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Economic Integration in the Indian Subcontinent
A study of Macroeconomic Interdependence

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ECONOMIC INTEGRATION IN THE INDIAN SUBCONTINENT
A STUDY OF MACROECONOMIC INTERDEPENDENCE

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Abstract

The South Asian Association of Regional Cooperation (SAARC) is now 25 years old. The charter, which was signed by Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka in 1985, has many similarities to the founding charters of similar regional associations signed elsewhere. While other regional associations have made substantial progress, the SAARC has yet to produce notable results. In the context of growing global economic interdependence, it is of interest to assess how far economic growth in each of the SAARC economies has influenced the growth in other member country in the region. Adopting a vector autoregression (VAR) methodology, this paper investigates macroeconomic interdependence in the South Asian region with a view to evaluating their readiness to forge ahead with their integration efforts. The paper concludes that both global and regional shocks have significantly impacted the SAARC countries, both in the short- and long-terms. Among SAARC countries, India exhibits a notable role in explaining the variation in the outputs of other member countries.

JEL classification: F15, O53

Keywords: Economic integration, SAARC, Indian Subcontinent, VAR methodology, macroeconomic interdependence

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1. Introduction

The South Asian regional organization, South Asian Association for Regional Cooperation (SAARC), which was formally launched by the seven nations[1] on December 8, 1985 is now 26 years old. Already a large body of popular articles and academic studies evaluating the performance of SAARC has started emerging[2]. Expectedly, these studies have compared and contrasted SAARC's achievements with those of the regional organizations elsewhere, including MERCOSUR[3] and NAFTA[4], which also completed 25 years of their existence in 2010. The performance evaluation studies measured their success in terms of indicators, which are used to evaluate the impact of trade liberalization and other integration policies. One of the indicators is the rise in the share of regional trade in the total trade of the member countries of the regional organization under scrutiny.

Another measure is the growth in the degree of macroeconomic interdependence of the member countries, which is considered as "real" or "de facto" integration (De Lombaerde and Van Langenhove 2005). Interdependence evolves not only from a rise in intraregional trade but also stems forth from "evolution of regionness", which emanates from various measures. These comprise institutional improvements, which are introduced in steps from time to time as well as from coordination mechanisms, including annual summits at the highest level and periodical meetings of committees of officials for monitoring the process of regional integration. According to Hettne (1999) and Hettne and Söderbaum (2000), regionness is a central concept in the new regionalism approach towards interdependence, which can be assessed on different dimensions, economic, political, cultural, security and infrastructural (De Lombaerde and Van Langenhove 2005).

There have been a substantial number of studies analyzing the patterns of regional trade in South Asia[5], both prior to the signing of the SAARC charter and subsequent period since 1985. However studies on macroeconomic interdependence of South Asian

[1] The original seven member nations of SAARC are Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. They were joined by Afghanistan in 2007.

[2] Notable contributions are Delinić (2011) and Akanda (2011).

[3] Mercosur or Mercosul (*Mercado Común del Sur)*, the Southern Common Market is an economic and political agreement among Argentina, Brazil, Paraguay and Uruguay. Mercosur origins trace back to 1985 when Argentina and Brazil signed the *Argentina-Brazil Integration and Economics Cooperation Program*

[4] The North American Free Trade Agreement or NAFTA is an agreement signed by the governments of Canada, Mexico, and the United States, creating a trilateral trade block in North America.

[5] The pre-SAARC studies are: Jayaraman (1978) and Bhuyan (1979). The leading post- SAARC studies include Panagariya (2003), Pitigala (2005), Baysan, Panagariya, and Pitigala (2006), Bhuyan (2008), Jain and Singh (2009), Raghuramapatruni (2010), Wadhwa (2010) and Jha (2011).

economies are limited in number[6]. The present study, which is an addition to the contributions on the subject, is different in approach adopted by the earlier ones. By adopting a vector autoregression (VAR) methodology and by undertaking variance decomposition (VDC) analysis, besides utilizing more recent data (1981-2010), we in this paper propose to investigate how fluctuations in the output of each of the SAARC countries[7] influenced the outputs of other countries in the regional group. The paper is organized on the following lines: the second section gives a brief review of SAARC initiatives for promoting regional cooperation and progress in different spheres of activities; the third section briefly reviews the findings of empirical studies undertaken so far; the fourth section outlines the methodology adopted for the study; the fifth section reports the results of the empirical study; and the sixth and final section presents a summary and conclusions.

2. A Background

The charter founding SAARC in 1985 was signed by seven nations, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The seven countries were joined by Afghanistan in 2007. The select key economic indicators of SAARC countries are given in Table 1. The Charter did not have a clearly defined provision for economic and trade cooperation. The only motivating force then was for restoring order and peace in the region after the birth of Bangladesh in 1971, after a confrontation between the two militarily powerful nations in the region. In fact, the initiative came from Bangladesh (Delinić 2011), as it proposed regional cooperation for promoting peace, stability, amity and progress in the region. Discussing the various aspects of SAARC, Desai (2010) notes that non-economic objectives[8] were the dominant reasons behind regional cooperation efforts in all the regions in the past, which were not uncommon in the initial years of formation of regional groups.

[6] The studies include Ranjan, Jain and Mukherji (2007), Maskay (2003), Jayanthakumaran and Lee (2006) Chowdhury (2004) and Saxena (2005).

[7] As data series for Afghanistan and Maldives on a consistent basis are not available, our study focuses only six countries.

[8] Desai (2010) lists the following objectives which influenced regional cooperation arrangements elsewhere: (i) countering common external threats to security (European integration: against the threat of spread and fear of the former Soviet Union and fear of totalitarianism); (ii) minimizing interstate conflicts and building stability and peace in the region (ASEAN: making peace with aggressive regional power Indonesia in the face of threat from Red China) ; and (iii) harvesting opportunities and managing issues in the region that require collaboration between two or more states (Europe and SAARC: cooperative arrangements for sharing river waters and other natural resources).

