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Authors

T.K. Jayaraman
Fiji National University
Email: tiru.jayarama@fnu.ac.fj

and

Chee-Keong Choong
University Tunku Abdul Rahman, Kampar, Perak, Malaysia
Email: choongck@utar.edu.my

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School of Economics, Banking and Finance,
Nasinu Campus, Nasinu, Fiji.

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by

T.K. Jayaraman*
Fiji National University
Email: tiru.jayarama@fnu.ac.fj

and

Chee-Keong Choong
University Tunku Abdul Rahman, Kampar, Perak, Malaysia
Email: choongck@utar.edu.my

Abstract

The article examines how growth fluctuations in major trading partner countries of the world have affected the Indian economy since its liberalization from the mid 1990s. This empirical study confirms that domestic output of India was strongly influenced by global shocks. The findings are not surprising as India's trade and financial integration with the rest of the world has been on the rise.

* Corresponding author.

1. Introduction

The financial and banking crises originating in the United States (US) in late 2007, which later spread to other advanced countries in Europe in the next two years, eventually affected developing countries as well in varying degrees. Consequently, the subject of macroeconomic interdependence of developing countries including India in a globalised world has been receiving wide attention. The paper seeks to investigate how far growth fluctuations in major countries of the world with which India has developed trade and financial relations since its economic liberalisation from the mid 1990s have been impacting the country.

This article, which employs a variable autoregression (VAR) modeling procedure for estimating the degree of impact of economic activities of selected major countries on India, is organised as follows: the next section provides a brief background by tracing the progress in India's trade and financial relations with the rest of the world; the third section outlines the methodology adopted and presents the empirical results; and the fourth and last section presents conclusions with policy implications.

2. Background

Economic growth in developed and developing countries, as reflected in the annual growth rates since the beginning of 2000 has been remarkable (Table 1). The devastating effects of the Asian financial crisis of 1997 were quickly overcome and the emerging economies led by China were marching towards growth and prosperity, which was well supported by rise in trade volumes and flow of funds between nations. Soon after the failure of some of the leading banking and financial institutions in the US and UK in 2007, the recessionary effects began to be felt across the continents commencing from early 2008 (Ram Mohan 2009).

However, there was some initial optimism, which was based on the 'decoupling' theory that emerging economies would be spared of the adverse impact of the crisis. It was argued that that even if the developed countries would experience a decline in economic activities as a fallout of the financial crisis, it would be a shallow crisis; and that emerging economies including India, because of their better financial regulations and control over financial sector institutions with much less exposure to the sub-prime mortgage assets of the failed institutions, and because of larger foreign exchange holdings as well, would be spared of the impact. Further, it was held that India's growth was mainly domestic demand driven and its exports were increasingly directed to other economies and there was declining reliance on US (Boorman 2009; Boorman et al. 2010).

There were strong reasons for such optimism. These were: (i) the American financial crisis was country specific, which was considered only a correction in the housing sector rather than due to generalised factor such as oil shock; (ii) trade linkages of emerging economies with the US were diminishing, but trade was rising among emerging markets; (iii) growth in emerging markets was more domestic demand driven; (iv) emerging economies were net savers, not borrowers; and (v) emerging economies had effected several economic reforms which introduced greater stability (Ram Mohan 2009, IMF 2007). However, as the crisis became one of severe slow-down rather than mild slow-down, due to asset price activation

and gradually declining financial flows to emerging markets, the "de-coupling" theory did not appear to hold water (Ram Mohan 2009).

