*Paper Prepared for the 32nd General Conference of
The International Association for Research in Income and Wealth*

Boston, USA, August 5-11, 2012

The External Sector and Economic Growth –Indian Experience.

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The External Sector and Economic Growth –Indian Experience.

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<u>Abstract</u>

This paper examines the trend in the behavior of the external sector of Indian Economy and its impact on economic growth since 1950-51. The dynamics of the external sector is captured in terms of the behavior of some indices like the index of trade integration; financial integration; net external position (NEXT); equity integration and also by studying the behavior of the current account balances , the capital account balances and the position of the net foreign asset (NFA) as well as international reserves since independence. For capturing the long run dynamics of causality between economic growth and the various indices we have made time series econometric analysis. It is found that the net external position of Indian Economy has improved substantially over the long period and especially after trade and financial liberalization which in turn has led to bring down the volatility of macro fundamentals   or instability of Indian Economy. It is also found that since the period of globalization the discrepancy in NFA, the financial and equity integration of our economy have increased significantly but this has in no way affected the steady growth process and stability of our economy. The econometric analysis (ADF and PP tests for stationarity of series) reveals that all the indices as well as the variables including the GDP growth are non-stationary at their levels but are stationary at their first differences. The co-integration analysis clearly establishes the long-run equilibrium relations i.e. causality between the GDP growth and trade integration, financial integration, the NFA, NEXT .The vector error   correction estimates also confirm the correction of short-run disturbances from long-term trend so that the explained and the explanatory variables move towards the long-run steady state path(i.e. convergent). This happens in the cases of relation between growth and financial

integration, trade integration, NEXT and NFA. The similar result is also found from the co-integration analysis for other variables but the vector error correction estimates of the long-run causality between the domestic inflation and the financial openness reveals that the short run disturbances are not corrected and are divergent. However in case of the relation between the inflation rate and the GDP growth although the co-integration analysis establishes a long-run causality, the vector error correction estimates reveal the divergence from long-run path due to short term disturbances which seems to be due to the domestic supply side constraint. Further we find that the trade integration, the financial integration, the NFA and the net external position have no significant positive long run contribution towards the growth of our economy. However they have significant positive contribution to GDP growth in the short run especially during the post full fledged liberalization period. Further we find that the external sector liberalization has helped bringing down the volatility as well as the instability of our economy.

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The External Sector and Economic Growth – Indian Experience.

I. Introduction:

It is well known that in an open economy macroeconomic structure the behavior of the macro fundamentals as well the macro variables relating to the external sector of any economy can not be independent of the behavior of the same in the global economy especially in the economies with which the former is integrated. Similar is the case of macro economic policies of any economy also. In fact the macro policies of any open economy can not also function independently of the policies adopted by it's counterpart and so these policies can not yield contemplated outcomes unless the counteractive policies adopted by other economies with which the former economy is linked be favorable .The nature of inter-relationship between the macro fundamentals and especially the fundamentals of the external sector is well known from the conventional theoretical wisdom on the international economics. Obviously in an open economy macro structure not only the aggregate demand of an economy contains an external part (i.e. the demand for exportable) depending on the exchange rate and the domestic income of the foreign country but the aggregate supply of the country concerned also constitutes a part known as the import component which depends on the exchange rate as well as the domestic income. Further if we consider the balance of payment (bop) of an economy then we sees that the surplus in the same simply means the accumulation of foreign asset and the deficit implies the reverse i.e. the decumulation of assets i.e. the liabilities to the foreigners. The former happens when the domestic absorption is less than the national output and the latter occurs when the reverse occurs. Conversely we find all kinds of accommodating transactions in the capital account of bop i.e. the sale of assets, bonds, borrowing and the reverse depending on whether the current account runs deficit or surplus. Therefore all kinds of international transactions which take place in the external sector of an economy are likely to affect not only the levels of income or output of the economy but also the growth and stability of the economy. Further the changes in the policies adopted by the countries relating to the external sector may also bring about change in the nature and magnitude of the international transactions. Given this

theoretical perception we examine the behavior of the external sector of Indian economy and its impact on her economic growth since 1950-51 as it is well recognized that Indian economy has occupied a prominent position amongst the emerging market economies in the globe especially since globalization. This has mainly been reflected in terms tremendous increase in her growth rate and the inflow of foreign capital both in the form of FDI and FPI. As a fall out India, like that of China is performing the role of leadership towards the maintenance of global economic growth and stability. We have actually tried to capture the dynamics of the external sector in terms of the behavior of some indices like the index of trade integration; financial integration; net external position (NEXT); equity integration and also by studying the behavior of the current account balances (CAB), the capital account balances (KAB) and the position of the net foreign asset (NFA) as well as international reserves since independence. For capturing the long run dynamics of causality between economic growth and the various indices we have made time series econometric analysis.

Now if we see the behavior of Indian economy then it is found that we have been able to increase the annual growth rate of our real GDP from around 2% to a maximum of 9.7% and the spurt in the growth rate has occurred since 2003-4 especially since when our economy has been experiencing service sector revolution. The volume of trade has indeed increased tremendously over the long period since independence nevertheless our economy has experienced current account deficit throughout the period excepting for a very few years .This has accompanied by a persistent increase in the inflow of foreign capital in the form of FDI including the technical and financial collaboration and also in the form of equity investment and portfolio investment especially since the inception of the policy of liberalization in 1991.Surprisingly   the inflow of foreign portfolio investment has increased to such a large extent due to the policy of equity integration that it constitutes about 75% of total inflow of foreign capital to our economy. Obviously this has created buoyancy in respect   of foreign exchange reserve of our economy such that the reserve position has improved tremendously from its poor position in the late 90s. The increase in the international reserve due to the financial integration of our economy has led to the tremendous improvement in the monetary base of our economy. Alongside this seems to have produced some impact on the domestic money

supply also thereby contributing towards the increase in the rate inflation which is of course partly due to the supply side constraint of our economy. Further as a result of the increase in the inflation rate there has been substantial appreciation on the real exchange rate which has made the domestic goods costlier to the foreigners and has helped reducing the export demand thereby creating adverse impact on our BOP also.

