Examining The Twin Deficit Hypothesis: Evidence from Selected SADC Countries (1980-2011)

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Declaration

The Dissertation is my original work and has not been presented for a Degree in any other University.

Dedication

I dedicate this piece of work to my Mom and Dad.

Acknowledgements

Acronyms and Abbreviations

ADF	Augmented Dickey Fuller
AEO	Africa Economic Outlook
AERC-JFE	African Economic Research Consortium - Joint Facility For Electives
AfDB	African Development Bank
ARDL	Auto Regressive Distributed Lag Model
AU	African Union
BNA	National Bank of Angola
GDP	Gross Domestic Product
HIPC	Highly Indebted Poor Countries
ICT	Information Communication Technology
IMF	International Monetary Fund
IRF	Impulse Response Functions
LDCs	Least Developed Countries
MDRI	Multilateral Debt Relief Initiative
OECD	Organisation for Economic Co-operation and Development
RBZ	Reserve Bank of Zimbabwe
REC	Regional Economic Community
REH	Ricardian Equivalence Hypothesis
RSA	Republic of South Africa
SACU	Southern African Customs Union
SADC	Southern African Development Community
SSA	Sub – Saharan Africa
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VAR	Vector Auto Regression
WB	World Bank
ZIMSTAT	Zimbabwe Statistics Agency

Table of Contents

Tables

Abstract

The dissertation investigates the existence of a causal relationship between fiscal balance and current account balance over the period 1980-2011, for nine SADC countries individually. The analysis is conducted within the framework of Granger causality test and Vector Auto Regression (VAR) approach on time series data for each individual country estimates. The Granger causality test results confirm the twin-deficit relationship, with a causal relation from fiscal deficits to external deficits for two countries: Malawi and Zambia together with SADC group average; inverse link operating from external balance to fiscal balance for another two countries: Zimbabwe and Swaziland. Existence of bi-directional causality was confirmed for Botswana and Ricardian Equivalence Hypothesis was confirmed for Mozambique. Results for Angola, South Africa and Seychelles were ambiguous hence inconclusive. The results point to the existence of a direct causal link from fiscal deficit to external deficit. There are indications that fiscal tightening (budget cuts) tends to correct the current account deficit directly. There is need for government to develop new exports, primary products beneficiation (value addition), use of nanotechnology and nurturing new export industries as a long-term measure. In Zimbabwe and to some extent Swaziland the current account can be used to address the budget balance. Countries such as Malawi and Zambia, which have shown evidence of the twin deficit, imply that policymakers must consider fiscal consolidation. Fiscal consolidation has proved to be effective; however half-hearted fiscal adjustments are doomed to fail. The relationship between the two macroeconomic variables changes over time depending on the dynamics of the economy. Again, given the intricacies that are innate in mixed economies, it may not be possible to authenticate a tight and steady connection between the two deficits.

CHAPTER I: INTRODUCTION

1.1 Background

The discussion on the problem of twin deficits has been rekindled in the past decade by the recent global economic melt-down, and the resultant phenomenon of current account and budget imbalances in many countries, which have attracted serious attention from academics and policymakers in both developed and developing countries. According to OECD (2011), the global current account imbalances widened markedly in the years preceding the global economic crisis. The crisis itself brought in its wake a renewed depth of fiscal sin across the developed and developing nations alike. The concern is centred on the extent to which fiscal adjustment can contribute to resolving external imbalances, especially when it is unrelenting.

In most developing countries it is common practice that larger budget deficits normally coincide with wasteful government spending, large bureaucracies, and other counterproductive economic policies. The international lending and economic aid-giving agencies such as the World Bank (WB) and the International Monetary Fund (IMF) have urged the least developed countries' (LDCs) governments to reform their economic policies by cutting careless spending, reducing deficits, privatising, and opening up their economies. Such measures have been demanded as a prerequisite for obtaining credit or other kinds of assistance.

The economic advancement of a country is centred chiefly on the fiscal and external balance situation. Experience from a number of advanced ecconomies has shown that the continuation of macroeconomic imbalances can be explained by fiscal and current account imbalances. During the 2008/09 economic slowdown, lower government revenues and countercyclical spending caused budget surpluses to shrink and deficits to widen. Several countries altered their strategy and took steps to contain spending while other countries continued to boost demand to prevent a weakening of economic activity or increased subsidies and social benefits to cushion the impact of high fuel and food prices. As a result of counter-cyclical spending in several countries fiscal deficits remained relatively high in many countries. This limits the space for counter-cyclical measures in case of new external shocks. In oil-importing countries where fiscal deficits remain high, restoring fiscal discipline remains a priority.

The measures are aimed at creating fiscal space which would create a buffer against future adverse shocks, increase domestic saving, reduce fiscal dominance in financial markets and help the financing of private investment. The knock-on effect on trade appears to be the biggest risk. Higher food and energy costs made import prices increase at a faster pace than export prices in many African countries and the weakened terms of trade pushed national income growth below GDP growth. Several other African countries face social and regional tensions. Drought and floods have also affected agricultural production and food security for many countries, especially in the Sahel region (RBZ, 2011).

1.2 Overview of SADC

SADC is one of the Regional Economic Communities (RECs) in Africa and currently it has fifteen member states. The economies of member countries differ markedly, in terms of both structure and income level. Most countries in the group have narrow production bases that are dependent on natural resources and agriculture (Madagascar, Malawi, Tanzania); specific natural resources (diamonds in Botswana and Namibia, copper in Zambia, and oil in Angola).

The region recorded an average real GDP growth of 5.9% in 2010; 2.9% above the 2009 growth rate of 3.0%. Inflation remained supportive at an average 7.9% in 2010 compared to 10.1% in 2009. Average fiscal deficit improved by 3.0% in 2010 compared to 4.9% of GDP in 2009 (BNA, 2012). However, some members recorded deterioration in the fiscal balances, in particular Lesotho and Swaziland.

Foreign investment in the region mainly flows from highly developed economies and is concentrated in the natural resources sector. South Africa is the dorminant source of investment from within the region, followed by Mauritius (mainly in tourism and financial services in neighbours like Mozambique and Madagascar).

Current account positions vary markedly among SADC members. This is mainly atributed to sizeable grants or transfers to some countries and the impact of a surge in commodity price on mineral exports. Middle-income countries (Mauritius and South Africa) have experienced widening of current account deficits in recent years mainly originating from investment-driven growth in imports. Botswana, Lesotho, Namibia, and Swaziland, on the other hand, have run

current account surpluses that have averaged 9% of GDP over the past four years. Current account deficits in low-income countries have widened in recent years to 12% on average because of increased aid-financed imports and rising oil prices (BNA, 2012). In Madagascar, the rapid import growth associated with large new mining investments pushed the current account deficit up.

The SADC region's public debt to GDP ratio moved from an average of 41.01% in 2010 to 41.83 in 2011(BNA, 2012). The median total government debt in SADC fell to 27% of GDP from 91% in 2000. The improvement has been greatest in the low-income countries, all of which benefited from debt relief under the Highly Indebted Poor Countries (HIPC) initiative and the Multilateral Debt Relief Initiative (MDRI) (RBZ, 2011). According to IMF (2003), over half of sovereign debt crises occurred when public debt ratios were less than 40% of GDP and two-thirds occurred when it was less than 60%. Low-income SADC countries may instead want to use the IMF–World Bank Debt Sustainability Framework as a tool for evaluating whether their current fiscal positions are appropriate. The 2003 IMF–World Bank assessments rate four SADC members (Madagascar, Mozambique, Tanzania, and Zambia) as having a low risk of debt distress; three (Angola, Lesotho, and Malawi) as having a moderate risk; and two (the DRC and Zimbabwe) as already in debt distress.

1.3 Problem Statement

In recent decades, many developing countries have embarked on major structural reforms in order to reduce fiscal deficits, eliminate unsustainable external imbalances, reduce inflation and create a enabling macroeconomic environment conducive for growth. Despite these reforms, positive fiscal and external balances remain elusive because governments in many developing countries continued to run deficits. The fact that deficits continue in a high number of countries calls for a re-examination of the causal link between internal and external deficits. Most countries in the SADC region significantly benefited from the debt forgiveness initiatives, however, the fiscal 'sins' and external imbalances continue unabated. Well conceived empirical tests of the twin concept shed light on the extent, if any, that budget deficits affect current account deficits and the channels through which budget deficits affect current account deficits. In other words, a better understanding of the causal linkages is important in the formulation and implementation of macroeconomic policies necessary for removing the twin deficits, which have

been considered as a precondition for the economy to thrive. Once the underlying link is confirmed, policymakers might effectively put the twin deficits under control and keep economic growth sustainable. Net foreign debt is bound to increase as a result of continuous extenal imbalances. Rubin, *et al*. (2004) confirmed that large continuous deficits cause pessimistic outlook which devastate confidence in the economy. However, to the best of our knowledge, there is scant empirical literature on the twin deficits hypothesis in the selected SADC countries. Thus, this paper investigates whether the statistical relationship between fiscal and extenal balance in nine SADC countries is unidirectional, bidirectional, or no relationship exists. The research seeks to provide evidence on the twin phenomenon from Southern African countries.

1.4 Research Questions

The study will be guided by the following research questions:
1. What is the relationship between fiscal balance and current account balance?
2. Does the Ricardian Equivalence hold for selected SADC countries?
3. Is fiscal policy an effective tool for current account balance adjustment?

1.5 Research Objectives

The overall objective is to assess the interaction between the fiscal balance and current account balance in selected SADC countries. The specific objectives are as follows:
1. To determine whether there is a causal relationship between fiscal balance and current account balance in selected SADC countries.
2. To establish the validity of Ricardian Equivalence in selected SADC countries.
3. To ascertain the effectiveness of fiscal policy in current account balance adjustment.

