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An Analysis of Determinants of Balance of Trade in India

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Abstract:

In the era of globalization, global macroeconomic crises and the changes in the international trade pattern have accentuated the need for clearer understanding of the factors underlying a country's balance of trade position. In this onset, this article attempts to examine the role of various determinants like real effective exchange rate, domestic consumption, FDI and foreign income on balance of trade in determining short-and-long-run trade balance behavior for India over the period,1972-73 to 2010-11. More precisely, the aim is to examine whether the trade balance is affected by exchange rates, FDI and household consumption and foreign incomes etc.Several econometric techniques and tools like Augmented Dickey Fuller test, Johansen Cointegration test and VECM , OLS have been used to observe long run as well as short run causality among different macro- economic variables under consideration of our study. The result suggests that long run as well as short run causality existed among different macro economic variables like real effective exchange rate, FDI, domestic consumption and foreign income and foreign direct investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate impacted negatively on balance of trade in India.

Keywords: Balance of trade, real effective exchange rate, domestic consumption, FDI, foreign income, India.

1. Introduction:

Indian economy and foreign trade are on a growth trajectory. Indian exports have come a long way in value terms from the time of gaining independence in 1947. Trends of global trade and policies have great influence on international trade, economic activity and growth. At the initial stage of reforms, expectation was created that such imbalances in trade would be temporary. With the inflation eradicated, consumption growth leveling off and domestic productivity enhanced through privatization and deregulation, trade deficit would tend to be gradually reversed.The aim of trade policies is to stimulate domestic output, protection to domestic industries, consumer protection and promotion of export etc. India needs various economic policies to enhance the balance of trade and boosts the economics activity and development which includes tariff structure, exchange rates, import control, export taxation, foreign exchange allocation system. In the era of globalization, global macroeconomic crises and the changes in the international trade pattern have accentuated the need for clearer understanding of the factors underlying a country's balance of trade position.

In this onset, the primary objective of this paper is to examine the role of various determinants like real effective exchange rate, domestic consumption, FDI and foreign income on balance of trade in determining short-and-long-run trade balance behavior for India. More precisely, the aim is to examine whether the trade balance is affected by exchange rates, FDI and household consumption and foreign incomes etc.

2. India's recent Balance of Trade scenario:

Since the independence in 1947, the balance of trade in India was on deficit except two fiscal years, 1972-73 and 1976-77. The trade balance has always been negative as shown in Table 1 except two years 1972-73, 1976-77. The trade deficit has been increasing in recent years. During post liberalization era, exports have done well particularly from 1992-93 to 1996-97;and from 2002-2003 to 2008-2009. The major component of import was crude oil. The persistent increase in oil price impacted on the balance of trade adversely and the deficit was fulfilled by external capital account borrowing that cause to raise external debt burden.Therefore, the higher trade deficit could be attributed to a rise

in petroleum, oil and lubricants (POL) as well as non-POL components in imports. Continued uptrend in prices in the international markets and rise in the price of gold were the major contributors to this process [Finance Ministry, (2008)]. The trade account is supported by the rising services exports. India's services exports, at $81.3 billion (Rs3.2 trillion) in 2006-07, are fast catching up with the country's merchandise exports of $127.1 billion. The services export growth rate in 2006-07 was 32.5% compared to 21% in merchandise export. [Singh,(2007)].

