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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) marked its Silver Jubilee in 2010. The SAARC's 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, 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 growth in other member countries. Adopting a vector autoregression (VAR) methodology, this paper investigates macroeconomic interdependence in the South Asian region with a view to evaluating its readiness to forge ahead with its integration efforts. The findings of the study reveal that India has been influencing economic growth in the region, as its output variability has been affecting outputs in other member countries. If SAARC has to become successful as a regional bloc, India as the biggest gainer from trade and investment relationships should take some bold steps, which would represent some readiness to part with some of the gains derived by way of trade surpluses.

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Key Words: Economic Integration, SAARC, Indian Subcontinent, VAR Methodology, Macroeconomic Interdependence

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I. Introduction

The South Asian regional organization, the South Asian Association for Regional Cooperation (SAARC), which was formally launched by seven nations[1] on December 8, 1985, turned twenty-five in 2010. With a combined population of 1.5 billion living on 3.8 percent of the total land area of the world, SAARC constitutes about 22 percent of the world's population. The SAARC's shares of world gross national product (GNP) and purchasing power are very small, around 2 percent and 7 percent, respectively, with the result it is home to 40 percent of the world's poor.

The proportion of world trade that SAARC accounts for is low. SAARC accounted for 1.4 percent and 2.3 percent of world exports and imports, respectively, in 2008~2010 as against the share of the European Union in world exports and imports being around 44.4 percent and 44.7 percent. Another regional trade group, ASEAN[2], accounts for 4.2 percent of exports and 4.5 percent of imports.

Intra-regional trade of SAARC is insignificant at around 5 percent of total trade as compared to intra-regional trade in other regional groupings: 62.4 percent in the European Union, 55.2 percent in NAFTA[3], and 35.3 percent in ASEAN. The reasons for slow growth in intra-regional trade are obvious. Deep rooted mistrust and the continued existence of contentious issues, especially between India and Pakistan have to be removed and resolved, if SAARC is to become effective.

Though SAARC has yet to emerge as a significant trade group, progress towards integration arrangements has helped to record increases in foreign direct investment (FDI) inflows in recent years, since an assured regional market for manufactured goods with tariffs being lowered over a period of years has attracted investors. SAARC's share of developing countries' total FDI inflows has risen from 1.6 percent in 1990 to 7.9 percent in 2008.

Marking the Silver Jubilee of SAARC in 2010, a large body of popular articles and academic studies evaluating the performance of SAARC has been published since 2011[4]. Expectedly, these studies have compared and contrasted SAARC's achievements with those of regional organizations elsewhere, including MERCOSUR[5] and NAFTA, which also turned

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

[2] The original ASEAN of 1967 comprised five nations, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei joined in 1984, followed by Vietnam in 1995, Laos and Burma in 1997, and Cambodia in 1999. Thus, as of June 2012, there are ten member countries of ASEAN. Hereafter ASEAN represents ten member countries, which are in alphabetical order: Burma, Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam

[3] 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.

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

[5] Mercosur or Mercosul (*Mercado Común del Sur*), the Southern Common Market is an economic and political agreement among

25 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 these 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 member countries, which is considered "real" or "de facto" integration (De Lombaerde and Van Langenhove (2005)). Interdependence evolves not only from a rise in the quantum of intra-regional trade but also stems from the "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[6], both prior to the signing of the SAARC charter and subsequent period since 1985. However studies on the macroeconomic interdependence of South Asian economies are limited in number[7]. The present study, which is an addition to the contributions on the subject, is different from the approach adopted by 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[8] influenced the outputs of other countries in the regional group. This 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 the 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.

Argentina, Brazil, Paraguay, and Uruguay. Mercosur's origins can be traced back to 1985 when Argentina and Brazil signed the Argentina-Brazil Integration and Economics Cooperation Program.

[6] These 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).

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

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

II. Background

The charter founding SAARC in 1985 was signed by seven nations: Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. The seven countries were joined by Afghanistan in 2007. Selected key economic indicators of the 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 at the time was the desire to restore peace and order in the region after the birth of Bangladesh in 1971, following a military conflict between India and Pakistan. 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[9] were the dominant factors behind regional cooperation efforts in all regions in the past, which is not uncommon in the initial years of the formation of regional groups.

