Testing the Applicability of the Twin Deficits Hypothesis in Zimbabwe

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Abstract

The concept of the twin deficit hypothesis is fraught with controversy. Some economists argue that there is independence between current account deficits and budget deficit while some believe that the relationship exists but the direction of causality is uncertain. While others say there is causality running from budget deficit to current account deficit and vice versa. The majority of economists trained in the Keynesian thinking are in favour of the twin deficits hypothesis while others are against it but in favour of the contrasting theory, the Ricardian equivalence. The Ricardian equivalence hypothesis, argues that the two are independent. The major objective of the paper is to test the applicability of the twin deficits hypothesis to Zimbabwe. This is premised on the argument of persistent budget and current account deficits obtaining in Zimbabwe. The majority of researches done along this line are not in Southern Africa. A Granger representation alongside co-integration analysis is used in the study. The findings indicate that the twin deficit hypothesis holds using Johansen cointegration and Granger causality based on lag two. The public expenditure overruns should be a thing of the past.

Keywords: Twin deficits, current account, budget deficit, Granger causality, Zimbabwe

1. Introduction

The concept of the twin deficit hypothesis is fraught with controversy. Some economists argue that there is independence between current account deficits and budget deficits while some say the relationship exists but the direction of causality is uncertain and still others say there is causality running from budget deficit to current account deficit. Both theoretical and empirical analyses tend not to agree.

In the Zimbabwean scenario, both economic woes are bedeviling the country. The nation has experienced persistent budget and current account deficits since the time it attained independence in 1980. Statistics revealed by the then CSO show that in that period in less than five years did Zimbabwe experience a current account surplus since it attained independence

Table 1: Five Year Averages Of Budget And Current Account Deficits For Selected Years

Years	1993-1997	1998-2002	2003-2006
Budget Deficit (US $ million)	-4.9	-32.24	-12513.
Current Account Deficit (US $ million)	-400.8	-345.4	-363.92

Source: Own calculations based on RBZ annual reports (2005) and (2008).

Table 1 shows that from 1993 to 2006, budget deficit in absolute figures has been going up with an average of -US$4.9 million in the period 1993 to1997 and then shot up to an average of -US $12 513 million from 2003 and 2006. The current account deficit was at a high average of -US$400.8 between 1993 and 1997 inclusive to a low of –US$345.4 million between 1998 and 2002 but shot up again to an astounding average of –US$363.92

million for the period 2003 to 2006. The trend depicted in Table 1 shows that while the budget deficit is continuously increasing, the current account deficit does not follow a certain pattern.

The relationship between the two variables can be a Ricardian Equivalence or the twin deficits hypothesis. The Ricardian equivalence argues that the two are not related in any way since people are concerned about current tax rates and budget deficit. They think that by incurring a deficit, the government intends to increase tax rates in the future and hence they save for the future generation. This leads us to say that the two deficits are not related in any way. On the contrary, the twin deficit hypothesis argues that a budget deficit will result in a current account deficit. Thus, the causality is supposed to run from budget deficit to current account deficit.

Zimbabwe has been facing the two economic evils, current account deficit and budget deficit since 1980 when it attained its independence. Both imply that the government will in the future intend to cover them. By so doing, the welfare of Zimbabweans will be affected. Both current account and budget deficit may require the government to borrow locally or abroad. This will, in the Keynesian argument increase interest rates in the domestic market. This will further exacerbate the situation by crowding out the private sector. Again, this will in turn reduce the productive capacity of the nation. By reducing productive capacity, the amount of exports will presumably reduce thus exacerbating the current account deficit.

The main objective of the paper is to investigate the applicability of the twin deficit hypothesis in Zimbabwe given the controversy surrounding the hypothesis in other countries. The persistent existence of budget and current account deficits has been an important policy issue in Zimbabwe. Again, given the emphasis given to international trade by the Zimbabwean government, and the strong need for fiscal stringency, there is need for a study on the applicability of the twin deficit hypothesis. Zimbabwe has endeavored in different trade blue prints and the most recent being the Industrial and International trade policies promulgated by the Ministry of Industry and Commerce on 29 March 2012.

The close relationship between the deficits can be tested using the cointegration approach. However, this does not reveal which one is the leading variable. Since the twin deficits hypothesis argue that it is the budget deficit that cause current account deficit, this study is in the right direction since it employs the Granger-causality approach. Again a study of the causal relationship between budget deficit and current account deficit in Zimbabwe has not been done to the best knowledge of the researchers.

