



RESEARCH ARTICLE

ROLE OF INFLATION AND MONEY SUPPLY IN INDIA'S TWIN DEFICIT

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ABSTRACT

The present study analyzes the role of inflation and money supply in India's current account deficit and fiscal deficit and assume that fiscal deficit and current account deficit move together. The long run relationship exists between current account deficit and fiscal deficit and money supply & inflation are mediating variables which affect current account balance. The research covers the period from 2000-01 to 2014-15. In order to accomplish the objective of twin deficit relationship, the empirical study starts with checking of normality with the help of unit root test of stationarity. To know the integrity between the variables Johansen cointegration test has been applied. Then vector error estimates test has been used. At last impulse response function test has been applied.

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INTRODUCTION

In the consequence of great recession, many developed and developing countries experiences the twin deficit. When an economy faces trade deficit and fiscal deficit is coined as twin deficit. In present days, twin deficit hypothesis become the forefront in the heart of policy makers and economist's debate. After independence, Indian economy encounters slavery of "2Fst" i.e. Foreign Exchange Rate and Food Scarcity. By restricting the import of machinery and equipment, India's early industrialization paves the way of employment which helps in chasing the challenge of "2Fnd". But from last couple of years, Indian economists bring into light a new threat for macroeconomic stability called by twin deficit. Twin deficit, firstly, faced by USA in early 1980^s during the Ragan Fiscal Experiment, following by Europe in early 1990^s. But it engaged the whole world in 2006. The worsen situation of Southeast Asian Countries (ASEAN) like Indonesia, Malaysia, Philippines and Thailand was also the matter of concern. Indian economy, from the last two decades, also put up with high fiscal deficit and disintegration of current account deficit. This is the only reason, why interest rate of India is higher than developed countries and collapsing the exchange rate. The Mundell-Fleming model explains the relationship between

higher interest rate and currency appreciation. As value of rupee depreciates, the current account deficit will increase with increasing oil prices and gold import. In this paper, the relationship between current account deficit and fiscal deficit is explored with the help of inflation and money supply.

Fiscal Deficit

In a layman language, fiscal deficit is increasing government borrowings and liabilities for public. But technically, fiscal deficit is,

$$\text{Fiscal Deficit} = \text{Government's Total Expenditure} - \text{Total Receipts (Excluding Borrowings)}$$

OR

$$\text{Fiscal Deficit} = \text{Budgetary Deficit} + \text{Borrowings} + \text{Other Liabilities of Government}$$

The views of economist regarding impact of fiscal deficit on Indian economy are different. Eminent economist John Maynard Keynes thinks that Deficit help countries climb out of economic recession but fiscal conservative believe that the fiscal deficit should be avoided for balanced budget policy. India's fiscal deficit as percentage to GDP in 1981-90 on an average was 7.9% which has been average decreased and become 7.5% in 1990-00. In 2001-02 it reaches its peak of

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history with 9.6% of GDP. The Fiscal Responsibility and Budget Management (FRBM) Act, 2003 has been passed in parliament with the purpose to reduce India's fiscal deficit. In the aftermath of FRBM act, India is moving towards achieving its target and result of that in 2008 fiscal deficit was just 4.0% of GDP. In 2008, government announced various schemes like NREGA (National Rural Employment Guarantee Act), sixth pay commission, food subsidies, increases the price of fertilizers and petroleum, resultant to fiscal deficit 8.3% of GDP and further rise to 9.3% as compared to 2007-08. The above figure provides a brief view of Fiscal Deficit in India from 1980's to 2015. In 1990-91 India experiences economic and average gross fiscal deficit crisis, which is indicated by blue line, increased to 9.9% of GDP.

each other increased. Every economy import and export the scarce and abundance resources. During this trade when the value country's import of goods and services exceeds the exports, create current account deficit. The government require foreign fund like NRI's savings and capital inflow to control the situation. The impact of fiscal deficit on economy can be easily observed but current account deficit is ambiguous. If foreign capital inflow exceeds the current account deficit the value of money is depreciated but actually it is appreciated as in case of India. From two consecutive decades, Indian economy is experiencing tremendous increment in current account deficit. External demand, international crude oil prices, instability of FII's, fluctuated exchange rate, stock market commodity prices are responsible factors for rising average current account