Table 1: SAARC Countries: Select Key Indicators

Countries	Land Area (Sq Km)	Population (Million)	GDP 2010 (US$ Million)	GDP per capita 2010 (US$)	Trade (% of GDP) 2009	Manufacturing 2009 (% of GDP)
Bangladesh	130,170	164.4	100,075.90	609	46.0	17.9
Bhutan	47,000	0.7	1,516.10	2,140	106.3	6.4
India	2,73,190	1,170.90	1,729,010.20	1,477	43.6	14.8
Maldives	300	0.3	1,479.80	4,714	161.3	6.8
Nepal	143,000	29.9	15,701.10	526	53.1	7.0
Pakistan	770,880	173.4	174,799.20	1,008	33.2	17.1
Sri Lanka	64,630	20.5	49,551.80	2,423	49.2	18.1

Source: World Bank (2011)

The objectives of promoting intra-regional and improving economic relations were not high on the agenda until 1993. The reasons were obvious as all the South Asian nations were all inward looking until the early 1990s, as they were committed to the goal of self-sufficiency through import substitution. Drawing a parallel between SAARC and Association of Southeast Asian Nations (ASEAN)[9], which was established in 1967, Panagaria (2003) observed that since political objectives were more dominant, progress in intra-regional trade was negligible during the first decade of their existence. Table 2 presents shares of regional trade in the total trade of the regional groups. In 1980 and 1990, ASEAN share was 15.9 percent and 17 per cent; and the corresponding figures for SAARC were 3.5 percent and 2.7 percent. Preoccupation with political objectives, such as regional stability and conflict resolution, rather than economic cooperation was identified as the chief reason for slow progress[10].

[9] The original ASEAN of 1967 comprised five nations, namely Indonesia, Malaysia, Philippines, Singapore and Thailand. With the addition of Brunei Darussalam in January 1984, ASEAN became ASEAN–6.

[10] In response to the criticism for not making much progress in intra-regional trade, the then Secretary General of ASEAN, Rodolfo Severino is reported by Desai (2010: 14) to have pointed out that the performance of a regional cooperation arrangement "should relate to its own characteristics and objectives and that ―we must first of all be clear about what ASEAN is and what it is not, what it can and what it cannot or was not meant to do…. The important thing is that ASEAN has to be measured against the purposes that it has set for itself and the limitations it has imposed on itself"

Table 2. Leading Regional Groupings: Intra- Regional Trade (share of intra regional trade in total trade of respective regional groups)

Regional Group	1970	1980	1990	1995	2000	2008
MERCOSUR	9.4	9.7	11	19.2	19.9	15.5
NAFTA	36	33.2	37.2	42	46.8	40
ASEAN	22.4	15.9	17	21	22.7	25.8
ASEAN+3	25.8	29	26.8	34.9	33.7	34
GCC	4.6	3.9	8.1	7.5	6.2	5.5
SAARC	3.2	3.5	2.7	4.3	4.5	4.8
EU 25	61	61.8	67.4	66.4	67.2	66.7
Euro zone	53.7	48.1	54.5	53.2	50.3	49.3
APEC	57.9	57.5	67.7	71.7	72.5	65.5

Source: Jain and Singh (2009)

The ASEAN, which came into existence in 1967, launched the ASEAN Preferential Trade Area ten years later in 1977. In the same way, ten years after its establishment in 1985, SAARC nations realized the importance of developing greater economic relations and began to embrace the idea of promoting regional trade with a view to paving the way for increased economic integration in the region. The SAARC Preferential Trading Arrangement (SAPTA), which was signed in 1993, formally entered into force in 1995 The SAPTA's objective was to reduce tariff and non-tariff barriers. Further, it was decided that a more favourable treatment be accorded to the regions least developed countries (LDCs), namely Bangladesh, Bhutan, Maldives and Nepal by the three non-LDCs, namely India, Pakistan and Sri Lanka.

Although four rounds of trade liberalisation negotiations were concluded under SAPTA, the agreement resulted only in a modest increase in regional trade[11](Akanda 2011, Ali and Talukder 2009, Bhuyan 2008, Jain and Singh 2009, Jha 2011, Ranjan, Jain and Mukherji 2007). During the ten years of SAPTA, intra-regional trade as share of overall trade rose from 4.1 percent in 1995 to 5.0 percent in 2005 (Akanda 2011). The reasons behind the modest increase were low product coverage, stringent rules of origin, product by product approach to tariff concessions, and denial of concessions to products of trade interest to each other (Panagaria 2003).

Critics were also unanimous in attributing the poor progress to "internal tension stemming from the lack of trust and security, Indo-Pakistani antagonism, and cross-

[11] Evaluating SAPTA's progress, Low (2004) noted that in the first round of SAPTA negotiations, 226 items (484 tariff lines at 6-digit level) were identified for tariff reductions ranging from 10 to 100 per cent. In the second SAPTA negotiation round, in 1996, 1,972 tariff lines were identified. The slow progress of SAPTA was due to unwillingness to effect reductions as per commitments and since only 1,972 tariff lines were reduced out of a total of 6,000 (Low 2004).

border terrorism and balance of payments and debt problems of the South Asian economies" (Low 2004: 4). Desai (2010) categorized them into three: trust deficit, trade deficit and institutional capacity deficit. In particular, LDCs, namely Bangladesh, Bhutan, Maldives and Nepal ran trade deficits with India, which is the dominant economy in the region.

Stung by the criticism that the biggest economy in SAARC was not fully forthcoming in its efforts to dismantle the trade barriers with SAARC members, India proposed at the ninth summit held in 2002 the formation of a SAARC Economic Community (SAEC) by 2020. As a transition to SAEC, it was also decided to usher in by 2020 a customs union by 2015. These suggestions paved the way for the South Asian Free Trade Area agreement (SAFTA), which was signed at the 2004 Summit. SAFTA entered into force on January 1, 2006. The member nations were committed to a step by step liberalization process by a ten year road map and were expected to lower the tariff at a maximum 5 percent. The LDCs were continued to be given the same facility of concessions as was given under SAPTA.

As of April 2011, SAFTA countries have cut on an average basis, the tariff rates on basic goods from 6.1 percent to 4.0 percent, on intermediate products from 25.0 percent to 9.5 percent and on finished products from 25.0 percent to 18.3 percent (Akanda 2011). However, the delicate part of concessions which is in regard to the freedom to maintain sensitive lists (SLs) of products, has yet to be satisfactorily handled. The SLs relate to goods, whose tariff protection would continue without any tariff cut. The SAFTA required the member countries to cut their sensitive lists by 20 percent[12].

The times series on intra-regional trade indicate that regional trade is not more than 5 percent of total trade of the member countries. Tables 3 and 4 present trends on intra-regional exports and imports. The share of SAFTA regional exports in its total exports has risen from 3.4 percent in 1990 to a maximum at 6.6 percent in 2008. In 2009, it declined to 5.7 percent. Bhutan and Nepal being landlocked countries have high share of regional exports at 97.0 percent and 71.0 percent respectively.

