CHAPTER 4

RELATIONSHIP BETWEEN TRADE DEFICIT AND BUDGET DEFICIT IN INDIA: A CASUALITY ANALYSIS

4.1 Introduction.

This chapter focuses on data presentation, estimation and analysis to examine the long run equilibrium relationship between budget deficits and current account deficits and as one of the objectives of the study, the direction of causality for the Indian economy. The analysis begins with some stylized facts about India's experience on the twin deficit phenomenon and then presents the econometric analysis of the study. The econometric analysis showed results of the unit root test (the ADF test), the Johansen co-integration test results, the multivariate Granger causality, the Vector error correction model (VECM) and Impulse response function (IRF) using the model earlier specified.

The data for this analysis was sourced from the Reserve Bank of India (RBI) Statistical Bulletin and the World Bank Development Indicators (WDI) covering the period from 1990 to 2013 for the variables current account deficit as a proxy of trade deficit at the percentage of GDP, gross fiscal deficit as a proxy of budget deficit at the percentage of GDP, interest rate on the basis of call money rate, inflation measured on the basis of wholesale price indices (WPI) and official exchange rate. This is to analyze the long run relationship and direction of causality between the budget and current account in India.

4.2 Descriptive Analysis of the Twin Deficits Phenomenon in India.

India has been experiencing twin deficits since 1980-81. The fiscal deficit of the central government has remained at 5.8percent on an average during the period 1980-2010. The main reason behind the financial crisis of 1991 was the inability to finance the high current account deficit via capital inflows leading to BOP crisis. However, later in 1990s, the researchers investigated that it was the financial crisis in mid 1980s that led to BOP crisis in the next decade. In the first half of the 1980s, the fiscal deficit was around 6 percent to 7.5 percent where as it rose to 9 percent in the next half. However, the investment that was financed by the external

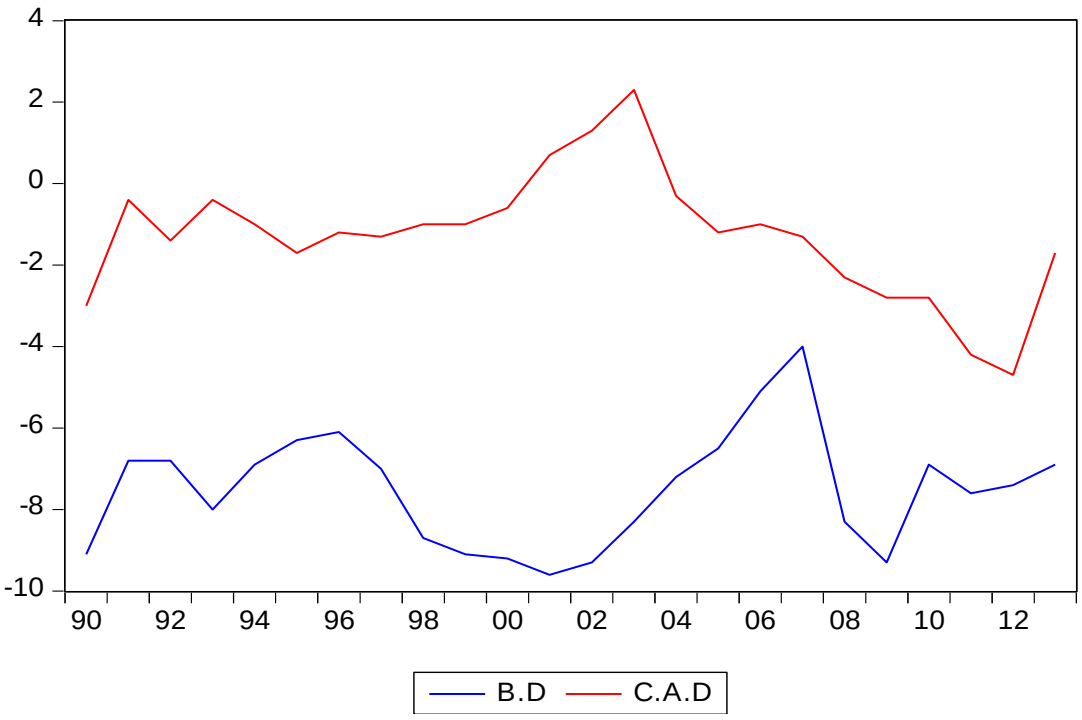
borrowing turned out to be inadequate. The confidence in economy went down leading to BOP crisis. This BOP crisis acted as a catalyst for a wider crisis realized in future. However, much-needed reforms were initiated but still the fiscal deficit continues to persist in high magnitude. The series of economic reforms had been launched to bring about macroeconomic stabilization and implement structural measures to push up growth.

The high and persistent fiscal deficit remains the main cause of worry for the policymakers. However, the current account deficit was lesser in magnitude. The fiscal deficit turned out to be driven more by the revenue deficit in the 1990s. By 1990s, the fiscal deficit and current account deficit rose at 9.4 percent and 3.5 percent respectively. The economic reforms helped the fiscal deficit to get reduced. In the new century, however, the revenue deficit constitutes as much as one-third of the fiscal deficit. This was mainly due to the introduction of Fiscal Responsibility and Budget Management Act (FRBM) introduced in 2003-04. The Act has reduced the fiscal deficit by 0.3 percent per year to a level of 3 percent. The targets were to be achieved by 2008-09. However, the combined fiscal deficit fell to 4.2 percent in 2007-08 (well below the targeted 6 percent). The combined deficit (state government fiscal deficit plus central government deficit) came down to 4.2 percent of GDP in 2007-08. However, it had increased suddenly in the next two years. The main reasons for this rise in fiscal deficit was the implementation of social security schemes under National Rural Employment Guarantee Act (NREGA), subsidies for food, fertilizers and petroleum and the Sixth Pay Commission Award. It rose to 8.9 percent in 2008-09. High government expenditure improved the domestic demand of the economy, especially in the rural sector. This has prevented the domestic demand from falling with the contraction of Indian exports. However, 2009-10 experienced fiscal deficit of more magnitude. Moreover, the debt obligation of the central government is a significant part of the fiscal deficit. In 1980-81, the debt-burden accounted to about one-third of the fiscal deficit which had increased over to 50 percent in 1990-91.