Table 1. Growth Rates of the World and Selected Advanced and Developing Countries (Percent)

	1995-99 (Average)	2000-04 (Average)	2005	2006	2007	2008	2009	2010 (estimate)
World	3.5	3.5	4.4	4.9	4.8	2.5	-2.2	5.0
Adv.Economies	3.1	2.4	2.6	3.0	2.7	0.4	-3.3	3.0
Eurozone	NA	1.9	1.8	3.1	2.8	0.4	-4.1	-1.8
UK	3.3	2.8	2.2	2.9	2.6	0.5	-4.9	1.7
US	4.0	2.6	3.1	2.7	2.1	0.4	-2.6	2.8
Germany	1.7	1.1	0.9	3.4	2.6	1.0	-4.7	3.6
Singapore	6.1	5.0	7.6	8.7	8.2	1.4	-2.0	3.6
Japan	0.8	1.5	1.9	2.0	2.3	-1.2	-5.3	4.3
China	9.1	9.2	10.4	11.7	13.0	9.0	9.2	10.3
UAE	3.9	7.7	8.2	8.7	6.1	5.1	-2.6	2.4
Brazil	2.0	3.0	3.2	4.0	6.1	5.1	-0.2	7.5
India	6.5	6.0	9.5	9.7	9.2	6.7	7.4	9.7

Source: Author's calculations; ADB (2010), IMF (2010)

Observing that subsequent developments proved the optimistic expectations of mild slow-down were wrong, the Reserve Bank of India Governor Subbarao (2008) confirmed in a policy speech that there had been steady contractions with slumping demand, declining production and rise in unemployment in developed countries, which resulted in fall in trade and financial integration between developed and developing countries. Thus, the US financial crisis spread to the real sector not only in America but also in Europe and in emerging countries (Goldstein and Xie 2009). There have been events of capital flow reversals, sharp widening of spreads on sovereign and corporate debt and abrupt currency depreciations. Governor Subbarao (2008) confirmed that "in a globalized world no country can be an island". In a subsequent speech, Governor Subbarao (2009a) noted that transmission channels of severe impact on India were through trade, financial and confidence channels, making it clear that globalisation is a double edged sword.

India's trade relations

Over the last 50 years, world trade as a ratio of GDP more than doubled from 24 per cent in 1960 to 57 per cent in 2006, just before the financial crisis hit the world. Economic liberalization began in India in the mid 1990s as the country opened the economy to foreign and domestic competition in a number of directions. These included international trade, telecommunication and privatisation (Panagaria 2008) and progressive financial market integration from the late 1990s (Dua *et al.* 2004). India's integration into the world economy over the last decade has been remarkably rapid (Subbarao 2008, 2009b). Table 2, which shows the directions of trade over a two decade period, indicates that besides the steady trade with traditional partners, there were new partners of trade as well: China in Asia and countries in the Middle East and Southeast Asia.

Table 2. India's Trade in Commodities with Major Trading Partners: Shares of Total trade (in percent)

	1990-1999 (Average)	2000-2004 (Average)	2005	2006	2007	2008	2009
United States	12.3	12.4	10.6	10.0	10.0	8.7	9.3
UAE	3.9	4.2	5.3	6.3	6.9	8.9	8.4
China	1.2	4.1	6.9	8.0	9.0	8.7	9.0
Singapore	2.3	3.0	3.5	3.7	3.7	3.4	3.7
United Kingdom	1.0	1.3	2.1	2.0	1.8	1.7	1.2
Hong Kong, China	2.1	2.3	1.8	1.6	1.5	1.4	1.5
Germany	3.4	2.1	2.3	2.4	2.4	2.4	3.0
Netherlands	0.9	0.9	0.9	0.9	1.2	1.3	0.9
Belgium	0.5	1.4	1.2	1.1	1.0	1.0	0.8
Italy	2.7	8.8	6.9	6.2	5.2	4.5	4.9
Euro area	12.5	13.1	11.4	10.6	9.8	9.2	9.6

Source: Author's calculations; ADB (2010), IMF (2010)