Table 1. SAARC Countries: Selected 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 trade and improving economic relations in other ways were not high on the agenda until 1993. The reason for this is 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 the Association of Southeast Asian Nations (ASEAN), which was established in 1967, Panagaria (2003) observed that since political objectives were considered more important, progress in

[9] Desai (2010) lists the following objectives which influenced regional cooperation arrangements elsewhere: (i) countering common external threats to security (European integration: totalitarianism and the threat of the spread of Soviet dominance); (ii) minimizing interstate conflicts and building stability and peace in the region (ASEAN: making peace with aggressive regional power Indonesia in the face of the threat of 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 water and other natural resources).

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's share was 15.9 percent and 17 per cent, respectively; 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] [11] [12] [13].

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[11]	25.8	29	26.8	34.9	33.7	34
GCC[12]	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
EUROZONE	53.7	48.1	54.5	53.2	50.3	49.3
APEC[13]	57.9	57.5	67.7	71.7	72.5	65.5

(Source) Jain and Singh (2009)

The original five-member ASEAN, which came into existence in 1967, launched the ASEAN Preferential Trade Area only ten years later in 1977. In the same way, ten years after its establishment in 1985, SAARC nations realized the importance of developing greater

[10] In response to the criticism that it had not made much progress in intra-regional trade, the then Secretary General of ASEAN, Rodolfo Severino is reported 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" (Desai 2010: 14).

[11] ASEAN +3 represents ASEAN countries plus three more countries: Japan, South Korea, and China

[12] GCC stands for the Gulf Cooperation Council, which comprises six member countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates which was established in 1981 by an agreement between the six countries known as the GCC States. Following a customs union in 2003, the GCC common market was launched on January 1, 2008. The common market grants national treatment to all GCC firms and citizens in any other GCC country, and in doing so removes all barriers to cross-country investment and services trade.

[13] APEC, which stands for Asia Pacific Economic Cooperation, is the premier forum set up in 1989 for facilitating economic growth, cooperation, trade, and investment in the Asia-Pacific region. It has no treaty obligations and decisions made within APEC are reached by consensus and commitments are undertaken on a voluntary basis. APEC comprises 21 economies: Australia; Brunei Darussalam; Canada; Chile; the People's Republic of China; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; the Republic of the Philippines; the Russian Federation; Singapore; Chinese Taipei; Thailand; the United States of America; Vietnam. They account for about 40 percent of the world's population, 54 percent of world GDP, and 44 percent of world trade.

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) formally entered into force in 1995, after it was signed in 1993. 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 region's 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 in only a modest increase in regional trade[14] (Akanda 2011, Ali and Talukder 2009, Bhuyan 2008, Jain and Singh 2009, Jha 2011, Ranjan, Jain, and Mukherji 2007). During the first ten years of SAPTA, intra-regional trade as a share of overall trade rose from 4.1 percent in 1995 to 5.0 percent in 2005 (Akanda 2011). The modest increase was attributed to low product coverage, stringent rules of origin, the 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 this poor progress to "internal tension stemming from the lack of trust and security, Indo-Pakistani antagonism, and cross-border terrorism and balance of payments and debt problems of the South Asian economies" (Low 2004: 4). Desai (2010) labeled the reasons as three categories of deficits: trust deficit, trade deficit, and institutional capacity deficit.

As the four LDCS: namely Bangladesh, Bhutan, the Maldives, and Nepal ran trade deficits with India, the dominant economy in the region, there was a chorus of protests from the leaders in the region. Stung by the harsh criticism that the biggest economy in SAARC was not fully forthcoming in its efforts to dismantle 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 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 with a ten year road map and were expected to lower tariffs with the maximum kept at 5 percent. The LDCs continued to be given the same facility of concessions as was given them under SAPTA.