[12] The SL of Bangladesh includes 1,233 items for LDCs and 1,241 for non LDCS; India's SL has 480 items for LDCs and 868 for non LDCs; Nepal's SL has 1,257 items for LDCs and 1295 items for non

Table 3. Intraregional Exports as share of total exports (in percent)

	SAFTA	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	3.4	2.4	NA	3.2	NA	NA	4.0	3.8
1995	4.9	2.4	NA	5.5	22.6	NA	3.4	NA
1996	4.4	2.4	NA	5.2	18.5	NA	2.7	NA
1997	4.1	1.9	NA	4.7	16.1	NA	2.8	NA
1998	5.3	1.1	98.4	5.1	17.3	36.9	5.4	NA
1999	4.6	1.4	99.2	3.9	19.6	39.2	4.7	2.8
2000	4.4	1.5	NA	4.1	18.1	45.2	4.5	NA
2001	4.2	0.8	NA	4.8	19.7	NA	4.3	3.4
2002	4.5	1.2	NA	4.8	15.5	NA	4.6	5.4
2003	6.5	1.4	NA	6.5	13.9	53.8	6.3	7.1
2004	6.0	2.1	NA	6.0	10.5	47.2	7.2	9.1
2005	6.3	2.9	92.9	5.4	13.0	NA	11.2	10.5
2006	5.9	2.8	80.0	5.1	13.8	NA	10.4	8.9
2007	6.1	4.9	83.4	5.4	16.8	60.5	9.1	8.4
2008	6.6	NA	98.4	5.6	11.1	NA	12.1	6.9
2009	5.7	NA	97.0	4.2	NA	71.0	12.5	6.2

Source: UN ESCAP (2011)
NA= Not available

Share of intraregional imports of SAFTA in its total imports is very low at 2.7 percent in 2009 as against 2.1 percent in 1990. The share of India in 2001 is around one percent, whereas the shares of the two landlocked countries are high. Thanks to bilateral trade agreements with India, intraregional import trade shares of Bangladesh and Sri Lanka have been on the rise since 1990

Chandra and Kumar (2008) list the following the reasons responsible for poor growth in intraregional trade amongst SAARC nations: (i) the liberalization of trade under SAFTA has been much less ambitious than what the countries have been pursuing on their own under the WTO framework; (ii) although the agreement became effective from January 2006, LDCs were given a longer time frame to liberalize trade with the result that SAFTA would be fully operational only by 2016; (iii) services trade is totally omitted from SAFTA; (iv) SAFTA did not address the issues of non-tariff barriers among the countries of the region; and (v) restrictive rules of origin, continuance of large negative lists and limited number of products for tariff concessions have proved to be difficult hurdles. Furthermore, the continued denial of the most favoured nation (MFN) status to India by Pakistan, despite the MFN status bestowed earlier in 1996 by India on Pakistan has also limited the process of trade liberalization in the region[13].

LDCS. The consolidated SL of Afghanistan comprises 1,072 items, Bhutan 150 items, Maldives 681 items, Pakistan 1,169 items and Sri Lanka 1,042 items (Akanda 2011).

[13] Denial of MFN violates the WTO rules. Besides the MFN issue, non-tariff barriers (NTBs) imposed by Pakistan on imports from India has been another thorny issue. The reason behind the NTBs has been adverse balance of trade. Bilateral trade between India and Pakistan is heavily skewed in India`s favour. Of the total $1.5 billion in 2009, nearly $1.2 billion were Indian exports, making Pakistan`s trade deficit with

Sensing that scope for regional trade under SASRC arrangements due to continuing distrust between India and Pakistan would not be any more expanding, bilateral trade agreements (BTAs) and free trade agreements (FTAs) in the sub-continent have become the order of the day. India has now FTAs with Nepal (since 2007), Bhutan (since 2006) and Sri Lanka (since 1999). Bangladesh has a BTA with India since 2006 and Maldives since 1981.

Table 4. Intraregional Trade: Imports as Share of Total Imports (percent)

	SAFTA	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	2.1	9.5	NA	0.5	NA	NA	1.7	7.0
1995	2.9	15.5	NA	0.7	17.5	NA	1.6	NA
1996	3.4	19.5	NA	0.6	20.0	NA	2.4	NA
1997	3.5	21.1	NA	0.6	21.2	NA	2.2	NA
1998	4.1	16.3	67.1	1.2	21.7	31.1	2.7	NA
1999	3.4	NA	75.4	0.8	20.9	47.8	2.3	11.7
2000	3.2	9.6	NA	0.9	23.0	37.8	2.7	NA
2001	3.8	12.4	NA	1.2	24.0	NA	3.2	13.2
2002	3.7	14.9	NA	0.9	26.3	NA	2.3	15.5
2003	4.8	17.7	NA	0.9	24.3	53.6	2.7	18.1
2004	3.6	14.9	NA	0.9	21.3	NA	3.3	19.0
2005	3.1	12.3	76.6	1.0	17.4	NA	3.0	19.1
2006	3.2	13.1	70.0	0.8	15.8	NA	4.4	20.3
2007	3.3	14.8	74.2	0.8	18.8	NA	4.5	26.2
2008	2.2	NA	75.1	0.7	16.7	NA	4.6	22.4
2009	2.7	NA	79.7	0.6	NA	57.2	4.2	20.4

Source: UN ESCAP 2011
NA= Not avaialble

Aside from BTAs within the region, India and Bangladesh are looking to the east by developing closer relations with Thailand and Burma. Having missed the opportunity in the early years, South Asian countries have begun to build contacts with adjoining countries in East Asia for fostering sub-regional cooperation. These efforts were a result

India close to $900 million a year. Informal trade through third countries including Dubai and Singapore, is estimated to be between $2 billion and $2.5 billion. It is believed that trade between India and Pakistan would skyrocket upon the removal of trade barriers. The full potential of India-Pakistan trade is estimated at $14.3 billion with India exporting about $11 billion worth of goods and importing $3 billion. The denial of MFN status and continuance of NTB by Pakistan have been the subjects of debate in Pakistan proving time and again that "if it is India, decisions about trade are as much political as economic." (Aftab, 2011) . Although Pakistan was reluctant to grant MFN status to India, it increased the list of items in the positive list by including textile machinery and chemicals. The agreement between Pakistan and India on the conditions and price for importing Iranian natural gas has greatly improved the chances of the gas pipeline project worth US$ 7 billion. If the gas pipeline project between Iran, Pakistan and India comes through, it could take regional cooperation to a new level. In November 2011, there were conflicting reports on Pakistan conferring the MFN status to India. The announcement of MFN status was quickly denied on the ground that the ministerial decision needed a formal Cabinet approval before it could become effective.

of two policies: the 'Look West' policy of Thailand and ASEAN with the 'Look East' policy of India and South Asia. The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), formed in 1997 by Bangladesh, India, Sri Lanka, and Thailand, which were joined later by Bhutan, Myanmar and Nepal later, comprising today in all seven member nations is expected to come into force in 2012 for liberalizing trade and investment flows, besides tackling other areas including counter-terrorism and transnational crimes. As Delinić (2011) notes, observers see great potential in the BIMSTEC project, if only because, unlike SAARC, the organization includes Thailand and Myanmar but does not include the crisis-ridden countries of Pakistan and Afghanistan[14].