Table 3. India's Trade, Capital and Financial Relations with Rest of the World

	1995-1999 (Ave.)	2000-2004 (Ave.)	2005	2006	2007	2008	2009
Exports (mill US$)	34,793	59,084	105,152	128,888	166,162	189,001	182,163
Imports (mill US$)	49,346	75,513	157,056	190,670	257,629	307,651	299,491
Total trade in Goods (mill US$)	84,139	134,597	262,208	319,558	423,792	496,653	481,654
Total trade in Goods/GDP (%)	20.5	23.9	31.2	33.8	35.4	38.8	37.4
Current Account Transfers (mill US$)	11,517	18,891	26,553	32,861	46,577	50,296	56,750
Current Account Transfers/GDP (%)	28.0	34.2	31.6	34.8	38.9	39.3	44.1
Capital Account Transactions /GDP	21.7	25.1	30.3	47.8	89.1	5.7	41.6
FDI (mill US$)	2,639	3,465	3,034	7,693	15,893	17,498	19,729
FDI/ GDP (%)	6.4	6.5	3.6	8.1	13.3	13.7	15.3
Port folio inv (mill US$)	2,201	4,745	12,494	7,060	27,433.197	140,030	32,396
Portfolio inv/GDP (%)	5.4	8.0	14.9	7.5	22.9	109.3	25.2
Services (mill US$)	26,240	54,529	110,819	144,038	175,442	186,849	186,823
Services and Incomes /GDP (%)	63.3	96.9	131.9	152.3	146.6	145.8	145.1
Total capital & Fin Transactions / GDP (%)	96.8	136.5	180.6	215.7	271.9	274.4	227.3

Source: Author's calculations; ADB (2010), IMF (2010)

Going by the common measure of globalisation, India's two-way trade (merchandise exports plus imports), as a proportion of GDP, grew from an average 21 percent during a five-year period (1995-99) to reach the maximum of 38 percent in 2008 (Table 3).

Globalisation of finance has been of much greater intensity. The ratio of total foreign assets and foreign liabilities to GDP rose from 45 per cent in 1970 to over 350 percent in 2006. Intensity of India's financial integration with the world has also been growing over the period. The ratio of total external transactions to GDP, which is an expanded measure denoting this ratio has more than doubled from average 97 percent during 1995-99 to 227 percent in 2008.

Remittances

The impact of globalisation on labour, which is reflected in the growing mobility of people over the last two decades, seeking jobs outside their countries of origin is more striking. Asia added nearly three billion to the world's pool of labour as it integrated with the rest of the world over the last two decades. As a result, inflows of remittances to all developing countries rose. India received the highest amount of remittances in absolute terms ($49.3 billion) in 2009, which is about 3.8 percent of GDP, ranking at world number four (Table 4).

Table 4. Top Ten Remittance Recipients of 2009

Country	Remittances	
	Percentage of GDP	US$ (billions)
Philippines	12.3	19.8
Bangladesh	11.8	10.5
Nigeria	5.8	9.6
India	3.8	49.3
Mexico	2.5	22.2
Belgium	2.2	10.4
China	1.0	47.6
Spain	0.7	9.9
France	0.6	15.6
Germany	0.3	10.9

Source: World Bank (2010)

Table 5 presents the trend in India's remittance inflows, which are of sizeable support to the country's foreign reserves. Thus, we have been witnessing a three dimensional expansion of globalisation: trade, finance and labour. With the rapid integration of India's economy with global economy, economic fluctuations in the major countries of the world, with which India has developed deeper trade and financial relations during the last two decades, are bound to affect India's national output. The next section deals with empirical aspects of investigation and to what extent growth fluctuations in the world affected India's growth, influencing the macroeconomic interdependence of global economy.

Table 5. India's Inward Remittances

Year	US $ (Billion)	Percent of GDP
1971-1980 (Average)	0.75	0.57
1981-1990 (Average)	2.46	1.02
1991-2000 (Average)	7.44	1.96
2001	14.27	2.99
2002	15.74	3.10
2003	21.00	3.50
2004	18.75	2.60
2005	22.13	2.64
2006	28.33	2.99
2007	37.22	3.02
2008	49.94	4.11
2009	49.26	3.76

Source: World Bank (2010).