Indian foreign trade has grown in absolute numbers as compared to 1950-51, but its share in world trade has gown down from around 2.5 percent to 0.67 percent in 1991 and increased to more than one percent in 2007. During the first phase, 1950-1970, exports have grown at a very slow rate. During 1950s, the exports growth rate was 3.6 percent in dollar terms and 3.5 percent in 1960s. Due to rising imports and stagnant exports, policy of import substitution was started in 1960s to cut down on imports. Five primary commodities constituted a major portion of Indian exports and the prevailing belief was that the country had nothing much to export. Government had adopted a policy of export pessimism and import substitution during this period. Exports were largely neglected during the first and the second five-year plans, which was justified on the ground that demand for Indian exports was inelastic. Whilst the world merchandise export was growing at 6.3 per cent per annum during the 1950s, exports from India stagnated. As the world merchandise exports expanded relatively faster during the 1960s at 8.8 per cent per annum, the growth rate of India's exports improved somewhat to 3.6 per cent per annum. Clearly, the country failed to make the best use of the trade possibilities available during the 1950s and 1960s .During the period of 1970-1991 exports performance improved. Government had taken initiatives in late 1960s like establishing Indian Institute of Foreign Trade and others for promoting foreign trade. The world economy was also growing fast in 1970s. The export growth rate was 15.8 percent in 1970s before slowing down to 8 percent in 1980s.During 1970s, imports growth rate also picked up and infact, was higher than growth rate of exports. The contribution of foreign trade to GDP again reached to 11.8 per cent, the same level as on 1950-51. The export boom of the 1970s, however, could not be maintained during the first half of the 1980s. As the growth rate of world exports turned negative in the aftermath of the second oil price hike, India's exports decelerated sharply. During the second half of the 1980s, however, the world economy recovered and India's exports grew at a healthy pace (17.8 per cent). There was a genuine improvement in the export competitiveness of India during this period due to a major depreciation of the REER and increased export subsidies. This period also witnessed some doses of industrial deregulation and liberalization of capital goods imports [Joshi and Little (1994); Veeramani, (2007)].

In the post liberalization period i.e. post 1991, export and import growth has picked up and the contribution of foreign trade to GDP has increased to 17.1 percent by 2000.However during the period import growth rates has been higher than exports growth rates. Many pro-export policies were started after liberalization. Export promotion schemes prevalent during the post 1991 period include: export promotion capital goods (EPCG), duty entitlement passbook (DEPB), duty free replenishment certificate (DFRC), advance licences, special import licence (SIL), exemption from income tax, sector/market-specific schemes [e g, market access initiative (MAI), towns of export excellence, agri-export zones (AEZ), Focus Africa, and Focus Latin American Countries], and schemes for status holders, export oriented units (EOUs), units in special economic zones (SEZs), electronic hardware technology parks (EHTPs), software technology parks (STPs) and biotechnology parks (BTPs). A few more schemes (such as, target plus, served from India) have been added under the Foreign Trade Policy 2004 [RBI (2004), Malik, (2005)].

[Insert Table-1 here]

3. Methodology:

3.1. Data and Variables:

Using the time period, 1972-73 to 2010-11 for India, this study aims to examine effect of various determinants affecting balance of trade in India. The estimation methodology employed in this study is ordinary least square method(OLS), cointegration and error correction modeling technique.

Data types are secondary in nature and sources from which these are collected are mainly Handbook of Statistics on Indian Economy,2010-11,International Financial Statistics,(several issues). The details of data set are depicted below:

BOT –Balance of Trade= (Export-imports) [Handbook of Statistics on Indian Economy,2010-11).

DC- Domestic consumption expenditure [Handbook of Statistics on Indian Economy,2010-11).

FDI -Foreign Direct Investment [Handbook of Statistics on Indian Economy,2010-11&UNCTAD],

REER-Real exchange rate [Handbook of Statistics on Indian Economy,2010-11]

Y_f -Income from the rest of the world (IFS-IMF) various issues.

3.2. Econometric specification:

3.2.1Hypothesis:

(i).Real effective exchange rate impacts positively on the trade balance.

(ii)Domestic consumption has a negative impact on trade balance.

(iii)FDI impacts positively on trade balance.

(iv)Real income to the rest of the world has a positive impact on trade balance.

3.2.2. Model:

The model for the study takes the form:

BOT = f (REER, DC, Y_f, FDI,) ----------(1)

The effect of independent variables like REER, DC, Y_f, FDI in India can be judged by the using the following regression model in linear form:

$BOT = \alpha + \beta_1 REER + \beta_2 FDI + \beta_3 DC + \beta_4 Y_f + \varepsilon_t$ ---------- (1.1)

α and $\beta>0$

where

BOT: Balance of Trade

Y_f: Real income to the rest of the world (Foreign Income)

DC: Domestic Consumption

FDI: Foreign Direct Investment

REER: Real Effective Exchange Rate

The Stationarity Test (Unit Root Test):