The current account deficit also started to widen with the recovery of the economy. The most important part of the current account balance is the balance of trade. Hence, a current account deficit is associated with the trade deficit. A negative net export is the main contributor of current account deficit. India imports crude oil and gold in huge amount. These are the biggest contributors to the trade gap. In addition to the oil and gold import, the other contributors of

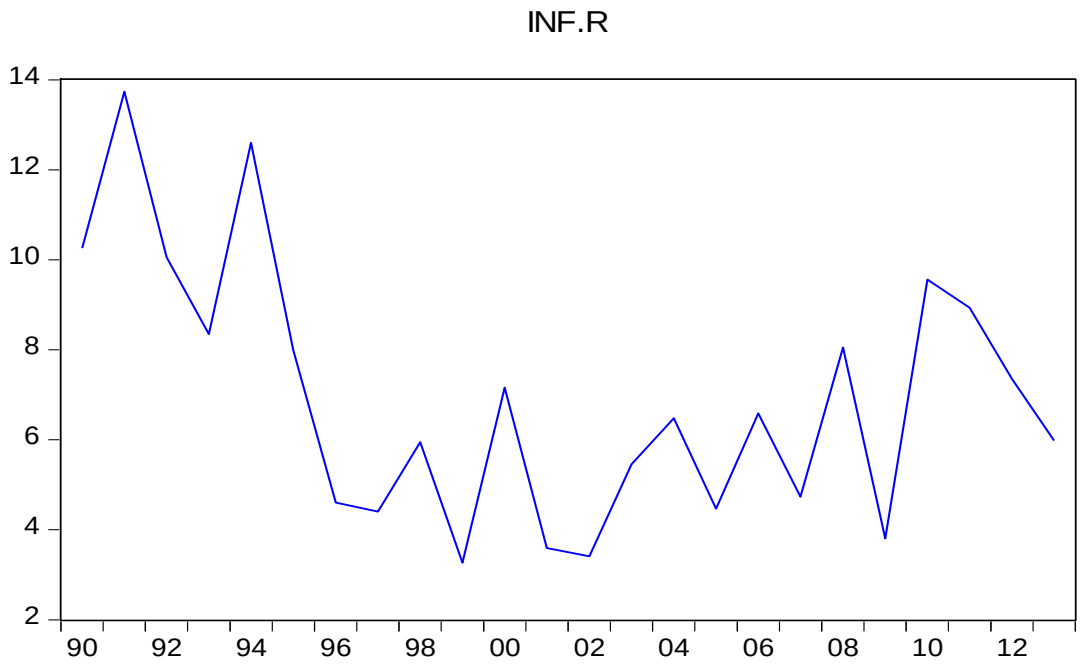
trade deficit are factor income paid to abroad, government grants made to the foreigners, direct investment outflow and bank loans to the residents of the country. During the financial crisis in 1991, the current account deficit was above 3 percent and budget deficit was also more than 9 percent. It has been seen that our budget deficit proxy of gross fiscal deficit has not been in surplus from 1990 to 2013. However, various structural reforms made the current account to run in surplus between 2001-02 and 2003-04. Again 2004-05 onwards, the current account experienced deficit in high magnitude. The current account deficit had increased from 1.3 percent in 2007 to 4 percent in 2012. This percentage rise in the first decade of the 21st century was the highest in magnitude among all the decades in the post-independence period. Below figures from 5 shows you the association between (BD) budget deficit and (CAD) current account deficit and figure 6 to 8 shows the behavior of other macroeconomic variables.

Figure 5: Relationship between Budget Deficit and Current Account Deficit



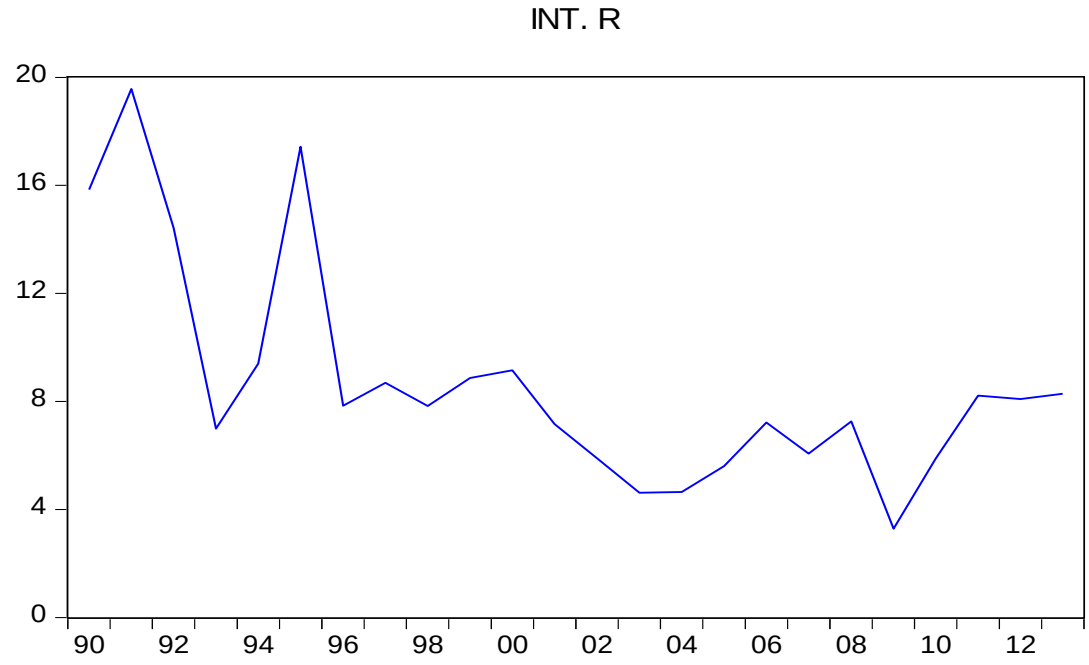
Source: Author's computation with Stata 12.0