It is also known that the behavior of the external sector is also partly the outcome of the attitudes as well as the policies followed by the Government form time to time towards this sector. If we focus on the same then it is found that immediately after independence our Govt. followed the strategy of import substituting industrialization with its main focus on the development of heavy industry including the machinery manufacturing sector and also the infrastructure. Because of poor domestic saving (10%of GDP in early 50s) and the foreign exchange crisis of 1957-58 and also because of the poor and limited domestic skills, entrepreneurship the Govt. followed the liberal policies towards the inflow of FDI including its collaborative form and also to trade regime for the period from 1950 to 1968.. However this policy continued to impose heavy cost to our economy due to large remittance by the foreign corporate to their home countries. So the Govt. introduced FERA Act in 1973 and continued to follow restrictive attitude towards the inflow of foreign capital during the 70s. As a fall out India's exportable continued to become qualitatively inferior in world market because of poor technology and so the manufacturing exports continued to fall. Consequently, our Govt. again continued to follow the policy of deregulation of external sector through the gradual liberalization of trade regime .and expose the domestic industry to foreign competition during the 80s. Eventually the policy of full-fledged liberalization of trade and gradually of the financial and social sector with caution came into force since 1991. Therefore it is obvious that the liberalizing attitude to the inflow of foreign capital and trade has been in operation almost throughout the period of economic development since independence excepting for 70s.This process of policy evolution is likely to produce a robust impact on India's economic growth. So we can expect a long-run positive impact of the behavior of external sector on the growth and volatility of Indian economy. This is actually one of the motivations of this study and under this backdrop we have tried to estimate the long-run

relationship between economic growth and the external sector liberalization as well as inflation.

As far as the literature relating to the relation between the external sector liberalization especially the financial sector liberalization and economic growth is concerned we find cross current of ideas so that the issue has become much more controversial. In fact the issue of the capital account liberalization raised a storm of controversy amongst the economists especially after the East Asian Crisis in 1997-8.. While some economists and even the IMF were in favour of the financial openness (**Fischer,1998; Summers,2000**) there are others who are staunch opponents of the financial openness(**Bhagwati,1998; Rodrik,1998; Stglitz,2003).** The conventional view about the financial globalization has been that it would help the flow of capital from high income countries with high capital labor ratio to poor developing economies with low capital labour ratio for boosting their economic growth as the poor countries suffer from saving constraint. But it is found by Lucas that the flow of capital from industrial countries is very small and rather the emerging market economies have been acting as net exporter of capital to the richer industrial countries in the form of accumulation of foreign exchange reserve which are mainly being invested in the industrial country Govt bonds (**Lucas, 1990).** There have indeed been a good number of studies which have investigated the relation between the cross-border   foreign capital flow and economic growth. The cross-country regression literature and the panel data analysis do not confirm any definite evidence of positive relation between financial openness and economic growth in the developing countries **(Kose, Prasad, Rogoff, and Wei,2006; Prasad, Rajan and Subramanian,2007; Prasad et al,2003 ;Henry,2006).**It is also argued that the financial integration does not produce growth effect at the initial stage of development especially when there is no sufficient development of institutional and financial structure . Rather at the initial level of development it is risky for the developing countries. In fact after a threshold level of development the financial openness becomes growth effective. So there is a positive relation between the financial openness and economic growth for the industrially developed countries. However some argue that the financial integration may have a catalytic effect on the development of the robust financial structure in the developing

countries. It has also some collateral benefits towards the development of sound institutional structure by making the financial sector more competitive and enhancing the corporate governance system which in turn will boost the economic growth . It is further argued that the collateral benefits will accrue and exceed the cost of capital account liberalization if and only if the economy crosses the threshold level of institutional development. **Henry (2006)** however argues that the growth effect of equity market liberalization is likely to be of short duration unless there is sufficient growth of productivity through financial market development In an analysis based on general equilibrium model **Gouurinchas and Jeanne(2006)** argues that the effect of the opening up to capital inflows of GDP growth is likely to be small as the productivity growth is the ma in explanatory factor of long-run growth of an economy.

 But it is true that financial development is concomitant of successful economic growth and a growing financial sector of an economy open to trade can not be insulated from cross-border financial flow. In fact openness to trade implicitly involves the partial openness of finance through the cross-border flow of financial resources. So larger the volume of cross-border trade, the larger will be the volume of transaction of foreign currency through the financial sector i.e. the central bank even if there is no full-fledged financial openness or capital account liberalization. So higher the rate of growth of an economy, the higher will be the functioning of the external sector including the financial sector. For instance Chinese policy of trade liberalization has played an important role to woo the majority proportion of FDI from East Asian countries which has used china as an export processing platform. However the country specific study on the long-run causality between the economic growth and the external sector liberalization is still scarce. This has also motivated us to undertake such an econometric study for Indian economy by covering the period from 1950-51 to 2008-09. The rest of this paper is organized as follows. Section II explains the nature and sources of the data used in this study. It also focuses on the methodology. Section III analyses the econometric results and finally the section IV presents the concluding observations.

II. Data and Methodology

The data series that we have used in this study are mainly taken from the Hand Book of Statistics on line data of Reserve bank Of India(RBI) and also from the various issues of International Financial Statistics (IFS) published by IMF. The data on GDP, Export(X), Import(M) , Forex reserve or International Reserve (IR), Current Account Balance (CAB), Capital account balance(KAB), for the period from 1950-51 to 2008-9 are taken from RBI. We have taken the GDP series both at current and constant prices and the constructed a GDP series at constant 1999-2000 price and also computed the inter-temporal growth rates of GDP. Further we have computed a series of GDP implicit deflator and used the same as a proxy of inflation. On the other hand , the data series on the total foreign asset (FA) and foreign liabilities(FL) including their components (viz; direct investment abroad and in India; portfolio investment including its components i.e. equity securities and debt securities on both asset liability sides; other investments(viz; debt instruments such as loans ,deposits and trade credits);reserve assets; banks and general Government transactions) are not available for the entire period of our study. However the data on FA and FL including their all components are now being published by RBI and also by the IMF in the form of International Investment Position since 1997.

Fortunately the IMF in its various issues of IFS is publishing the monetary authorities' data series for various countries since 1950. Interestingly the monetary authorities' data series contains the data set relating to all kinds of financial transactions and reserve of the monetary authorities of the countries. This data measure the creation of reserve money comprising currency in circulation and the deposits of the deposit money banks and also the demand deposit of the private sector with the monetary authorities. The data focus on the sector classification of assets and liabilities with the latter further classified by degree of liquidity. On the asset side, foreign assets are shown gross to highlight the functions of the monetary authorities as the holder of international reserves and other foreign claims. , The domestic assets are classified as claims on Govt, claims on deposit money banks and if sizable, claim on official entities and the private sector. The financial liabilities constitute of the reserve money, foreign liabilities and Govt deposit. In fact the the monetary authorities data in IFS consolidate the account of the central bank with the

account arising from monetary functions of the Govt such as the issuance of currency or holding of international reserves and position vis-à-vis the fund (IFS,IMF 1988)..