It is suggested that when dealing with time series data, a number of econometric issues can influence the estimation of parameters using OLS. Regressing a time series variable on another time series variable using the Ordinary Least Squares (OLS) estimation can obtain a very high R^2, although there is no meaningful relationship between the variables. This situation reflects the problem of spurious regression between totally unrelated variables generated by a non-stationary process. Therefore, prior to testing Cointegration and implementing the Granger Causality test, econometric methodology needs to examine the stationarity; for each individual time series, most macro economic data are non stationary, i.e. they tend to exhibit a deterministic and/or stochastic trend. Therefore, it is recommended that a stationarity (unit root) test be carried out to test for the order of integration. A series is said to be stationary if the mean and variance are time-invariant. A non-stationary time series will have a time dependent mean or make sure that the variables are stationary, because if they are not, the standard assumptions for asymptotic analysis in the Granger test will not be valid. Therefore, a stochastic process that is said to be stationary simply implies that the mean [(E(Yt)] and the variance [Var(Yt)] of Y remain constant over time for all t, and the covariance [covar(Yt, Ys)] and hence the correlation between any two values of Y taken from different time periods depends on the difference apart in time between the two values for all t≠s. Since standard regression analysis requires that data series be stationary, it is obviously important that we first test for this requirement to determine whether the series used in the regression process is a difference stationary or a trend stationary. The Augmented Dickey-Fuller (ADF) test is used. To test the stationary of variables, we use the Augmented Dickey Fuller (ADF) test which is mostly used to test for unit root. Following equation checks the stationarity of time series data used in the study:

$$\Delta y_t = \beta_1 + \beta_1 t + \alpha y_{t-1} + \gamma \sum_{t=1}^{n} \Delta y_{t-1} + \varepsilon_t$$

Where ε is white nose error term in the model of unit root test, with a null hypothesis that variable has unit root[t]. The ADF regression test for the existence of unit root of y_t that represents all variables (in the natural logarithmic form) at time t. The test for a unit root is conducted on the coefficient of yt-1 in the regression. If the coefficient is significantly different from zero (less than zero) then the hypothesis that y contains a unit root is rejected. The null and alternative hypothesis for the existence of unit root in variable y_t is H0; $\alpha = 0$ versus H1: $\alpha < 0$. Rejection of the null hypothesis denotes stationarity in the series.

If the ADF test-statistic (t-statistic) is less (in the absolute value) than the Mackinnon critical t-values, the null hypothesis of a unit root can not be rejected for the time series and hence, one can conclude that the series is non-stationary at their levels. The unit root test tests for the existence of a unit root in two cases: with intercept only and with intercept and trend to take into the account the impact of the trend on the series. Once the number of unit roots in the series was decided, the next step before applying Johansen's (1988) co-integration test was to determine an appropriate number of lags to be used in estimation.

Johansen Cointegration Approach:

Cointegration, an econometric property of time series variable, is a precondition for the existence of a long run or equilibrium economic relationship between two or more variables having unit roots (i.e. Integrated of order one). The Johansen approach can determine the number of co-integrated vectors for any given number of non-stationary variables of the same order. Two or more random variables are said to be cointegrated if each of the series are themselves non – stationary. This test may be regarded as a long run equilibrium relationship among the variables. The purpose of the Cointegration tests is to determine whether a group of non – stationary series is cointegrated or not.

Having concluded from the ADF results that each time series is non-stationary, i.e it is integrated of order one I(1), we proceed to the second step, which requires that the two time series be co-integrated. In other words, we have to examine whether or not there exists a long run relationship between variables (stable and non-spurious co-integrated relationship) . For the variables to be co-integrated, they must be integrated of order one (non-stationary) and the linear combination of them is stationary I(0).

The crucial approach which is used in this study to test r cointegration is called the Johansen cointegration approach. The Johanson approach can determine the number of cointegrated vectors for any given number of non-stationary variables of the same order.

Error Correcting Model (ECM) and Short Term Causality Test :

Error correction mechanism was first used by Sargan (1984), later adopted, modified and popularized by Engle and Granger (1987). By definition, error correction mechanism is a means of reconciling the short-run behaviour (or value) of an economic variable with its long-run behaviour (or value). An important theorem in this regard is the Granger Representation Theorem which demonstrates that any set of cointegrated time series has an error correction representation, which reflects the short-run adjustment mechanism.