Table 1. Combine Deficit of Central and State Governments (as % of GDP)

Year	Gross Fiscal Deficit	Gross Primary Deficit	Revenue Deficit
1981-90	7.9	4.8	1.7
1990-00	7.5	2.6	4.1
2000-01	9.2	3.4	6.4
2001-02	9.6	3.6	6.8
2002-03	9.3	3	6.4
2003-04	8.3	2	5.6
2004-05	7.2	1.3	3.5
2005-06	6.5	1	2.7
2006-07	5.1	-0.3	1.3
2007-08	4	-1.2	0.2
2008-09	8.3	3.3	4.3
2009-10	9.3	4.5	5.7
2010-11	6.9	2.4	3.2
2011-12	7.8	3.2	4.1
2012-13	6.9	2.3	3.4
2013-14	6.7	1.9	3.3
2014-15	7	2.2	2.5

Note: Negative Sign Indicate Surplus

Source: Budget Documents of Govt. of India and the States Governments.

Table 2. Current Account Deficit in India

Year	1981-90	1990-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
CAD	-1.84	-1.24	-0.6	0.7	1.3	2.3	-0.3	-1.2	-1
Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	
CAD	-1.3	-2.3	-2.8	-2.8	-4.2	-4.8	-1.7	-1.3	

Source: Handbook of Statistics on Indian Economy, RBI, 2015-16

In 2008, government announced various schemes like NREGA (National Rural Employment Guarantee Act), sixth pay commission, food subsidies, increases the price of fertilizers and petroleum, resultant to fiscal deficit 8.3% of GDP and further rise to 9.3% as compared to 2007-08. The above figure provides a brief view of Fiscal Deficit in India from 1980's to 2015. In 1990-91 India experiences economic and average gross fiscal deficit crisis, which is indicated by blue line, increased to 9.9% of GDP.

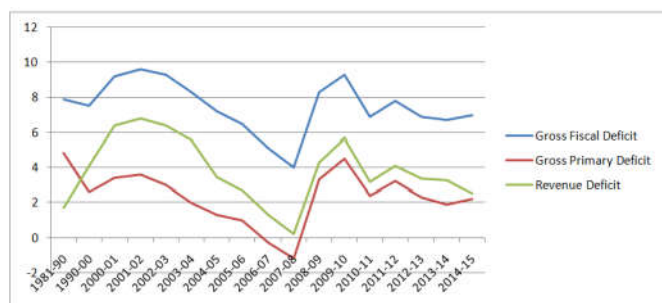


Figure 1. Combine Deficit of Central and State Government (as % of GDP)

Current account deficit: Due to globalization, the world becomes a global village. Simultaneously, the dependency on

deficit to -1.24% of GDP which observed during financial crisis in 1990-00. Extended current account deficit widen the risk of growth because of inflation and extremely fluctuations in exchange rates. Foreign portfolio opens the floodgates of foreign capital inflow but foreign direct investment work as two edged sword. 1991 reforms argue that FDI inflow will work as a miracle to control CAD. The situation is going to become worse in future because of rising external debt i.e. commercial borrowings and short term debt which is 70% of India's total growth.

Twin deficit in India

Indian economy was closed economy till 1991. 1991 financial crisis considered mainly due to "Balance of Payment" but it was a twin deficit. It worse the Balance of Payment problems which assist India to take financial help from international market like IMF (International Monetary Fund), Bank of England. Even India was not able to finance its current account deficit through inflows and it was more than commercial borrowings, external assistance and NRI deposits. In 1989-90 Indian import touch just 1.9 months and 2.5 months in 1990-91. The researches bring into limelight that from 1980's fiscal deficit continuously rising despite domestic savings. To meet

the investment requirement government is forced to borrow from abroad which increase both current account deficit and fiscal deficit.