Now since the data series in the form of total FA and FL as is shown in International Investment Position in IFS are not available for the entire period of our study i.e. before 1997 , we use the data series on FA and FL from monetary authorities data of IFS as proxy of financial integration. By using this data we have formed an index of financial integration (FINOPEN) of our economy in terms of the sum of FA and FL scaled by real GDP. Using the same series we have constructed the data series on the net foreign asset (NFA) position of our economy by taking the difference between the FA and FL which is also scaled by the real GDP series. Further we have measured the net external position of our economy since 1950 by using an index (NEXT) which is formed by taking the difference between the changes in the NFA and CAB (**Lane and Ferretti,2007).** On other hand, we measure the trade integration (TRADEOPEN) of our economy in term of the ratio of X+M to the real GDP. Using these indices we have made the co integration and the vector error correction analysis.

Further since the monetary authorities data series on FA and FL are gross proxies for total cross-border financial transaction of our economy, we have also used the transactions in our Capital Account in the form of asset –liability as another surrogates for financial integration by forming all the above indices . Once again we have done the same time series econometric analysis for estimating the long-run relationship between the GDP growth and FINOPEN, NFA, as well as NEXT.

Further since the full fledged data series on total FA and FL including its all the component are available in International Investment Position data of IFS since 1997, we have expressed these values in real term (at 1999-00 prices) and constructed the indices like FINOPEN,NEXT, NFA and run the cross-time regression (OLS) for estimating the relation between the GDP growth and all the indices. It is expected that this will give us some insights about the effect of full fledged liberalization of our economy on growth. Moreover to have the idea about the volatility of the macro fundamentals of our economy we have computed Co-efficient of Variation(C.V) for almost all the macro

variables by dividing the total period onto two Phases viz; (i) 1950-51 to1990-91 i.e. pre- reform and (ii) 1991 to 2008post-reform.

Since any time series data especially the macroeconomic data involve a stochastic process, one has to examine whether the data generating process is a stationary stochastic process or a non-stationary stochastic process before undertaking any estimation of long-run causality relationship between the series. We have done this by applying firstly the Augmented Dicky –Fuller (ADF) test and secondly the non- parametric alternative to ADF (as there is the problem of size distortion and low power in ADF) the Phillips and Perron (PP) test. We have incorporated both the intercept and trend component in ADF estimated relation as follows.

$$\Delta y_t = \alpha_t + \beta_t + \rho y_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta y_{t-1} + \varepsilon_t \text{-------(1)}$$

The ADF statistic is the t-value associated with the estimated coefficient of ρ, the probability distribution of which is a functional of Weiner process which is used to explain the Brownian motion of a particle with large number of molecular shocks (**Mddala and Kim, 1998).** The PP test that we have used is actually a non-parametric extension of the DF unit root test through the addition of a correction factor to the DF t-statistic. We have done both of the tests for all the logarithmic values of the series of indices and also for their first differences, by choosing the lag length in terms of the Akaike Information Criterion (AIC). After conducting the unit –root tests for examining the stationarity of the series, we have estimated the long-run causal relationship between the non-stationary series of our indices by applying the tests for cointegration and the estimation of cointegrating relationships i.e. **Engle and Granger (1987)** tests. Engle and Granger have shown that if two series are cointegrated then there will be a causal relation between the series in at least one direction. This helps to integrate the short-run dynamics with the long-run equilibria so that our indices move together over time. Again to capture the short –run dynamics of disequilibria we have applied the vector error correction model (ECM) which helps correcting the past periods disequilibrium. The analysis of short-run dynamics is done by first eliminating trends in the variables by taking the difference. This process is likely to give us a more potential valuable information about long-run relationships between the indices(variables) In fact the Granger .representation

theorem explains the process of modeling the cointegrated I(1) series in the form of Vector Auto regression(VAR) such that it could be constructed either in terms of levels(logarithmic values) of the data series following I(1) or in terms of their first differences, the I(0) variables/ data series, with the addition of an Error Correction Mechanism(ECM) for capturing the short run dynamics.

For any two variables X and Y the model can be presented in the following forms of equations (2 to5) such that the equations 4& 5 incorporate the ECM.

$$\ln Y_t = \alpha + \sum_{i=1}^{m} \beta_i \ln X_{t-i} + \sum_{j=1}^{n} \gamma_j \ln Y_{t-j} + u_t \quad \text{.................................(2)}$$

$$\ln X_t = \mu + \sum_{i=1}^{p} \pi_i \ln X_{t-i} + \sum_{j=1}^{r} \xi_j \ln Y_{t-j} + v_t \quad \text{.................................(3)}$$

$$\Delta \ln Y_t = \alpha + \sum_{i=1}^{m} \beta_i \Delta \ln X_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta \ln Y_{t-j} + \psi ECM_{t-1} + u_t \text{-----------(4)}$$

$$\Delta \ln X_t = \mu + \sum_{i=1}^{p} \pi_i \Delta \ln X_{t-i} + \sum_{j=1}^{r} \xi_j \Delta \ln Y_{t-j} + \chi ECM_{t-1} + v_t \text{---------------(5)}$$

Where u_t and v_t are the random disturbances with zero mean and they are serially uncorrelated; ECM represents the error correction mechanism for capturing short run dynamics.

III. Analysis of Econometric Results

The results of the unit root tests are given in table-1 where both the ADF test statistics and the PP statistics are given in the upper part of the table and the lower part of the table presents the critical values of the test statistics at 1%, 5% and 10% levels. It follows that

Table 1

Estimated Statistics of Unit Root Tests

Series	ADF	PP
LogGDP	0.454176	1.564247
Δ(LogGDP)	-9.337181	-9.453819
Log(NFA)	-2.659083	-1.908668
ΔLog(NFA)	-5.450134	-3.85253
Log(FINOPN)	-2.340334	-1.806938
ΔLog(FINOPN)	-5.066767	-5.10178
Log(GDPD)	-6.359132	-3.766004
ΔLog(GDPD)	-6.359132	-6.359132
NEXT	-7.305636	-7.303575
Δ(NEXT)	-5.947225	-28.51709
Log(TRADEOPEN)	-2.309826	-6.186778
Test critical values		
1% level	-4.133838	-4.133838
5% level	-3.493692	-3.493692
10% level	-3.175693	-3.175693

Source: Author's Computation from RBI and IFS Data

the null hypothesis of the presence of unit roots for the variables GDP, FINOPEN, NFAGDPRATIO and TRADEOPEN is not rejected in their original series in logarithmic form by both the ADF and PP tests. So we can say that the series are non-stationary. However, the null hypothesis of the presence of unit root is rejected for all these variables in their first differences of values. But so far as the variables GDP deflator(GDPD) , a proxy of inflation and the NEXT are concerned we see that these series are stationary at

both of their levels and first differences as the ADF and PP statistics confirm the rejection of the null hypothesis of the presence of unit root.