Co- integration relationships just reflect the long term balanced relations between relevant variables. In order to cover the shortage, correcting mechanism of short term deviation from long term balance could be cited. At the same time, as the limited number of years, the above test result may cause disputes (Christpoulos and Tsionas, 2004). Therefore, under the circumstance of long term causalities, short term causalities should be further tested as well. Empirical works based on time series data assume that the underlying time series is stationary. However, many studies have shown that majority of time series variables are nonstationary or integrated of order 1 (Engle and Granger, 1987). The time series properties of the data at hand are therefore studied in the outset. Formal tests will be carried out to find the time series properties of the variables. If the variables are *I* (1), Engle and Granger (1987) assert that causality must exist in, at least, one direction.

4. Analysis of the results:

Before presenting the analytical result, we depict below the descriptive statistics in Table:2 to have a brief snapshot of the different macro-economic variables under our consideration like balance of trade, real effective exchange rate, domestic consumption, FDI and foreign income.

[Insert Table-2 here]

Ordinary Least Square Technique:

[Insert Table-3 here]

In ordinary least square Method, we reject the hypothesis that there is no relationship between the variable and the results of the Ordinary Least Squares Regression are summarized in the Table 3. The empirical analysis on basis of ordinary Least Square Method suggests that there is either positive relationship or negative relationship among Balance of trade , FDI, real effective exchange rate, domestic consumption and foreign income.

The given coefficient shows foreign income has significant positive impact on balance of trade which has implicit implication that with increase of foreign income, balance of trade position approaches towards favourable direction, on the other hand, balance of trade deficit lessens because it may have positive impact on export. Coefficient of House holds spending is found to have significant negative effect on balance of trade as house holds consumption increases that may cause to increase the balance of trade deficit. Variable of FDI shows positive impact on balance of trade as FDI flows increase which may motivate the multinational corporation to produce import substitution domestically and it can reduce import and a positive impact on balance of trade.

The effectiveness of exchange rate depreciation in improving the trade balance has long been an issue of considerable interest to economists and policy makers. The traditional Keynesian expenditure switching hypothesis suggests that a real depreciation makes home produced traded goods more competitive, thereby reducing imports and stimulating exports.

From our analysis, coefficient of real effective exchange rate shows negative impact in that as real exchange rate depreciates, it may increase the balance of trade towards the surplus.It is indicative that decrease in real effective exchange rate should increase the demand for traded industries' output by stimulating export.

[Insert Table-4 here]

Results of ADF Test:

Table 4 highlighted the finding of ADF (Augmented Dickey Fuller) test / unit root test. The impacts of result shows that the non stationary in all variables at level. Here equation is used to check stationary in the data with trend and intercept. Here null hypothesis means non stationary in the data and alternative hypothesis means stationary in the data. All the given variables are non stationary at level. Consequently checking stationary at first difference, the result indicates that all the variables are also non stationary at first difference. ADF test for presence of unit root shows that given variables are stationary at second difference .The value in parenthesis shows the lag length of different variables. All the given variables are integrated at order two i.e. I (2).

Results of Johansen Cointegration test:

[Insert Table-5 here]

The results reported in table 5 suggest that the null hypothesis of no cointegrating vectors can be rejected at the 1% level of significance. It can be observed from the Likelihood Ratio (L.R.) that we have four co-integration equations. In other words, there exist four linear combinations of the variables. Therefore, table 5 highlights the outcomes of Johansen co integration approach, the result indicates that four vectors are co integrated among the five vectors according to Likelihood Ratio value. The result shows that there is long run association among the variables.

Results of VECM:

All variables in the cointegrating equation are assumed endogenous in a VAR structure. The VECM extends this by making use of differenced data and lagged differenced data of the chosen variables in a VAR structure. An essential element of the VECM is the error correction term or factor. The coefficient of the error correction term is theoretically expected to be negatively signed and have a value between zero and one. This is to ensure that equilibrium error correction within the system over time is at least meaningful. Besides, the VECM contains vital information on causal relationships and the dynamic interactions among the cointegrating variables.