1.6 Justification of the Study

The current account position of SADC countries has historically been one of mostly deficits. The unrelenting budget deficits eventually gave way to current account deficits and build up of a large stock of external debt. On the other hand, if such a view concerning the causal role of budget deficits proves to be incorrect, policy attempts to reduce government spending or increase taxes or private savings or public investment may not resolve the external deficit dilemma, but more importantly, the wasted efforts and scarce resources could have been diverted to more deserving and urgently needed policy options. Though earlier studies have focused on the twin

deficits hypothesis in the affluent countries, the importance of this matter to the economies of SADC countries is not in doubt, more so that investment financing of these countries is mainly from foreign sources. In general, the existence of a link between the two balances logically requires practical assessment. This study will empirically examine the causal relationship between fiscal and external balance in nine SADC countries.

1.7 Scope and Organisation of Study

The study will centre on the economies of selected SADC countries (Angola, Botswana, Malawi, Mozambique, Seychelles, South Africa, Swaziland, Zambia and Zimbabwe). The study seeks to establish causal link between current account and fiscal balances and how this relationship can be used in policy formulation.

The remainder of this paper is structured as follows. Chapter 2 provides a review of the relevant literature and the description of the theoretical framework of national accounting identity for analyzing the causal relationship of the twin deficits. Chapter 3 provides a description of methodology for investigating the twin deficit hypothesis. Chapter 4 provides data description and empirical results, while Chapter 5 summarises the results and make policy recommendations based on the research findings.

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

This chapter mainly focuses on the underlying theoretical framework, theoretical and empirical literature review. It consists of several sections which are theoretical framework; theoretical literature review and empirical literature. The chapter will finally conclude with a critique of the previous studies.

2.2 Theoretical Framework

The basis for the causal link between fiscal and external deficit is ingrained in the national account identity. Following the proposed Keynesian open economy model:

$$Y = C + I + G + X - M \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.(1)$$

where: Y is gross domestic product, C is consumption, I is investment, G is government expenditure, and X-M is net exports, which is also defined as current account (CA) balance after adding net factor income from abroad. The sum of the first three terms on the left hand side constitutes the spending of domestic residents (domestic absorption). Rearranging equation 1:

$$CA = Y - (C+I+G)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ (2)$$

In a closed economy, aggregate domestic savings (S) is equal to aggregate investment (I). However, in an open economy funds available for investment go beyond domestic savings since funds can be tapped from both domestic and international sources. Thus:

$$S - I = CA \dots\dots\dots\dots \ (3)$$

Decomposing aggregate savings into private (S_p) and government (S_g): $CA = S_g + S_p - I$, where:

$$S_p = Y - T - C \dots\dots\dots (4a) \qquad S_g = T - G \dots\dots\dots (4b)$$

where T, is government tax revenue. Substituting equation 4a and 4b into equation 3 yields:

$$CA = (S_p - I) - (G - T) \ \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.. (5)$$

where the term (G - T) is indicative of budget deficit. This equation can directly be interpreted as the current account balance being equivalent to the difference between excess savings over investment, and budget deficit. This equation implies that a rise in fiscal deficit (G-T) decreases total national savings which worsen the current account balance. Holding both (Sp – I) and tax revenue constant, a temporary increase in government expenditure implies a rise in fiscal deficit,

which affects the current account positively. Thus, increased purchases by government worsen the external balance as the nation's current account surplus reduces.

2.2 Theoretical Literature Review

2.2.1 Neoclassical View

The standard neoclassical model has three main assumptions which are: consumers are rational, farsighted, and have access to perfect capital markets. This would then mean that permanent deficits significantly depress capital accumulation, and temporary deficits have either a negligible or perverse effect on most economic variables (including consumption, saving, and interest rates). If many consumers are either liquidity constrained or myopic, the impact of permanent deficits remains qualitatively unchanged. However, temporary deficits should depress saving and raise interest rates in the short run.

2.2.2 Keynesian model

The Twin Deficit Hypothesis is grounded within the traditional Mundell- Fleming paradigm. Keynesian proponents argue that fiscal expansion has an effect of raising absorption. This will push up the appetite for foreign goods and ultimately diminish the surplus in the current account balance. Fiscal expansion has also a crowding – out effect on the domestic market which raises the interest rate and the resultant capital flows will lead to appreciation of currency. Domestic goods will appear to be expensive in the eyes of foreigners, thus exports will diminish and the current account worsens.

The Keynesian view made a number of assumptions which are: economic agents are either myopic or liquidity constrained, individuals have a high marginal propensity to consume out of current disposable income and that the economy has some resources which are under-employed.

Eisner (1989) also argued from the Keynesian point of view suggesting that increased aggregate demand enhances profitability of private investment thereby leading to a higher level of investment at any given rate of interest. Budget deficits are therefore viewed as a tool to stimulate aggregate saving and investment, despite the fact that they raise interest rates. Eisner assumes underemployement in the economy, thus increased consumption would be supplied by unutilised resources.

2.2.2 The Fiscal Approach to Balance of Payments

The fiscal approach to the determination of balance of payments is based upon the national income identity which states that the current account is equal to government balance and the private sector balance between investment and savings (Bartoli: 1989). According to this approach, when domestic savings and investment are equal then the resulting variations in the current account balance will have been a consequence of variation in the fiscal budget deficit. Policymakers will thus have to use the fiscal policy or adjustment to domestic national savings and investment to adjust the national accounts.

The fiscal approach is one-sided in that it only takes into account the causality running from fiscal deficit and the savings and investment relationship. According to Chu (1989), in highly open economies trade balance can be transmitted directly to the fiscal sector. However, fluctuations in the expenditures rather than in revenues were the immediate cause of unstable fiscal deficits only if government expenditures are based on anticipated future revenue which is also a function of future trade.

2.2.3 Ricardian Equivalence Hypothesis

The Ricardian Equivalence Hypothesis (REH) was introduced by Barro (1974) and its arguments arise from the Neoclassical school of thought. The proposition states that the cuts in taxes are matched by an increase in savings since people look forward to the government increasing the taxes in future. This foresight gives rise to Say's Law for deficits that the demand for bonds always rises to match government borrowing. The proposition is expected to hold under the following conditions: generational linkages, non-distortionary taxes, rational expectations (perfect foresight concerning the path of taxes and fiscal policies), identical planning horizons for both private and public sector agents, the availability of deficit financing as a fiscal instrument does not alter the political process and perfect capital markets with no borrowing constraint. However, much criticism have been raised concerning the realism of these assumptions.

The Ricardian Equivalence in an open economy will produce the same results as in a closed economy. In an open economy real interest is determined in the world capital markets and within the economy individuals are free to borrow and lend. Given that both public and private sector agents face the world interest rates Ricardian Equivalence is satisfied just like in the

closed economy case. An increase in government debt is fully internalised by the private sector which accounts for the taxes to be paid back to lenders. In an open economy the private sector's savings rise by enough to avoid having to borrow from abroad (Barro, 1989).

Leachman (1996) and David Ricardo (1966) argued that there is no first order difference between tax and debt financed expenditure. The payment for public debt would be financed by future taxes, money creation and reduces government expenditure or additional deficits. Barro (1974) considered the effect of bond values and tax capitalisation, finite lives, imperfect capital markets, government monopoly in the production of liquidity services and uncertainty about future tax obligations. The findings of the paper revealed that as long as there are intergenerational linkages there would be no net wealth effect and aggregate demand will not be affected.

Buchanan (1976) was the first person to point out the close relationship between Barro's proposition and the work of David Ricardo. Ricciuti (2007), Patinkin (1965), Bailey (1971) and Kochin (1974) also concurred on the idea that the means of funding government debt does not matter. Furthermore, Barro (1979) concluded again that the choice between debt and taxes does not really matter, however the study also sought to identify factors that influence the choice between debt and taxes. In a later paper, Barro (1989) cited major conjectural objections: that people do not live forever, and do not care about future taxes, private capital markets are not perfect, future taxes and income are not certain, taxes are not lump sum and the assumption of full employment. However, a number of observed findings tend to support Ricardian Equivalence. The study also notes that empirical analysis involves considerable problems with data and identification thereby rendering empirical literature to be inconclusive. This was also supported by Elmendorf and Mankiw (1999).

Leiderman and Blejer (1988) and Seater (1993) illustrated the implications of Ricardian equivalence. Leiderman (1988) relaxed the main assumptions of the Ricardian model and the study concluded that debt financing policies can have an impact on private consumption and aggregate demand. Seater (1993) found out that Ricardian Equivalence is logically reliable but the restrictions necessary for it to hold are too many and not likely to be met.

2.2.4 Summary and Conclusion of Theoretical Literature Review

The Ricardian Equivalence is grounded in the Neoclassical school of thought, however, both Neoclassicals and Keynesians agree that budget deficits have real effects. Neoclassicals are mainly concerned about the long run effects of deficits on capital accumulation while Keynisians are more interested in the short run effects of deficits and their ability to stimulate consumption and national income. It can be concluded that one can find support for every conceivable normative position and no single choice of paradigm corresponds exactly to reality.

2.3 Empirical Literature Review

2.3.1 Ricardian Equivalence Theorem

Walker (2011) studied the extent to which Japanese households conform to Ricardian equivalence. The study employed VAR techniques on national accounts data and the results suggested that the Ricardian Equivalence hold. Moreover, there was some form of private savings off-setting to change in fiscal policy. Yi (2003) considered South Korea data, the study found no cointegration relationship between the variables (real exchange rate, current account, and consumption). This implies Ricardian equivalence holds.

Bernheim (1987), Giorgioni and Holden (2003) used a sample of ten developing countries (Burundi, El Salvador, Ethiopia, Honduras, India, Morocco, Nigeria, Pakistan, Sri Lanka and Zimbabwe) to test the Ricardian equivalence. The study applied Bernheim's framework of private consumption across the panel of countries and the conclusion was that there was some presence of Ricardian equivalence. However, they were cautious and unconvinced given the diversity of countries and data limitations within the group.