Table-2(A)

Estimated Statistics of Cointegration Test for GDP Growth and Financial Openness

	Hypothesised number of Cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.416881	31.03625	15.49471	0.0001
	At most 1	0.014746	0.831912	3.841466	0.3617
Max. Eigen Value	None	0.416881	30.20434	14.2646	0.0001
	At most 1	0.014746	0.831912	3.841466	0.3617

Source: Author's Computation from RBI and IFS Data

Table-2(B)

Estimated Statistics of Cointegration Test for GDP Growth and Trade Integration

	Hypothesised number of Cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.475026	36.69149	15.49471	0
	At most 1	0.034458	1.893541	3.841466	0.1688
Max. Eigen Value	None	0.475026	34.79795	14.2646	0
	At most 1	0.034458	1.893541	3.841466	0.1688

Source: Author's Computation from RBI and IFS Data

Now since the ADF and PP test statistics reveal that the GDP and all the indices as well as variables like FINOPEN,TRADEOPEN, NFA,NEXT,GDPD series are integrated in order one , we may have common long run trend between them through cointegration. So for capturing the long run equilibrium relations between the variables

we have estimated the cointegrating relationship between the series by applying Johansson's cointegration test. We have estimated both the trace test i.e. the LR test and the maximum eigenvalues. The estimated statistics of cointegration test for the relation between GDP growth and FINOPN and TRADEOPEN are given in table 2A and 2B above and the same for rest of the variables are given in APPENDIX-I in tables 2C -2F. The trace statistics or the LR test statistics are given in the upper part of the tables and the maximum eigenvalues are given in the lower parts of the tables. The trace statistics in the tables clearly indicate that there is one cointegrating equation at the 0.05 level of significance for all the series. Further the likelihood statistics corresponding to eigenvalues given in the tables which are used to test the hypothesis of the presence of cointegrating relations i.e. the long run equilibrium relations between the series against the alternative hypothesis of full rank are also higher than the critical values at 5% level. Further the p-values also indicate the high probability of rejection of the null hypothesis of the absence of cointegrating equation. So we find that there are cointegrating relationship i.e. the long run causal relationship between GDP growth and FINOPEN, TRADEOPEN, NFA and NEXT. Further there are also cointegrating relation i.e.the long lun equilibrium relation between the GDP growth and GDPD (inflation and the financial integration (FINOPEN).

 Now to confirm the persistence of the long run causal relation between the GDP frowth and other indices and also between the GDPD and FINOPEN we have made the maximum likelihood estimates of the co-efficients of the cointegrating equations where GDP growth (GGDP) is treated as explained variable and the other indices viz; FINOPN, TRADEOPEN, NFA, NEXT are used as explanatory variables. The Table 3G below presents the maximum likelihood estimate of the cointegrating coefficients. We have seen that the unrestricted cointegration rank test (i.e. the trace test and the maximum eigenvalues) has confirmed the presence of long run equilibrium relations between gdp growth and other indices. Here in 3G the maximum likelihood estimates of the cointegrating coefficients are also found to be statistically significant. So these estimates also confirm the presence of long run equilibrium relations between the series. But the signs of the coefficients in all the cases are negative. So it is plausible to say that there is no positive relation between the GDP growth and the trade integration , financial

integration , NEXT and net foreign asset position. The same relation also holds for GDPD and the FINOPEN. So our results also confirms the existing hypothesis in the literature that there is no long run positive relation between the GDP growth and the external sector openness especially the financial openness for the developing countries because of their inadequate robust financial and institutional development. Since in India the full fledged external sector liberalization has been introduced since 1991 the long run effect is likely to be small and even negative .

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Table3(G)

Maximum Likelihood Estimation of Cointegrating Coefficients.

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Indp. Var.	Dep. Var.	ΔGGDP				ΔLGDPD	ΔLGDPD
LFINOPEN(-1)		-1.682749					
		[-4.18099]					
LTRADEOPEN(-1)			-1.017043				
			[-5.26193]				
NEXT(-1)				-0.02377			
				[-5.30727]			
LNFAGDPRATIO(-1)					-1.02958		
					[-3.77522]		
LFINOPEN(-1)						-1.50184	
						[-4.97162]	
GGDP(-1)							-0.81984
							[-9.18496]
C		-10.25923	-8.56061	-4.52997	-18.2448	-7.86895	0.882348

Figures in parentheses are t values.

Source: Author's Computation

It may be noted that the above results are computed by using the data series of monetary authority's data in IFS as proxy of foreign assets and liabilities.

Further to capture the short run dynamics in the frame of VAR with error correction mechanism (ECM) we have estimated the vector error correction model (equations 4&5)such that signs of the error correction parameters indicate whether the short run disequilibrium due to external shocks are being corrected.. The results of the estimates of the vector error correction model are given in the tables 3A to 3F in Appendix -2.It is found from the tables that the error correction parameters in the tables 3A to 3D are negative and highly significant which clearly indicate that that the short run disequilibrium due to external shocks is being corrected so that the series converges with the long run equilibrium path or the steady state equilibrium growth. However the error correction parameters for GDPD are found to be positive (see table 3E&3Fin Appendix-2) and statistically insignificant. So we can say that in case of the inflation rate measured by GDPD the short run disequilibrium due to external shocks are not being corrected so as to reach the long run steady state inflation rate, In other words the short run dynamics is not being captured in this case. However for the variables NEXT, NFA the error correction parameters are positive and statistically significant which clearly indicate that the short run disturbances are not being corrected to converge with the long run equilibrium path. So in cases of NEXT and NFA the short run disturbances matter. Further it follows from the tables that the FINOPEN, TRADEOPEN, NEXT, and NFA have no significant short run effect on the GDP growth. Moreover it also follows from the table 3E that the FINOPEN has no significant short run effect of the inflation GDPD. So the higher rate of inflation measured in terms of GDP deflator can be explained by the domestic supply side constraint instead of the external sector effect,

 But if we estimate the relation between Growth and the external Sector indices when the transaction in our   capital account (KA) in the form of FA and FL is used as a proxy for constructing the indices of Financial integration ,NFA and NEXT then also we have almost same result in our econometric analysis excepting a few cases.   Before undertaking the estimation of cointegrating equations and the vector error correction

model, we have made ADF unit root test for judging the stationarity of the series and also to see whether the series are integrated in common order. The table -4A reports the ADF