Figure 6 Shows the Behavior of inflation Rate



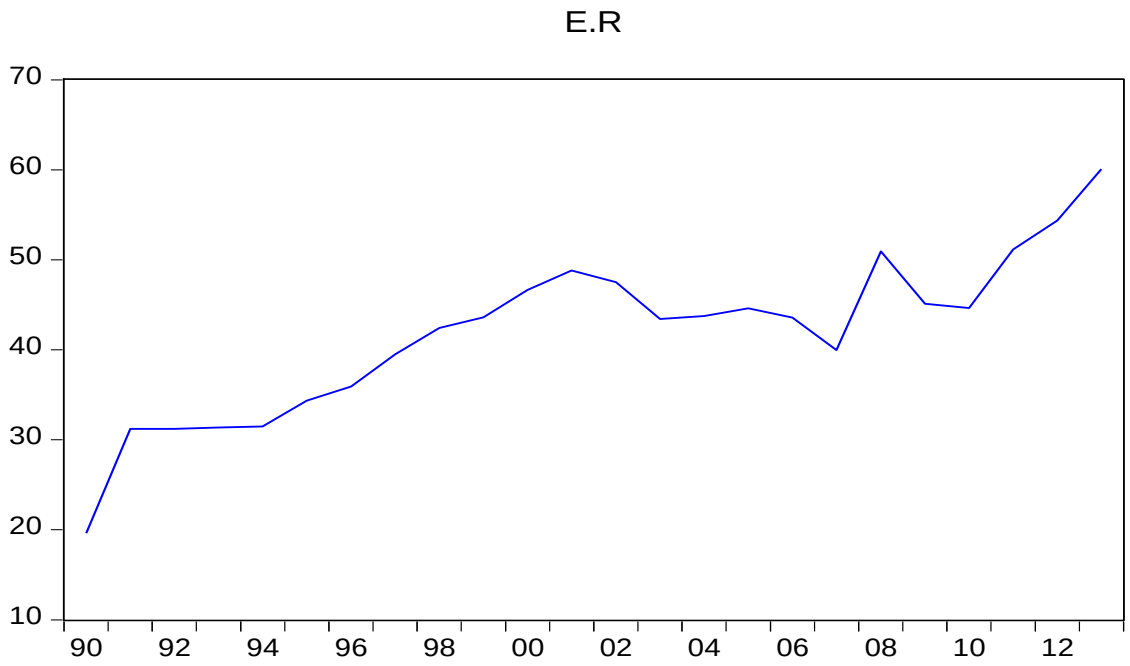
Source: Author's computation with Stata 12.0.

Figure 7 Shows the Behavior of Interest Rate



Source: Author's computation with Stata 12.0.

Figure 8 Shows the Behavior of Exchange Rate



Source: Author's computation with Stata 12.0.

4.3 Presentation and Discussion of Results.

This section presents the results of the estimation carried out to analyze the relationship and direction of causality between the budget deficit and current account deficit in line with the methodology of the study. It also discusses these results and their interpretation.

4.3.1Descriptive Statistics

	CAD	BD	ER	INF	INT
Mean	-1.291667	-7.516667	41.89042	6.95065	8.67833
Median	-1.20000	-7.30000	43.59500	6.534990	7.835000
Maximum	2.30000	-4.00000	60.0900	13.7384	19.57000
Minimum	-4.70000	-9.60000	19.6400	3.269370	3.29000
Std.Dev.	1.558962	1.424832	8.938504	2.863749	4.093434
Skewness	-0.032113	0.446569	-0.383869	0.692402	1.376775
Kurtosis	2.837937	3.504055	3.210018	2.785383	4.092862
Jarque-Bera	0.823950	0.258196	0.633530	1.963741	8.776382
Probability	0.8788	0.6623	0.7285	0.3746	0.0124

Observations	24	24	24	24	24

Source: Author's computation with Stata 12.0.

Where CAD is current account deficit as a percentage of GDP, BD is budget deficit as percentage of GDP, INT interest rate on the basis of Call Money Rate, INF is the inflation on the basis of WPI and ER is official exchange rate.

The above table summarizes the descriptive statistics of all the variables: CAD, BD, ER, INF and INT. The mean and median values differ from each other for all the variables. However ER is relatively volatile compared to the other variables which is clear from the standard deviation. Most of the variables are positively skewed indicating lack of normality in the frequency distribution. The value of the Kurtosis (greater than3) also reveals absence of normality in the frequency distribution for the maximum number of variables. Moreover, the Jarque-Bera test of normality has been applied which claims that the frequency distributions of both the variables are not normal.

4.3.2. Unit Root Test

The unit root test determines if the time series variables under observation are stationary or not. This is because most time series data sets are often found not to be stationary and estimation with such data produces a spurious result. Various methods are often used to test for stationarity of variables, they include Dickey-Fuller (1979 & 1981), Augmented Dickey-Fuller (1979), GLS Detrended Dickey-Fuller (GLS-DF, 1996), Phillips-Perron (1998), Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992), Ng-Perron (2001) among others. However, this study will employ the Augmented Dickey-Fuller (ADF) unit root test to test for non-stationarity or otherwise of the variables. The equation can be written in the form:

$$\Delta yt = \alpha 1 + \gamma Y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta Y_{t-k} + \varepsilon t \ldots\ldots\ldots\ldots (1)$$

Where Yt is the time series, Δ is the first difference operator, α is a constant and εt is the error term. Table 2 below presents the results of the stationarity test for each of the variables.