As of 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 regards the freedom to maintain sensitive lists (SLs) of products has

[14] Evaluating SAPTA's progress, Low (2004) noted that in the first round of SAPTA negotiations, 226 items (484 tariff lines at the 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 an 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). .

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[15].

The times series on intra-regional trade indicate that regional trade is not more than 5 percent of the 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 rose from 3.4 percent in 1990 to a maximum of 6.6 percent in 2008. In 2009, it declined to 5.7 percent. Bhutan and Nepal, being landlocked countries, had high shares of regional exports at 97.0 percent and 71.0 percent, respectively.

Table 3. Intra-Regional Exports as Share of Total Exports

(%)

	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)
(Note) NA: Not available

Share of intra-regional imports of SAFTA in its total imports was very low at 2.7 percent in 2009 as against 2.1 percent in 1990. India's share in 2001 was around 1.0 percent, whereas the shares of the two landlocked countries were high. Thanks to bilateral trade agreements with India, intra-regional import trade shares of Bangladesh and Sri Lanka have been on the rise

[15] 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 1,295 items for non-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).

since 1990.

Chandra and Kumar (2008) list the following the factors responsible for poor growth in intra-regional 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 on January 2006, LDCs were given concessions that lengthened the time-frame for liberalizing trade with the result that SAFTA will not be fully operational until 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 a limited number of products for tariff concessions have proved to be difficult hurdles. Furthermore, the continued denial of 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[16].

Sensing that scope for regional trade under SAARC arrangements would not be further expanded due to continuing distrust between India and Pakistan, 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 had a BTA with India since 2006 and the Maldives since 1981.

[16] This denial of MFN violates WTO rules. Besides the MFN issue, non-tariff barriers (NTBs) imposed by Pakistan on imports from India has been a thorny issue. The reason behind the NTBs has been an adverse balance of trade. Bilateral trade between India and Pakistan is heavily skewed in India`s favour. Of the total $1.5 billion of trade in 2009, nearly $1.2 billion were Indian exports, making Pakistan`s trade deficit with 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 $3 billion. The denial of MFN status and the continuance of NTB by Pakistan have been the subjects of debate in Pakistan proving time and again that "if it is India, decisions about trade are as much political as economic" (Aftab, 2011). Although Pakistan was reluctant to grant MFN status to India, it has lengthened the list of items in the positive list by including textile machinery and chemicals. The agreement between Pakistan and India on the conditions and price for importing Iranian natural gas has greatly improved the chances of the gas pipeline project worth US$ 7 billion. If the gas pipeline project between Iran, Pakistan, and India goes through, it could take regional cooperation to a new level. In November 2011, there were conflicting reports on Pakistan conferring the MFN status on India. The announcement of MFN status was quickly denied on the grounds that the ministerial decision needed formal Cabinet approval before it could become effective. In a major step forward in bilateral ties, according to newspaper reports in February 2012, Pakistan will give India MFN status by year-end.

Table 4. Intra-Regional Trade: Imports as Share of Total Imports

(%)

	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
(Note) NA: Not available

Aside from BTAs within the region, India and Bangladesh have been looking to the east by developing closer relations with Thailand and Myanmar. 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 are a result of two policies: the 'Look West' policy of Thailand and ASEAN and 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, joined later by Bhutan, Myanmar, and Nepal, 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[17].

Despite various setbacks in terms of military and political conflicts in the Indian sub-

[17] 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."

continent, intra-regional trade has grown in a modest way[18]. 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 a 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 allowed Bangladesh, India, Nepal, and Bhutan to make progress 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 such as the 30-year Ganges Water Treaty in 1996 to share water of the Teesta[19] and other common rivers and greater border trade in the north-east and settling disputed patches of territory and other security-related matters on the long border that the countries share would bring greater integration of neighbouring countries.

With the rise in intra-regional trade, foreign direct investment flows have also increased. Drawing parallels to East Asian experiences, where production networks were expanded through foreign direct investment (FDI) inflows by multinational enterprises, Lamberte (2005) refers to the emergence of similar patterns in SAARC countries. Bilateral trade agreements 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 are expected to lead to an eventual emergence of macroeconomic interdependency in the region. Growth in a given country would then influence economic growth trends in other countries in the region, which are increasingly brought closer through the rise of intra-regional trade and regional FDI flows. Growing macroeconomic interdependence in a region over time would therefore determine the suitability of the

[18] Delinić (2011) notes the contribution of SAARC with 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."