Table 4(A)

Estimated Statistics of Unit Root Tests

Series	ADF
FINOPEN(KAB)	1.906261
Δ(FINOPEN)(KAB)	-7.300267
NEXT	-4.989525
Δ(NEXT)	-7.259687
RNFA(KAB)	-1.106132
Δ(RNFA)(KAB)	-8.912543
GGDP	-7.687546
Test critical values	
1% level	-3.568308
5% level	-2.921175
10% level	-2.598551

Source: Author's Computation from RBI and IFS Data

statistics along with their critical values. It follows that the variables FINOPEN and real NFA are non stationary in their levels but are stationary at their first differences. On the other hand the series NEXT and GGDP i.e. growth of GDP are stationary. So the series can be integrated in same order I(1). Thus it is likely that we may have a common long run trend and thus we once again estimate the cointegrating relationship between the GGDP and the FINOPEN, NEXT and NFA by applying the Engle-Granger cointegration method. The Table 4E in Appendix-3 presents the maximum likelihood estimate of the cointegrating coefficients. Here in the table the maximum likelihood estimates of the cointegrating coefficients are also found to be statistically significant. So these estimates also confirm the presence of long run equilibrium relations between the series. But the signs of the coefficients in all the cases are once again negative. So it is plausible to say that there is no positive relation between the GDP growth and financial integration, NEXT and net foreign asset position. So our results once again confirms the existing

hypothesis in the literature that there is no long run positive relation between the GDP growth and the external sector openness especially the financial openness for the developing countries because of their inadequate robust financial and institutional development. Since in India the full fledged external sector liberalization has been introduced since 1991 the long run effect is likely to be small and even negative.

Once again for capturing the short run dynamics in the frame of VAR with error correction mechanism (ECM) we have estimated the vector error correction model (equations 4&5). The results of the estimates of the vector error correction model are given in the tables 4B to 4D in Appendix -3.It is found from the tables that the error correction parameters for GGDP is negative and highly significant which clearly indicate that that the short run disequilibrium due to external shocks is being corrected so that the series converges with the long run equilibrium path or the steady state equilibrium growth. However the error correction parameters for FINOPN and NEXT are found to be positive (see tables Appendix-3) and statistically significant. So we can say that in case of financial openness and net external foreign asset the short run disequilibrium due to external shocks are not being corrected so as to reach the long run steady state inflation rate, In other words the short run dynamics is not being captured in this case. Further it follows from the tables that the FINOPEN, NEXT, have significant short run effect on the GDP growth but the NFA has no such effect albeit their coefficients are negative.

Now to capture the nature of the financial integration of our economy since the inception of the process of globalization we have constructed another index of financial integration which is the sum of the portfolio equities (assets plus liabilities) and FDI stocks (assets plus liabilities) in real term scaled by real GDP for the period from1997 to 2006 on the basis of the data available from the International Investment Position of IFS. The Figure -1 represents the behavior of the indices of financial integration. It is quite clear from the figure that our economy has experienced a gradual increasing trend in financial integration up to 2002 followed by a steady increasing trend thereafter. So we find an exponentially increasing cross-border equity position of our economy since the period of

globalization. This further indicates that there has been a remarkable shift in the structure of external position of our economy since liberalization.

Figure--1
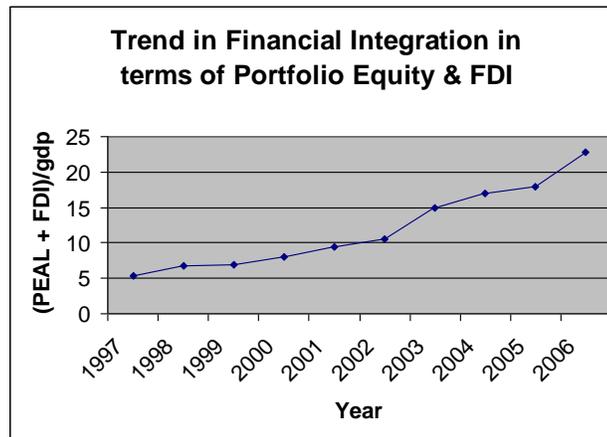
Further it is also true that with the opening up of our economy especially with the gradual increase in the financial openness the domestic financial assets have been brought in to the ambit of portfolio decision of the wealth holders of the developed and also other developing countries. This has indeed led to a sharp increase in the inflow of FPI and FDI to our economy. Now to capture the dependence of our economy on debt financing especially the equity based financing of our economy we have again constructed an index of equity integration for the period from 1997 to 2006 by following Lane and Ferretti (2007) method. The Equity Integration Index is the ratio of the sum of portfolio equity liability and the FDI liability to the total foreign liabilities in real term .We present the behavior of the indices in figure -2 which clearly reveals an exponentially increasing trend in equity integration of our economy since 1999. Therefore we can say that the portfolio equity liabilities and FDI liabilities as a proportion of total external liability of our economy have also increased sharply during the period of globalization. Interestingly, this has not produced any adverse effect on the growth and stability of our economy including the price stability. Rather we have been able to sustain our high conspicuous growth rate of GDP.

Figure-2

Trend in Equity Integration in India
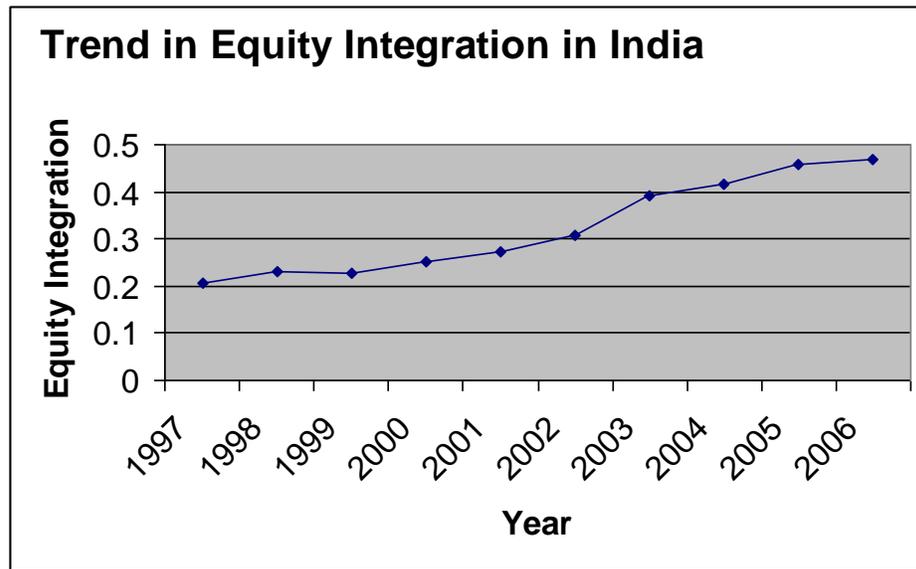
On the other hand, figure -3 shows the long run behavior of the international reserve in Indian currency at constant price scaled by real GDP and that of the inflation rate measured in terms of GDP deflator. It follows that there has been a steady increasing trend in the inflation rate since 1978 which was unaccompanied by the increase in the IR upto1998-99. It is discernable that the IR position has had its steady increasing trend since 2000-01. Therefore we can say that the inflow of foreign capital has not produced any impact on our inflationary process. Rather it seems to be the result of domestic supply constraint. Our maximum likelihood estimate of the co-efficient cointegrating equations also confirms this.