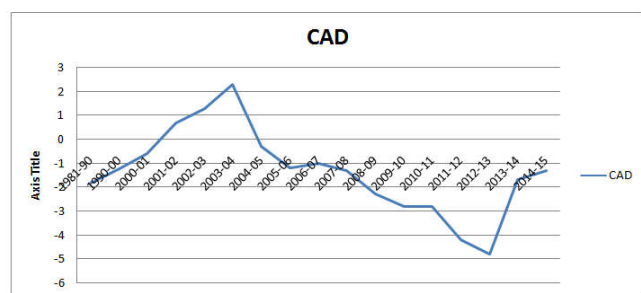


Figure 2. Current Account Deficit in India

Despite the FRBM Act persistence and increasing twin deficit is a matter of concern. The government has been expected to keep deficit 5.6% of GDP with focusing on more collection of taxes and continuous auctions but not controlling the expenditures, oil prices and global economic turmoil cause the widened CAD. In 1991 CAD was 3% of GDP and fiscal deficit was high with 8.3%. Now after 26 years, India is again near to danger of twin deficit as it is continuously shifting upwards. Downward shifting of current account deficit and budget deficit is a positive sign of growth for developing countries like India. If interest rates increase, investment through FII's and FDI's will be raised that lead to upward shifting of domestic currency demand and appreciate the value of rupee. At the result, the imports become less expensive and export costly and it will give birth to deficit in economy.

Review of Literature

The twin deficit hypothesis evoked to draw consideration in the 1980s. Milne (1977) and Bernheim (1988) in their study erect positive association in current account deficit and fiscal deficit with the help of Ordinary Test Squares (OLS) Regression to cross data. Enders and Lee (1990) examined a six variable VAR structure by using 1947-1985 annually data. The findings favor Ricardian Equivalence Hypothesis. It means there is no correlation exists between budget deficit and trade deficit. Abell (1991) selected data of 1979-1985 from United States. The empirical findings shows that budget deficit impact the current account deficit through intermediating variables like interest rates and exchange rates. A multi-cointegration investigation had been done on data 1950-1986 by Ghatak and Ghatak (1996) and found no witness of application of Ricardian Equivalence Hypothesis. The suggestions show the possibility of Conventional Hypothesis. Anoruo and Ramchander (1998) with the help of Granger Causality test prove that trade deficit cause the budget deficit. Koussi, Mougoue and Kymn (2004) inspected the data from 1975-97 and found no causal relationship between current account deficit and fiscal deficit in context of India. Kim and Roubini (2008) tested that budget deficit cause current account deficit in U.S.A. They use VAR model for the post-Bretton-Woods period. But Grier and Ye (2009) found no long run relationship between the current account deficit and budget deficit because of break stationary series but an endless positive short run relationship. Bose and Jha (2011) try to examine the twin deficit in context of India. The study promote mediating variables i.e., exchange rate and interest rate and found that current account deficit, fiscal deficit, exchange rate and interest rate are correlated. The Keynesians Hypothesis is

applicable in India, i.e., fiscal deficit causes high interest rates which leads to increase in exchange rate, ultimately resulting worsen the current account deficit. Efremidze and Tomohora (2011) present the consequences of twin deficit in estimating sudden stops or crises. The findings reveals that the importance of twin deficit in predicting sudden stops or crises declining year by year. But till then it is considered as an important factor for anticipate the sudden stops. Ratha (2010) by using macroeconomic variables like domestic and foreign income, real effective exchange rate developed a model. The model try to upgrade the prior approach by defining variables in real, non-negative and unit free terms, applying the bound-testing approach and using high-frequency data. Azgun (2012) recognize the sign of twin deficit hypothesis in Turkish economy for post economic reforms (1980-2009). Papia Mitra, Gholam Syedain Khan (2014) analyses the period from April, 1994-95 to July, 2013-14 and found short run bi-directional causality between current account deficit and fiscal deficit but in long run there exists unstable equilibrium. Madhura Bedarkar, Santosh Gopalkrishnan, Kunal Khairnar (2016) use intermediating variables, inflation and money supply, to know the relationship between current account deficit and fiscal deficit. The results reveal that current account deficit and fiscal deficit have long run relationship.

Objectives of the study

The objectives of the study can be:

- To take a review of India's twin deficit from 2000 to 2015.
- To study the relationship between the Current Account Deficit and Fiscal Deficit with the help of inflation and money supply.
- To suggest various recommendations to combat the situation of twin deficit.