Since long run association has been observed among these variables, we can also explore the possibility of a short run relationship by using an error correction model (ECM) framework. ECM permits the introduction of past disequilibrium as explanatory variables in the dynamic behaviour of existing variables and thus facilitates in capturing both the short run dynamics and long run relationships among variables.

[Insert Table-6 here]

The co-integration result indicates the presence of error correction model. Thus, the vector error correction model is tested. This indicates short run dynamics of the model. The error correction model combines the short- and long-term relations between analyzed variables. The results of error correction model given in Table-6 confirm the co-integration results and indicate the presence of error correction term for "real BOT, REER and domestic consumption, FDI and foreign income". "Error correction equation shows correct negative sign for ""real BOT, REER and domestic consumption, FDI and foreign income". The coefficient ECT_{t-1} is significant and does have the correct sign (negative). For example, in case of balance of trade, the coefficient of ECT_{t-1} indicates the speed of adjustment and in this case, 21% adjustment is observed. In other words about 21% of disequilibrium is corrected each year.

5. Conclusions:

The objective of this paper is to examine the role of various determinants like real effective exchange rate, domestic consumption, FDI and foreign income on balance of trade in determining short-and-long-run trade balance behavior for India using annual data over the period 1972-73 to 2010-11. The unit root properties of the data were examined using the Augmented Dickey Fuller test (ADF) after which the cointegration and causality tests were conducted. The error correction models were also estimated in order to examine the short –run dynamics. The major findings include the following:

The unit root test clarified that all variables under our study are non-stationary at the level and first difference but found stationary at the second differences. Therefore, the series of variables of our consideration-BOT,REER,DC,FDI and Y_f, namely, balance of trade, real effective exchange rate, domestic consumption, foreign direct investment and foreign income found to be integrated of order two i.e I(2)one using the ADF tests for unit root.

The cointegration test confirmed that macro economic variables like real effective exchange rate, domestic consumption, foreign direct investment and foreign income are cointegrated, indicating an existence of long run equilibrium relationship as confirmed by the Johansen cointegration test results.

The error correction estimates gave evidence that there exists also short run causality among variables.

Foreign direct investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate impacted negatively on balance of trade in India.

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Table-1: Export, Import and Trade Balance in India

year	Export	Growth rate	Import	Growth rate	Trade Balance
1972-73	1972	-	1867	-	104
1973-74	2523	27.99	2955	58.26	-432
1974-75	3329	31.92	4519	52.90	-1190
1975-76	4036	21.25	5265	16.51	-1229
1976-77	5143	27.41	5074	-3.63	69
1977-78	5408	5.16	6020	18.65	-612
1978-79	5726	5.88	6811	13.13	-1085
1979-80	6418	12.09	9143	34.24	-2724
1980-81	6711	4.55	12549	37.26	-5839
1981-82	7806	16.32	13608	8.43	-5802
1982-83	8803	12.78	14293	5.03	-5489
1983-84	9771	10.99	15832	10.77	-6061
1984-85	11744	20.19	17134	8.23	-5391

1985-86	10895	-7.23	19658	14.73	-8763
1986-87	12452	14.30	20096	2.23	-7644
1978-88	15674	25.87	22244	10.69	-6570
1988-89	20232	29.08	28235	26.94	-8004
1989-90	27658	36.71	35328	25.12	-7670
1990-91	32558	17.71	43193	22.26	-10635
1991-92	44042	35.27	47851	10.78	-3809
1992-93	53688	21.90	63375	32.44	-9686
1993-94	69751	29.92	73101	15.35	-3350
1994-95	82674	18.53	89971	23.08	-7297
1995-96	106353	28.64	122678	36.35	-16325
1996-97	118817	11.72	138920	13.24	-20103
1997-98	130101	9.50	154176	10.98	-24076
1998-99	139753	7.42	178332	15.67	-38579
1999-2000	159561	14.17	215237	20.69	-55675
2000-01	203571	27.58	230873	7.26	-27302
2001-02	209018	2.68	245200	6.21	-36182
2002-03	255137	22.06	297206	21.21	-42069
2003-04	293367	14.98	359108	20.83	-65741
2004-05	375340	27.94	501065	39.53	-125725
2005-06	456418	21.60	660409	31.80	-203991
2006-07	571779	25.28	840506	27.27	-268727
2007-08	655864	14.71	1012312	20.44	-356448
2008-09	840755	28.19	1374436	35.77	-533681
2009-10	845534	0.57	1363736	-0.78	-518202
2010-11	1157475	36.89	1605315	17.71	-447840

Source: Handbook of Statistics on Indian Economy,2010-11(Compiled).