Figure-3
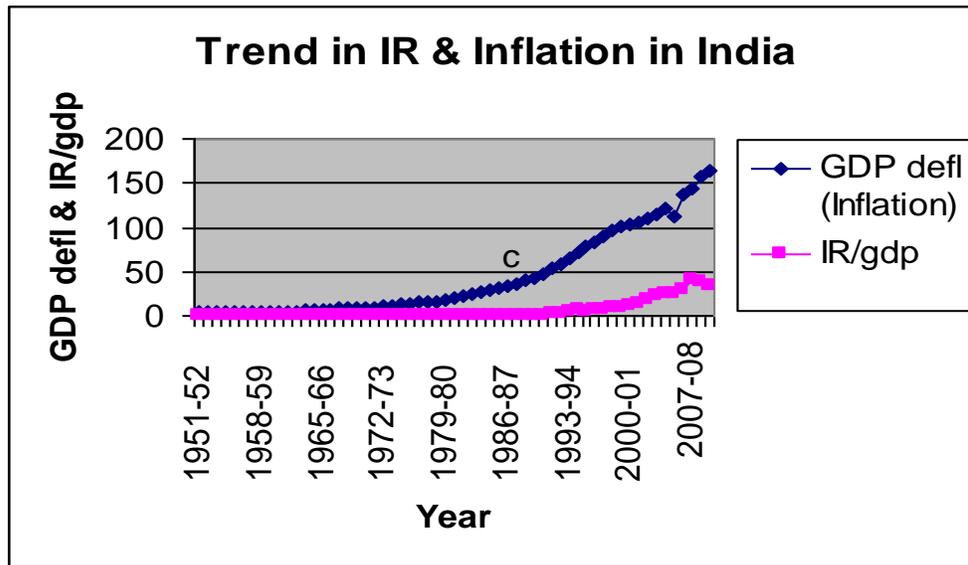
Further to capture the impact of the full fledged liberalization of our external sector (i.e. trade and financial sector liberalizations) on economic growth we have formed all the indices by using the data set from the International Investment Position of IFS and run simple regression (OLS method) by treating GGDP as dependent variable and the FINOPEN,TRADEOPEN, NEXT and NFA as the independent variables. The results of the regression analysis are given in table- 5 below. It follows from the table that the variables TRADEOPEN, FINOPEN and NFA are statistically significant with positive signs. So we conclude that the financial openness, trade openness and the net foreign asset position have significant positive impact on the GDP growth of our economy during the post reform period. Therefore it is plausible to say that this result also supports the view that trade and financial integration have short run positive effect on the GDP growth of our economy since liberalisation. However, the computed CVs for all the series for the pre and post liberalization period (see appendix Table -5) also reveal that the degree of volatilities of the indices and the GDP growth has fallen during the post reform period. So we can say that the trade and the financial integration have reduced the instability of our economy.

Table-5

Regression Analysis

Indp. Var.		GDP_GR				
Dep.Var.						
	Const.	Coefficients	R-Squared	Adj R Sqd.	D-W Stat.	F-Stat.
FIN_OPN	-0.6487	0.1782	0.372139	0.293656	2.150737	4.741671
	(-0.1789)	**(2.1775)**				[0.061096]
NEXT	7.138487	0.002197	0.087165	-0.04324	1.585792	0.668414
	(9.39718)	**(0.817566)**				[0.440541]
NFA\gdp	11.89454	0.344716	0.638354	0.593148	2.909599	14.12106
	(8.9375)	**(3.7578)**				[0.005562]
TRADEOPEN	3.527571	14.09802	0.436529	0.398965	2.048741	11.62074
	(3.967)	**(3.40892)**				[0.003886]

( ) t-values

[ ] P-values

Source: Author's Computation From IFS Data

IV. Concluding Observation.

 In this paper we have tried to examine dynamics of the behavior of the external sector of Indian Economy and its impact on economic growth since 1950-51. We have made this analysis by using different sets of data series taken from monetary authorities' data of IFS and from data on International Investment position published in IFS by IMF and also from RBI. It is found that since liberalization the discrepancy in NFA, and the financial and equity integration of our economy have increased significantly. The econometric analysis (ADF and PP tests for stationarity of series) reveals that all the indices as well as the variables including the GDP growth are non-stationary at their levels but are stationary at their first differences. The co-integration analysis clearly establishes the long-run equilibrium relations i.e. causality between the GDP growth and trade

integration, financial integration, the NFA, NEXT .The vector error correction estimates also confirm the correction of short-run disturbances from long-term trend so that the explained and the explanatory variables move towards the long-run steady state path(i.e. convergent). This happens in the cases of relation between growth and financial integration, trade integration, NEXT and NFA. The similar result is also found from the co-integration analysis for other variables but the vector error correction estimates of the long-run causality between the domestic inflation and the financial openness reveals that the short run disturbances due to external shocks are not corrected and are divergent However in case of the relation between the inflation rate and the GDP growth although the co-integration analysis establishes a long-run causality, the vector error correction estimates reveal the divergence from long-run path due to short term disturbances which seems to be due to the domestic supply side constraint. But we find that the trade integration, the financial openness, the NFA and the net external position have no significant positive long run contribution towards the growth of our economy. However they have significant positive contribution to GDP growth in the short run especially during the post liberalization period. Further if we estimate the relation between Growth and the external Sector indices when the transaction in our capital account (KA) in the form of FA and FL is used as a proxy for constructing the indices of financial integration, NFA and NEXT then also we have almost same result in our econometric analysis excepting a few cases. Further the regression analysis for capturing impact of the full fledged liberalisation on growth reveal that the variables TRADEOPEN, FINOPEN and NFA are statistically significant with positive signs. So we can safely conclude that the financial openness, trade openness and the net foreign asset position have significant positive impact on the GDP growth of our economy during the period of globalisation. Further it is plausible to say that this result also supports the view that financial integration has short run positive effect on the GDP growth. However, the computed CVs for all the series for the pre and post liberalization period also reveal that the degree of volatilities of the indices and the GDP growth has fallen during the post reform period. So we can say that the trade and the financial integration have reduced the instability of our economy during the post liberalization period.