MATERIALS AND METHODS

The current research aims at studying the relationship between current account deficit and budget deficit. The study is descriptive cum diagnostic.

Sources of the data

The collection of data is based on secondary sources like official site of Reserve Bank of India (RBI), Ministry of Finance, International Monetary Fund (IMF), World Bank, Government Periodicals and journals.

ANALYSIS AND RESULTS

Unit Root Tests: Unit root test is based on the hypothesis of stationarity:

H_0 : variable is non-stationary or got unit root

H_1 : variable is stationary

Table 3. ADF Unit Root Test Results

Series	CAD	FD	M3	CPIW	lags
Test Statistics	-1.949021	-2.596194	-2.422217	-2.047165	2
1% level	-2.740613	-5.124875	-4.800080	-4.800080	2
5% level	-1.968430	-3.933364	-3.791172	-3.791172	1
10% level	-1.604392*	-3.420030	-3.342253	-3.342253	1

Note: * indicate non-stationary at 10% significance level.

Criteria: If test statistics value is less than critical value we accept null hypothesis. From the above table we find all the variables clear the criteria of non-stationary for applying Cointegration test.

Description: The Augmented Dickey Fuller (ADF) test shows that current account series is non-stationary at 10% significance level. It means current account is a unit root process. Fiscal deficit, money supply and inflation found significant in 5% level of significant. Thus, all variables have unit root process.

Test for Cointegration: Optimum lag size for Johansen Cointegration test and Vector Error Correction Model is based on the likelihood ratio, Hann-Quinn information criteria and final prediction error. Johansen Cointegration test (trace test and maximum eigenvalue test) has been used to know the long run association between the variables. Table 2 shows two cointegrating vectors for variables i.e. fiscal deficit, current account deficit, money supply and inflation. The null hypothesis for trace test and maximum eigenvalue test can be rejected at 5% significance level.

Table 4. Johansen Trace Test for Current Account Deficit, Fiscal Deficit, Inflation and Money Supply

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.955369	71.26839	47.85613	0.0001
At most 1 *	0.810649	30.84723	29.79707	0.0377
At most 2	0.506284	9.213238	15.49471	0.3460
At most 3	0.002911	0.037899	3.841466	0.8456

Trace test indicates 2 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.955369	40.42116	27.58434	0.0007
At most 1 *	0.810649	21.63399	21.13162	0.0425
At most 2	0.506284	9.175339	14.26460	0.2719
At most 3	0.002911	0.037899	3.841466	0.8456

Max-eigenvalue test indicates 2 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 5. Normalized Cointegration Matrix

Normalized cointegrating coefficients (standard error in parentheses)

	CAD	CPIW	FD	M3
	1.000000	-4.041645	0.000123	-0.070126
		(0.28219)	(2.2E-05)	(0.00540)

Table 6. Vector Autoregression Estimates

Vector Autoregression Estimates

Included observations: 13 after adjustments

Standard errors in () & t-statistics in []

	CAD	FD	M3	CPIW
CAD(-1)	0.270976 (0.85064) [0.31855]	0.405043 (0.16336) [2.47940]	-22.42784 (191.866) [-0.11689]	-11.41270 (17.8387) [-0.63977]
CAD(-2)	-0.594543 (1.30509) [-0.45556]	0.019988 (0.25064) [0.07975]	133.9785 (294.368) [0.45514]	11.85826 (27.3689) [0.43328]
FD(-1)	1.059625 (2.72421) [0.38897]	-0.305251 (0.52318) [-0.58346]	-792.1293 (614.459) [-1.28915]	5.435665 (57.1292) [0.09515]
FD(-2)	0.166248 (1.01121) [0.16440]	0.055200 (0.19420) [0.28424]	-96.21098 (228.083) [-0.42182]	-16.61385 (21.2060) [-0.78345]
M3(-1)	-6.38E-05 (0.00225) [-0.02835]	-0.000480 (0.00043) [-1.11086]	1.691014 (0.50787) [3.32962]	-0.079177 (0.04722) [-1.67681]
M3(-2)	6.17E-05 (0.00250) [0.02467]	0.000523 (0.00048) [1.08883]	-0.677852 (0.56414) [-1.20156]	0.087066 (0.05245) [1.65994]
CPIW(-1)	-0.007109	-0.018217	0.526837	-0.128537

Continue.....