Table: 2: Descriptive Statistics

Sample: 1972-73 to 2010-11					
	BOT	REER	FDI	DC	Y_f
Mean	-74096.79	88.60744	24415.79	196922.7	-19338.15
Median	-8004.000	93.04000	683.0000	82292.00	-5956.000
Maximum	104.0000	127.5000	179059.0	943397.0	63983.00
Minimum	-533681.0	60.23000	-26.00000	4538.000	-182347.0
Std. Dev.	146109.4	19.03406	49476.22	253876.7	47283.48
Skewness	-2.227738	0.044042	2.234108	1.633536	-2.325102
Kurtosis	6.618572	1.888251	6.549646	4.849373	8.679342
Jarque-Bera	53.53617	2.021084	52.91803	22.90264	87.55391
Probability	0.000000	0.364022	0.000000	0.000011	0.000000
Observations	39	39	39	39	39

Source: Own estimate.

Table:3: Results of Ordinary Least Square Estimates

Dependent Variable: BOT Method: Ordinary Least Squares Sample: 1972-73 to 2010-11 Included observations: 39				
Variables	Coefficient	Std. Error	t-Statistic	Prob.
C	62136.28	16773.60	3.704409	0.0007
DC	-0.157271	0.035790	-4.394289	0.0001
FDI	1.755564	0.206622	8.496507	0.0000
Y_f	0.451846	0.114715	3.938854	0.0004
REER	-605.6093	170.5260	-3.551419	0.0011
R-squared	0.987637	Mean dependent var		-74096.79
Adjusted R-squared	0.986183	S.D. dependent var		146109.4
S.E. of regression	17174.61	Akaike info criterion		22.45946
Sum squared resid	1.00E+10	Schwarz criterion		22.67274
Log likelihood	-432.9595	F-statistic		679.0532
Durbin-Watson stat	1.589780	Prob(F-statistic)		0.000000

Ho: There is no relationship between the variables; H1: There is relationship between the variables

Source: Own estimate.

Table 4: Unit Root Test: The Results of the Augmented Dickey Fuller (ADF) Test

Variables	Level(with Intercept &trend)			First difference(with Intercept&Trend)			Second difference(with Intercept&Trend)		
	ADF(0)	ADF(1)	ADF(2)	ADF(0)	ADF(1)	ADF(2)	ADF(0)	ADF(1)	ADF(2)
BOT	-0.2230	-1.9808	-1.1683	-3.1834	-3.5296	-1.7291	-6.3943	-5.3598	-4.7686
REER	-0.8812	-1.0514	-1.2929	-5.3936	-4.6593	-4.7393	-8.7971	-7.7955	-4.4893
FDI	-0.8164	-3.8068	-4.1981	-2.1553	-2.6662	-4.1981	-4.7139	-4.6093	-4.7686
DC	2.8213	1.0679	2.3491	-3.7883	-3.3078	-0.2434	-7.2211	-5.9835	-5.2303
Y_f	0.1813	-0.7480	-0.3396	-4.8272	-4.1190	-2.8478	-7.8021	-6.6005	-6.8862

*MacKinnon critical values for rejection of hypothesis of a unit root.

1% Critical Value* -4.2505

5% Critical Value -3.5468

10% Critical Value -3.2056

Source: Own estimate.