3. Methodology, Modeling and Results

Nature of Shocks

Global macroeconomic interdependence is signified by transmission of shocks from one economy to another. These shocks, which affect aggregate supply and demand sides of a given economy, may be either internal or external. Domestic supply shocks are of two kinds: positive and negative. Positive domestic supply shocks, which boost supply, stem from policy reforms and institutional improvements aiming at better governance, thereby increasing productivity. On the other hand, negative supply shocks dent supply. The usual external negative shocks for economies in South Asia include a rise in oil price or fall in terms of trade. Domestic negative supply shocks arise from natural disasters, such as floods and cyclones or man-made disasters, including social unrest.

Demand shocks are also of two kinds. Positive ones are those stepping up aggregate demand, including the rise in private sector activities or fiscal stimulus during periods of depressed domestic demand. Negative demand shocks, which reduce aggregate demand usually emanate from fall in investor confidence that decreases capital formation. These shocks might originate either within a country or outside the country.

Our study seeking to investigate impacts of rising global interdependence on India, since its liberalization from the early nineties, adopts a vector autoregression (VAR) modeling methodology, which has been utilized by notable studies, including Kawai and Motonishi (2005) and Takagi (2008). The study specifically focuses on examining how shocks from one particular country to another are transmitted each quarter. However, the choice of period of study and of variables for econometric modeling to study the impact of shocks on India is dictated by the number of quarterly observations available. First, the national income data series for India on a quarterly basis are available only from 1996 onwards. Secondly, as the degrees of freedom for econometric analysis are affected by the limited number of observations as well as the number of lags employed, we have to restrict the number of

countries as well. While the US (being the largest economy) and the Eurozone (the third largest economic entity) automatically choose themselves as the candidate countries, we also choose UK for its historical importance to India as the traditional major trade and investment partner.

While USA, UK and Eurozone thus represent the West, Singapore represents ASEAN countries. For the middle-east region, we chose UAE. Thus, we have in all six countries including India. All countries except UAE have time series of quarterly real GDP, while UAE reports data only on annual basis. Hence, we are constrained to use cubic-spline procedure to generate quarterly data for UAE. As the quarterly RGDP data series for the Eurozone are compiled from 1999, which marks the birth of the single currency, the period of analysis has to be restricted to 1998Q4-2010Q1. The total number of quarterly observations is 46. All real output data series, which are expressed in respective local currency units, are first converted into index numbers, so as to eliminate the influences of exchange rate fluctuations and then transformed into respective logs before entering them into analysis.

The Model

The VAR model comprises six variables and the moving average representations are given below:

$$LUSA_t = \sum \alpha_{1i} LUSA_{t-j} + \sum \alpha_{2i} LUK_{t-j} + \sum \alpha_{3i} LEURO_{i,t-j} + \sum \alpha_{4i} LSGP_{i,t-j}$$
$$+ \sum \alpha_{5i} LUAE_{i,t-j} + \sum \alpha_{6i} LIND_{i,t-j} \tag{1}$$

$$LUK_t = \sum \beta_{1i} LUSA_{t-j} + \sum \beta_{2i} LUK_{t-j} + \sum \beta_{3i} LEURO_{i,t-j} + \sum \beta_{4i} LSGP_{i,t-j}$$
$$+ \sum \beta_{5i} LUAE_{i,t-j} + \sum \beta_{6i} LIND_{i,t-j} \tag{2}$$

$$LEURO_t = \sum \delta_{1i} LUSA_{t-j} + \sum \delta_{2i} LUK_{t-j} + \sum \delta_{3i} LEURO_{i,t-j} + \sum \delta_{4i} LLSGP_{i,t-j}$$
$$+ \sum \delta_{5i} LUAE_{i,t-j} + \sum \delta_{6i} LIND_{i,t-j} \tag{3}$$