Table 2: Augmented Dickey-Fuller (ADF) Unit Root Test at Level

Series	t statistic	ADF at 1% Level	ADF at 5% Level
CAD	-2.737323	-3.75296	-2.998064
BD	-2.118445	-3.752946	-2.998064
ER	-1.804653	-3.752946	-2.998064
INF	-2.965073	-3.752946	-2.998064
INT	-2.786642	-3.752946	-2.998064

Source: Author's computation with Stata 12.0.

Note: A variable is stationary when the ADF t-stat is greater than the critical values and Non-stationary when t-stat is less than critical value.

Table 3: Augmented Dickey-Fuller (ADF) Unit Root Test at First Difference

Series	t statistic	ADF at 1% Level	ADF at 5% Level
CAD	-4.820096	-3.769597	-3.004861
BD	-4.769597	-3.769597	-3.004861
ER	-6.237862	-3.769597	-3.004861
INF	-8.120664	-3.769597	-3.004861
INT	-6.011285	-3.769597	-3.004861

Source: Author's computation with Stata 12.0.

Note: A variable is stationary when the ADF t-stat is greater than the critical values and Non-stationary when t-stat is less than critical value.

From the table 2 and 3 above, it can be observed that all the variables where non-stationary at leval. However, all the variables became stationary after the first differencing; in other words, all the variables were integrated of order 1 that is I(1). Thus, the null hypothesis of the presence of a unit root is rejected at first difference as the absolute values of the ADF statistics

4.3.3. Co-integration Test

The next step is to examine the existence of a long run association between budget deficit and current account deficit together with their interacting variables. The purpose of the co-integration test is to determine whether a group of non-stationary series is co-integrated or not. Engle and Granger (1987) pointed out that if the linear combination of non-stationary series exists, then the non-stationary time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long run equilibrium relationship among the variables. In the study, the multivariate Johansen co-integration test will be used as against the Engle and Granger two-step procedure.

According to Tang (2010), the major advantage of using the multivariate co-integration approach is that it has superior properties in particular for two or more variables in a system as it is not sensitive to the choice of dependent variables as it assumes all variables to be endogenous. Also, the Johansen test is preferred to the Engle and Granger two step procedure as the latter first estimates the regression equation and test for stationarity of the residual, this can bring about the transmission of errors. In addition, the Johansen method shows the number of co-integrating equations as well as the estimation of the long run equation which is not possible with the Engle and Granger two step procedures.

The starting point of the Johansen Co integration methodology is said to begin with a VAR order of p given by:

$$\Delta Y_t = \mu + A1\ Y_{t-1} + \ldots + Ap\ Y_{t-p} + \beta\ X_t + \varepsilon_t \ldots\ldots\ldots (1)$$

Where Y_t is a k-vector of the I(1) variables, X_t is a vector of the deterministic variables and ε_t is an identically and independently distributed error term. This VAR can be re-written as:

$$\Delta yt = \mu + \Pi\, Yt-1 + \ldots + \sum_{i=1}^{p-1} \Gamma\, Yt-p + \beta\, Xt + \varepsilon t \ldots\ldots\ldots\ldots (2)$$

$$\text{Where } \Pi \sum_{I=1}^{p-1} Ai - I \text{ and } \Gamma = -\sum_{j=i+1}^{p-1} Aji$$

Johansen proposes two different likelihood ratio tests of significance of theses economical correlations and thereby the reduced ranks of the Π matrix. These are the trace tests and the maximum Eigen value tests. The trace test statistics tests the null hypothesis "there are at most r co integrating relations" against the alternative hypothesis of "m co integrating relations" (that is, the series are stationary), r = 0, 1, 2, ..., m-1. The maximum Eigen value on the other hand test the null hypothesis "there are co-integrating relations" against the alternative hypothesis "there are r + 1 co-integrating relations". The co-integration rank test which is to test the number of co-integrating vectors was done under the assumption that the series have no deterministic trend and have intercept. This is because a number of the variables were found to have intercept when the line graph was constructed. The results of the Johansen co-integration test is presented in table 4 and 5.

Table 4: Johansen Co-integration Test (For Trace Value stat)

Maximum Ranks	**Eigen Value**	**Trace Statistic**	**5% Critical Value**
0	.	90.2146	68.52
1	0.88779	42.0927*	47.21
2	0.69844	15.7193	29.68
3	0.40187	4.4124	15.41
4	0.18020	0.0410	3.76
5	0.00186		

Source: Author's computation with Stata 12.0.

Trace-Value stats indicates 1 co-integrating equation at 0.05 level.

** denotes rejection of hypothesis at 0.05 level.*

Table 5: Johansen Co-integration Test (For Max-Eigen Value stat)

Maximum Ranks	**Eigen Value**	**Max Statistic**	**5% Critical Value**

0	.	48.1219	33.46
1	0.88779	26.3734	27.07
2	0.69844	11.3069	20.97
3	0.40187	4.3714	14.07
4	0.18020	0.0410	3.76
5	0.00186		

Source: Author's computation with Stata 12.0.

Max-Eigen stats indicates 1 co-integrating equation at 0.05 level.

** denotes rejection of hypothesis at 0.05 level.*

The result of the trace and maximum Eigen value summarized in Table 4 and 5 indicates the possibility of rejecting the null hypothesis that says there are no co-integrating vectors at 5 percent level of significance. That means when 5 percent critical value is greater than trace statistic that means we can reject null hypothesis which means there is a 1 co-integration. This validates the existence of long run equilibrium relationship between budget deficit and the current account deficit as the trace statistics indicates 1 co-integrating relationship while the maximum Eigen value indicates 1 co-integrating relationship, which means that they do not diverge away from each other in the long run. It means our five variables are co-integrated and have long run association and are moving together in the long run. However, in this study, the indication of the maximum Eigen value test is followed. This is because the maximum Eigen value test is more likely to give normal result as regards the number of equations in the model that would converge towards the long run equilibrium path.