Berben and Brosens (2007) were interested in finding out whether the observed consumer reactions to fiscal policy could be explained by the level of government debt. A panel of 17 OECD countries was used and the ARDL approach to cointegration was applied. The results from the study pointed out that in the long run consumption is positively related to disposable household income, equity wealthy and housing wealth. Government debt has a statistically significant negative impact that is to say fiscal expansion is partly crowded out by a fall in private consumption.

2.3.2 Twin Deficit Hypothesis

Felderstein (1985 & 1987) made known the notion of twin deficit hypothesis in the U.S. in a later study, Felderstein (1990) noted that deteriorating trade balance in the U.S. was due to the higher exchange rate which was caused by the higher interest rate which in turn was due to fiscal deficits. However, according to Feldstein this should be treated as a special one-off and not as an indication of any long run phenomenon.

Miller and Russek (1989) are among the first people to use VAR analysis to test the Twin Deficit Hypothesis. The study found a positive relationship between government deficit and net exports for the flexible exchange rate period. Abell (1989) used U.S. data throughout the 1980s and found out that budget deficits influence trade deficits indirectly rather than directly. The twin deficits are linked trough a transmission mechanism of interest rate and exchange rate. Enders and Lee (1990) also used U.S. data but applied a six variable VAR for the period 1947-1987. The result from unconstrained VAR suggests that government spending innovations generate persistent current account deficits. However, the unconstrained VAR failed to reject the Ricardian Equivalence Hypothesis.

Kearney and Monadjemi (1990) also used VAR in a sample of eight countries (Australia, Britain, Canada, France, German, Ireland, Italy and U.S.) for the period of the floating exchange rate 1972 -1987. The results show a short-run relationship between the two deficits which does not persist over time. Corsetti and Muller (2000) studied Australia, Canada and U.S. using a longer time frame. The investigations revealed that the likelihood and magnitude of twin deficit increases with the degree of openness of the economy and decreases with the persistence of fiscal shocks. Stronger evidence of twin deficit was found for UK and Canada which were considered to be more open.

Islam (1998) and Normandin (1999) concurred that there is a feedback link between the two deficits while Summers (1988) found a reverse a link (i.e.current account causes fiscal deficit). Godley and Cripps (1983), Enders and Lee (1990) and Evans (1994) did not detect a stable long-run association between the two deficits using a variety of samples. Similarly, in a study of the G7 countries, Godley and Cripps (1983) find no short-run statistical association between the two

deficits. Bartlett (1999) concludes that the relationship between the two deficits is not consistent over time.

Laney (1984) discovered that the twin link holds better for countries that are still developing. Baharumshah (2006), looked at the twin concept in ASEAN-4 countries. The study discovered a long run link between the two balances: the Keynesian logic was the case for Thailand.

Easterly and Schmidt (1994) in their study of developing countries (Ghana, Morocco, Ivory Coast, Pakistan, Chile, Colombia and Thailand) established a positive link between the two balances. Carlos (2006) studied Ricardian equivalence and Feldstein's puzzle in Egypt using annual data (1974-1989). The results reveal that there is a weak long run relationship between the two deficits. Saruni (2006) using data from Tanzania found out that government expenditure and consumption were statistically significant in a positive manner in determining trade balance. A 1% increase in government expenditure will result in a 0.46% increase in trade balance.

Brittle (2009) in Australia used a large sample of 188 observations across 50 years (1959-2006) and applied econometric methods that capture structural breaks in time. The traditional Augmented Dickey Fuller tests were conducted together with the more advanced Lee and Strazicich unit root tests. The major findings of the research were that there is no full Ricardian response to a change in fiscal policy, there is partial off-setting behaviour. Lower short-run private savings revealed through the error-correction mechanism indicate that real frictions/rigidities prevent some significant proportion of off-setting behaviour from occurring more quickly.

2.4 Critique of Existing Literature

The results from both Ricardian Equivalence and the twin deficit are conflicting and are not consistent across countries and over time. This is likely to be stemming from the different empirical techniques, data measures and samples.

Econometric methods have however been evolving over the years. Early studies used univariate techniques while multivariate techniques are a recent development. Most empirical studies did not consider structural beaks in the data especially long time-frame samples. Only a few recent

studies have made an attempt to capture the issue. Failure to account for structural breaks leads to biased and inaccurate population means.

There is also lack of a common methodology in the compilation of government spending and government deficits across countries. This is a data problem which mainly affects studies where a panel of countries is used.

Most studies have been carried out for the U.S., developed world and developing countries in Asia and Latin America. Less attention has been paid to developing countries in Africa, especially countries in Southern Africa.

CHAPTER III: METHODOLOGY

3.1 Framework

The study attempts to explore the twin deficit hypothesis by applying causality test and Vector Auto Regression (VAR) technique on annual fiscal and external balances for nine SADC countries. Through Vector Autoregression modelling, the study attempts to reveal if there exists a consistent causal relationship between the two deficits. The VAR technique was discovered by Sims (1980) and it proved to be credible and coherent in data description, forecasting, structural inference and policy analysis. This macro-econometric technique can capture the rich dynamics in multiple time series and is easy to use and interpret. Generally, VAR reports results from Granger causality tests, impulse responses and variance decomposition will be used. Vector Autoregression model (VAR) is applied to track innovations in government budget deficit (current account balance) on a nation's trade deficit (budget balance) over varying time lags. VAR modelling has proven successful for forecasting systems of interrelated time series variables over short-term horizons (Watson, 1994).

3.2 Model Specification

The equations are estimated and they include a constant, c_{i1} which captures the effects of exogenous variables including the spread between domestic saving and gross private domestic investment. The estimated equations are:

$$CAB_{it} = c_{i1} + \sum_{j=1}^{n} \alpha_{i,j} CAB_{i,t-j} + \sum_{j=1}^{n} \beta_{i,j} BB_{i,t-j} + \varepsilon_{1t} \ \ t = 1,2 \dots T; i = 1,2 \dots N \ \dots\dots(1)$$

$$BB_{it} = c_{i2} + \sum_{j=1}^{n} \alpha_{i,j} CAB_{i,t-j} + \sum_{j=1}^{n} \beta_{i,j} BB_{i,t-j} + \varepsilon_{2t} \ \ t = 1,2 \dots T; i = 1,2 \dots N \ \dots\dots(2)$$

where CAB represents current account balance, BB is government budget balance, c_{i1} and c_{i2} are the constants and ε_{1t} and ε_{2t} are innovations for the CAB and BB respectively. Countries are denoted by i and j denotes variable lag. In a VAR model, every equation has the same right hand variables, and those variables include lagged values of all the endogenous variables. The inclusion of lagged values of the endogenous variables is intended to eliminate estimation bias associated with simultaneity and serial correlation. The lag length in the VAR model is chosen using various criteria including the Akaike Information Criteria (AIC) as well as Sims (1980) and Blanchard (1993) procedures. The data extends from 1980 through to 2011. Data was

sourced from Reserve Bank of Zimbabwe, ZIMSTAT, UNCTAD, World Bank and AfDB (Socio-Economic Database May 2012) online databases.

3.3 Impulse Response Functions

The impulse–response functions (IRFs) would be estimated to find out the effects of an innovation in a given variable on the endogenous variables that appear in the model. The response functions are equivalent to dynamic multipliers providing an estimate of the current and future response of a variable in the left-hand-side of the equation to an innovation in one of the variables in the right-hand-side of the system.

3.4 Variance Decomposition

Besides the IRFs, variance decomposition estimates would be computed to trace out the effects of innovations in deficit spending on the external balance (budget balance). The decomposed variance estimates will indicate the magnitude and the longevity of the variance in the system variables that can be attributed to an external shock. The objective is to determine the degree to which forecast errors in the trade deficit can explain the forecast errors in the budget deficit

3.5 Hypothesis

1. There is bidirectional relationship between CAB and BB.
2. There is unidirectional relationship between CAB and BB.
3. There is no relationship between CAB and BB.

3.6 Definitions and Measurement of Variables

Current account balance (CAB) is the sum of the balance of trade (i.e., net revenue on exports minus payments for imports), factor income (earnings on foreign investments minus payments made to foreign investors) and cash transfers. It is called the current account because goods and services are generally consumed in the current period. It indicates the direction of international borrowing and lending.

Budget balance (BB) refers to the difference between government expenditure and revenue. It can be positive or negative.

3.7 Sampling and Sampling Technique

The sampling frame of SADC members (Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa,

Swaziland, Tanzania, Zambia and Zimbabwe) was used. The countries are further divided into categories: middle income countries (Angola, Botswana, Lesotho, Mauritius, Namibia, South Africa, Swaziland); low income countries (Madagascar, Malawi, Mozambique, Seychelles, Tanzania, Zambia) and fragile states (Democratic Republic of Congo and Zimbabwe). Stratified sampling was then used to select nine countries from the different categories subject to data availability. The sample comprised of four countries from middle income group, four from low income group and one from the fragile states category. The average for SADC group will also be part of the sample to make it ten. The selected countries are: Angola, Botswana, Malawi, Mozambique, Seychelles, South Africa, Swaziland, Zambia and Zimbabwe.

CHAPTER IV: ESTIMATION AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter presents the results of the empirical estimation and gives an economic interpretation of the results. We start with data description, correlation and test for stationarity and go on to estimate VAR and then Granger causality test follows. Finally, impulse response functions and variance decomposition results are discussed.