CPIW(-2)				
	(0.04858)	(0.00933)	(10.9572)	(1.01874)
	[0.63335]	[-0.67108]	[-1.07811]	[-0.04806]
C	-13.54147	14.51248	10399.01	445.7542
	(36.8582)	(7.07850)	(8313.54)	(772.951)
	[-0.36739]	[2.05022]	[1.25085]	[0.57669]
R-squared	0.440340	0.947377	0.999797	0.821816
Adj. R-squared	-0.678980	0.842132	0.999390	0.465447
Sum sq. resids	38.81285	1.431497	1974603.	17069.13
S.E. equation	3.114998	0.598226	702.6028	65.32445
F-statistic	0.393400	9.001619	2458.506	2.306082
Log likelihood	-25.55591	-4.105715	-95.99724	-65.11671
Akaike AIC	5.316295	2.016264	16.15342	11.40257
Schwarz SC	5.707413	2.407383	16.54454	11.79369
Mean dependent	-1.138462	7.176923	49300.33	152.6254
S.D. dependent	2.404003	1.505630	28447.50	89.34706
Determinant resid covariance (dof adj.)		6.51E+08		
Determinant resid covariance		5830944.		
Log likelihood		-175.0463		
Akaike information criterion		32.46866		
Schwarz criterion		34.03313		