Despite various setbacks in terms of military and political conflicts in the Indian sub-continent, intraregional trade has grown in a modest way[15]. In 2007, India after assuming the chairmanship of SAARC took some forward looking steps. These included measures to provide free market access to imports from its LDC neighbours. Other steps were (i) commitment to reduce the Indian negative list; (ii) unilateral liberalization of visas; (iii) improving regional connectivity for imports; (iv) addressing issues relating to trade facilitation; (v) setting up a world class South Asian University; (vii) promoting South Asian textiles through textile exhibitions and SAARC fashion festival in Delhi and (vii) setting up a SAARC food bank to collectively meet the region's emergencies and shortages.

Further fresh initiatives by India in 2009 and 2010 have made Bangladesh, India, Nepal and Bhutan moving on the issue of transit regulations for goods and passenger transportation and on the use of deep-sea ports. Further, aside from the declared readiness on the part of India to provide greater market access for Bangladesh's textiles such as readymade garments, new initiatives similar to the 30-year Ganges Water Treaty in 1996 to share water of the Teesta[16] and other common rivers and greater border trade with the north-east and settling disputed patches of territory and other security-related matters on the long border that both countries share would bring in greater integration of the countries sharing common borders.

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[14] Mohan (2011) refers to this as a "highly innovative bit of strategizing that got over the sticky problem of including countries like Nepal while excluding Pakistan. BIMSTEC, thus, equaled SAARC minus Pakistan with Myanmar and Thailand thrown in for good measure"

[15] Delinić (2011) notes the contribution of SAARC in the following words: "SAARC has managed to create situations, institutions and forums where Heads of State have had to shake each others' hands and go into talks together. SAARC has tackled important topics for the region such as a social charter, development agreements and even the sensitive subject of fighting terrorism and has achieved some good results. The food and development banks are important steps in the right direction. Exchanges in the areas of civil society and science have become one of the pillars of South Asian integration efforts".

[16] The much awaited decision on the sharing of Teesta river water was postponed in the last minute during the Indian Prime Minister's state visit to Bangladesh in September 2011 in the face of protests from the Indian State of West Bengal, which is the adjacent to Bangladesh (BBC 2011).

With rise in intraregional trade, foreign direct investment flows have also increased. Drawing parallels to the East Asian experiences, where production networks were expanded through foreign direct investment (FDI) inflows by multinational enterprises, Lamberte (2005) refers to emergence of similar patterns in SAARC countries. Bilateral trade agreement between India and Nepal encouraged Indian enterprises to locate their production bases in Nepal, since intra-industry trade had been on the increase. Intra-industry trade examples are: (i) Bangladesh/India: manufacturing shirts, sacks and plastics; (ii) India/Bhutan: sweetened flavoured water, tubes and pipes; (iii) India/Maldives: air-conditioning machines and water pumps; (iii) India/ Nepal: manufacture of tooth paste, household and laundry soaps and detergents; and (iv) India/Sri Lanka: manufacture of printing paper; soap cutting and moulding machinery (Mukherji 2004).

These and other FDI inflows would lead to an eventual emergence of macroeconomic interdependency in the region. Growth in a given country would then influence economic growth trends in another country in the region, which is increasingly brought closer through rise in intraregional trade and regional FDI flows. Growing macroeconomic interdependence in a region over time would therefore determine the suitability of the economies concerned whether they could deepen their economic integration through the next logical steps of greater harmonizing measures including monetary integration. We now proceed to investigate the degree of macroeconomic interdependence in the SAARC region with a brief review of the limited number of studies on macroeconomic interdependence in the Indian subcontinent.

3. Review of Empirical Literature on macroeconomic interdependence

The number of notable empirical studies investigating macroeconomic interdependence of South Asian economies is not as large as the number of studies on trade aspects, including trade patterns and intraregional trade and bilateral and free trade agreements both within and outside the region. The empirical studies on macroeconomic aspects examined topics ranging from convergence of per capita incomes in the South Asian economies to assessment of optimum currency area criteria, fulfillment of which are required for the formation of a South Asian currency union. This section seeks to review these contributions.

In his study of three concepts of convergence, namely σ convergence, β convergence and conditional β convergence (β_c) in the seven South Asian countries during 1962-2000, Chowdhury (2004) came to the conclusion that that there was a clear absence of per capita income convergence, as there was a rising per capita income dispersion in the region. Chowdhury attributed the absence of income convergence to several reasons, one of them being weak trade links, which are considered a conduit for transmission of technology and resources[17].

[17] The other reasons include weak governance and prevalence corruption as well as absence of strong long term economic policies aiming at increasing years in average schooling of labour force; greater fiscal discipline; enhancing financial sector development and additions to public transport infrastructure.

In their study, Jayanthakumaran and Lee (2009) who looked at the increasing trend in trade relationships outside the region, especially with ASEAN countries and within the region in terms of free trade arrangements, were more optimistic. They were of the view that multilateralism and RTAs were complementary. The two author's detected breaks in the trend function of univariate trade per person time series data (proxy for trade and foreign investment) in 1992 and 2002, which coincided with India's attempt at multilateral trade liberalization, and more bilateral dealings inside and outside SAARC member countries respectively. The significant trend break in 2002 indicated that multilateralism had a greater impact on trade in the region, and such events tend to unite the SAARC countries in economic cooperation. However, the Granger causality tests conducted showed that causal relationship between trade and income inequality was not well established among the SAARC countries. The two authors concluded that benefits to the region were not shared mainly due to a lack of regional cooperation (Jayanthakumaran and Lee 2009).

Bandara and Yu (2003) argued that SAFTA would not benefit the region economically due to political conflicts. They felt that regional economic and political integration among the SAARC member countries was not sufficient to utilize the regional advantage of similar cultural values, low wages, low transaction and transport costs.