4.2 Data Description

Figure 1
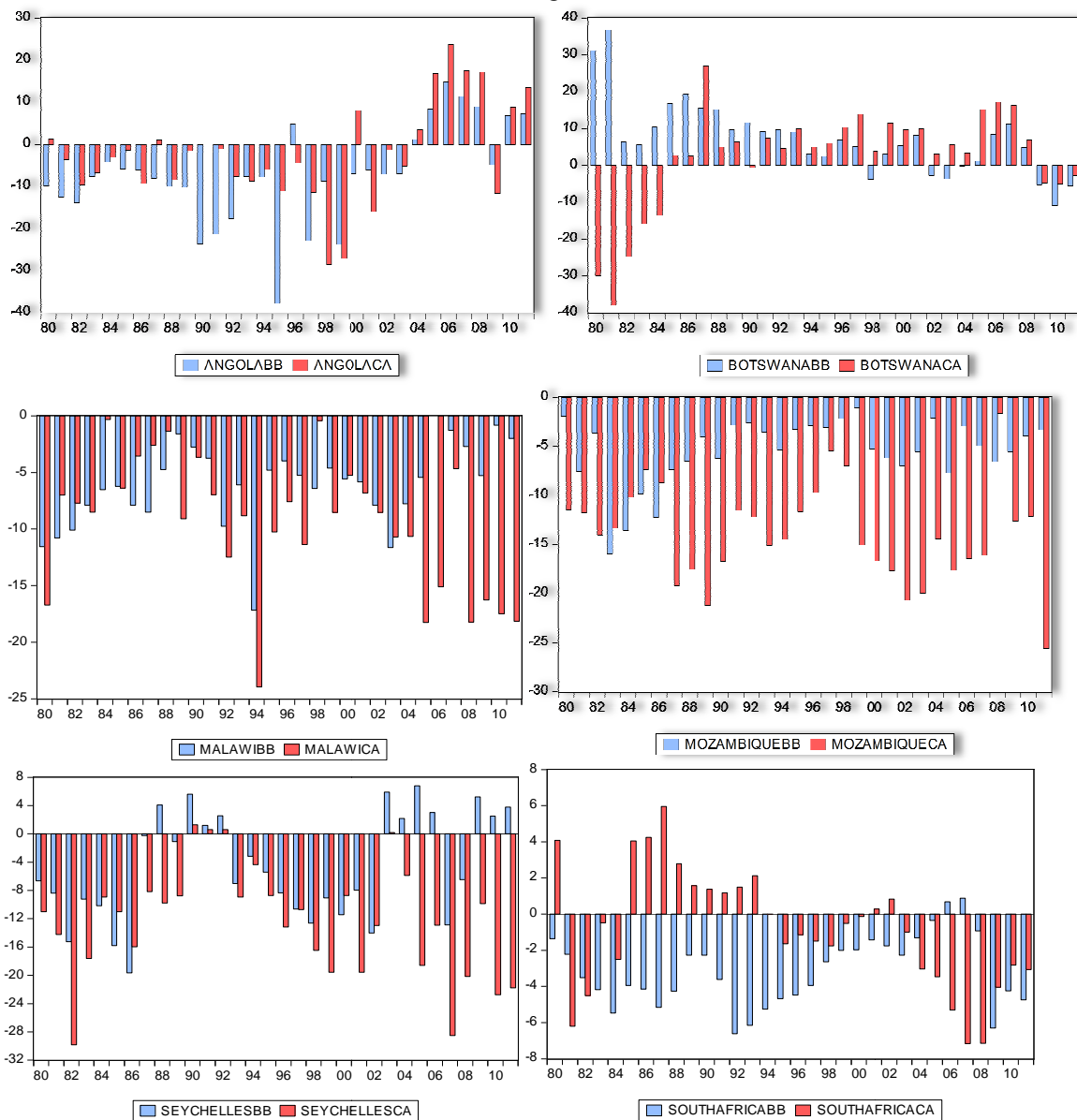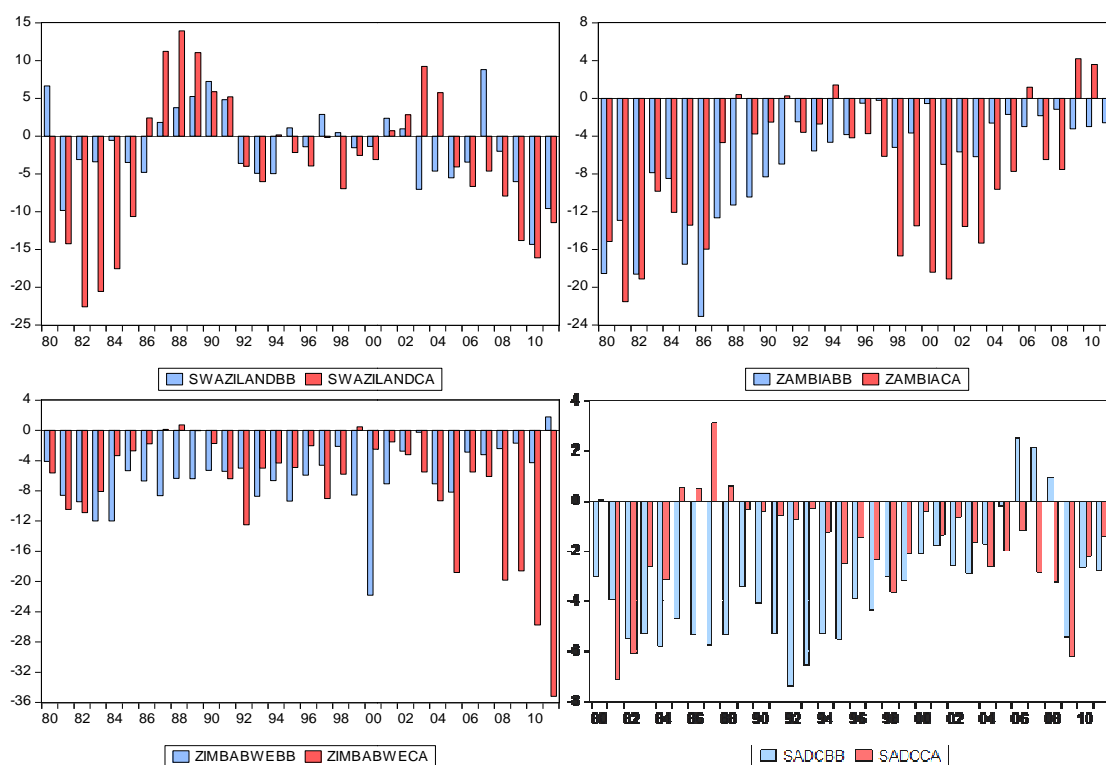
The above graphs show mixed relationships for the two series in selected countries. Angola, Malawi, Mozambique, and Zimbabwe show some positive relationship between budget balance and current account balance. Botswana, Seychelles, South Africa, Swaziland, Zambia, and SADC group average show a mixed relationship with some periods showing a negative relationship while other periods reflect a positive relationship between the two series. In some countries such as Seychelles and Malawi for instance, the relationship between the budget balance and current account balance is positive (for certain periods).

Correlations indicate the predictive connection between fiscal and external balances. Table 1 below shows Botswana, Mozambique, South Africa, Zimbabwe and SADC indicate negative but low correlation implying that large figures in one variable are associated with low values in the other variable.

Table 1: Correlation

	Angola	Botswana	Malawi	Mozambique	SADC	Seychelles	RSA	Swaziland	Zambia	Zimbabwe
Correlation	0.67	-0.38	0.11	-0.097	-.10	0.43	-0.38	0.41	0.42	-0.43

18

This supports the behaviour of the two variables (budget balance and current account balance) as suggested by the graphs. Angola is the only country that has a high positive correlation; Malawi, Seychelles, Swaziland and Zambia also have positive but low correlation suggesting that the two series are moving up and down together. However, statistical dependence is not sufficient to reveal the existence of a causal relationship (i.e. correlation does not mean causality).

4.3 The Unit Root Tests

The time series variables for the selected SADC countries were tested for stationarity using the Augmented Dickey-Fuller Test to avoid spurious estimation. To reject the null hypothesis that the series are non stationary in favour of stationarity the estimated ADF should be greater than the critical value. The data for the selected countries was used as ratios of GDP.

Table 2: Unit Root Test- Augmented Dickey Fuller Test

	Current Account Balance			Fiscal Balance		
	Level	1st Difference	Order of Integration	Level	1st Difference	Order of Integration
Angola	-3.544621*		I(0)	-4.460437***		I(0)
Botswana	-3.374384*		I(0)	-6.795481***		I(0)
Malawi	-5.134476***		I(0)	-4.021357**		I(0)
Mozambique	-3.969595**		I(0)	-3.939616**		I(0)
South Africa	-3.460828*		I(0)	-2.428847	-4.787551***	I(1)
Seychelles	-3.366932*		I(0)	-3.292712*		I(0)
Swaziland	-1.568031	-3.871807**	I(1)	-3.665188**		I(0)
Zambia	-1.994022	-6.379773***	I(1)	-3.503551*		I(0)
Zimbabwe	-1.110331	-3.755199**	I(1)	-4.297984***		I(0)
SADC	-3.176049	-7.901796***	I(1)	-3.268099*		I(0)

Notes: ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

The current account balance variable is stationary at levels for the majority of countries, except for Swaziland, Zambia, Zimbabwe and SADC group average which become stationary after first differencing. However, the stationarity property of the variables varies across countries. The budget deficit variable turned out to be stationary for all countries except for South Africa. Given the non-uniform stationarity properties of all the series under analysis, testing for the existence of cointegration is not necessary. Thus, we move straight to VAR estimation followed by Granger Causality Test to ascertain the direction of relationship among the series.

4.4 Vector Auto Regression (VAR) Model

4.4.1 Diagnostic Test for VAR

The lags for most countries is one, except for Botswana and Zimbabwe which have two lags. All countries satisfied the stability condition test since no roots were found lying outside the unit circle. The Lag Exclusion Test [H_o: The restricted model (model without lags) is a viable. Joint hypothesis at lag h] was also conducted. Results show that H_o was rejected in all countries at least at 10% level of significance.