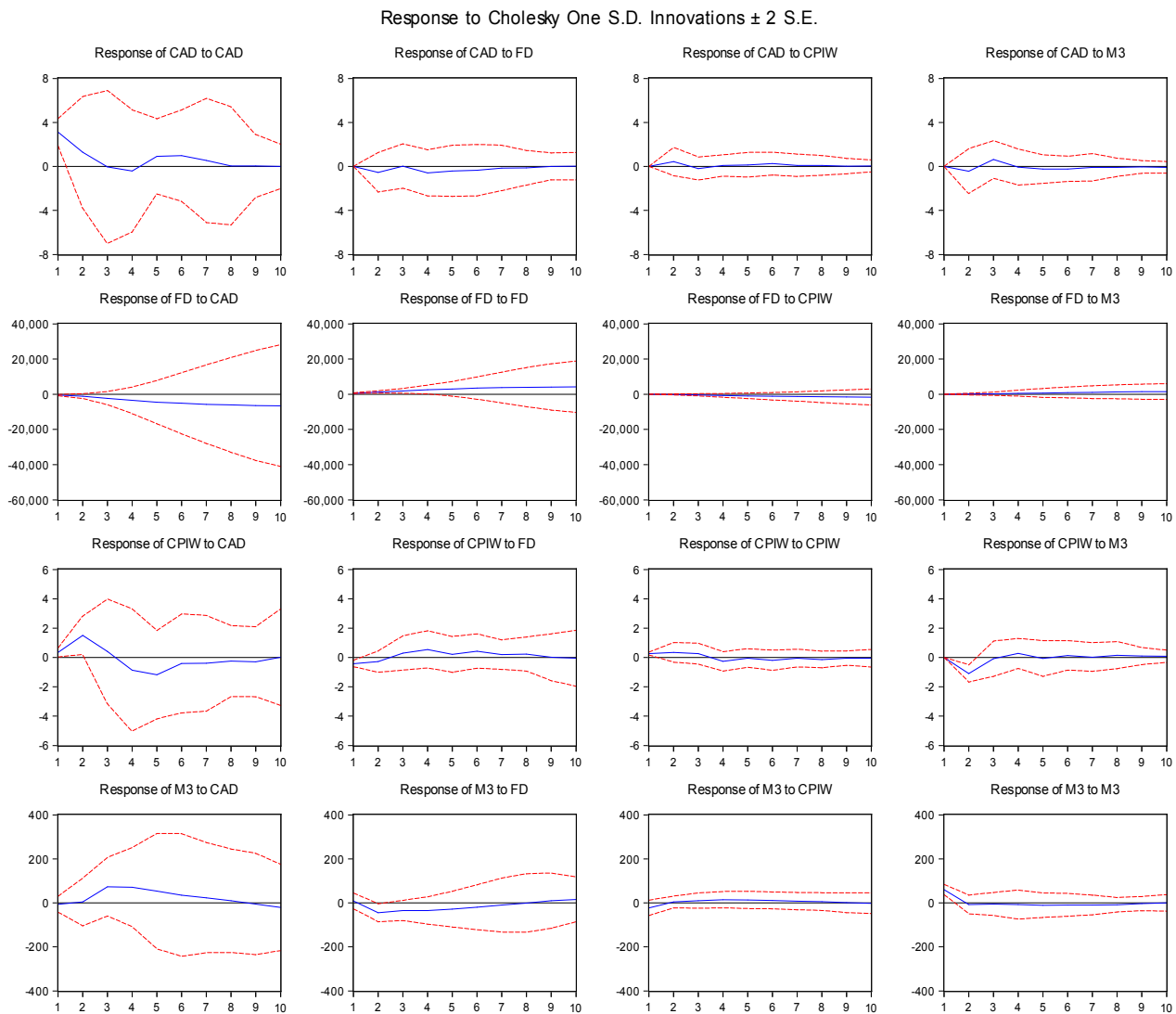


Figure 3. Impulse Response Function

Chung and Lai (1993) recommended that Johansen trace test is powerful to skewness and kurtosis in the residuals than maximum eignvalue test. But the maximum eignvalue test is a good alternative than trace test. So, it should be preferred in determining the number of cointegrating vectors (Enders, 1995). Thus, the number of cointegrating vectors for fiscal deficit, current account deficit, money supply, and inflation growth is one. This suggests that there is a long run relationship between current account deficit, fiscal deficit, inflation, money supply.

H_0 : there is no-cointegration between the variables

H_1 : there is cointegration between the variables

From the Table 2, Johansen Cointegration tests (trace and maximum eignvalue) indicate that p value is less than critical value (0.05) we reject the Null hypothesis and accept that there is cointegration between all the variables. It implies that there is long run relationship between current account deficit, fiscal deficit, inflation and money supply. Table 5, normalized cointegration matrix suggest that there is negative relation

between inflation and money supply and positive relation between current account deficit and fiscal deficit. It means current account deficit increase with increasing fiscal deficit and inflation decrease with decreasing money supply in long run.

Vector Error Correction Model: The Vector Error Correction Model under Vector Autoregression Estimates explains long run relationship between variables while other coefficients interpret the short run association between the variables. The table also states that there is short run causality running from fiscal deficit and money supply to inflation. It means fiscal deficit and money supply cause inflation. The model suggests long run relationship between the four variables (current account deficit, fiscal deficit, money supply, inflation) and in short run there is positive relationship between fiscal deficit, money supply and inflation.

Impulse Response Function based on Unrestricted VAR: The impulse response based on unrestricted VAR is illustrated in Figure 3. As it is normal that the return of one standard deviation shock to current account resultant fall in fiscal deficit (indicate the positive relationship between current account deficit and fiscal deficit). Correspondingly, one standard deviation shock to fiscal deficit leads to diminish current account. Thus, maximum fiscal deficit worsen the current account balance. This long run relationship is suggested by Johansen cointegration test. Column 1, row 3 in below figure represents the response of inflation to current account balance. Inflation reacts negatively to a shock in current account balance. Thus, expansion in current account deficit gives birth to high inflation. Column 3, row 1 of the figure indicates the current account balance to inflation. Decreasing current account balance implies that inflation worsen current account balance. Column 4, row 1 shows response of current account balance to money supply. A one standard deviation shock to money supply worsens the current account balance. Column 4, row 3 shows relationship between inflation and money supply. A shock to money supply leads to increment in inflation. Thus, expansion of money creates inflation. All these relation exists in long run which is proved by Johansen cointegration test. Thus, current account deficit increase with increasing fiscal deficit, inflation and money supply.