Saxena (2005) in her study investigated the feasibility of a currency union amongst SAARC countries. By applying the well known optimum currency area (OCA) criteria (Mundell 1961), she came to the conclusion that that all the seven countries were not ready to adopt a common currency. However, she indicated that that there were some encouraging attributes such as the existence of positive shocks for major economies like India, Pakistan and Sri Lanka. Providing a geo-political justification for greater more economic cooperation among the countries, she suggested areas where cooperation could be mutually beneficial to the economies in the Indian subcontinent. Noting that intra-regional trade in the past was small for most of the SAARC countries, except Bhutan, Nepal and Maldives and that there have been increases in trade for Bangladesh and Sri Lanka in the last decade, Saxena (2005) referred to the observations by Frankel and Rose (1996, 1997) that trade is an endogenous variable, and countries are more likely to satisfy the OCA criteria *ex-post*, than *ex-ante*.

Saxena's study (2005) confirmed a similar conclusion reached by an earlier study by Maskay (2003). By undertaking a quantitative analysis along the lines of Bayoumi and Mauro (2001) and Bayoumi and Ostry (1997), Maskay (2003) examined the patterns of shocks, which affected SAARC countries over a twenty one year (1980–2000). The empirical analysis suggested that the member countries were not suitable candidates for a currency union during the period surveyed, since they were prone to asymmetrical economic disturbances with large adjustment costs and exhibited low economic (i.e., trade and factor) integration. Maskay (2003) suggested that only deeper integration through trade and investment flows would lead to changes in the nature of shocks and

reduce the cost of monetary cooperation. The next section outlines the methodology of our study, which utilizes more recent data (1981-2010) on real GDP.

4. Methodology and Data

Nature of shocks

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 forth 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 macroeconomic interdependence in SAARC region during a 30-year year period (1981-2010) adopts a vector autoregression (VAR) modeling methodology, which assumes all the variables included are endogenous. The VAR methodology was utilized by notable studies on macroeconomic interdependence (Kawai and Motonishi 2005; and Takagi 2008). The study specifically focuses on examining how shocks from one particular country to another are transmitted each year. However, the choice of the period for econometric modeling to study the impact of shocks on SAARC is dictated by the number of annual observations available.

Since two member countries namely Afghanistan and Maldives do not have consistent time series of data on real GDP (RGDP), our study is confined only to six SAARC countries: Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The US (being the largest economy) chooses itself as a representative of global output. In addition, we choose the output of ASEAN, as the second variable for its growing importance outside the Indian subcontinent, since India, Bangladesh and Sri Lanka have developed greater trade and investment relations. Thus, we have in all eight outputs. Table 5 presents the index numbers of eight RGDPs. The total number of annual observations is 30. All output data series, which are expressed in respective local currency units, are converted into index numbers and then transformed into respective logs for entering them into analysis.

Table 5: Real GDP Index Numbers: USA, ASEAN and SAARC

	1981	1985	1990	1995	2000	2005	2006	2007	2008	2009	2010
Bangladesh	127.4	147.3	176.9	219.3	282.7	368.3	392.7	417.9	443.8	469.3	496.6
Bhutan	100.0	130.4	225.7	273.7	371.6	552.2	590.0	695.8	728.3	777.3	835.1
India	123.6	149.9	200.1	256.4	340.5	476.9	521.1	572.2	600.4	655.1	718.8
Nepal	121.6	142.6	178.3	229.6	290.1	342.8	354.3	366.4	388.8	405.9	424.4
Pakistan	145.8	187.4	248.4	311.4	365.6	466.5	495.3	523.4	531.8	551.1	575.1
Sri Lanka	136.6	164.5	194.8	253.4	323.9	393.5	423.7	452.5	479.4	496.4	536.1
ASEAN	160.0	179.1	247.8	349.6	408.9	518.6	550.9	589.3	615.0	623.6	676.2
USA	122.9	140.5	164.6	186.5	230.7	259.9	266.8	272.0	271.9	264.7	272.2

Source: IMF (2007)

The Model

The VAR model, which comprises eight variables, is given below:

$$LUSA_t = \sum \alpha_{1i} LUSA_{t-j} + \sum \alpha_{2i} LASEAN_{t-j} + \sum \alpha_{3i} LIND_{t-j} + \sum \alpha_{4i} LBGD_{t-j} + \sum \alpha_{5i} LBHU_{t-j} + \sum \alpha_{6i} LNEP_{t-j} + \sum \alpha_{7i} LPAK_{t-j} + \sum \alpha_{8i} LSL_{t-j} \quad (1)$$

$$LASEAN_t = \sum \beta_{1i} LUSA_{t-j} + \sum \beta_{2i} LASEAN_{t-j} + \sum \beta_{3i} LIND_{t-j} + \sum \beta_{4i} LBGD_{t-j} + \sum \beta_{5i} LBHU_{t-j} + \sum \beta_{6i} LNEP_{t-j} + \sum \beta_{7i} LPAK_{t-j} + \sum \beta_{8i} LSL_{t-j} \quad (2)$$

$$LIND_t = \sum \delta_{1i} LUSA_{t-j} + \sum \delta_{2i} LASEAN_{t-j} + \sum \delta_{3i} LIND_{t-j} + \sum \delta_{4i} LBGD_{t-j} + \sum \delta_{5i} LBHU_{t-j} + \sum \delta_{6i} LNEP_{t-j} + \sum \delta_{7i} LPAK_{t-j} + \sum \delta_{8i} LSL_{t-j} \quad (3)$$

$$LBGD_t = \sum \phi_{1i} LUSA_{t-j} + \sum \phi_{2i} LASEAN_{t-j} + \sum \phi_{3i} LIND_{t-j} + \sum \phi_{4i} LBGD_{t-j} + \sum \phi_{5i} LBHU_{t-j} + \sum \phi_{6i} LNEP_{t-j} + \sum \phi_{7i} LPAK_{t-j} + \sum \phi_{8i} LSL_{t-j} \quad (4)$$

$$LBHU_t = \sum \varphi_{1i} LUSA_{t-j} + \sum \varphi_{2i} LASEAN_{t-j} + \sum \varphi_{3i} LIND_{t-j} + \sum \varphi_{4i} LBGD_{t-j} + \sum \varphi_{5i} LBHU_{t-j} + \sum \varphi_{6i} LNEP_{t-j} + \sum \varphi_{7i} LPAK_{t-j} + \sum \varphi_{8i} LSL_{t-j} \quad (5)$$

$$LNEP_t = \sum \gamma_{1i} LUSA_{t-j} + \sum \gamma_{2i} LASEAN_{t-j} + \sum \gamma_{3i} LIND_{t-j} + \sum \gamma_{4i} LBGD_{t-j} + \sum \gamma_{5i} LBHU_{t-j} + \sum \gamma_{6i} LNEP_{t-j} + \sum \gamma_{7i} LPAK_{t-j} + \sum \gamma_{8i} LSL_{t-j} \quad (6)$$