4.3.4. Vector Error Correction Model (VECM).

If the variables included in the empirical model are co-integrated, it will be useful to use a (Vector Error Correction Model (VECM) to understand the relationship between the variables in the short run, which will be useful to have comprehensive information concerning the dynamic relationship between the variables and how the adjustment toward the equilibrium position occurs after the initial divergence. The table 6 and 7 below shows the results of VECM which shows the relationship between the variables in short run.

Table 6: VECM Dependent variable D (BD)

Test Statistic	**Value**	**Df**	**Probability**
F-statistic	0.493001	(4, 15)	0.7411
Chi-square	1.972005	4	0.7409

Source: Author's computation with Stata 12.0.

Normalized Restriction (= 0)	**Value**	**Std. Err.**
C(3)	0.344561	0.361094
C(4)	0.078248	0.147936
C(5)	-0.179174	0.163364
C(6)	0.171480	0.134389

Source: Author's computation with Stata 12.0.

Null Hypothesis: C (3) =C (4) =C (5) =C (6) =0

Note: when probability value is more than 0.5% we accept null hypothesis.

The result of the f-statistic, chi-square and probability value value summarized in Table 6 indicates the acceptance of null hypothesis that says there is no short run causality among the variables. The table 6 shows that there is no causality running from current account deficit,

exchange rate, inflation and interest rate to budget deficit (BD) which is indicated from the probability value which is more than 5 percent significance level.

Table 7: VECM Dependent variable D (CAD)

Test Statistic	Value	Df	Probability
F-statistic	1.063795	(4, 15)	0.4084
Chi-square	4.255179	4	0.3726

Source: Author's computation with Stata 12.0.

Normalized Restriction (= 0)	Value	Std. Err.
C(9)	-0.208461	0.235424
C(11)	-0.050353	0.109699
C(12)	-0.049518	0.121139
C(13)	-0.071429	0.099653

Source: Author's computation with Stata 12.0.

Null Hypothesis: C (9) = C (11) = C (12) = C (13) = 0

Note: when probability value is more than 0.5% we accept null hypothesis.

The result of the f-statistic, chi-square and probability value value summarized in Table 7 indicates the acceptance of null hypothesis that says there is no short run causality among the variables. The table 7 shows that there is no causality running from budget deficit, exchange rate, inflation and interest rate to current account deficit (CAD) which is indicated from the probability value which is more than 5 percent significance level.

4.3.5. Multivariate Granger Causality Test.

The Johansen co-integration method confirms the existence of a long-run equilibrium relationship between budget deficit and trade deficit, but this method does not say which of the two deficits cause the other deficit (Mamdouh, 2002). The Granger causality test thus, helps to test the existence of causality and determine its direction. In most studies to explain the link between the budget deficit and the current account deficit, the most commonly used type of Granger causality is the bivariate framework. The Granger causality tests with the bivariate framework are said to be biased owing to the omission of relevant variable(s) that affects the relationship between the twin deficits (Tang, 2010). Also, the multivariate Granger causality shows how the other variables individually and jointly Granger causes the dependent variable. This is a remarkable improvement over the bivariate framework.

This study employs the Vector Error Correction (VEC) Granger causality/Block Exogeneity Wald test to test for the multivariate Granger causality which shows causality among the variables of interest. The multivariate Granger causality can be performed in various ways but this study will use the Granger causality Block Wald test within the VEC model framework. The result is presented in table 8 and 9 below.

VECM Granger Causality/ Block Exogeneity Wald test.

Table 8: Dependent Variable; D (CAD)

Excluded	Chi-Square	Df	Prob
D(BD)	7.6426	3	0.054
D(ER)	48.78	3	0.000
D(INF)	.90985	3	0.823
D(INT)	12.582	3	0.006
ALL	127.17	3	0.000

Source: Author's computation with Stata 12.0.

Table 9: Dependent Variable; D (BD)

Excluded	Chi-Square	Df	Prob

D(CAD)	9.038	3	0.029
D(ER)	16.316	3	0.001
D(INF)	25.124	3	0.000
D(INT)	11.688	3	0.009
ALL	76.652	3	0.000

Source: Author's computation with Stata 12.0.

Table 10: Dependent Variable; D (ER)

Excluded	**Chi-Square**	**Df**	**Prob**
D(BD)	6.6961	3	0.082
D(CAD)	9.7824	3	0.021
D(INF)	15.208	3	0.002
D(INT)	7.1013	3	0.069
ALL	56.182	3	0.000

Source: Author's computation with Stata 12.0.

Table 11: Dependent Variable; D (INF)

Excluded	**Chi-Square**	**Df**	**Prob**
D(BD)	23.277	3	0.000
D(CAD)	38.584	3	0.000
D(ER)	52.846	3	0.000
D(INT)	27.05	3	0.000
ALL	183.52	3	0.000

Source: Author's computation with Stata 12.0.

Table 12: Dependent Variable; D (INT)

Excluded	**Chi-Square**	**Df**	**Prob**
D(BD)	29.409	3	0.000
D(CAD)	8.8593	3	0.031

D(ER)	8.8593	3	0.000
D(INF)	6.2181	3	0.101
ALL	79.542	3	0.000

Source: Author's computation with Stata 12.0.

Note: when probability value is more than 0.10% we accept null hypothesis.