Table 3: VAR Diagnostic Tests

Country	Lags	Stability Condition Test	Lag Exclusion Test	Residual Serial Correlation Test	Residual Heteroskedasticity Test (Chi –square)
Angola	1	Satisfied	11.10534**	3.367785	24.82778*
Botswana	2	Satisfied	18.49529***	9.218284*	38.83897
Malawi	1	Satisfied	17.27058***	3.560622	19.68749
Mozambique	1	Satisfied	12.85298**	1.668576	7.625784
SADC	1	Satisfied	53.85971***	4.375414	11.14260
Seychelles	1	Satisfied	21.57915***	0.574068	14.69188
South Africa	1	Satisfied	65.25669***	2.927038	20.02279
Swaziland	1	Satisfied	14.34334***	1.606256	8.725875
Zambia	1	Satisfied	48.61700***	4.924710	21.89781
Zimbabwe	2	Satisfied	12.72373**	2.547256	53.91332

***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

This suggests that the model with lags is the appropriate model. Residual Serial Correlation Test (H_o: No serial correlation at lag order h) was performed and the null hypothesis was rejected at least at 5% level of significance. Finally, the Residual heteroskedasticity Test (H_o: Residuals are homoskedastic) and the null hypothesis could not be rejected for countries in the sample.

4.5 Granger Causality Test Results

The Granger causality test to determine the direction of influence of the variables on one another was conducted. The Granger causality test between the variables was conducted up to the fifth lag and the results are reported in Table 4 below. It is apparent from results in Table 4 that there is Granger causality running from budget deficit to current account deficit for Malawi; Zambia and SADC region average. Therefore, the existence of Keynesian hypothesis of one-way Granger causality from government budget deficit to current account deficit is found for two countries together with SADC region.

Table 4: Results of Granger Causality Test

Country	Operating from BB to CAB		Operating from CAB To BB
		F- Statistic	
	No.of lags	1980 -2011	1980- 2011
Angola	1	1.56209	2.43720
	2	1.58962	0.47176
	3	0.85940	0.38138
	4	1.82168	0.38450
	5	1.71829	0.30530
Botswana	1	0.84915	0.05006
	2	1.53833	4.05571**
	3	3.40614**	2.72601*
	4	2.14489	1.22960
	5	0.74318	1.06949
Malawi	1	1.49835	2.28422
	2	0.59253	1.49244
	3	1.23239	1.72426
	4	3.25787**	1.07518
	5	2.22025	1.04890
Mozambique	1	0.10825	0.00662
	2	0.10403	0.04886
	3	0.20300	0.08610
	4	0.68133	0.39612
	5	0.60620	0.41440
SADC	1	3.09489*	0.01045
	2	2.35094	0.72540
	3	0.95211	0.48218
	4	1.84568	0.16989
	5	0.88854	0.18258
Seychelles	1	0.63297	0.08904
	2	0.47151	0.05629
	3	0.60922	0.25972
	4	0.65004	1.10241
	5	0.56082	0.99011
South Africa	1	2.66981	2.03959
	2	1.11475	1.79634
	3	0.72625	0.91604
	4	0.75150	0.51280
	5	0.40630	0.32138
Swaziland	1	0.94917	1.55916
	2	1.37160	0.58924
	3	0.97947	0.92223
	4	0.46240	2.40364*
	5	0.73312	2.18215
Zambia	1	4.03327*	0.82792
	2	1.80351	0.81507
	3	0.63404	0.02856
	4	2.69290*	0.16171
	5	1.77047	0.37000
Zimbabwe	1	0.22671	6.33506**
	2	1.54908	4.12071**
	3	0.49670	3.64191**
	4	0.54204	2.55964*
	5	0.71801	2.28905*

***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

A unidirectional causality (from the current account deficit to budget deficit) was the case for Swaziland and Zimbabwe which implies that the main driver of fiscal indiscipline in these countries is the current account imbalances they tend to grapple with. These countries have a narrow export base which is mainly composed of primary products and they are also oil-

importers. They also import most of the capital equipment which is not matched by the low value primary exports. As for Angola, Mozambique, Seychelles and South Africa the result showed that the two variables are statistically independent which confirms existence of the Ricardian Equivalence hypothesis of no relationship between the two deficits. It should also be noted that for these countries there is no express association between the two variables. However, the relationship may be indirect via interest rate and exchange rate. Botswana is the only country in the sample which has shown the existence of bidirectional causality between the two balances.

4.6 Results from Bivariate Model

Table 5: Bivariate (BB to CAB) Model Estimation Results

	BB (-1)	BB (-2)	CAB (-1)	CAB (-2)	Constant	Adj. R^2
Individual Country Estimates						
Angola	0.1440		0.3479		-4.9752**	0.15
	(0.06303)		(1.5612)		(-2.0749)	
Botswana	0.5640***	-0.1500	0.3179**	-0.3015**	12.5765	0.45
	(3.8541)	(-1.0090)	(2.5631)	(-2.6897)	(1.6589)	
Malawi	0.4468**		-0.1587		-4.644***	0.17
	(2.6927)		(-1511)		(-3.2632)	
Mozambique	0.4676***		0.0102		-2.8794	0.16
	(2.8356)		(0.0814)		(-14047)	
South Africa	0.0415		0.1228		0.03622	0.08
	(0.2220)		(1.4281)		(0.1261)	
SADC	0.7591**		-0.0145		-0.8239	0.54
	(6.0407)		(-0.1022)		(-1.52089)	
Seychelles	0.5426**		0.2031		-2.6302	0.20
	(6.0407)		(-02984)		(-1.1485)	
Swaziland	0.4777***		0.1856		-0.7856	0.23
	(2.9346)		(1.2487)		(-0.9400)	
Zambia	0.7146***		0.1221		-16354	0.50
	(5.5184)		(0.9099)		(-1.4481)	
Zimbabwe	0.4064*	-0.3416*	-0.03451**	-00103	-5.9663***	0.20
	(2.0552)	(-0.7579)	(-2.3472)	(0.0679)	(-3.4077)	

NOTE: t-statistics in parenthesis, and ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

To analyze the dynamic impact of changes in fiscal balances and current account balances on one another, we adopt a VAR specification estimation procedure. All variables that are not stationary in each of the sample estimates were made stationary for inclusion in VAR analysis. In the bivariate specification (Table 5) for government fiscal deficit running to current account deficit, a percentage point change in budget deficit results in between 0.1 and 0.49 percentage point change in the current account balance. The specification (Table 6), in which the current account deficit runs to budget deficit, a percentage point change in the current account deficit aggravates the government budget deficit by between 0.06 and 0.29 percentage points. Though the results suggest some support for the twin-deficits hypothesis, the strength of the relationship varies across countries with the individual country estimates showing diverse results.

Table 6: Bivariate (CAB toBB) Model Estimation Results

	BB (-1)	BB (-2)	CAB (-1)	CAB (-2)	Constant	Adj. R^2
Individual Country Estimates						
Angola	0.2993		0.2837		0.5936	0.21
	(1.3524)		(1.2498)		(0.2493)	
Botswana	0.2286	-0.3727*	0.3774**	0.1290	4.4874**	0.51
	(1.1409)	(-1.7534)	(2.2694)	(0.1503)	(2.1549)	
Malawi	-0.3459		0.3695**		-8.0982	0.09
	(-1.2241)		(2.0657)		(-3.3414)	
Mozambique	-0.088		0.4167**		-8.813***	0.08
	(-0.3290)		(2.1673)		(2.8007)	
South Africa	-0.3727		0.8062**		-0.115	0.66
	(-1.63396)		(7.67317)		(-0.3279)	
SADC	-0.219*		-0.1632		-0.6056	0.07
	(-1.7592)		(-1.1613)		(-1.12857)	
Seychelles	-0.1647*		0.5168		-7.0151	0.14
	(1.7434)		(2.5995)		(-2.8298)	
Swaziland	-0.1957		0.3089		-0.1880	0.05
	(-0.9743)		(1.6838)		(-01823)	
Zambia	-0.3325*		-0.1841		-1.2037	0.09
	(-2.0083)		(-1.0729)		(-0.8336)	
Zimbabwe	-0.44.52*	-0.3653	-0.2833	-0.4243**	-6.5317***	0.005
	(-1.7296)	(-1.4441)	(-1.4805)	(-3.4077)	(-2.8664)	

NOTE: t-statistics in parenthesis, and ***, ** and * denotes significance at the 1%, 5% and 10% levels, respectively.

4.7 Impulse Response Functions

The impulse response function traces out the effect of an exogenous shock or innovation in one of the variables on some or all of the other variables. If there is a reaction of one variable to an impulse in another variable we may call the latter causal for the former. The impulse responses are zero if one of the variables does not Granger-cause the other variables taken as a group. An innovation in variable k has no effect on the other variables if the former variable does not Granger-cause the set of the remaining variables.

The selected sample of SADC countries has varied responses to shocks from budget balance and current account balance. The life of the exogenous shock is different among the countries. Some countries reflect a response that stabilises after the ninth period. For most series the effect of a shock dampens after two or three periods. The strength of the twin deficit varies across countries. To begin with SADC average budget balance does not respond to current account shock implying that the current account is an exogenous variable in the determination of budget balance. The current account responds positively in the first period; negatively in the second period then slowly converges to equilibrium in the tenth year. Angola fiscal balance reacts positively to current account shock with the highest impact in the second year; it then dampens in a fluctuating manner and reaches equilibrium in year nine. The current account balance reacts positively to a fiscal shock and converges back to equilibrium in period ten. Botswana's fiscal

balance responds to a unit shock in current account positively and most significantly in the second period; converges to equilibrium in the seventh period. The current account also responds positively and its highest impact is in the first period; calms down to equilibrium in the seventh period. Malawi's fiscal balance responds negatively to current account shock which reaches highest impact in the second period, then gradually dies out to equilibrium in the eighth period. The current account balance responds positively to a fiscal shock in the first period, and then turns negative in the second period before converging to equilibrium in the eighth period. Mozambique's fiscal balance does not respond to a shock in the current account. Seychelles' fiscal balance responds negatively to a current account shock, and then converges to equilibrium in the seventh period. The current account balance responds positively and has high impact in the first period, and then converges to equilibrium in the eighth period. South Africa's fiscal balance responds positively and realises maximum impact in the second period; converges to equilibrium in the tenth period. However the current account responds negatively to a fiscal shock. Swaziland's fiscal balance responds positively to a current account shock and reaches maximum impact in the second period. The current account responds negatively with maximum impact in the second period. Zambia's fiscal balance responds positively to a current account shock while the fiscal balance responds positively initially before turning negative in the second period. Zimbabwe's fiscal balance responds negatively from first to third period then oscillates around equilibrium and the current account responds to a fiscal shock in a similar manner.