Therefore our results also corroborate the existing hypothesis in the literature that there is no long run positive relation between the GDP growth and the external sector openness especially the financial openness for the developing countries because of their inadequate robust financial and institutional development. Since in India the full fledged external sector liberalization has been introduced after 1991, the long run effect is likely to be small and even negative, but the short run positive contribution of the process of globalization towards the growth and stability of our economy is confirmed by our study.

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APPENDIX -1

Table 2(B)

Estimated Statistics of Cointegration Test for GDP Growth and Trade Integration

	Hypothesised number of cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.475026	36.69149	15.49471	0
	At most 1	0.034458	1.893541	3.841466	0.1688
Max. Eigen Value	None	0.475026	34.79795	14.2646	0
	At most 1	0.034458	1.893541	3.841466	0.1688

Source: Author's Computation from RBI and IFS Data

Table 2(C)

Estimated Statistics of Cointegration Test for GDP Growth and External Position

	Hypothesised number of cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.416651	44.27911	15.49471	0
	At most 1	0.222544	14.09678	3.841466	0.0002
Max. Eigen Value	None	0.416651	30.18232	14.2646	0.0001
	At most 1	0.222544	14.09678	3.841466	0.0002

Source: Author's Computation from RBI and IFS Data

Table 2(D)

Estimated Statistics of Cointegration Test for GDP Growth and NFA/gdp

	Hypothesised number of cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.457526	35.0304	15.49471	0
	At most 1	0.036417	2.0032	3.841466	0.157
Max. Eigen Value	None	0.457526	33.0272	14.2646	0
	At most 1	0.036417	2.0032	3.841466	0.157

Source: Author's Computation from RBI and IFS Data

Table 2(E)

Estimated Statistics of Cointegration Test for GDP Deflator and Financial Integration

	Hypothesised number of cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.247334	16.59546	15.49471	0.034
	At most 1	0.00699	0.399819	3.841466	0.5272
Max. Eigen Value	None	0.247334	16.19564	14.2646	0.0245
	At most 1	0.00699	0.399819	3.841466	0.5272

Source: Author's Computation from RBI and IFS Data

Table 2(F)

Estimated Statistics of Cointegration Test for GDP Deflator and GDP Growth

	Hypothesised number of cointegratrion equations	Eigen value	Statistic	5% Critical value	Prob.
Trace	None	0.491853	38.29519	15.49471	0
	At most 1	0.006835	0.384093	3.841466	0.5354
Max. Eigen Value	None	0.491853	37.9111	14.2646	0
	At most 1	0.006835	0.384093	3.841466	0.5354

Source: Author's Computation from RBI and IFS Data

APPENDIX -2

Table 3(A)

Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(GGDP)	Δ(LFINOPEN)
Indp. Var.			
ECM		-1.311862	0.002947
		-0.21605	-0.01431
		[-6.07200]	[0.20590]
Δ(GGDP(-1))		0.063841	-0.003361
		-0.13691	-0.00907
		[0.46631]	[-0.37062]
Δ(LFINOPEN(-1))		0.554086	0.445518
		-1.89943	-0.12582
		[0.29171]	[3.54092]
C		0.011421	0.012373
		-0.39129	-0.02592
		[0.02919]	[0.47736]
R-squared		0.61915	0.19567
Adj. R-squared		0.597178	0.149266
Sum sq. resids		443.4564	1.945815
S.E. equation		2.920275	0.193441
F-statistic		28.17895	4.216688
Log likelihood		-137.3995	14.61022
Akaike AIC		5.049982	-0.378936
Schwarz SC		5.19465	-0.234268

Figures in parentheses are t values.

Source: Author's Computation from RBI and IFS Data

Table 3(B)

Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(GGDP)	Δ(LTRADEOPEN)
Indp. Var.			
ECM		-1.475901	-0.008979
		-0.22158	-0.00832
		[-6.66080]	[-1.07927]
Δ(GGDP(-1))		0.158265	0.006763
		-0.1388	-0.00521
		[1.14022]	[1.29767]
Δ(LTRADEOPEN(-1))		-3.284152	0.235774
		-3.57909	-0.13438
		[-0.91759]	[1.75455]
C		0.304014	0.063973
		-0.4824	-0.01811
		[0.63020]	[3.53206]
R-squared		0.652145	0.093446
Adj. R-squared		0.631274	0.039053
Sum sq. resids		402.6163	0.567556
S.E. equation		2.837662	0.106542
F-statistic		31.24601	1.717973
Log likelihood		-130.8657	46.37313
Akaike AIC		4.995025	-1.569375
Schwarz SC		5.142357	-1.422043

Figures in parentheses are t values.

Source: Author's Computation from RBI and IFS Data

Table 3(C)

Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(GGDP)	Δ(NEXT)
Indp. Var.			
ECM		-0.558621	33.07649
		-0.18204	-8.07991
		[-3.06875]	[4.09367]
Δ(GGDP(-1))		-0.298113	-16.16011
		-0.13818	-6.13317
		[-2.15747]	[-2.63487]
Δ(NEXT(-1))		-0.005824	-0.114989
		-0.00321	-0.14256
		[-1.81319]	[-0.80661]
C		0.086588	6.618087
		-0.47295	-20.9925
		[0.18308]	[0.31526]
R-squared		0.441647	0.444876
Adj. R-squared		0.409434	0.412849
Sum sq. resids		650.1395	1280873
S.E. equation		3.535913	156.9464
F-statistic		13.71033	13.89089
Log likelihood		-148.1119	-360.5162
Akaike AIC		5.432569	13.01843
Schwarz SC		5.577237	13.1631

Figures in parentheses are t values.