[19] The much awaited decision on the sharing of Teesta river water was postponed at 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 adjacent to Bangladesh (BBC 2011).

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.

III. Review of Empirical Literature

There are not many studies investigating the macroeconomic interdependence of South Asian economies unlike the large number of studies on trade aspects, including trade patterns, intra-regional trade, and bilateral and free trade agreements both within and outside the region. The empirical studies on macroeconomic aspects examined topics ranging from the 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 (βc) in the seven South Asian countries during 1962~2000, Chowdhury (2004) came to the conclusion that there was a clear absence of per capita income convergence, as there was 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 the transmission of technology and resources[20].

In their study, Jayanthakumaran and Lee (2009), who studied the rising trend in trade relationships by SAARC countries with ASEAN countries in terms of free trade arrangements, were more optimistic. They were of the view that multilateralism and regional trade agreements were complementary. The two authors concluded that benefits to the region were not shared mainly due to lack of regional cooperation. Another study by Bandara and Yu (2003) was of the view 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, and low transaction and transport costs.

Saxena (2005) investigated the feasibility of a currency union amongst SAARC countries. By applying well-known optimum currency area (OCA) criteria (Mundell 1961), she came to the conclusion that that all seven countries were not ready to adopt a common currency. However, she indicated that there were some encouraging attributes such as the existence of

[20] The other reasons include weak governance and prevalent corruption as well as the absence of strong long term economic policies aiming at increasing years of average schooling of the labour force, greater fiscal discipline, enhanced financial sector development, and additions to public transport infrastructure.

positive shocks for major economies like India, Pakistan, and Sri Lanka. Providing a geo-political justification for more economic cooperation among the countries, she suggested areas where cooperation could be mutually beneficial to the economies of the Indian subcontinent. Noting that intra-regional trade in the past was small for most of the SAARC countries, except Bhutan, Nepal, and the 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 that 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 the shocks that affected SAARC countries over a twenty-one year period (1980~2000). The empirical analysis suggested that during the period surveyed, the member countries were not suitable candidates for a currency union, 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.

IV. Methodology and Data

A. Nature of shocks

Macroeconomic interdependence is signified by the transmission of shocks from one economy to another. These shocks, which affect the 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 prices or a 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 a rise in private sector activity or fiscal stimulus during periods of depressed domestic demand. Negative demand shocks, which reduce aggregate demand, usually emanate from a fall in investor confidence that decreases capital formation. These shocks might

originate either within or outside a country.

Our study seeks to investigate macroeconomic interdependence in the SAARC region during a 30-year year period (1981~2010) and adopts a vector autoregression (VAR) modeling methodology, which assumes that all the variables included are endogenous. The VAR methodology has been utilized by notable studies on macroeconomic interdependence (Kawai and Motonishi 2005; and Takagi 2008). This study specifically focuses on examining how shocks are transmitted each year from one particular country to another. 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 the Maldives, do not have consistent time series of data on real GDP (RGDP), our study is confined to only six SAARC countries: Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. The United States of America (USA) (being the largest economy) is chosen as a representative of global output. In addition, we choose the output of ASEAN, as the second variable due to its growing importance outside the Indian subcontinent, since India, Bangladesh, and Sri Lanka have developed greater trade and investment relations with ASEAN. 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)

B. The Model

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

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

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

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

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

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

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

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

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

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 lag length.

C. Variance Decomposition

Variance decomposition analysis determines how much of the total variance in each country's output is explained by variability in the outputs of other countries. Specifically, it enables us to reach conclusions 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 the 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 that the economic growth of India might have evolved independently of global, ASEAN, and other SAARC members' shocks.