The impulse response functions suggest bidirectional causality between fiscal balance and current account balance for Angola and Botswana. Unidirectional causality running from budget balance to current account may be possible for Seychelles and unidirectional causality (current account to budget balance) maybe possible for Swaziland, South Africa and Zambia. Zimbabwe shows mixed reactions therefore it shows that the relationship is dynamic, while Mozambique reflects some kind of Ricardian Equivalence (This suggests that for these countries inter-temporal shift between taxes and budget deficit does not matter for real interest rates, the quantity of investment or the current account balance). Zimbabwe is one case where the current account balance explains a big chunk of budget balance; this may suggest a strong possibility of unidirectional relationship the running from current account to the budget deficit.

4.8 Variance Decompositions

The variance decomposition provides information about the relative importance of each random innovation in affecting the variation of variables in the VAR.

Table 7: Variance Decomposition

Country	Variance Decomposition	Decomposition % Explained Budget Balance				Decomposition % Explained Current Account			
		1	4	7	10	1	4	7	10
Angola	Budget Balance	100	92	92	92	0	7.7	7.85	7.85
	Current Account	34	48.8	46	46	65.58	54.15	53.97	53.96
Botswana	Budget Balance	100	92.9	91.9	91.9	0	7.1	8.1	8.1
	Current Account	29.1	33.3	34.1	34.1	70.9	66.7	65.9	65.9
Malawi	Budget Balance	100	89.87	88.98	88.9	0	10	11	11
	Current Account	6.7	8	8.5	8.6	93	91.7	91	91
Mozambique	Budget Balance	100	99.96	99.96	99.96	0	0.04	0.04	0.04
	Current Account	1	2.2	2.2	2.2	98.9	97.8	97.8	97.8
South Africa	Budget Balance	100	95.5	94.7	94.6	0	4.9	5.3	5.4
	Current Account	1.7	14.4	15.3	15.5	98.3	85.6	84.7	84.5
Seychelles	Budget Balance	100	99.5	99.4	99.3	0	0.5	0.6	0.7
	Current Account	27.1	22.4	22.6	22.6	72.9	77.6	77.4	77.4
Swaziland	Budget Balance	100	93.1	93	93	0	6.9	7	7
	Current Account	0.1	3.8	3.9	3.9	99.9	96.2	96.1	96.1
Zambia	Budget Balance	100	98.4	98.4	98.4	0	1.6	1.6	1.6
	Current Account	10.2	20.1	20.6	20.6	89.8	79.9	79.4	79.4
Zimbabwe	Budget Balance	100	74.2	73.7	73.6	0	25.8	26.3	26.4
	Current Account	13.8	20.7	20.4	20.4	86.1	79.3	79.6	79.6
SADC	Budget Balance	100	99.9	99.9	99.9	0	0.01	0.01	0.01
	Current Account	11.1	18.9	19.8	19.8	88.9	81.1	80.2	80

In most countries the current account accounts for at most 11% of the forecast error variance for budget balance except Zimbabwe where it accounts for 26% (at most). The budget balance accounts for a higher percentage of the forecast error variance of current account and at most about 48% (Angola) of the forecast error variance in current account is accounted for by the budget balance. This suggests the relative importance of fiscal policy in correcting the current account balance.

There is a possibility of bidirectional relationship for countries such as Zimbabwe while for Malawi and Swaziland the relationship is weak. The majority of countries (Angola, Botswana, South Africa, Seychelles, Zambia and the average for the SADC region) display a possibility of unidirectional relationship running from budget deficit to current account deficit. Thus, there is a strong possibility of twin deficit as suggested by the Keynesian theory. Mozambique is one case where the Ricardian Equivalence Hypothesis is reflected.

4.9 Conclusion

The Granger causality test, bivariate estimates, impulse response functions and the variance decomposition were used to determine the relationship between the budget balance and the current account balance. Mixed results were obtained showing bidirectional, unidirectional and no relationship for some countries.

CHAPTER IV: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter dwells on summarising results, making appropriate policy recommendations from the study and suggests areas of further research which have not been explored by the study.

5.2 Summary

Mixed results were obtained showing bidirectional, unidirectional and no relationship for some countries. A bidirectional relationship was found for Botswana by Granger causality test; this was also confirmed by bivariate estimates results that showed a significant relationship in both equations. The impulse response functions also supported the existence of bidirectional relationship for Botswana. However, the variance decomposition suggests the Keynesian twin deficit is much stronger.

The twin link (budget deficit cause current account deficit) was confirmed by the Granger causality test for Malawi, Zambia and the SADC region. For Malawi the variance decomposition suggests that the relationship is not strong whereas for SADC group, the impulse response function together with the variance decomposition confirms the existence of the relationship. However, for Zambia there are mixed results from other tests.

Unidirectional relationship (operating from CAB to BB); only Zimbabwe has proved to be a strong case as confirmed by Granger causality test, impulse response functions and variance decomposition. Swaziland seems to suggest such a relationship though weak. This is supported by Summers (1988) who argued that external imbalances may lower the pace of growth which suffocates revenue generation.

Mozambique has shown that the two variables have no relationship and all tests seem to confirm this whilst Angola, South Africa, and Seychelles results are ambiguous hence inconclusive.

5.3 Policy Recommendations

Botswana has shown a bidirectional relationship between the budget deficit and the current account deficit. This suggests that policymakers can use fiscal adjustments which also address external imbalances. The reverse is also true

27

Countries such as Malawi and Zambia which have shown evidence of the twin deficit imply that policymakers must consider fiscal consolidation (reducing deficit and debt accumulation). Fiscal consolidation includes measures such as efficient spending monitoring; proficient revenue collection apparatus and restructuring the civil service. Fiscal consolidation has proved to be helpful in many countries where it has been fully implemented. However, lax fiscal adjustments are destined to fail. Fiscal strain can be controlled by reducing non-priority expenditure, strengthening the revenue base and where feasible allowing flexible exchange rate.

Low Official Development Assistance (ODA) is a contributing factor to the large budget deficits of SADC countries. Countries such as Zimbabwe need to attract aid flows and negotiate for debt relief. ODA are transfers of real resources to countries. This has to be accompanied by a well-built policy structure to make possible their successful assimilation.

Countries such as Zimbabwe have shown reverse link operating from external balance to fiscal balance. External shocks have been known to be the cause of fiscal flux in a number of developing countries. Intermittent export prices and foreign interest rates imply the commodity exporters and highly indebted countries face an innate instability which repeatedly hinders fiscal adjustment efforts. Other causes include decline in conventional exports, lack of balance of payments support for over a decade, surge in imports of capital goods, fuel, droughts coupled with a narrow range of exports which are mainly primary products.

There is need to take up a number of initiatives such as: lowering production costs and exploiting market niche; raising production of agriculture; considering use of other sources of power (such as solar, mandatory ethanol blending, consider expansion of power generation both hydro and fossil); removing structural bottlenecks to productivity growth; moving resources from traditional and less productive sector to more productive sectors; improving the investment environment so that investors automatically pick up signals and invest in profitable export oriented areas in order to improve the current account.

There are also a number of factors which need to be improved such as addressing inadequate infrastructure, high transport costs, product quality issues, regulatory and other constraints limiting supply responses and which improve the business environment. For Zimbabwe, it is sustainable to finance current account through inflows of portfolio and direct investments since it

is an addition of real resources. The other two options (drawing down international reserves and external borrowing) are not feasible since the country is saddled with a large international debt. In the long run there is need for government to develop new exports, primary products beneficiation (value addition), use of nanotechnology and nurturing them. In Zimbabwe and to some extent Swaziland the current account can be used to address the budget balance.

Variance decomposition implies that for trade policies to be sustainable countries should take into account budget deficit which is not a fully controlled variable. Managing these two variables is an important agenda for the region. Sustaining these two macroeconomic variables complemented by appropriate coordination of monetary and fiscal policies is necessary to promote macroeconomic stability and sustainability in the region.

Evidence on the twin deficit hypothesis is not exact hence complex and unclear for the majority of countries. The relationship evolves over time depending on the dynamics of the economy. Bartlett (1999) also supports the notion that the relationship between the two deficits is not consistent overtime. Again given the complexities that are intrinsic in mixed economies, it may not be probable to verify a firm and unwavering relationship between the two deficits. However, there is neither a one-size fits all explanation for selected countries nor 'a silver bullet' stratagem for any country. The solution might be a mixture of policies that tackle the binding constraints faced by countries.

5.4 Suggestions for Further Research

Areas for further research include employing structural breaks, estimating Granger non causality tests, using multicointegration and cointegration models with regime shifts. Granger non causality test can test for indirect relationship between the two variables. Multicointegration and cointegration allow the researcher to test for long-run and short-run relationships using many variables. An attempt can also be made to investigate the hypothesis using quarterly data.

