. M., Stephen, A. O., & Francia, M. M. (2010). Capital Mobility, Monetary Policy, and Exchange Rate Management in Kenya. *Central Bank of Kenya Working Papers*.
- Omoniyi, O. S., Olasunkanmi, O. I., & Babatunde, O. A. (2012). Empirical Analysis of Twins' Deficits in Nigeria. *IJMBS*, 2(3), 38-41.
- Phillips, P. C., & Perron, P. (1998). Testing for a Unit Root in Time Series Regression. *Biometrika*, 725(2), 336-346.
- Rambald, A. N., & Doran, H. E. (1996). Testing for Granger Non-Causality in Cointegrated Systems Made Easy. *WORKING PAPERS IN ECONOMETRICS AND APPLIED STATISTICS*.
- Republic of Kenya. (2012). *Budget Statement for the Fiscal Years 2013/2014*. Government Printer.
- Republic of Kenya. (n.d.). *Economic Survey-Variou Issues*. Government Printer.
- Roubini, N., & Kim, S. (2008). Twin Deficit or Twin Divergence? Fiscal Policy, Current Account and Real Exchange Rate in the US. *Journal of International Economics*, 74(2), 362-383.
- Roubini, N., Sachs, J., Honkapohja, S., & Cohen, D. (1989). Government Spending and Budget Deficits in the Industrial Countries. *Economic Policy*, 4(8), 100-132.
- Salvatore, D. (2006). Twin Deficits in the G-7 Countries and Global Structural Imbalances. *Journal of Policy Modelling*, 28(6), 701-712.

- Sen, A., Senturk, M., Sancar, C., & Akbas, Y. E. (2014). Empirical Findings of Triplet Deficits Hypothesis: The Case of Turkey. *Journal of Economic Cooperation and Development*, 35(1), 81-102.
- Şengönül, A., Bolat, S., & Değirmen, S. (2014). Does Triple Deficits Have (Un)Stable Causality for the EU Members? Evidence from Bootstrap-Corrected Causality Tests. *Procedia Economics and Finance*, 16(2014), 603-6012.
- Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, 48(1).
- Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. (1995). *Journal of Econometrics*, 66(2), 225-250.
- Szakolczai, G. (2006). The Triple Deficit of Hungary. *Hungarian Statistical Review*, 10, 40-62.
- Tang, T. C. (2014). Fiscal Deficit, Trade Deficit, and Financial Account Deficit: Triple Deficits Hypothesis with the U.S. Experience. *Discussion Paper: Monash University*.
- Tang, T. C., & Fausten, D. K. (2012). Current and Capital Account Interdependence: An Empirical Test. *International Journal of Business and Society*, 13(3), 229-244.
- The World Bank. (2016). *Gross Domestic Savings (% of GDP) Data*. Retrieved from World Bank Data: data.worldbank.org/indicator/NY.GDS.TOTL.ZS
- Thomas, R. L. (1997). *Modern Econometrics: An Introduction*. Harlow: Pearson Education.
- Toda, H. Y., & Phillips, P. C. (1993). Vector Autoregression and Causality. *Econometrica*, 61, 1367-1393.

- Toda, H. Y., & Phillips, P. C. (1995). Statistical inference in Vector Autoregressions with possibly integrated processes. *Journal of Econometrics*, 66, 225-250.
- Toda, H. Y., & Yamamoto, T. (1994). Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. *Journal of Econometrics*, 66, 225-250.
- Trachanas, E., & Katrakilidis, C. (2013). The Dynamic Linkages of Fiscal and Current Account Deficits: New Evidence from Five Highly Indebted European Countries Accounting for Regime Shifts and Asymmetries. *Economic Modelling*, 31, 502-510.
- TÜLÜMCE, S. Y. (2013). The Empirical Analysis of Triplet Deficit in Turkey (1984-2010). 97-114.
- Vamvoukas, G. (1999). The Twin Deficits Phenomenon: Evidence from Greece. *Applied Economics*, 31, 1093-1100.
- Wawire, N. H. (2006). Determinants of Tax Revenue in Kenya. *Unpublished Ph. D Thesis, Kenyatta University*.
- Winner, L. E. (1993). The Relationship of the Current Account Balance and the Budget Balance. *The American Economist*, 37(2), 78-84.
- Yan, H. D. (2005). Causal Relationship Between the Current Account and Financial Account. *International Advances in Economic Research*, 11(2), 149-162.
- Zapata, H. O., & Rambaldi, A. N. (1997). Monte Carlo Evidence on Cointegration and Causation. *Oxford Bulletin of Economics and Statistics*, 59, 185-298.

APPENDIX I: DATA

YEAR	CA	BB	FA
1980	-12.080555	-0.35	-7.2742424
1981	-8.2199673	-11.23	-3.3565427
1982	-4.7869438	-10.02	-6.8006982
1983	-.8430574	-4.44	-2.4280698
1984	-2.0968615	-5.76	-5.7529481
1985	-1.9169524	-4.25	-5.1701887
1986	-.64625508	-7.45	-4.5875634
1987	-6.3099419	-4.05	-6.0123109
1988	-5.6503277	-4.59	-5.1022213
1989	-7.1298993	-6.21	-5.5513123
1990	-6.1486423	-7.28	-5.6118676
1991	-2.616955	-1.87	-1.8565212
1992	-2.1945623	-3.65	-2.2990175
1993	-4.5528329	-6.23	19.711173
1994	-6.2801645	0.82	14.184262
1995	-17.446216	-17.78	1.360188
1996	-7.9794156	-0.83	.81996882
1997	-13.652802	-1.44	.30208209
1998	-18.679824	0.63	1.6438338
1999	-18.340704	1.75	6.2929851
2000	-1.5693516	-1.61	-3.9083141
2001	-2.4663256	-1.26	-4.7638166
2002	-.89497587	-2.62	-1.1511623
2003	.88845113	-1.64	-1.2333946
2004	-.8187038	-2.78	-.91038887
2005	-1.3465585	-1.72	-.80850886
2006	-2.2681763	-1.59	-2.6265889
2007	-3.7891768	-2.99	-3.9106366
2008	-6.507677	-5.08	-5.8240877
2009	-5.5215356	-4.86	-4.8184246
2010	-7.5372544	-5.94	-7.4640089
2011	-10.001397	-4.79	-10.813149
2012	-6.427126	-6.67	-10.307202
2013	-9.8688137	-5.60	-10.346049
2014	-11.403341	-8.00	-11.812398

Appendix II: OPTIMAL LAG LENGTH RESULTS

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	- 253.356				17990.6	18.3111	18.3548	18.4539
1	- 237.248	39.215	9	0.000	10891.5	17.8035	17.978	18.3744
2	- 230.056	14.385	9	0.109	12726.1	17.9326	18.238	18.9317
3	- 213.905	32.302	9	0.000	8159.44	17.4218	17.8581	18.8491
4	- 189.835	48.141	9	0.000	3173.35	16.343	16.9126	18.2009
5	- 175.728	28.213	9	0.001	2796.74	15.9806	16.6787	18.2643
6	- 165.212	21.032	9	0.013	3812.27	15.8723	16.7014	18.5843
7	- 136.751	56.922*	9	0.000	2028.51*	14.4822*	15.4422*	17.6224*

* indicates lag order selected by the criterion

LL: log likelihood

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SBIC: Schwarz-Bayesian information criterion

HQIC: Hannan-Quinn information criterion