V. Results and Interpretations

A. Unit Root Tests

The paper uses 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**
India	-0.796	-5.333**	-0.927	-15.867**
Bangladesh	0.528	-4.301**	-1.011	-15.096**
Bhutan	-1.226	-5.902**	-1.640	-16.971**
Nepal	-2.720	-7.327**	-8.120	-15.922**
Pakistan	-1.657	-4.152**	-3.019	-15.489**
Sri Lanks	-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 asterisks (**) denote the rejection of the null hypothesis at the 5% level of significance.

Given that the variables are all of I(1), the next step is to investigate the presence of long-run relationships between outputs of these countries. This 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 the 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

(Note) ** Significance at the 5% level.

B. Granger Causality Analysis

Having established the existence of a cointegrating relationship between all eight countries, we proceed to undertake a vector error correction modeling (VECM) in first differences. The technique is aimed at examining the short-and long-run temporal causality relationships between the output of a given SAARC member country and the 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 the USA and ASEAN equations.

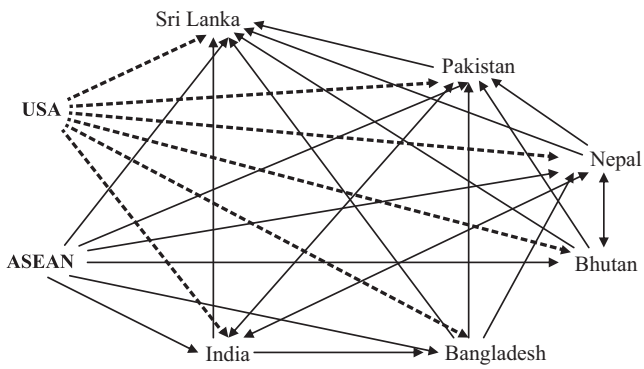
In the short-run, it is of interest to note that the outputs of all six SAARC countries are significantly Granger caused by shocks to the USA as well as shocks to ASEAN. Further, the fluctuation in India's output Granger causes fluctuations in the outputs of Bangladesh, Nepal, Pakistan, and Sri Lanka (but not Bhutan). This suggests that India has been playing a pivotal role in influencing output levels in the region, despite slow growth in intra-regional trade within SAARC. The causality relationships among these countries are summarized in Figure 1.

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)

(Note) * 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



(Note) X → Y indicates changes in X Granger cause changes in Y while X↔Y indicates a bi-directional causality between X and Y.

C. 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[21], 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 of 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 shocks range from around 42 percent (Sri Lanka) to 81.7 percent (India) in the short-term (1st year) and from around 8.0 percent (Bangladesh) to 41.3 percent (India) in the long-term (10th year). The decreasing role of country-specific shocks in explaining the variation in all SAARC countries is accompanied by the increasing influence of global shocks 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 (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 the 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 variability in the output of India. In the long run of ten years, India's output shocks have had a steady and considerable influence on other SAARC countries' outputs, except for Pakistan's. India's output variance explains 26.0 percent of the 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 observed to be the least, as it was in the short-run as well.

[21] We are grateful to Professor Gary Koop for his advice (personal correspondence).

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

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

(Note) Cholesky Ordering: USA ASEAN IND(India) BGD(Bangladesh) BHU(Bhutan) NEP(Nepal) PAK (Pakistan) SL(Sri Lanka)

VI. Summary and Conclusions

Utilizing the 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 the USA, shocks to the output of the immediate neighbouring region, namely ASEAN with which SAARC countries are building Pan Asian trade and investment relationships through BISTEMEC, and country-specific shocks. Using cointegration and Granger causality tests, the study findings show that despite slow progress in the deepening of intra-regional trade within the region, 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 the emergence of macroeconomic interdependence in the region.

This study's 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 is to become successful and emerge as a meaningful regional bloc like ASEAN, some bold and decisive asymmetric initiatives on the part of India are called for. Experiences from other regions have now shown that 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 light by taking the initiative, it would become easier to implement other required measures in a collective way, with much support from other members of the region (Baysan, Panagariya and Pitigala 2006). These include (i) trade facilitation; (ii) harmonization of standards and policies; (iii) trade in services and (iv) infrastructure cooperation.

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