EXAMINING THE TWIN DEFICIT HYPOTHESIS: EVIDENCE FROM SELECTED SADC COUNTRIES (1980-2011)

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ABSTRACT

This paper 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. Government Organizations.

INTRODUCTION AND BACKGROUND

The discussion on the problem of twin deficits has been rekindled 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 'sins' 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 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, there is scant empirical literature on the twin deficits hypothesis on 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.

Overview of SADC

SADC is one of the Regional Economic Communities (RECs) in Africa with 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).

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. 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).

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. The study will centre on the economies of selected SADC countries (Angola, Botswana, Malawi, Mozambique, Seychelles, South Africa, Swaziland, Zambia and Zimbabwe).

The remainder of this paper is structured as follows. Section 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. Section 3 provides a description of methodology for investigating the twin deficit hypothesis. Section 4 provides data description and empirical results, while section 5 concludes and make policy recommendations based on the research findings.

LITERATURE REVIEW

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:

$Y = C + I + G + X – M$

……………………………….(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:

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

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: $S - I = CA$ ....(3)

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

$$S\_p = Y - T - C ....(4a) \quad S\_g = T - G ....(4b)$$

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

$$CA = (S\_p - I) - (G - T) ....(5)$$

where the term $(G - T)$ is indicative of 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.

Theoretical Literature Review

The standard neoclassical model postulates 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.

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. 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 (1989) assumes underemployement in the economy, thus increased consumption would be supplied by unutilised resources.

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 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. 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 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 (1979) concluded again that the choice between debt and taxes does not really matter.

Empirical Literature Review

Walker (2002) 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 co integration relationship between the variables (real exchange rate, current account, and consumption). This implies Ricardian equivalence holds for the study. 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. There was some presence of Ricardian equivalence; however, they were cautious and unconvinced given the diversity of countries and data limitations within the group. Islam (1998) and Normadin (1999) concurred that there is a feedback link between the two deficits while Summers (1988) found a reverse link (i.e. current account causes fiscal deficit). Godley and Cripps (1983), Enders and Lee (1990) and Evans & Hasan (1994) did not detect a stable long-run association between the two deficits using a variety of samples. 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. 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 partly stemming from the different empirical techniques, data measures and samples.

METHODOLOGY

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. VAR reports results from Granger causality tests, impulse responses and variance decomposition will be used. VAR modelling has proven successful for forecasting systems of interrelated time series variables over short-term horizons (Watson, 1994).

Model Specification

The equations are estimated and they include a constant, $ci1$ which captures the effects of exogenous variables including the spread between domestic saving and gross private domestic investment. The estimated equations are:

$$⟦CAB⟧\_it=c\_i1+\sum\_(j=1)^n ⟦\alpha\_(i,j)⟧ CAB\_(i,t-j)+\sum\_(j=1)^n ⟦\beta\_(i,j)⟧ ⟦BB⟧\_(i,t-j)⟧⟧+\varepsilon\_1t$$
$$t=1,2….T; i=1,2….N ……..(1)$$

$$⟦BB⟧\_it=c\_i2+\sum\_(j=1)^n ⟦\alpha\_(i,j)⟧ CAB\_(i,t-j)+\sum\_(j=1)^n ⟦\beta\_(i,j)⟧$$

〖 B B 〗 _ (i , t - j) 〗 〗 + ε _ 2 t t=1,2….T;i=1,2….N ……(2)

where CAB represents current account balance, BB is government budget balance, ci1 and ci2 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. 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 lag selection criteria in E-Views 7. The data extends from 1980 through to 2011. Data was sourced from Researve Bank of Zimbabwe, ZIMSTAT, UNCTAD and AfDB (Socio-Economic Database May 2012) online databases.

ESTIMATION AND INTERPRETATION OF RESULTS

Correlations indicate the predictive connection between fiscal and external balances. 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. 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). The time series variables for the selected SADC countries were tested for stationary using the Augmented Dickey-Fuller Test to avoid spurious estimation. Given the non-uniform stationary properties of all the series under analysis, testing for the existence of co integration is not necessary.

Granger Causality Test Results

The Granger causality test is used to determine the direction of influence of the variables on one another. The Granger causality test between the variables was conducted up to the fifth lag. It is apparent from results 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. 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.

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 the latter may be called 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 determi-

nation 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.

Variance Decompositions

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

Variance Decomposition

Country	Variance Decomposition	Decomposition percentage (%) Explained Budget Balance				Decomposition Percentage (%) 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

CONCLUSIONS AND RECOMMENDATIONS

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 that 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.

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.

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 which is politically difficult. 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 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.

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 examine the 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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Appendices

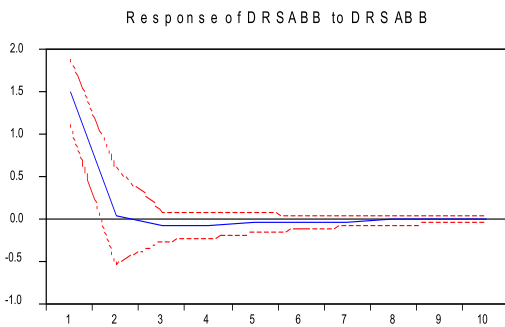## Appendix 1: Impulse Response Functions

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
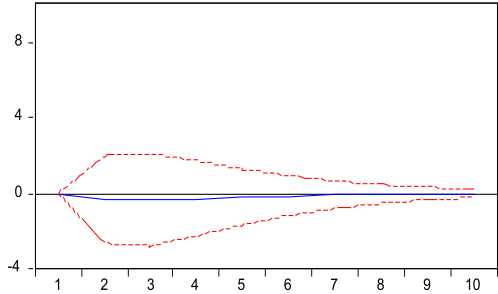
Response of AGOCAB to AGOCAB

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

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

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

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

Response of ZAMBIABB to ZAMBIABB

Response of ZAMBIABB to DZAMBIACA

Response of DZAMBIACA to ZAMBIABB

Response of DZAMBIACA to DZAMBIACA

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

Response of ZIMBABWEBB to ZIMBABWEBB

Response of ZIMBABWEBB to DZIMBABWECA

Response of DZIMBABWECA to ZIMBABWEBB

Response of DZIMBABWECA to DZIMBABWECA

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
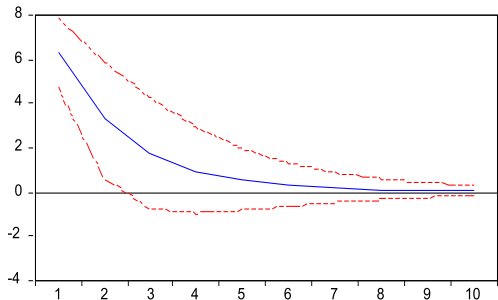
Unit Root Test - Augmented Dickey Fuller Test

	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.

Diagnostic Test for VAR

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.

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.