Do south-south trade agreements enhance member countries' trade? evaluating implications for development potential in the context of SAARC

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Do South-South Trade Agreements Enhance Member Countries' Trade? Evaluating Implications for Development Potential in the Context of SAARC.

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"South –South Cooperation holds key to building upon the best of what our region has to offer. Let us leverage our strengths to create a more integrated and inclusive Asia pacific region-free from poverty, free from hunger" Dr. Noeleen Heyzer, UN Under Secretary General and Executive Secretary of ESCAP. [1]

I: Background

One of the most important developments in the post WTO scenario has been the phenomenal growth of *regional* trading agreements among different countries' blocs across the globe as complement to the multilateral trading system. At the advent of "new regionalism", different countries have formed the complex web of regional trading arrangements what Bhagwati and Panagariya (1999), Estevadeordal (2006) and others refer as the "Spaghetti Bowl" phenomenon of the international trading system. In Asian region itself, there have been 49 such regional trading blocs (*RTBs*) operating like "Spaghetti bowl", where every country is member of such blocs simultaneously. Among several others, East Asian economies have been emerging as most successful RTBs in Asia region after achieving strong economic interdependence, particularly through external liberalization, domestic structural reforms and market-driven integration with the global and regional economies. Intraregional trade, FDI and financial flows among these countries have created a "*naturally*" integrated economic zone (Kawai, 2005). Association for South-East Asian Nations (*ASEAN*) has also been emerging as strong, cohesive, and well-integrated regional trading bloc due to its proximity in demand and vertically-integrated production system across the members. In order to strengthen its regional economic cooperation, it has concluded many regional trading agreements among several countries of the region.

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[1] see http://www.unescap.org/unis/press/2009/aug/g58.asp

Recently, Plummer (2007) has argued that regional and bilateral trade agreements in Asia with the *exception* of a few in South Asia appear to minimize the 'spaghetti bowl effect' such as, via overlapping accords and inconsistency compared to other trade agreements initiated in other parts of the world. His conclusions are based on examination of the actual contents and operations of those agreements. One of his conclusions is that there can still be *ways to improve* the performance of trade agreements in Asia. It is, in this context, an attempt has been made to identify ways to improve trade agreements in Asia, particularly involving majority of South Asian countries. Unlike EU and NAFTA, regional trading arrangements in Asia in general and South Asia are not cohesive due to asymmetry in economic development among the member countries, which is more prominent among the South Asian countries. Though it has been trying through several institutional reforms to liberalize its economies and to augment regional cooperation on win-win basis, perennial political mistrust among two major trading partners in this regional has crippled the prospect the successful economic cooperation in this region over the years.

Economic theory argues that liberalization of trade through policy induced measures, by reducing and then eliminating tariff and non-tariff barriers, promotes efficient allocation of resources to productive uses, exploitation of scale economies, encourages competition, increases factor productivity and increases trade flows, thereby, promoting economic growth (Barro and Sala-i-Martin, 1995 and Wacziarg, 1997). Thus, encouraged by theoretical suggestions and empirical evidences around the globe, countries started implementing trade policy liberalization. However, regardless of the level and speed of liberalization of trade policy, still there remain some *country-specific barriers*, which impede the growth of world trade. To protect their weak sectors from the onslaught of competition, respective countries enforce these country-specific barriers. In many cases, it is not possible to measure all of these frictions, which emerge from country-specific social, political and institutional factors. For example, Elizondo and Krugman (1992) argued that trade flows are adversely affected when infrastructure development are concentrated only on some developed pockets of the country. Furthermore, large government size (Rodrik, 1998), weak and inefficient institutions in home country (Wilson, Mann, and Otsuki, 2004; Levchenko, 2004) and political

influences (Gawande and Krishna, 2001) have been identified to constrain trade flows between countries. A good empirical example in the context of country-specific constraints impeding trade between countries is the case of South Asian Association for Regional Cooperation (SAARC). It could have emerged as the 'engine of growth' for South Asia, but could not do so with its full vigor because of political frictions between two largest trading partners viz. India and Pakistan. Other sporadic efforts to form regional trading arrangement in this region viz. Bhutan, Bangladesh, India and Nepal – Growth Quadrangle (BBIN-GQ) and Mekong – Ganga Cooperation (MGC), which includes 5 ASEAN countries viz. Cambodia, Lao PDR, Myanmar, Thailand and Vietnam, have not made any perceptible progress in this regards so far.