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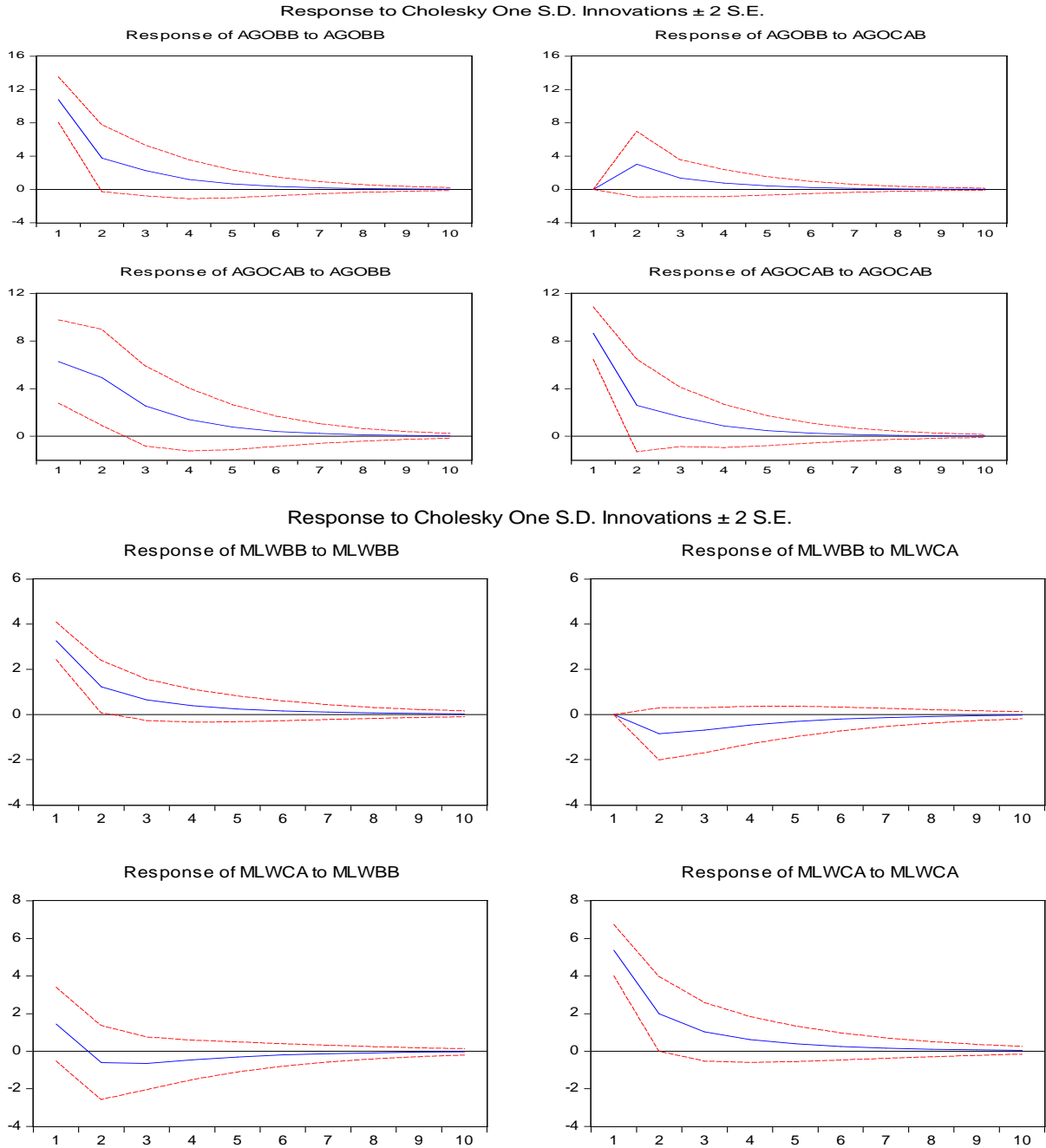
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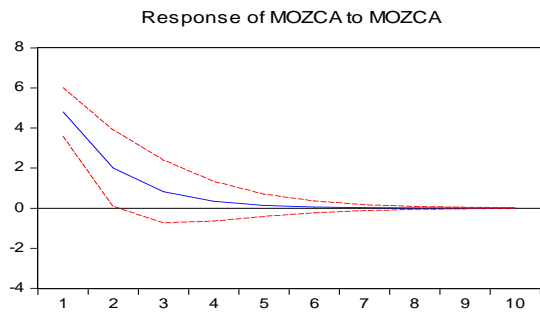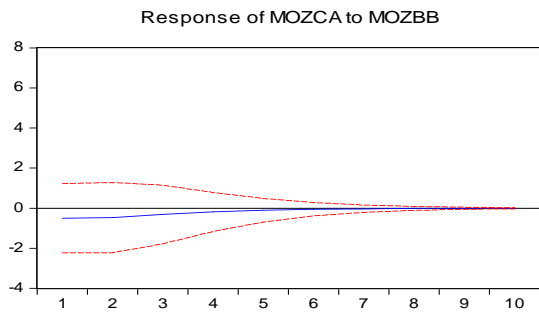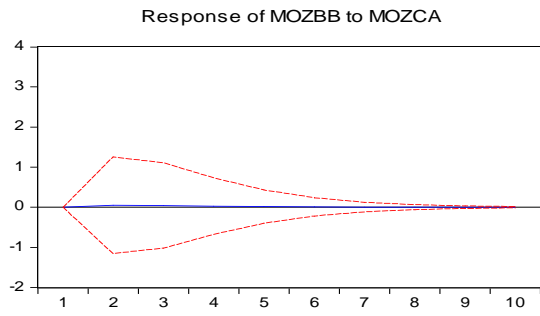Walker, C.W. (2002). Ricardian Equivalence and fiscal policy effectiveness in Japan. *Asia Economic Journal*, 16(3).
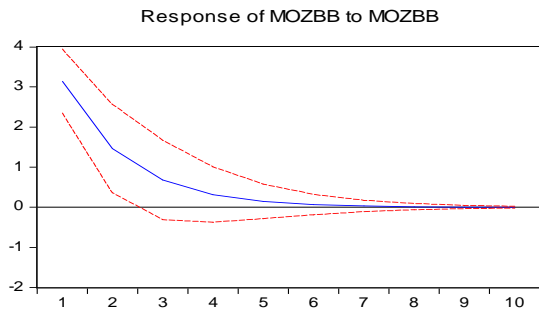
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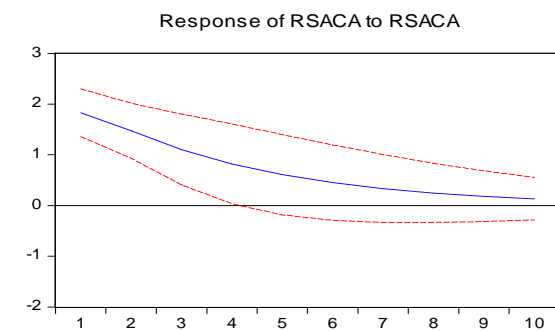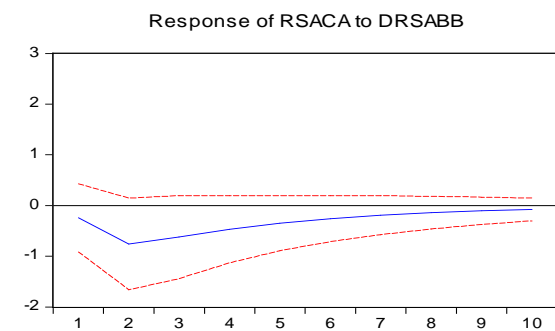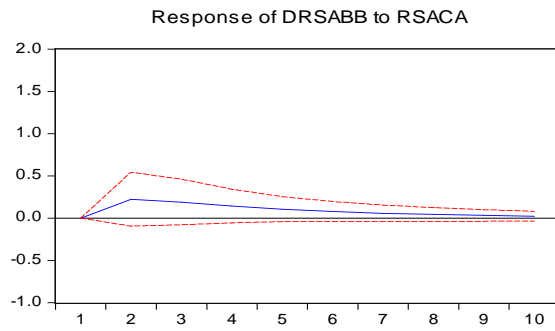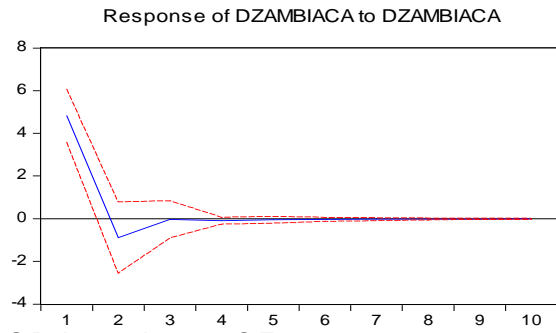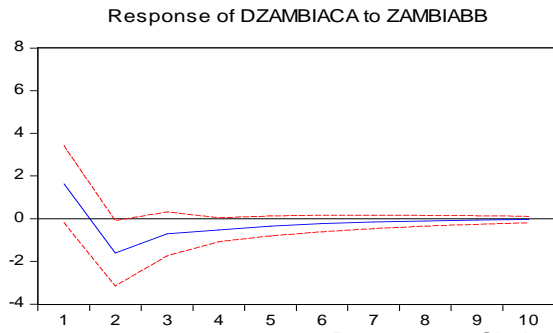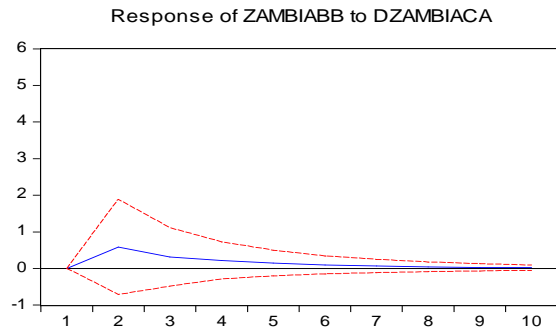
Appendices