$$LPAK_t = \sum \mu_{1i} LUSA_{t-j} + \sum \mu_{2i} LASEAN_{t-j} + \sum \mu_{3i} LIND_{t-j} + \sum \mu_{4i} LBGD_{t-j} + \sum \mu_{5i} LBHU_{t-j} + \sum \mu_{6i} LNEP_{t-j} + \sum \mu_{7i} LPAK_{t-j} + \sum \mu_{8i} LSL_{t-j} \quad (7)$$

$$LSL_t = \sum \rho_{1i} LUSA_{t-j} + \sum \rho_{2i} LASEAN_{t-j} + \sum \rho_{3i} LIND_{t-j} + \sum \rho_{4i} LBGD_{t-j} + \sum \rho_{5i} LBHU_{t-j} + \sum \rho_{6i} LNEP_{t-j} + \sum \rho_{7i} LPAK_{t-j} + \sum \rho_{8i} LSL_{t-j} \quad (8)$$

where
USA = RGDP of USA;
ASEAN = RGDP of ASEAN
BGD= RGDP of Bangladesh
BHU= RGDP of Bhutan
IND= RGDP of India
NEP = RGDP of Nepal
PAK =RGDP of Pakistan
SL = RGDP of Sri Lanka

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 a shock to *USA* affects *ASEAN;* shock to *ASEAN* affects *IND*, shock to *IND* affects *BGD*, shock to *BGD* affects *BHU*; shock to *BHU* affects *NEP*; shock to *NEP* affects *PAK*; and shock to *PAK* affects *SL*, whereas the output shock of SL affects none. Accordingly, we enter the variables in that order, namely: *USA, ASEAN, IND, BGD, BHU, NEP, PAK, and SL*. We employ the Akaike information criterion for determining the lag length.

Variance decomposition

Variance decomposition analysis determines how much of the total variance in each country's output is explained by the variability in the outputs of other countries. 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, ASEAN, and other SAARC countries 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, ASEAN and other SAARC members shocks.

5. Results and interpretations

Unit root tests

The paper used two unit root tests to examine the order of integration of each series, namely Augmented Dickey-Fuller (ADF) and Ng and Perron (2001) unit root tests. The results suggest that the time series are non-stationary in levels (Table 6). However, the time series are stationary at I(1).

Table 6: Results of Unit Root Tests (Sample Period: 1981-2010)

Output Variable	ADF		Ng and Perron	
	Level	First Difference	Level	First Difference
USA	-2.460	-4.169**	-4.693	-13.657**
ASEAN	-2.609	-4.437**	-12.149	-15.217**
IND	-0.796	-5.333**	-0.927	-15.867**
BGD	0.528	-4.301**	-1.011	-15.096**
BHU	-1.226	-5.902**	-1.640	-16.971**
NEP	-2.720	-7.327**	-8.120	-15.922**
PAK	-1.657	-4.152**	-3.019	-15.489**
SL	-1.181	-4.669**	-5.116	-16.175**

Note: The ADF critical value at 5% level is –2.9640 and –3.5629 for constant without trend and constant with trend regressions, respectively. These critical values are based on McKinnon. The optimal lag is selected on the basis of Akaike Information Criterion (AIC). The Ng and Perron critical value is based on Ng and Perron (2001) critical value and the optimal lag is selected based on Spectral GLS-detrended AR based on SIC. The null hypothesis of the test is: a series has a unit root. The asterisk * denotes the rejection of the null hypothesis at the 5% level of significance. The figures in brackets denote number of lags.

Given the variables are all of I(1), the next step is to investigate the presence of long-run relationship between outputs of these countries. The paper uses the Johansen and Juselius (1990) procedure of examining the existence of cointegration. Using an optimal lag structure for the VAR, the results of cointegration tests are reported in Table 7. The trace and maximum eigenvalue statistics suggest that there are six and five cointegrating vectors, respectively for these countries. These results suggest that there is a common long-term trend which binds all six SAARC countries together with USA and ASEAN 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	276.371**	159.530	88.355**	52.363
r≤1	r>1	188.016**	125.615	52.307**	46.231
r≤2	r>2	135.709**	95.754	38.942**	40.078
r≤3	r>3	96.767**	69.819	33.881**	33.877
r≤4	r>4	62.886**	47.856	28.984**	27.584
r≤5	r>5	33.903**	29.797	18.443	21.132
r≤6	r>6	15.460	15.495	14.174	14.265
r≤7	r>7	0.286	3.841	0.286	3.841

Notes:
** Significance at the 5% level.

Granger causality analysis

Having established the existence of a cointegrating relationship between all the eight countries, we proceed to undertake a vector error correction modeling (VECM) in first differences[18]. The technique is aimed to examine the short-and long- run temporal causality relationship between output of a given SAARC member country and other outputs of other economies. The results of the Granger causality tests are exhibited in Table 8. It is found that the error correction terms are statistically significant in all 6 SAARC countries, except for USA and ASEAN equations.

In the short-run, it is of interest to note that outputs of all six SAARC countries are significantly Granger caused by both shocks to USA and ASEAN. Further, the fluctuation in India's output Granger causes fluctuations in outputs of Bangladesh, Nepal, Pakistan and Sri Lanka (except Bhutan). This suggests that India has been playing a pivotal role in influencing the output levels in the region despite slow growth in intraregional trade within SAARC. The causality relationships among these countries are summarized in Figure 1.

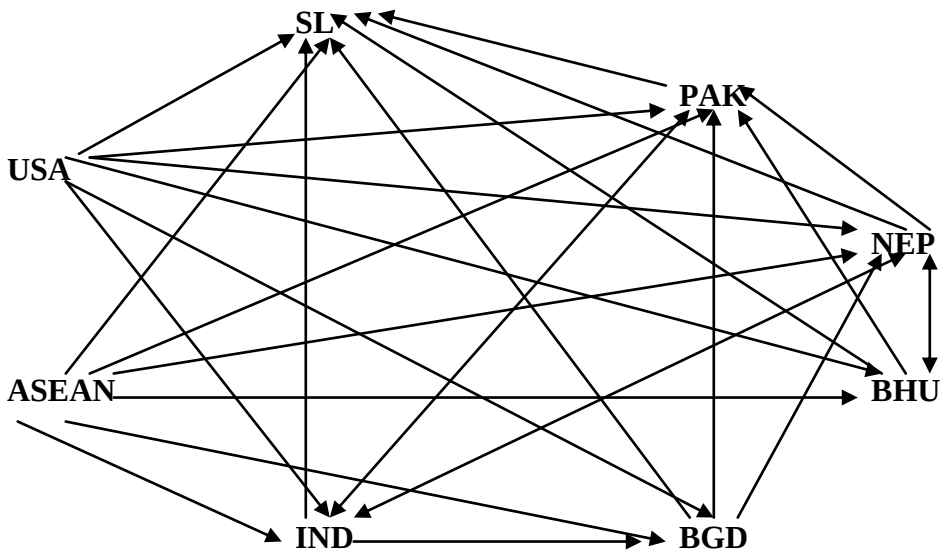
[18] We are grateful to Professor Koop for his advice (personal correspondence)