Policy Implications

The policy implications on the basis of above analysis can be:

- Management of Fiscal Deficit.
- High prices of products can be controlled by regulating inflation.
- It assures that real interest rates are positive.
- Regulation on import of gold
- Liberalism of SLR (Statutory Liquidity Ratio).

Conclusion

For the developing country like India fiscal policies plays an important role in growth and sustainability. In one hand fiscal policies increase the purchasing power of people in other hand it expand money supply in country which leads to inflation and enlarging demand worsen the current account deficit. Thus, all the variables are interrelated to each other. This study attempts to find out the relationship between the current account deficit and fiscal deficit with the help of money supply and inflation. The results of the Johansen cointegration test confirm the long

run association between current account deficit, fiscal deficit, money supply, and inflation. It also advocates the reason of worsening current account deficit; definitely, it is increasing fiscal deficit, inflation and money supply. The Vector Error Correction Model suggests that in case of fluctuations from long run equilibrium, money supply and inflation will react to readjust the association.

REFERENCES

- Abell, J.D. 1991. Twin Deficit during the 1980s: An Empirical Investigation. *Journal of Macroeconomics*, Vol. 12 (1), pp. 81-96.
- Anoruo, E. and Ramchander, S. 1998. Current Account and Fiscal Deficits: Evidence from Five Developing Economies of Asia. *Journal of Asian Economics*, Vol. 9 (3), pp. 487-501.
- Azgun, S. 2012. Twin Deficit Hypothesis: Evidences from the Turkish Economy. *Dogus Universitesi Dergisi*, Vol. 13 (2). Pp. 189-196.
- Bedarkar, M., Gopalkrishina, S., Khairnar, K. 2016. Indian Twin Deficits: The Role of Inflation and Money Supply, *Indian Journal of Finance*, pp. 7-22.
- Bernheim, B.D. 1988. The Budget Deficit and Balance of Trade. *Tax Policy and the Economy*, Vol. 2, pp. 1-32.
- Bose, S. and Jha, S. 2011. India's Twin Deficits: Some Fresh Empirical Evidence. *ICRA BULLETIN, Money & Finance*, pp. 83-104.
- Efremidze, L. and Tomohara, A. 2011. Have the Implications of Twin Deficits Changed? Sudden Stops over Decades. *International Advances in Economics and Statistics*, Vol. 55 (3), pp. 313-328.
- Enders, W. and Lee, B.S. 1990. Current Account Budget Deficits: Twin or Distant Cousins? *The Review of Economics and Statistics*, Vol. 72 (3), pp. 373-381.
- Ghatak, A. and Ghatak, S. 1996. Budgetary Deficits and Ricardian Equivalence: The Case of India, 1950-1986. *Journal of Public Economics*, Vol. 60 (2), pp. 267-282.
- Grier, K. and Ye, H. 2009. Twin Sons of Different Mothers: The Long and the Short of the Twin Deficits Debate. *Economic Inquiry*, Vol. 47(4), pp. 625-638.
- Koussi, Mougoue and Kymn. 2004. Causality tests of the relationship between the twin deficits, *Empirical Economics*, Volume 29 (3), pp 503-525.
- Kim, S. and Roubini. N. 2008. Twin Deficit or Twin Divergence? Fiscal Policy, Current Account and Real Exchange Rate in the U.S., *Journal of International Economics*, Vol. 74.
- Mitra, P., Khan, G. S. 2014. Twin Deficits Hypothesis: An Empirical Analysis in the Context of India. *International Journal of Commerce & Business Studies*. Vol. 2(2), pp. 10-23.
- Ratha, A. 2010. Twin Deficit or Distant Cousins? Evidence from India, *Working Paper from Saint Cloud State University, Department of Economics*.

Websites Visited

- http://eac.gov.in/index_archive.html
http://eac.gov.in/reports/eco_report1708.pdf
<http://eac.gov.in/reports/EconomicOutlook201314.pdf>
<https://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics>
<https://rbi.org.in/scripts/AnnualReportPublications.aspx?Id=1175>
<https://rbi.org.in/scripts/PublicationsView.aspx?id=14349>
www.rbi.org.in/scripts/referenceratearchive.aspx