Source: Author's Computation from RBI and IFS Data

Table 3(D)

Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(GGDP)	Δ(LFAGDPRATIO)
Indp. Var.			
ECM		-0.967629	0.077259
		-0.21281	-0.02194
		[-4.54695]	[3.52066]
Δ(GGDP(-1))		-0.100844	-0.0396
		-0.14458	-0.01491
		[-0.69751]	[-2.65612]
Δ(LFAGDPRATIO(-1))		-1.300231	0.475009
		-1.07144	-0.11049
		[-1.21354]	[4.29929]
C		0.087446	0.013747
		-0.44055	-0.04543
		[0.19849]	[0.30261]
R-squared		0.548584	0.396333
Adj. R-squared		0.521499	0.360113
Sum sq. resids		522.4808	5.55582
S.E. equation		3.232587	0.333341
F-statistic		20.25416	10.94238
Log likelihood		-137.902	-15.22096
Akaike AIC		5.255629	0.711887
Schwarz SC		5.402962	0.859219

Figures in parentheses are t values.

Source: Author's Computation from RBI and IFS Data

Table 3(E)
Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(LGDPD)	Δ(LFINOPEN)
Indp. Var.			
ECM		0.016339	0.067126
		-0.00699	-0.02587
		[2.33717]	[2.59500]
Δ(LGDPD(-1))		0.024668	0.09576
		-0.14474	-0.53555
		[0.17043]	[0.17881]
Δ(LFINOPEN(-1))		0.004178	0.398653
		-0.03124	-0.11559
		[0.13372]	[3.44874]
C		0.062297	0.004829
		-0.01109	-0.04104
		[5.61707]	[0.11769]
R-squared		0.136123	0.320722
Adj. R-squared		0.087224	0.282272
Sum sq. resids		0.120755	1.653219
S.E. equation		0.047733	0.176615
F-statistic		2.783766	8.341329
Log likelihood		94.59618	20.01983
Akaike AIC		-3.178813	-0.562099
Schwarz SC		-3.035441	-0.418727

Figures in parentheses are t values.

Source: Author's Computation from RBI and IFS Data

Table 3(F)

Estimated Coefficients of Vector Error Correction Model.

	Dep. Var.	Δ(LGDPD)	Δ(GGDP)
Indp. Var.			
ECM		0.007614	1.709586
		-0.00488	-0.28258
		[1.56057]	[6.04990]
Δ(LGDPD(-1))		0.091023	-2.716993
		-0.14492	-8.3929
		[0.62810]	[-0.32373]
Δ(GGDP(-1))		0.002251	0.11837
		-0.00246	-0.14221
		[0.91671]	[0.83238]
C		0.058569	0.190556
		-0.01137	-0.65846
		[5.15145]	[0.28940]
R-squared		0.083173	0.634694
Adj. R-squared		0.030279	0.613619
Sum sq. resids		0.126818	425.3577
S.E. equation		0.049384	2.860062
F-statistic		1.572457	30.11547
Log likelihood		91.06935	-136.2328
Akaike AIC		-3.10962	5.008313
Schwarz SC		-2.964952	5.152981

Figures in parentheses are t values.
Source: Author's Computation from RBI and IFS Data

APPENDIX -3

Table 4(B)
Estimated Coefficients of Vector Error Correction Model.

Dep. Var. Indp. Var.		Δ(GGDP)	Δ(LFINOPEN),2
ECM		-0.82595 [-4.03599]	0.008615 [2.93410]
Δ(GGDP(-1))		-0.16344 [-1.14743]	-0.004425 [-2.16529]
Δ(LFINOPEN(-1),2)		-34.8633 [-3.02527]	-0.223886 [-1.35414]
C		-0.05159 [-0.11461]	-0.000547 [-0.08472]
R-squared		0.496462	0.416686
Adj. R-squared		0.467412	0.383034
Sum sq. resids		586.3134	0.120683
S.E. equation		3.357865	0.048175
F-statistic		17.08975	12.38196
Log likelihood		-145.219	92.45776
Akaike AIC		5.329237	-3.159206
Schwarz SC		5.473905	-3.014538

Figures in parentheses are t values.
Source: Author's Computation from RBI and IFS Data

Table 4(C)
Estimated Coefficients of Vector Error Correction Model.

Dep. Var. Indp. Var.		Δ(GGDP)	Δ(NEP)
ECM		-0.465	97.16599
		[-2.55397]	[4.72552]
Δ(GGDP(-1))		-0.34583	-43.25033
		[-2.46058]	[-2.72479]
Δ(NEP(-1))		-0.00511	0.005756
		[-2.31932]	[0.02312]
C		-0.16359	32.44473
		[-0.33092]	[0.58114]
R-squared		0.412703	0.763749
Adj. R-squared		0.37882	0.750119
Sum sq. resids		683.8415	8721872
S.E. equation		3.626403	409.5465
F-statistic		12.1804	56.03482
Log likelihood		-149.527	-414.2284
Akaike AIC		5.483109	14.93673
Schwarz SC		5.627777	15.08139

 Figures in parentheses are t values.
Source: Author's Computation from RBI and IFS Data

Table 4(D)

**Estimated
Coefficients of Vector
Error Correction
Model**

Dep. Var. Indp. Var.		Δ(GGDP)	Δ(RNFA,2)
ECM		-0.03008	0.001382
		[-0.63088]	[8.65262]
Δ(GGDP(-1))		-0.57416	-0.000555
		-0.1125	-0.00038
		[-5.10339]	[-1.47206]
Δ(RNFA(-1),2)		-24.8772	0.79377
		[-0.39359]	[3.74940]
C		0.026914	0.001872
		[0.05178]	[1.07553]
R-squared		0.347146	0.802522
Adj. R-squared		0.309481	0.791129
Sum sq. resids		760.1752	0.008528
S.E. equation		3.823448	0.012807
F-statistic		9.216749	70.44021
Log likelihood		-152.49	166.6511
Akaike AIC		5.588931	-5.808967
Schwarz SC		5.733599	-5.664299

Figures in parentheses are t values.
Source: Author's Computation from RBI and IFS Data

Table 4(E)
Maximum Likelihood Estimation of Cointegrating Coefficients.

Dep. Var. Indp. Var.	ΔGGDP		
Δ(FINOPEN(-1))	-71.82382 [-5.53946]		
NEXT(-1)		-0.0171 [-7.54006]	
Δ(RNFA(-1))			-1878.629 [-9.41556]
C	-4.224762	-4.57904	-4.666513

Figures in parentheses are t values.
Source: Author's Computation from RBI and IFS Data

APPENDIX TABLE-5
Volatility (CV)of External Sector:

Period	CAB	KAB	ER	IR	TRADEOPEN	FINOPEN	NFA	GGDP
1950-51 to 1990-91	118	94.96	43.5	79	62.28	53.4	111.35	80.58
1990-91 to 2008-9	180	92.27	16.96	75.9	50.5	29.48	95.99	32.29

Source: Author's Computation.