South Asia has been the late comer in the bandwagon of regional trading arrangements in the Asia-Pacific region due to firstly, inward-orientation of its economies relative to other nations of this region and second, political mistrust, which is the major stumbling block of economic integration. Though members of South Asia have traditionally been protectionist towards opening its economies to other countries, it has recently been engaged in regional cooperation through signing PTAs and FTA, first, bilaterally and then, among all of its members. South Asia Free Trade Area (*SAFTA*) was signed by seven members of SAARC during Twelfth SAARC Summit held in Islamabad on 4-6 January 2004, which came into force from 1 January 2006.

Article 7 of the SAFTA Agreement provides for a phased tariff liberalization program (TLP) under which, in 2 years, NLDC (non-LDCs) would bring down tariffs to 20 per cent while LDCs will bring them down to 30 per cent. Non-LDCs will then bring down tariffs from 20 per cent to 0-5 per cent in 5 years (Sri Lanka 6 years), while LDCs will do so in 8 years. NLDCs will reduce their tariffs for LDC products to 0-5 per cent in 3 years. This TLP would cover all tariff lines except those kept in the sensitive list (negative list). The Member states have implemented SAFTA TLP with effect from 1 July 2006 except Nepal and Sri Lanka, which did so on 1 August 2006 and 16 September respectively. India has unilaterally notified the reduction of tariffs to zero per cent for LDC Member States with effect from1 January 2008, thereby completing SAFTA TLP for LDCs one year ahead of 3 year stipulated in the SAFTA Agreement. The Govt of

Pakistan has so far restricted SAFTA Tariff concessions for India to the items included in their List of Importable items from India called "positive list".

In spite of triumphs and tribulations, trade among the SAARC countries has been on higher trajectory since 2000. Pakistan has increased the number of items to be imported from India from earlier 1075 items to 1936 items at present. Despite this fact, Pakistan's exports to India have increased from 65 million dollars during 2000 to 291 million dollars during 2007 i.e. registering an average growth of 49.7 per cent. Whereas its imports from India has been growing much faster than its exports to the latter country. Pakistan's imports from India were 183 million dollars during 2000, which increased to 1266 million dollars, thus registering an annual growth of 84.55 per cent.

Intraregional trade in SAARC has been miniscule compared to other RTBs in this region in particular and in the world in general. Its intraregional export was 4.28 per cent during 2000, which marginally increased to 5.35 per cent during 2008. Situation is too grim in case of intraregional imports, which was 3.8 per cent in 2000 that even declined to 1.88 per cent in 2008. In absolute terms SAARC's intraregional exports was 2791.4 million dollars during 2000, which increased to 11,273.71 million dollars in 2008. On imports fronts, SAARC total intraregional import was 2767.4 million dollars in 2000 that increased to 7019.06 million dollars in 2008. Exponential growth in SAARC's intraregional export has been 30.37 per cent and intraregional import has been 20.25 per cent during the comparable periods against its exponential e growth in total exports of 23.64% and exponential growth in total imports of 33.95 per cent during the same period. SAARC's total exports during 2000 were 65196 million dollars that increased to 210716.72 million dollars in 2008. During the same period its imports increased from 72733 million dollars to 373055.24 million dollars. Intraregional trade (both exports and imports) in the SAARC countries was 3.13 per cent during 2008. Paper is structured as follows. After offering an overview in Section II, Section III evaluates the trade potential among SAARC members; Section IV presents the analytical framework, scenario analysis, data and estimation results. Section V enumerates the impacts of FTA/PTA and spells out the results. Drawing on Sections IV and V, a qualitative argument for development objectives are analyzed in Section VI, whereas Section VII summarizes and discusses limits of the work.