Table 8. Causality Results based on Vector Error Correction Model

	F-statistics								ECT (t-stat)
	ΔUSA	**ΔASEAN**	**ΔIND**	**ΔBGD**	**ΔBHU**	**ΔNEP**	**ΔPAK**	**ΔSL**	
ΔUSA	-	0.694	1.180	0.238	0.277	1.235	0.224	0.246	-0.1135 (-0.306)
ΔASEAN	1.863	-	0.422	1.068	1.134	1.864	1.505	0.906	-0.0094 (-0.056)
ΔIND	4.619***	3.853**		0.656	1.863	2.611**	5.102***	1.633	-0.6138*** (-3.121)
ΔBGD	2.481**	2.716**	2.161*	-	7.656	0.974	0.002	0.705	-0.1376* (-2.072)
ΔBHU	7.557***	2.060*	1.438	1.307	-	5.582***	0.590	0.842	-0.7908*** (-3.571)
ΔNEP	14.294***	3.577*	3.289*	3.534*	6.053***	-	0.003	1.277	-0.8756*** (-3.305)
ΔPAK	8.142***	10.713***	33.080***	5.757***	8.525***	3.845**	-	2.374	-0.2224*** (-5.070)
ΔSL	15.124***	10.616***	15.2592***	4.771**	10.45346***	6.543***	11.171***	-	-0.8762*** (-4.748)

* Significance at the 10% level.
** Significance at the 5% level.
*** Significance at the 1% level.

Figure 1: USA, ASEAN and SAARC-6 Direction of Granger Causal Relations



Notes: The notation applied in this figure followed: IND: India; BGD: Bangladesh; BHU: Bhutan; NEP: Nepal; PAK: Pakistan; and SL: Sri Lanka. X→Y indicates changes in X Granger cause changes in Y while X↔Y indicates a bi-directional causality between X and Y. .

Variance Decomposition Analysis

Since all variables are stationary in their first differences, our study proceeds to employ the methodology of orthogonalized forecast error variance decomposition in first differenced form[19], which is based on Choleski factorization with particular ordering, namely: global output, ASEAN output, and domestic output. Since our study focuses on SAARC countries, results of variance decomposition for a ten-year-ahead period with forecast errors are presented for India, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka in Tables 9-14. Table 15 presents the correlation coefficients matrix of the residuals. The magnitudes of the correlation coefficients are low and hence the ordering of the variables in the analysis is not of any major concern.

Variance decomposition results show that outputs for all SAARC economies are mainly explained by shocks to their own national outputs, especially in the short- and medium terms. The variation of country-specific shock for these SAARC is ranging around 42 percent (Sri Lanka) to 81.7 percent (India) in the short-term (1st year) and around 8.0 percent (Bangladesh) to 41.3 percent (India) in the long-term (10th year). The decreasing role of country-specific shock in explaining the variation in all SAARC countries is accompanied by the increasing influence of global shock in these economies in the medium and long-terms. USA (global shock) explains the variability in the outputs of SAARC countries in the medium (mostly from 4th year) ranging from 8.0 percent

[19] We are grateful Professor Koop for his advice (personal correspondence)

(Pakistan and Sri Lanka); and in the long run from 20.0 percent (Nepal) to 49.0 percent (Bangladesh). All SAARC countries are greatly influenced by ASEAN countries for the first 3 years (generally more than 10 percent).

It is worth noting that in the short run (one year), India explained 11.0 percent of the variability in outputs of Bangladesh and Bhutan, 19.0 percent in the case of Nepal and 20.0 percent in the case of Sri Lanka. Pakistan's output variance was least affected by the variability in the output of India. In the long run by 10 years ahead, India's output shocks have had steady and considerable influence on SAARC countries outputs, except Pakistan. India's output variance explains 26.0 percent of variability in Nepal's output, followed by 20.0 percent in the case of Bangladesh and Sri Lanka and 18.0 percent in the case of Bhutan. The influence of India's output variance on Pakistan's output in the long run was the least, as it was in the short-run as well.

Table 9. Results of Variance Decomposition Analysis for India

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.026	1.303	17.018	81.679	0.000	0.000	0.000	0.000	0.000
2	0.038	1.192	16.077	74.230	6.534	0.865	0.324	0.563	0.215
3	0.050	9.089	15.781	65.192	5.650	2.535	1.102	0.422	0.229
4	0.065	18.267	7.470	64.300	3.852	4.754	0.935	0.249	0.173
5	0.079	23.901	7.454	58.440	2.857	6.252	0.654	0.180	0.263
6	0.094	28.867	7.489	53.483	2.132	7.060	0.535	0.147	0.288
7	0.109	32.897	7.573	49.260	1.611	7.741	0.458	0.123	0.337
8	0.125	35.901	7.702	46.017	1.252	8.229	0.385	0.110	0.403
9	0.139	38.279	7.826	43.424	1.002	8.572	0.333	0.105	0.459
10	0.154	40.207	7.940	41.294	0.823	8.833	0.296	0.102	0.506

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 10. Results of Variance Decomposition Analysis for Bangladesh

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.010	0.015	11.486	11.046	77.453	0.000	0.000	0.000	0.000
2	0.013	0.013	10.910	13.521	71.611	0.067	2.530	0.002	1.346
3	0.015	1.772	11.357	14.096	67.160	2.538	1.963	0.014	1.100
4	0.021	18.915	11.674	21.282	38.324	7.062	1.959	0.187	0.597
5	0.030	26.508	7.987	23.661	28.420	11.333	1.383	0.340	0.368
6	0.041	35.386	7.543	23.755	18.634	13.054	0.966	0.327	0.334
7	0.052	41.178	7.354	22.845	13.540	13.692	0.762	0.278	0.351
8	0.064	44.863	7.322	21.884	10.724	13.947	0.619	0.232	0.408
9	0.077	47.293	7.377	21.083	9.063	14.004	0.510	0.191	0.478
10	0.089	49.015	7.464	20.395	8.020	13.975	0.435	0.157	0.540

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 11. Results of Variance Decomposition Analysis for Bhutan