The paper is organized into four sections. The next section delves into previous literature on twin deficit tests. This will be followed by the research methods and data analysis. The last part provides conclusion and policy proposals.

2. REVIEW OF EXISTING LITERATURE

Twin deficits hypothesis dates back to the works of Keynes but it only received attention during the 1980s due to events occurring in the Unites States among other nations. This hypothesis is premised on the argument that fiscal deficits and current account deficits are related with the later caused by the former. The theoretical framework in the hypothesis is based on the national income accounting equation.

The national income accounting equation is given as in the following equation.

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

Where Y is the national income

C is private consumption

G is government expenditure

X and M are exports and imports respectively and the difference reflected here is the current account deficit (CAD).

The same equation can be written in another way as follows.

$$Y = C + S + T - - - - - - - - - - - 2$$

In this equation: Y and C are as in equation one

S and T are private savings and tax revenues.

Replacing Y in equation 1 by equation 2, one gets the following equation

$$C + S + T = C + I + G + (X - M) - - - - - - 3$$

Equation 3 reduces to

$$(X - M) = (I - S) + (G - T) - - - - - - 4$$

In equation four, it is reflected that current account deficit is as a result of the fiscal deficit or the excess of investment on savings. Those economists trained in the Keynesian thinking point out that the current account deficit is as a result of the fiscal deficit. This therefore points out that CAD is dependent on the fiscal deficits. Any change in fiscal deficits will lead to a change in CAD. The policy implication, implied here, for curing CAD is to stabilize the fiscal deficits.

The other side of the story is the Ricardian equivalence where it is argued that the change in taxes will lead to a change in disposable income but will not change expenditure and hence CAD. In this instance one must expect that the current account deficits and fiscal deficits are not related in any way instead they are distant cousins, as supported by Zengin (2000).

Empirical studies done in the context of the twin deficits do not give similar results. Some support the hypothesis while others refute its applicability. It is imperative that a thorough research be done to reflect where these dissimilar or similar results are emanating from.

Baharumshah, Lau and Khalid (2006) investigated the twin deficits hypothesis within a VAR representation, impulse response functions and variance decomposition in Indonesia, Malaysia, Philippines and Thailand. The major finding in the paper was that co integration between the two variables exists and the twin deficits hypothesis hold since causality was found to run from budget deficit to current account deficit. It was also revealed that the consequences of the huge budget and current account balances become noticeable in the long-run as revealed by the variance decomposition and impulse response functions.

Baharumshah, Lau and Ismail (2009) furthered the study in the above Asian countries in which their findings were that twin deficits hold in Malaysia, Thailand and Philippines but not in Singapore and Indonesia. The other findings indicated that the Feldstein-Horioka puzzle is less important in these countries. The paper also revealed that government expenditure crowd out private expenditure.

Holmes (2011) investigated the twin deficit hypothesis applicability in USA in the context of cointegration framework. The results from the Engle-Granger, Phillips-Ouliaris and Johansen cointegration methodologies all refute the presence of cointegration. This was explained as evidence of the absence of the twin deficit hypothesis. The Markov regime switching framework, however, revealed the twin deficit could be present as well as the twin divergence argument. It was therefore inconclusive whether the twin deficit actually applied in USA for the period between 1960 and 2000. Technological shocks were argued to be the leading cause for the short run twin divergence while it also caused long-run twin deficits.

For Turkey, it was established by Akbostancı and Tunç (2002), in cointegration analysis and error correction methodologies that the twin deficits hypothesis holds. The long run relationship detected by the cointegration analysis was found present while the short-run relationship also revealed by the ECM was enough to conclude that the two are related. However, the contrasting theory, the Ricardian equivalence, could not be confirmed.

Mukhtar, Zakaria and Ahmed (2007) applied cointegration and Granger causality to study the twin deficits in Pakistan. The findings indicated that a long run relationship between the concerned variables exist by cointegration analysis. It is also revealed that the quarterly data used from 1975 to 2005 showed a bi-directional causality between budget deficit and current account deficit. This then was taken as casting doubt on the twin

deficit hypothesis applicability in Pakistan and is argued to be due to the use of single equation models. The authors therefore suggested use of simultaneous equation models.