Applying the WALD test, the results from Table 8 shows that the causality between budget deficit and current account deficit does not exist at 5 percent level of significance. The value 0.054 is not statistically significant showing that budget deficit does not granger cause current account deficit. But if we look at 10 percent level of significance the probability value of budget deficit which is 0.054 shows that budget deficit significantly granger cause the current account deficit at 10 percent level of significance when current account deficit is the dependent variable. The result shows the existence of Keynesians proposition in Indian economy that the flow is from budget deficit to current account deficit and leads a bi-directional relationship between the two deficits. Only exchange rate and interest rate was found to granger cause the current account deficit at 5 percent level of significance even though their joint p-value was found statistically significant (0.000). However, Table 9, the probability value of current account deficit which is 0.029 shows that current account deficit significantly granger cause the budget deficit at 5 percent level of significance when budget deficit is the dependent variable. The other variables like exchange rate, inflation rate and interest rate was found to granger causes budget deficit at 5 percent level of significance even through their joint p-value was found statistically significant (0.000). This result implies that only a unit-directional causality exists between the twin deficit and it flows from current account deficit to budget deficit as against the proposition of the Keynesians that the flow is from budget deficit to current account deficit, however Anoru & Ramchander in (1998) finds that the direction of causality is seen to run unambiguously from oil prices to the current account deficit to fiscal deficit. Moreover, oil price is seen to cause significant influence in short run on all other variables in the system. Anorus and Ramchander (1998) analyzed the twin deficits hypothesis of SEACEN countries including India using panel VAR methodology covering the period 1957-1993. The results supported the presence of unidirectional reverse causality from CAD to fiscal deficit with inflation, exchange rate and

interest rate playing the role of interlinking variables. In other words, for the Indian economy, reverse causality is what is evident.

Table 10 shows the relationship between budget deficit, current account deficit, inflation, interest rate and dependent variable exchange rate. The budget deficit and interest rate does not cause granger to exchange rate at 5 percent level but are statistically significant at 10 percent level of significance, on the other hand current account deficit and inflation causes granger to exchange rate at 5 percent level of significance and even joint p-value was found statistically significant (0.000). Table 11 shows that granger causality is running from independent variables to dependent variable inflation, all the variables are statistically significant 0.000 percent. Table 12 shows the causality is running from budget deficit, current account deficit and inflation to dependent variable interest rate at 5 percent level of satisfaction and even joint p-value was found statistically significant (0.000).

4.3.6 Impulse response function

This technique involves measuring unexpected changes in one variable X (the impulse) in time t and predicting its effect on the other variable Y in time t, t+1, t+2, etc... (the responses). The impulse response function (IRF) defines the response of the dependent variable in the VAR model to shocks in the error terms. Impulse response function traces the impact of one standard deviation shock to one innovation on its current and future value of endogenous variables. Shock to the variable directly affects the variable but it also shows impact on all endogenous variables. The results are presented in the graph below from figure 9 to 12:

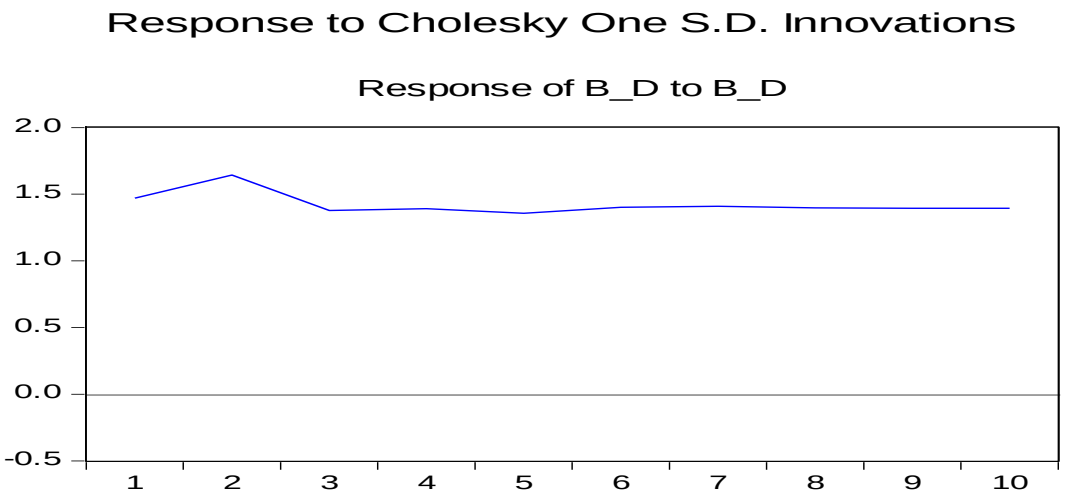


Figure 10

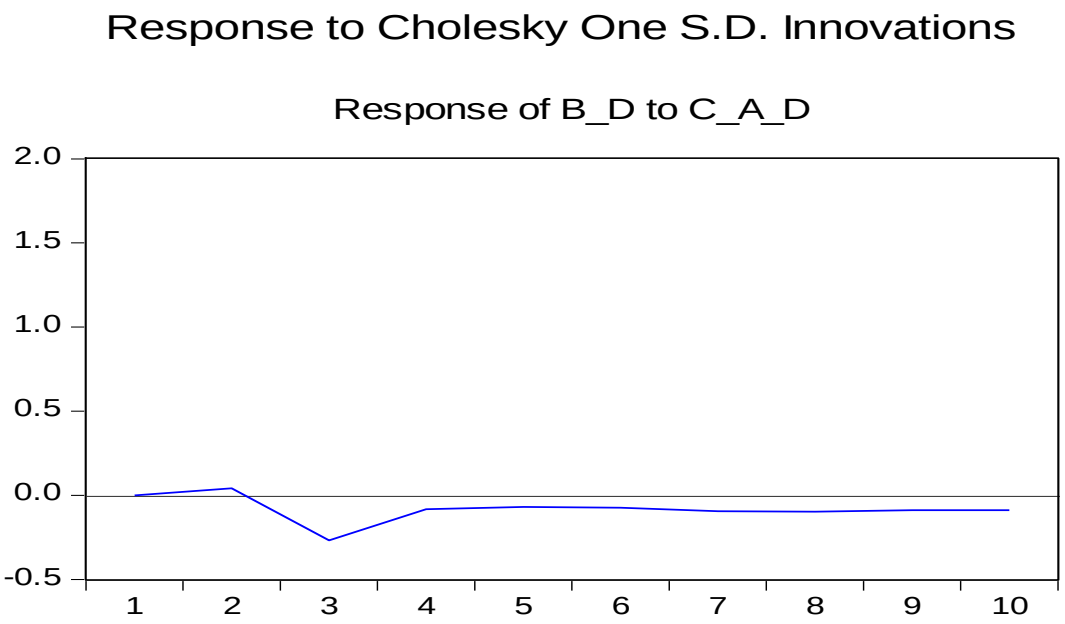


Figure 11

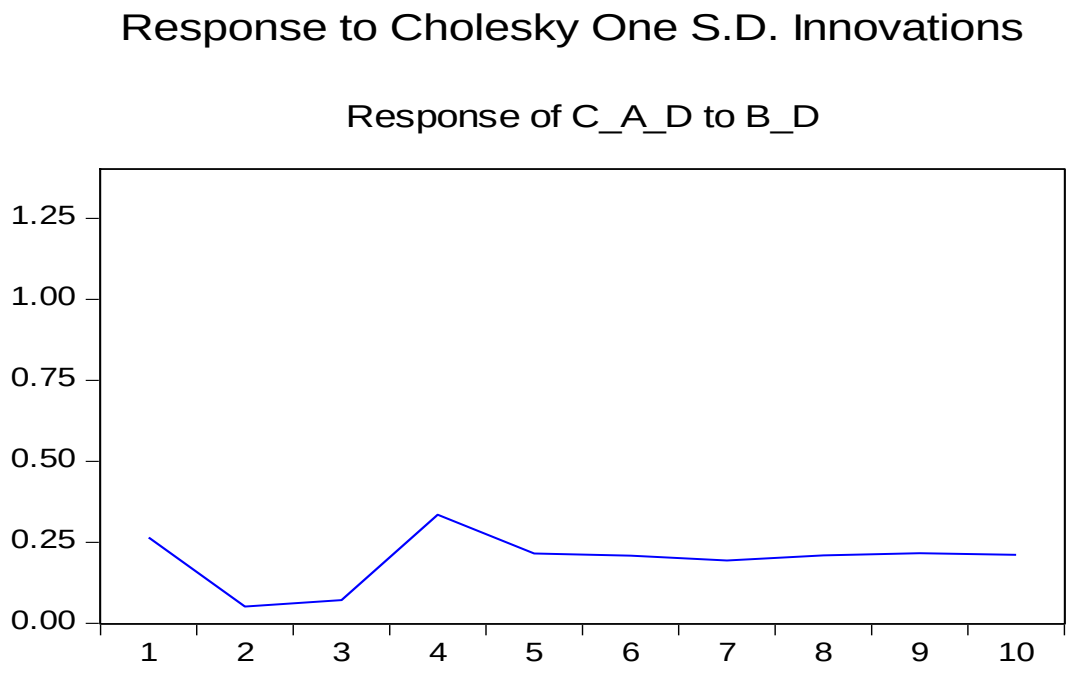
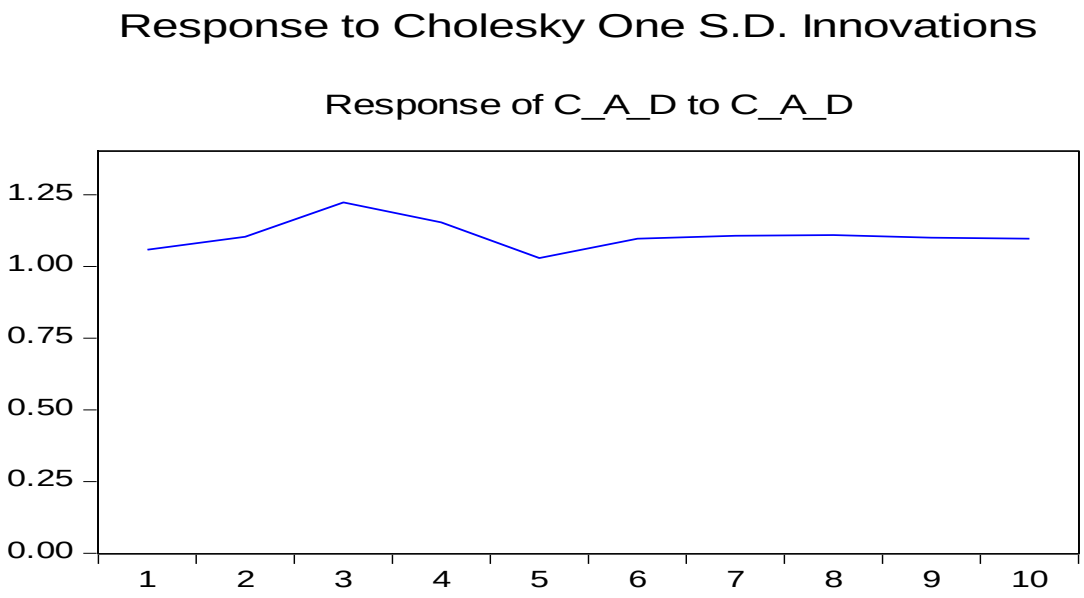


Figure 12



1. In figure 9 when we give a positive shock of one standard deviation to budget deficit its intercept starts from 1.00 percent and increase little trend and then declines little bit and then moving in the straight line.
2. In figure 10 when we give a positive shock of one standard deviation to current account deficit the budget deficit turn to be negative. It means current account deficit and budget deficit have a negative association.it shows budget deficit turns negative after two years and then declines a little bit and then moving in the straight line. It means current account deficit influences the budget deficit in the negative way.
3. In figure 11 when we give a shock of one standard deviation to budget deficit its intercept starts from 0.25 percent and decrease till two years and then it increase lit bit and then moving in the straight line. It means budget deficit did not lead to current account deficit.
4. In figure 12 when to give shock of one standard deviation to current account deficit to current account deficit meaning reacting to its own CAD TO CAD. Its intercept starts from 1.00 percent and increase little bit and then moving in the constant way.