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.408	4.233	19.489	10.943	0.411	64.923	0.000	0.000	0.000
2	0.617	17.644	11.477	21.107	2.117	36.313	8.233	0.421	2.688
3	0.732	15.447	14.770	15.440	4.155	34.315	7.713	2.345	5.815
4	0.831	12.259	8.839	12.316	10.467	32.293	12.575	3.701	7.551
5	0.962	12.440	8.058	12.285	11.505	24.276	17.435	5.231	8.769
6	1.124	18.346	7.244	14.022	10.899	18.022	17.734	5.965	7.768
7	1.325	26.655	6.645	15.736	9.199	13.760	15.895	5.797	6.314
8	1.569	35.109	6.289	16.872	7.226	11.036	13.380	5.201	4.886
9	1.839	42.087	6.153	17.504	5.575	9.528	10.891	4.538	3.725
10	2.124	47.434	6.157	17.835	4.326	8.682	8.763	3.935	2.868

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 12. Results of Variance Decomposition Analysis for Nepal

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.023	0.661	9.599	19.058	0.390	0.558	69.734	0.000	0.000
2	0.031	4.626	14.717	23.012	0.838	5.017	51.011	0.034	0.746
3	0.038	14.972	12.768	20.554	0.553	5.892	44.652	0.102	0.507
4	0.045	16.523	7.652	20.720	4.038	5.405	45.175	0.073	0.414
5	0.052	16.853	7.504	22.161	3.234	6.977	42.842	0.093	0.336
6	0.058	17.121	7.411	23.332	3.147	7.928	40.664	0.079	0.318
7	0.063	17.822	7.341	24.008	2.449	8.587	39.447	0.068	0.278
8	0.069	18.742	7.296	24.718	1.555	9.246	38.115	0.061	0.266
9	0.074	19.624	7.276	25.332	0.775	9.851	36.815	0.055	0.273
10	0.079	20.518	7.265	25.792	0.035	10.330	35.733	0.049	0.277

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 13. Results of Variance Decomposition Analysis for Pakistan

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.019	4.676	23.693	7.864	4.411	7.455	2.985	48.915	0.000
2	0.029	4.373	13.870	7.955	2.749	6.775	1.788	61.343	1.147
3	0.038	4.624	11.039	5.418	4.189	6.739	1.291	64.952	1.749
4	0.047	6.546	8.820	5.114	5.425	5.488	0.868	65.329	2.409
5	0.057	11.392	8.623	6.879	5.328	4.307	0.726	60.227	2.519
6	0.067	17.057	7.831	8.812	4.889	4.134	0.598	54.462	2.217
7	0.079	22.949	6.928	10.268	4.250	4.434	0.520	48.768	1.883
8	0.090	28.527	6.071	11.355	3.590	4.901	0.468	43.528	1.560
9	0.102	33.397	5.338	12.144	3.005	5.407	0.420	39.010	1.281
10	0.114	37.518	4.747	12.684	2.523	5.875	0.378	35.219	1.056

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 14. Results of Variance Decomposition Analysis for Sri Lanka

Period	S.E.	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
1	0.018	7.141	11.459	20.118	2.107	4.939	9.533	2.627	42.076
2	0.029	7.566	12.737	25.439	2.815	1.377	12.342	1.093	36.630
3	0.036	7.236	12.664	29.558	3.110	1.268	10.329	0.725	35.109
4	0.043	8.936	12.490	29.386	3.652	2.981	8.216	0.704	33.634
5	0.050	11.415	8.750	27.649	4.022	4.120	10.975	1.113	31.956
6	0.057	14.079	8.924	26.105	4.226	4.990	9.918	1.438	30.320
7	0.065	16.974	9.018	24.486	4.460	5.667	8.915	1.806	28.674
8	0.072	19.565	9.124	22.947	4.623	6.180	8.140	2.166	27.255
9	0.080	21.801	9.215	21.654	4.743	6.542	7.526	2.475	26.044
10	0.087	23.767	9.279	20.554	4.843	6.809	7.010	2.741	24.998

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

Table 15. Correlation Matrix of the Reduced Form of the VAR Residuals

	USA	ASEAN	IND	BGD	BHU	NEP	PAK	SL
USA	1.000	0.013	-0.114	-0.012	-0.206	-0.081	0.129	0.107
ASEAN	0.013	1.000	0.141	-0.122	-0.383	-0.063	0.244	0.274
IND	-0.114	0.141	1.000	-0.258	0.295	-0.073	0.498	-0.133
BGD	-0.012	-0.122	-0.258	1.000	0.029	-0.271	0.051	0.145
BHU	-0.206	-0.383	0.295	0.029	1.000	0.361	-0.201	0.106
NEP	-0.081	-0.063	-0.073	-0.271	0.361	1.000	-0.117	-0.221
PAK	0.129	0.244	0.498	0.051	-0.201	-0.117	1.000	0.189
SL	0.107	0.274	-0.133	0.145	0.106	-0.221	0.189	1.000

Cholesky Ordering: USA ASEAN IND BGD BHU NEP PAK SL

5. Summary and Conclusions

Using VAR procedure and employing variance decomposition analysis, we examined how far the economies in the Indian sub-continent are dependent on each other by focusing on three different shocks, namely the global represented by the output of USA and shocks to the output of the immediate neighbouring region, ASEAN with which the SAARC countries are building a Pan Asian trade and investment relationships through BISTEMEC and country-specific shocks. Using cointegration and Granger causality tests, the study findings show despite slow progress in the deepening of interregional trade within the region, the SAARC countries are indeed interdependent. To a great extent, bilateral trade agreements in SAARC region, including the India-Sri Lanka FTA, have been promoting greater intra-regional trade and investment flows than before contributing to emergence of macroeconomic interdependence in the region

The study findings reveal that as a major player, India has been influencing economic growth in the region, as its output variability has been affecting outputs in other member

countries. If SAFTA has to become successful and to emerge as a meaningful regional bloc like ASEAN, some asymmetric initiatives, bold and decisive, by India, are called for. Experiences have now shown regionalism, if purely dependent on agreements and summit talks, cannot take hold unless it is market driven. Market forces can work only if the biggest gainer from trade and investment relationships shows some readiness to part with portion of the gains experienced by way of trade surpluses. Regionalization by way of unilateral liberalization by India as a major partner, either in measured steps or all in a single go, would be most appropriate. Once India gives a green signal, other measures, as noted important by Baysan, Panagariya and Pitigala (2006) would be easier to promote in a collective way with much support from other members of the region have to follow once India has taken the initiative. These include (i) trade facilitation; (ii) harmonization of standards and policies; (iii) trade in services and (v) infrastructure cooperation.

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