Within the context of Pakistan grounds, Siddiqui (2010) studied the twin deficits. The Johansen and Juselius cointegration method and the rolling window estimation method were used in this study. It was established that cointegration between the variables exists implying that the twin deficit hypothesis holds. Within the rolling window method, mixed results were obtained between several samples. Thus in one period budget deficit would impact on current account deficit while on the other sample the opposite result was obtained.

India is no exception in terms of researches done to validate the twin deficit hypothesis or the Ricardian equivalence. Ghatak and Ghatak (1996) and Ratha (2011) carried out a study on the twin deficit in India. Ghatak and Ghatak (1996) used cointegration analysis to validate the Ricardian equivalence. Their efforts led to the conclusion that the hypothesis did not work. Within the bounds tests and error correction model and using quarterly and monthly data, Ratha (2011) established that the twin deficit hypothesis hold in India in the short run but not in the long-run.

In a group of ten countries using panel data in which Zimbabwe was included, Giorgioni and Holden (2003) failed to reject the Ricardian equivalence. The study used data ranging from 1975 to 1999. The authors argued that in developing county set up, Ricardian equivalence hypothesis can not be ruled out a priori and the problem is complex due to the assumptions underlying the hypothesis.

Kouassi, Mougoue and Kymn (2004) tested the twin deficit applicability in twenty countries, ten developing and ten developed. Within the developing countries, South Africa was the only one from Sub-Saharan Africa. The Granger non-causality test used revealed that there was causality between the variables, that is, both bi-directional and unidirectional for some developing nations while for developed nations results were not persuasive. South Africa and Venezuela happen to be the two to reveal feedback causality within the developing countries sample. In this study the Johansen cointegration analysis could not accept any cointegration between budget deficit and current account balance in the developed nations sample but accept it in the developing nations sample. This was a sign of the impending conclusion from the Granger-non causality from the Toda and Yamamoto methodology which showed no causality in any direction.

Zamanzadeh and Mehrara(2011) applied cointegration and Vector Error Correction Model to study Twin deficit hypothesis in Iran. The effect of budget deficit on non-oil deficit was tested and results found revealed that the twin deficit hypothesis hold in Iran at least for the period 1950-2007. The Ricardian equivalence hypothesis was however refuted.

The twin deficit hypothesis was also tested in Cambodia by Lau and Tang (2009). It was established that in the short run the quarterly data between 1996 and 2006 support the twin deficits hypothesis. In the long run, it was also established that the variables are cointegrated. The question which may be posed here based on the results is that since the authors found bi-directional causality, does it really mean the hypothesis is present. In empirical studies, the twin deficits hypothesis only hold if causality runs from government budget deficit to current account deficit. But since they found causality in both directions and concluded that the hypothesis holds, we tend to question the validity of these conclusions. What is true about these results is that both the Ricardian equivalence and twin deficits hypothesis hold.

Using Ukraine, Vyshnyak (2000) found that within a cointegration approach and Granger-causality framework, the twin deficit hypothesis was validated in Ukraine. The author also discovered that the transmission mechanism in this phenomenon is via the exchange rate.

Celik and Deniz (nd) investigated the twin deficit hypothesis in six countries using quarterly data between 1996 and 2006. The study employed the panel cointegration technique to the six countries in which results revealed that the hypothesis holds. Among the countries studied, South Africa is the only one from Africa.

Saeed and Khan (2012) tested the Ricardian equivalence hypothesis in Pakistan using the Johansen cointegration. It was established that the Ricardian hypothesis did not hold but the twin deficits held for Pakistan for the period 1972 to 2008.

3. Methodology

This section presents the model specification after the necessary diagnostics have been undertaken.

3.1 Model specification

In this study, the simple Granger causality test is used. Thus we adopt the methodology of Granger (1969). Here, the model is specified as:

$$BD_t = \delta \sum BD_{t-1} \text{ -----------------------------} 1$$

$$CAD_t = \phi \sum CAD_{t-1} \text{ -------------------------} 2$$

$$BD_t = \alpha \sum BD_{t-i} + \beta \sum CAD_{t-i} \text{ -------------} 3$$

$$CAD_t = \eta \sum CAD_{t-i} + \lambda \sum BD_{t-i} \text{ ------------} 4$$

Where BD is budget deficit and CAD is current account deficit.

In this specification, the first two equations are called the restricted equations while the last two are called the unrestricted equations.

Within this specification, we can detect direction of causality by inspecting the coefficients of the equations.