Table- 5: Johansen Cointegration Test

Sample: 1972-73 to 2010-11 Included observations: 37 Test assumption: Linear deterministic trend in the data Series:BOT DC REER FDI Y_f Lags interval: 1 to 1				
Eigen value	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.910544	182.8033	68.52	76.07	None **
0.661564	93.48509	47.21	54.46	At most 1 **
0.627092	53.39858	29.68	35.65	At most 2 **
0.357244	16.90089	15.41	20.04	At most 3 *
0.014681	0.547238	3.76	6.65	At most 4
*(**) denotes rejection of the hypothesis at 5%(1%) significance level. L.R. test indicates 4 cointegrating equation(s) at 5% significance level.				

Source: Own estimate.

Table-6: Error Correction Model

Sample(adjusted): 1975-76 to 2010-11 Included observations: 36 after adjusting endpoints Standard errors & t-statistics in parentheses					
Error Correction:	D(BOT)	D(REER)	D(FDI)	D(DC)	D(Y_f)
CointEq1	-0.210250 (0.04902) (-4.28924)	-9.49E-06 (1.8E-05) (-0.52102)	-0.120974 (0.01414) (-8.55389)	-0.192540 (0.02638) (-7.29970)	-0.100489 (0.04498) (-2.23393)
D(BOT(-1))	0.871788 (0.23711) (3.67680)	-0.000235 (8.8E-05) (-2.66248)	-0.243561 (0.06841) (-3.56036)	-0.360833 (0.12759) (-2.82817)	1.354683 (0.21759) (6.22591)
D(BOT(-2))	0.992112 (0.32717) (3.03244)	-9.15E-05 (0.00012) (-0.75282)	-0.264037 (0.09439) (-2.79721)	0.069437 (0.17605) (0.39442)	0.263052 (0.30024) (0.87615)
D(REER(-1))	-377.8805 (534.621) (-0.70682)	0.347488 (0.19867) (1.74908)	-23.77618 (154.248) (-0.15414)	-98.84231 (287.677) (-0.34359)	-191.9152 (490.614) (-0.39117)
D(REER(-2))	105.2201 (538.075) (0.19555)	-0.159073 (0.19995) (-0.79555)	-253.0233 (155.244) (-1.62984)	-384.5277 (289.536) (-1.32808)	202.9479 (493.784) (0.41101)
D(FDI(-1))	-1.598766 (0.36922) (-4.33015)	-0.000157 (0.00014) (-1.14419)	0.725420 (0.10653) (6.80982)	1.363619 (0.19867) (6.86361)	0.810243 (0.33882) (2.39133)

D(FDI(-2))	-2.830393 (0.46058)* (-6.14522)**	-0.000524 (0.00017) (-3.06299)	0.880928 (0.13289) (6.62916)	3.293893 (0.24784) (13.2905)	0.824381 (0.42267) (1.95041)
D(DC(-1))	1.279443 (0.22037) (5.80592)	-9.60E-05 (8.2E-05) (-1.17243)	-0.255362 (0.06358) (-4.01638)	-0.447080 (0.11858) (-3.77031)	0.851064 (0.20223) (4.20842)
D(DC(-2))	0.588090 (0.28308) (2.07748)	0.000223 (0.00011) (2.11599)	-0.439959 (0.08167) (-5.38684)	-0.014361 (0.15232) (-0.09428)	-0.624181 (0.25978) (-2.40276)
D(Y_f(-1))	-1.063899 (0.23155) (-4.59470)	0.000331 (8.6E-05) (3.84120)	0.350011 (0.06681) (5.23922)	0.282609 (0.12460) (2.26822)	-0.505952 (0.21249) (-2.38107)
D(Y_f (-2))	-0.966793 (0.26541) (-3.64265)	2.51E-05 (9.9E-05) (0.25406)	-0.069996 (0.07658) (-0.91409)	0.278359 (0.14282) (1.94908)	-0.124895 (0.24356) (-0.51279)
C	-17429.51 (3361.20) (-5.18549)	-2.794576 (1.24904) (-2.23737)	5990.092 (969.767) (6.17684)	12730.09 (1808.65) (7.03846)	73.79689 (3084.53) (0.02392)
R-squared Adj. R-squared	0.909694 0.868304	0.609353 0.430306	0.949496 0.926348	0.973210 0.960932	0.741733 0.623360

Source: Own estimate.

* Indicates SE, ** Indicates t statistics of respective coefficient.