Appendix 1: Impulse Response Functions

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of AGOBB to AGOBB

Response of AGOBB to AGOCAB

Response of AGOCAB to AGOBB

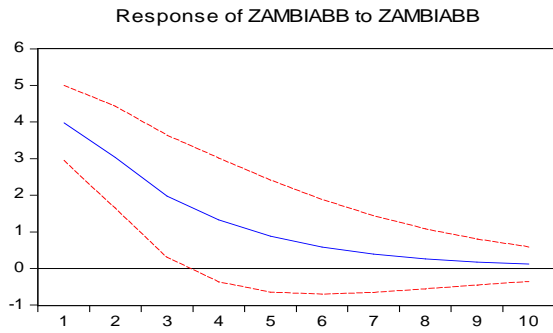Response of AGOCAB to AGOCAB

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of MLWBB to MLWBB

Response of MLWBB to MLWCA

Response of MLWCA to MLWBB

Response of MLWCA to MLWCA

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of MOZBB to MOZBB
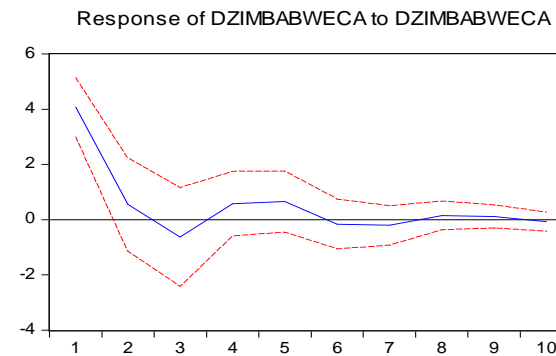
Response of MOZBB to MOZCA

Response of MOZCA to MOZBB

Response of MOZCA to MOZCA

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of DRSABB to DRSABB

Response of DRSABB to RSACA

Response of RSACA to DRSABB
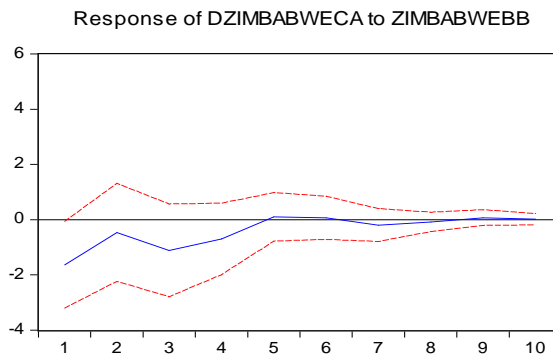
Response of RSACA to RSACA

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of SEYBB to SEYBB

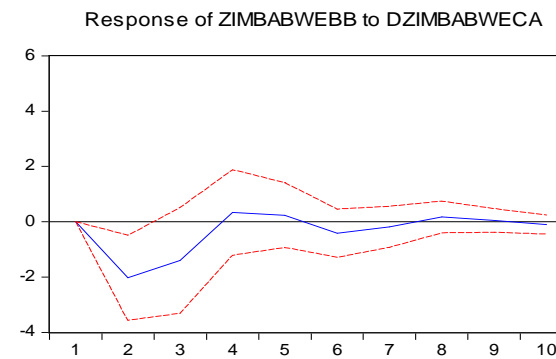Response of SEYBB to SEYCA

Response of SEYCA to SEYBB

Response of SEYCA to SEYCA

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of SWAZILANDBB to SWAZILANDBB

Response of SWAZILANDBB to DSWAZILANDCA
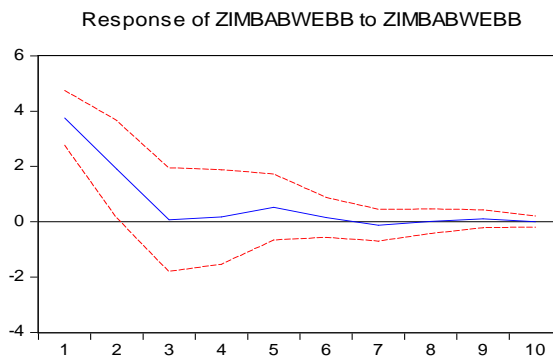
Response of DSWAZILANDCA to SWAZILANDBB
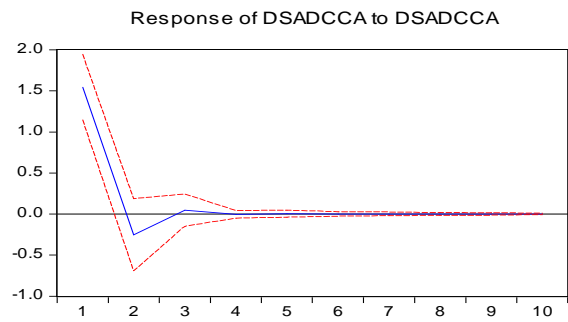
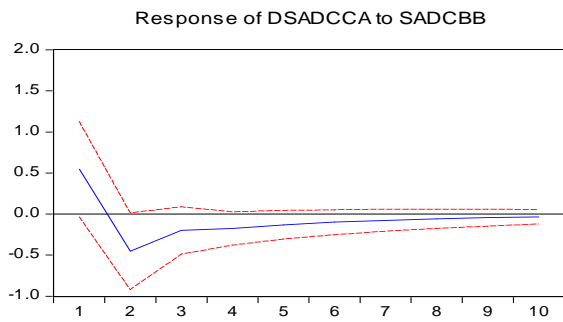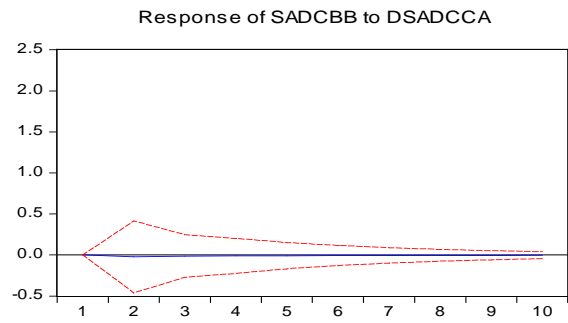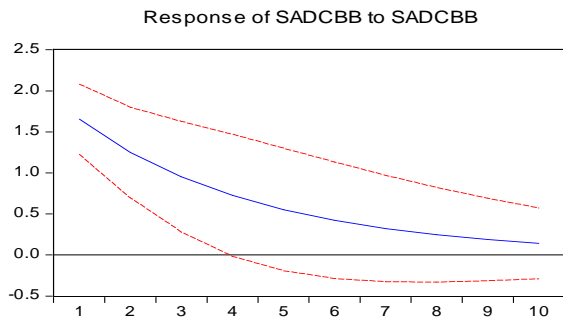Response of DSWAZILANDCA to DSWAZILANDCA

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response to Cholesky One S.D. Innovations ± 2 S.E.

Response of SADCBB to SADCBB

Response of SADCBB to DSADCCA

Response of DSADCCA to SADCBB

Response of DSADCCA to DSADCCA

Appendix 2: Granger Causality Test

Pairwise Granger Causality Tests
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
AGOCAB does not Granger Cause AGOBB	31	2.43720	0.1297
AGOBB does not Granger Cause AGOCAB		1.56209	0.2217

Pairwise Granger Causality Tests
Date: 03/26/13   Time: 14:18
Sample: 1980 2011
Lags: 3

Null Hypothesis:	Obs	F-Statistic	Prob.
DLSOCA does not Granger Cause DLSOBB	28	1.54692	0.2319
DLSOBB does not Granger Cause DLSOCA		1.71954	0.1936

Pairwise Granger Causality Tests
Date: 03/26/13   Time: 20:00
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DMDRCA does not Granger Cause MARSBB	30	0.09062	0.7657
MARSBB does not Granger Cause DMDRCA		0.35394	0.5568

Pairwise Granger Causality Tests
Date: 03/26/13   Time: 20:27
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MLWCA does not Granger Cause MLWBB	31	2.28422	0.1419
MLWBB does not Granger Cause MLWCA		1.49835	0.2311

Pairwise Granger Causality Tests
Date: 03/26/13   Time: 20:53
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
MOZCA does not Granger Cause MOZBB	31	0.00662	0.9357
MOZBB does not Granger Cause MOZCA		0.10825	0.7446

Pairwise Granger Causality Tests
Date: 03/26/13   Time: 21:50
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.

RSACA does not Granger Cause DRSABB	30	2.03959	0.1647
DRSABB does not Granger Cause RSACA		2.66981	0.1139

Pairwise Granger Causality Tests
Date: 03/27/13   Time: 09:48
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DSADCCA does not Granger Cause SADCBB	30	0.01045	0.9193
SADCBB does not Granger Cause DSADCCA		3.09489	0.0899

Pairwise Granger Causality Tests
Date: 03/27/13   Time: 10:05
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
SEYCA does not Granger Cause SEYBB	31	0.08904	0.7676
SEYBB does not Granger Cause SEYCA		0.63297	0.4330

Pairwise Granger Causality Tests
Date: 03/27/13   Time: 12:00
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DSWAZILANDCA does not Granger Cause SWAZILANDBB	30	1.55916	0.2225
SWAZILANDBB does not Granger Cause DSWAZILANDCA		0.94917	0.3386

Pairwise Granger Causality Tests
Sample: 1980 2011
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
DZAMBIACA does not Granger Cause ZAMBIABB	30	0.82792	0.3709
ZAMBIABB does not Granger Cause DZAMBIACA		4.03327	0.0547

Pairwise Granger Causality Tests
Sample: 1980 2011
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
BOTSWANACA does not Granger Cause BOTSWANABB	30	4.05571	0.0298
BOTSWANABB does not Granger Cause BOTSWANACA		1.53833	0.2344

Pairwise Granger Causality Tests
Date: 03/28/13
Sample: 1980 2011
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.

DZIMBABWECA does not Granger Cause ZIMBABWEBB	29	4.12071	0.0289
ZIMBABWEBB does not Granger Cause DZIMBABWECA		1.54908	0.2329