4.4 Summary of Findings

The main purpose of this empirical study was to examine the causal linkages between the budget deficit and current account deficit for India within a multi-dimensional system, of interlinking

variables covering the period from 1990-2013. The causal chain of such linkages is important as different results lead to very different policy recommendations regarding the target variable for controlling the twin deficits. This study attempted to prove that even in a developing economy like India, the Keynesian proposition of a long run equilibrium relationship exists between the twin deficits, and there occurs bi-direction causality among the variables at 10 percent level of significance which gives us the evidence of Keynesian theory is proved in India economy. This implies that the past values of any one variable jointly can statistically significantly predict the present value of the other concerned variable. But on the other hand in table 8 it implies that the causality flows from current account deficit to budget deficit and is significant at 5 percent level of significance.

This study established that the twin deficit theory of a positive long run relationship between the budget and current account deficit using the Johansen multivariate co-integration approach. The co-integration test verifies the existence of a long run association between the two deficits, thus supporting the Mudell-Fleming theory and refuting the Ricardian Equivalence Hypothesis (REH). In the co-integration test, the study followed the maximum Eigen value and max statistics which stated that their exists at most one co-integrating equation in the model, signifying the existence of a long run association between the twin deficits as argued by the conventional twin deficit hypothesis.

A vector error correction model was also employed to identify the short run relationship between the two deficits. This was done by using the vector error correction model VECM framework to test for short run relationship between the twin deficits and their interacting variables (such as inflation, interest rate and exchange rate) for the period 1990 to 2013. This study established that there is no short run relationship between the budget deficit and current account deficit and also with other macroeconomic variables using the vector error correction model.

A multivariate Granger causality test was also employed to identify the direction of causality between the two deficits as this is the main objective of the study. This was done by using the Wald/exogenueity test for granger causality between the twin deficits and their interacting variables (such as inflation, interest rate and exchange rate) for the period 1990 to 2013. The Granger causality test showed a bi-directional causality flowing from the budget deficits to the

current account deficits in Indian between 1990 and 2013. The result of the Wald Test showed that the causality between budget deficit and current account does exist at 10 percent level of significance; looking on the other hand current account deficit also leads budget deficit which is significant at 5 percent level because India's growing dependence on oil imports(accounting for almost one-third of the country's total imports) makes the import bill and trade balance sensitive to movements in world oil prices, while the case for reverse causation is very strong. This leads us to explore the role of oil prices as a linking factor between the two deficits, given that the two deficits show clear evidence of co-movement over time along with reverse causation and oil prices are known to be a factor behind the heightening of both the external and domestic deficits. Bringing in oil prices indeed helps complete the chain of causation in the twin deficit hypothesis for India, as the direction of causation is unambiguously seen to run from oil prices to the external deficit to the fiscal deficit. It could also be possible that the expansion in the fiscal deficit due to the small pass-through of oil price shocks appears akin to current account targeting in the case of India, but rather the two deficits are closely related to each other.

However we look into the possible channels of transmission from one deficit to the other; specifically we examine transmission through the budget deficit (BD), current account deficit (CAD) inflation rate (INF) and interest rate (IR) routes. We find evidence that definitely shows that all the four variables considered, namely, FD, CAD, INF and IR, show co-movement and long-run co-integration, the economic implication of this study is that any change in any of the variables lead to a change in the other variable. Moreover, the growth rate of BD is higher than CAD though both the variables rise confirming the hypothesis. Hence, while formulating any governmental policy, the government has to take into account how the policy changes will affect BD and thereby, CAD. The widening of budget deficit may lead expansion in money supply which will lead to a rise in inflation rate and deteriorating the export performance as a result of fall in the competitiveness. Similarly a widening budget deficit will lead to increase in imports which will cause a rise in current account deficit.

An expansionary fiscal policy by the government leads to rise in government expenditure (including transfer payments) will induce the fiscal balance to run in deficit. This rise in government expenditure leads to increase in aggregate demand in the economy inducing the income/output level to increase. With this rise in income level, the import of foreign goods and services rises such that the trade balance runs into deficit. This trade deficit leads to current

account deficit in an open economy. Hence, fiscal deficit leads to current account deficit. On the other hand, any trade shock will positively affect the fiscal balance. Suppose, the autonomous export rises inducing the trade balance to improve. This will improve the current account balance leading to raise in aggregate demand and thereby, the output/income level in the economy. The rise in income level will increase the tax revenue of the government thereby improving the fiscal balance. Thus, any policy changes by the internal or the external sector of the economy will positively affect the other sector in Indian context. An expansionary fiscal policy leads to unfavorable current account balance and a favorable trade shock leads to a favorable fiscal balance in the economy. This clarifies the existence of twin deficits hypothesis in Indian context.
When there is an interaction with other macro-economic variables like interest rate, exchange rate and inflation, we can say when there is an increase in interest rate it has an adverse effect on the export performance as of the current account deficit (CAD) widens. However with the increase in interest rate capital inflow is likely to increase thus there is a conflict in policy of increasing the interest rate that accelerates the inflow of capital on the one side decrease in interest rate that narrow down the current account deficit on the other side.
If we look over the other macro-economic variable like inflation, when there is an increase in inflation the exports of our country will become less competitiveness because due to the decrease in real effective exchange rate. We can say when there is an increase in domestic inflation our import will increase and lead current account deficit this shows that inflation has an adverse effect on current account deficit (CAD) because increase in imports and fall in exports, on the other side increase in inflation also increase budget deficit because it increase expenditure and decreases receipts and leads to the budget deficit (BD).

The empirical results prove the existence of long run relationship among BD and CAD. This relation was found to be positive, implying that a positive shock given to CAD affects BD positively, as is clear from the IRF result. The results of the IRF check the presence of any such relationship between the budget deficit (BD) and current account deficit (CAD). IRF shows the impact of one-period shock to one of the innovations on current and future values of the endogenous variables (CAD and BD) for the period 1990 to 2013. The impulse response function shows uni-directional causality from current account deficit to budget deficit in Indian economy. This result is consistent with the granger causality result at 5 percent level of

significance. But if we look at 10 percent level of significance both the deficits have bi-directional causality among the variables. This proves that an improvement in (BD) will induce the current account deficit to improve and vice-versa as proven in the results of granger causality.