$$LUAE_t = \sum \phi_{1i} LUSA_{t-j} + \sum \phi_{2i} LUK_{t-j} + \sum \phi_{3i} LEURO_{i,t-j} + \sum \phi_{4i} LSGP_{i,t-j}$$
$$+ \sum \phi_{5i} LUAE_{i,t-j} + \sum \phi_{6i} LIND_{i,t-j} \tag{4}$$

$$LSGP_t = \sum \gamma_{1i} LUSA_{t-j} + \sum \gamma_{2i} LUK_{t-j} + \sum \gamma_{3i} LEURO_{i,t-j} + \sum \gamma_{4i} LSGP_{i,t-j}$$
$$+ \sum \gamma_{5i} LUAE_{i,t-j} + \sum \gamma_{6i} LIND_{i,t-j} \tag{5}$$

$$LIND_t = \sum \eta_{1i} LUSA_{t-j} + \sum \eta_{2i} LUK_{t-j} + \sum \eta_{3i} LEURO_{i,t-j} + \sum \eta_{4i} LSGP_{i,t-j}$$
$$+ \sum \eta_{5i} LUAE_{i,t-j} + \sum \eta_{6i} LIND_{i,t-j} \tag{6}$$

Where;
USA = RGDP of USA;
EURO = RGDP of Eurozone;
UK = RGDP of United Kingdom
UAE = RGDP of UAE
SGP = RGDP of Singapore
IND = RGDP of India

As noted by Takagi (2008), the estimation of a VAR system is sensitive to the choice of particular strategy such as the ordering of the variables and lag length. We assume that initially, in the first round a shock to output of USA affects the outputs of UK, Eurozone, and India; a shock to USA's output affects the outputs of UK, Eurozone, Singapore, UAE, and India; a shock to the output of UK affects the outputs of Eurozone, Singapore, UAE, and India; a shock to the output of Singapore affects the outputs of UAE and India; and a shock to the output of UAE affects the output of India, whereas the output of India affects none. Accordingly, we enter the variables in that order, namely: *USA, UK, EURO, SGP, UAE* and *IND.* We employ the Akaike information criterion for determining the lag length.

Variance decomposition

We adopt the approach of variance decomposition, which determines how much of the total variance in India's output is explained by the variability in the outputs of USA, UK, Eurozone, Singapore and UAE. Specifically, it enables us to conclude about the proportion of changes in a variable resulting from its own shocks as well as shocks to other variables in the system (Enders 1995: 311). For instance, if shocks or innovations to outputs of USA, UK, Euro area, Singapore and UAE explain none of the forecast error variance of India at all periods in the time horizon, it would mean economic growth of India might have evolved independently of the global shocks.

4. Results and interpretations

Unit root tests

We used two testing procedures for examining the order of integration of each series, namely Augmented Dickey-Fuller (ADF) and Ng and Perron (2001) unit root tests. The results by both tests indicate that the time series are non-stationary in levels (Table 6). After first differencing, however, unit root tests reveal that the series are of I(1).

Table 6. Results of Unit Root Tests

Output Variable	ADF		Ng and Perron	
	Level	First Difference	Level	First Difference
EURO	-2.931	-3.948**	-11.131	-89.581**
IND	-1.968	-2.597*	-4.737	-10.361**
SIN	-2.730	-2.781*	-2.779	-8.563**
UAE	-1.622	-3.438**	-0.532	-7.573*
UK	0.658	-3.186**	-3.337	-11.339**
USA	-1.927	-3.189**	-14.615	-17.281**

Notes: The ADF critical values are based on Mckinnon. The optimal lag is chosen on the basis of Akaike Information Criterion (AIC). The null hypothesis for both ADF and Ng-Perron tests is a series has a unit root (non-stationary) while the null hypothesis of the KPSS test is it does not have unit root problem and it is stationary. The asterisk ** denotes the rejection of the null hypothesis at the 5% level of significance.