In the above equations, according to Granger (1969), CAD is said to Granger-cause BD if β is not equal zero and BD will also Granger-cause CAD if λ is not equal to zero. If these two situations simultaneously exist then there is bi-directional causality. The first two scenarios represent unidirectional causality and if none of them prevails then we conclude that there is independence between the two variables under consideration.

3.2 Diagnostic Tests

A number of diagnostic tests were carried out as part of econometric procedures. These include the unit root tests, co integration tests, and optimal lag length.

Unit root test

A unit root test was undertaken. The paper uses the conventional Augmented Dickey-Fuller test to perform this function. This reduces the possibility of spurious regression which lead misleading recommendations.

Cointegration test

Cointegration basically refers to the long run relationship between the variables in a model. The Johansen methodology for cointegration was used. In this study, unlike in other studies, this is treated as both a diagnostic test and an analysis methodology.

Optimal lag length

According to Brooke (2008), the choice of the information criterion used is the author's since there is no information criterion superior to the other. The optimal lag length in this paper was determined using the Akaike and Schwarz Information Criteria. One thing that we have to be clear at this moment is that the results of Granger-causality are sensitive to lags.

3.3 Data sources and types

The secondary data for the period 1980 to 2011 used in this paper is obtained from different sources, chief among them is the Zimbabwe Statistical Agency (formerly Central Statistical Office), Indexmundi website, 'tradingeconomics' website, the IMF website and the Reserve Bank of Zimbabwe annual reports. The main challenge is the accuracy of data collected after 2002. This period was characterized by hyperinflation. The government struggled to keep track of macroeconomic developments in the country. Various sources were used to mitigate this limitation.

4.   Results Presentation And Interpretation

4.1 Diagnostic tests results

Unit root test

Unit root tests were carried out using the ADF test and the results obtained are as follows.

Table 2: Unit Root Test Results

Variable	ADF	Critical ADF (5%)	Critical ADF (1%)	Order of integration
BD	-2.192528	-1.9546	-2.6560	0
CAD	2.172358	-1.9546	-2.6560	0

Within the framework of the ADF, results obtained show that all variables are integrated of order zero. Thus, they are level stationary. This leads us to conclude that we can have reasonable results since the variables are stationary, thus there is no possibility of spurious regression.

Optimal lag length selection

The information criterion used in this study is the Akaike information criterion. It is assumed that the lag length with the smallest value is the optimal lag length. The study found out that the optimal lag length is two as shown in Table 3.

Table 3: Optimal Lag Length Selection Results

Lag	AIC	SIC
1	12.51132	12.80583
2	12.40981	12.90067
3	12.62548	13.31268

The optimal lag length in the paper is two according to the AIC and one as per SIC estimates. Having these results, the research would use both lags but also include lag three. However, we rely more on the Schwarz Information criterion, since it is preferred when using small samples.

Cointegration test results

The fact that the variables are of the same order is itself enough to conclude that there is cointegration between the variables. To verify this, the researchers proceeded to test cointegration using the Johansen methodology and obtained the following results.

Table 4: Cointegration Test

No// of Cointegration equations	Trace Statistics	5% Critical Value	1%Critical Value.
None	19.79316	15.41	20.04
At most one	5.129142	3.76	6.665
No// of Cointegration equations	Maximum Eigen values.	5% Critical Value	1% Critical Value.
None	14.66402	14.07	18.63
At most one	5.129142	3.76	6.65

Table 4 shows evidence of cointegration since we can not reject the hypothesis that at most two cointegrating equations exist. This means that there exists a long-run relationship between budget deficit and current account deficit. Again this can be interpreted as evidence of the twin deficits hypothesis. Thus, using the cointegration approach, we can safely conclude that the twin deficits hypothesis exists in Zimbabwe.

4.2 Granger Causality Results

Results from the SIC showed that the optimal lag length is one, while the AIC revealed that the optimal lag length is two. Therefore, the research findings are guided by these optimal lag lengths. We present, in Table 5, results for lags one, two and three for comparison purposes.

Table 5: Granger Causality Results

Direction of causality	Lag order	F-statistics	P-value
CA ⟶ BD	1	0.84328	0.36799
BD ⟶ CA	1	1.30156	0.26567
CA ⟶ BD	2	0.73979	0.48983
BD ⟶ CA	2	4.00951	0.03434
CA ⟶ BD	3	0.69600	0.56716
BD ⟶ CA	3	2.4220	0.10147

4.3 Results interpretation

Results from Table 5 indicate that there is no causality in any direction except for lag two where causality runs from Budget Deficit to Current Account deficit since the p-value is smaller than 0.05. This is interpreted as evidence of twin deficits in Zimbabwe at least for the period under study and for lag two alone. The independence between the two variables means that the government should treat each one of these variables independently and not as related variables, if we consider results from lag one and three. Policies meant to solve budget deficits should not be expected to solve current account deficit as implied by the twin deficits hypothesis. From lags one and three we can, therefore, not reject the Ricardian Equivalence, which argues that budget deficit and current account deficits are independent.

The results of the research presented here indicate that while there is cointegration, meaning evidence of twin deficits, this is only confirmed by a Granger causality running from budget deficit to current account deficit as

shown by lag two results. This unidirectional causality means twin deficits hypothesis hold. However, there is no causality between the two deficits according to other lags, thus implying absence of twin deficits. We can therefore conclude that the results are mixed. But one thing is true, association does not mean causality. The association implied by cointegration tests might be a sign that budget deficit have an effect on current account deficits, as shown by lag two, but not the reverse.

4.4 Variance Decomposition

Table 6: Variance Decomposition of Budget Deficit

Period	S.E	BD	CA
1	7.792080	100.0000	0.000000
2	8.170796	100.0000	2.70E-06
3	8.241974	98.54027	1.459727
4	8.354388	97.22012	2.779877
5	8.524952	95.16346	4.836543
6	8.774690	92.52170	7.478302
7	9.132517	89.04187	10.95813
8	9.640528	84.77343	15.22657
9	10.35019	79.82068	20.17932
10	11.32407	74.48345	25.51655

Table 7: Variance Decomposition of Current Account

Period	S.E	BD	CA
1	3.541729	26.48623	73.51377
2	5.326545	53.21714	46.78286
3	6.811848	48.47287	51.52713
4	8.580235	48.68854	51.31146
5	10.67646	48.00845	51.99155
6	13.19777	47.85912	52.14088
7	16.23829	47.68209	52.31791
8	19.92142	47.59017	52.40983
9	24.39260	47.52226	52.47774
10	29.82937	47.47942	52.52058

Table 6 shows that in the first period all variances in BD are attributed to its own changes since 100% of variances are explained by changes in BD. However, when one considers the tenth period, one would see that 74.5% of the variance in BD is attributed to itself while the remaining 25.5% is emanating from changes in current account (CA). With Table 7, the story is different with first period showing that 26.5% of changes in CA are from BD while 73.5% is coming from changes in CA itself. As one considers period two, one would see that 53% of the changes in CA are coming from BD. This is in line with the findings that BD Granger causes CA as shown in Table 5 above. As the time progresses until period ten, it is clear that the majority of changes in CA are emanating from CA itself as shown by 52.5% from CA and 47.5% from BD.

5.   Conclusions and Policy Implications

The study results revealed that the twin deficits hypothesis holds as per the Johansen cointegration approach and the Granger causality results for lag length two confirms this. This means that an increase in budget deficit will lead to a current account deficit. In Zimbabwe for the period under review, the government's persistent budget deficits caused recurrent deficits on the foreign sector. Thus, the budget deficits preceded the current account deficits.

The paper found that the twin deficits hypothesis can be accepted in Zimbabwe. Based on these findings we therefore recommend that the government in its crafting of policies should expect that the Keynesian view of first solving the budget deficit as a way of solving the current account deficit will help because these are related

variables based on lag two. We therefore argue for policies to solve budget deficits which will solve the current account deficits.

Policies such as export led growth could assist the nation to reduce current account deficits as well. Thus, the export led growth promulgated by the government in 2012 must be supported so as to get maximum benefits. The Export Processing Zones (EPZ) instituted by the government must be put to full use so as to reap the positive results. This will help reduce current account deficits as well as improve foreign currency earnings.

Fiscal rectitude must be put in place by the government. The Ministry of Finance must make sure that fiscal deficits are under control. This can be implemented by making sure that only budgeted for expenses are the ones paid for. Ministries must not spend as they wish. This will have ripple effects on the current account.

While the paper tried to be as exhaustive as possible, there is still room for further studies. We recommend that future researchers must use simultaneous equation models since, in most cases, they give better results. Also, we suggest that future researchers use absolute figures instead of the percentage of GDP figures used in the study. These may give a clearer picture than the current research.

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