Cointegration analysis

Given the variables are all of I(1), the next stage is to examine for the presence of cointegration. In this analysis, we use the Johansen and Juselius (1990) procedure of examining the existence of cointegration. Results of the cointegration procedure, using an optimal lag structure for the VAR, are reported in Table 7 for these six countries. The maximum eigenvalue statistics suggest that there are two cointegrating vectors while the trace statistics show that there appear three cointegrating vectors for these countries. These results suggest that there is a common long-term trend which binds together all six countries.

Table 7. Cointegration Tests for Multiple Cointegrating Vectors

Null hypothesis	Alternative hypothesis	Trace Statistic	Critical Value	Maximum Eigenvalue Statistic	Critical Value
r=0	r>0	156.410**	95.754	57.256**	40.078
r≤1	r>1	99.154**	69.819	46.480**	33.877
r≤2	r>2	52.674**	47.856	22.907	27.584
r≤3	r>3	29.766	29.797	16.346	21.132
r≤4	r>4	13.421	15.495	12.333	14.265
r≤5	r>5	1.087	3.841	1.087	3.841

Notes:
** Significance at the 5% level.

Granger causality analysis

Having established the existence of a cointegrating relationship between all the six variables, we proceed to undertake a vector error correction modeling (VECM) in first differences for variance decomposition analysis. The VECM also enables us to conduct Granger causality tests for determining the short-and long- run temporal causality relationship between output of India and outputs of other economies. Results of the Granger causality tests for output of India are shown in Table 8. The error correction term (ECT), which is statistically significant in the equation with India's output as dependent variable re-confirms the existence of long run relationship between outputs of the six countries studied. The results thus show that fluctuations in economic performance in the rest of the world did affect India in the long run.

In the short run, the coefficient of Singapore output which is a proxy for ASEAN output is not statistically significant. However, the coefficients of all other countries are statistically significant indicating that fluctuations in the outputs of USA, UK, Eurozone and UAE did affect India's output in the short-run as well.

Table 8. Causality Results for India based on Vector Error Correction Model

Dependent Variable	F-statistics						ECT (t-stat)
	ΔUSA	ΔUK	ΔEURO	ΔUAE	ΔSIN	ΔIND	
ΔIND	18.511***	34.598***	2.350*	17.001***	2.155	-	- 0.740*** (-7.493)

* Significance at the 10% level.
*** Significance at the 1% level.

Variance decomposition analysis

Variance decomposition analysis is based on Cholesky factorization with the following ordering, namely: *USA, UK, EURO, UAE, SGP* and *IND,* as noted earlier. The analysis is done up to 10-year horizon.

India's output is affected by shocks to outputs of countries under study in the short run, except Singapore. For example, shocks to outputs of USA and UK explain about 30% of variability in India's output at the end of the first year, while output shocks of Eurozone and UAE explains about 10% of the total variation in India's output. Although both USA and UK are dominant economies in explaining the variability in India's output in the short-run, their effects are decreasing over the medium- and long-term. In contrast, both Eurozone and UAE are explaining a much higher proportion of variability in India's output in the medium- and long-terms. Variability in Singapore's output explains less than 10% of total variation in India's output for the whole time horizon.

Table 9. Results of Variance Decomposition Analysis for India

Period	S.E.	*USA*	*UK*	*EURO*	*UAE*	*SGP*	*IND*
1	0.012	29.520	32.008	11.527	10.587	7.125	9.231
2	0.023	21.952	30.233	13.456	23.845	5.014	5.500
3	0.037	16.561	36.289	12.780	28.936	3.159	2.276
4	0.047	14.303	36.763	15.025	30.142	2.378	1.389
5	0.055	13.560	35.107	18.143	29.940	2.119	1.131
6	0.062	14.081	31.765	20.844	30.104	2.071	1.134
7	0.070	14.622	27.210	24.032	31.047	2.171	0.917
8	0.079	14.436	22.228	27.382	32.459	2.148	1.347
9	0.090	13.269	17.331	30.638	32.374	1.844	4.545
10	0.104	11.451	12.997	33.606	30.439	1.448	10.059

5. Conclusions and Policy Recommendations

The article examined the impact of global economic fluctuations on India, whose trade and financial integration with rest of the world has been growing ever since Indian economy was liberalised with reforms in several sectors since the mid 1990s. Using the VAR methodology, the empirical study finds that in the long run shocks to the five countries chosen for investigation significantly impacted India's output. The results are not surprising given that

there is strong evidence India seems to be well integrated regionally and globally in both trade and finance with these countries.

The policy implication is that since there is every likelihood of the intensity of trade and financial integration growing stronger in the near future, it would be appropriate that India and its partners should strive towards achieving a high degree of synchronisation of their monetary and exchange rate policies, which would eventually minimise volatility in growth rates.

References

1. Asian Development Bank (2010): *Key Indicators of Developing Asia and Pacific* (Manila: Asian Development Bank).

2. Boorman, J. (2009): "The impact of financial crisis on Emerging Market Economies: The Transmission Mechanism, Policy Response and Lessons", Discussion Draft (Washington, D.C: Emerging Markets Forum).

3. Boorman, J., J. Fajgenbaum, M. Bhaskaran, H. Alberto and D. Arnold (2010): "The New Resilience of Emerging Market Countries: Weathering Recent Crisis in the Global Economy", *Paper presented at the Regional Forum on the Impact of Global Economic and Financial Crisis,* November (Manila: Asian Development Bank).

4. Dua, P., N. Raje and S. Sahoo (2004): "Interest Rate Modeling and Forecasting in India", *Working Paper,* Centre for Development Studies, Delhi School of Economics.

5. Enders, W. (1995): Applied *Econometric Time Series* (New York: John Wiley & Sons).

6. Goldstein, M. and D. Xiew (2009): "The Impact of Financial Crisis on Emerging Asia", Working Paper No.09-11, Washington, D.C.: Peterson Institute of International Economics.

7. International Monetary Fund (2007): *World Economic Outlook,* April.

8. International Monetary Fund (2010): *World Economic Outlook*, October.

9. Johansen, S. and K. Juselius (1990): "Maximum likelihood estimation and inference on cointegration with applications to money demand", *Oxford Bulletin of Economics and Statistics*, 52: 169-210.

10. Kawai, M. and T. Motonishi (2005): Macroeconomic Interdependence in East Asia: Empirical Evidence and Issues, *Asian Economic Cooperation and Integration* (Manila: Asian Development Bank).

11. Ng, S. and P. Perron (2001): "Lag Length Selection and the Construction of Unit Root Tests with Good Size and Power", *Econometrica*, 69: 1519-54.

12. Panagaria, A. (2008): *India: The Emerging Giant* (New York: Oxford University Press).

13. Ram Mohan, T.T (2009): "The Impact of the Crisis on the Indian Economy"*, Economic and Political Weekly*, XLIV (13), March 28, 2009, 107-14.

14. Subbarao, D. (2008): "The Global Financial Turmoil and Challenges for the Indian Economy", Speech delivered at the Bankers' Club, Kolkata, December 10, 2008.

15. Subbarao, D. (2009a): "Impact of the Global Financial Crisis on India: Collateral Damage and Response", *Speech delivered at* Tokyo, February 18, 2009.

16. Subbarao, D. (2009b): "Global Financial Crisis Questioning the Questions", *JRD Tata Memorial Lecture delivered at the Associated Chambers of Commerce and Industry of India,* New Delhi on July 31, 2009.

17. Takagi, S. (2008): "Managing Macroeconomic Interdependence", Chapter 5, *Emerging Asian Regionalism* (Manila: Asian Development Bank).

18. World Bank (2010): *World Development Indicators* (Washington D.C: World Bank).