II: Towards Regional Integration: SAARC Intraregional Trade

The basic reason of 'regional integration; is the 'economic integration' of 'natural' and 'unnatural' countries. Economic integration is propelled by the competitive needs of different countries of the world to face the onslaught of globalization after the onset of WTO in 1 January 1995. In the new liberalized trade regime, it is pertinent for the countries to be more competitive by reducing costs through removal of trade barriers and restrictions on the movement of factors of production. As Richard Baldwin (1995) and C. Fred Bergsten (1996) have pointed out that there seems to be intense competitive pressures in the world economy today than what it was prior to WTO, which has induced governments to liberalized trade both bilaterally and regionally. Since new issues have been cropped up over the years in the trade arena, it becomes almost impossible task for WTO to take up any agenda with consensus from its 153 members, which is evident from increasing number of trade disputes at the WTO. This leads members to find out an alternative system to the multilateral system, where prompt decision can be taken and implemented. This gives rise to the proliferation of regional trading blocs since last one and a half decade. Nevertheless, there has been an intense pressure to the governments by the voters and firms' lobbies to provide a framework of policies well suited to their interests of maximizing economic welfare and economic profits. In the face of such pressures and the stalemate of multilateral trading system under the auspices of WTO to promote trade and investment, governments have sought alternative policy changes to improve economic welfare and farms' profits. This was the route cause of phenomenal growth of regionalism in recent years.

Intra-regional trade of major trading blocs has grown tremendously over the last one and a half decade (see Table 1). EU's intra-regional trade has grown from 62 per cent in 1995 to 66.2 per cent in 2006, though remains at the same level of 1990. NAFTA's intra-regional trade was merely 41.4 per cent in 1990, skyrocketed to 53.8 per cent in 2006. ASEAN, which is yet to be a cohesive trading bloc to go for free trade arrangement, has also done well in international trade during this period. Its intraregional trade (exports) was 19 per cent during 1990, increased to 24.9 per cent during 2006, registering a substantial growth in trade among the member countries. SAARC is still reeling round the political paranoid and yet to emerge as a viable regional trading bloc of the Asian

region. Its intraregional trade was 3.2 per cent during 1990, which increased marginally to 5.6 per cent in 2006. MERCOSUR is one of the most vibrant and emerging trading blocs in the Latin America, whose intraregional trade was 11.6 per cent in 2006, up 8.9 per cent during 1990. Interregional trade among the countries of the Bangkok Agreement (BA) has also shown tremendous growth from 3.7 per cent in 1990 to 10.7 per cent during 2006. Trade among the APEC countries is highest among all trading blocs, which was 71.8 per cent during 1995, although reduced to 69.4 per cent during 2006. IOR has also made inroad as a vibrant regional trading bloc, not much significantly. Its intraregional trade has increased from 4.1 per cent (1990) to 4.7 per cent (2006). BIMSTEC is still crawling in regional economic cooperation with miniscule intraregional trade share—share increasing from 2.37 per cent in 1990 to 4.55 per cent during 2006.

Table 1 Intra-Regional Trade (Export) of Major Trading Blocs (%)

Groups	1990	1995	2000	2001	2002	2003	2004	2005	2006
EU	65.9	62.4	61.6	60.8	60.6	61.12	60.7	65.66	66.2
NAFTA	41.4	46.2	55.7	55.5	56.6	56.1	55.9	55.95	53.8
ASEAN	19	24.6	23	22.4	22.7	22.2	22.2	25.62	24.9
SAARC	3.2	4.4	4.1	4.3	4.8	5.7	5.6	5.42	5.6
MERCOSUR	8.9	20.3	20	17.1	11.5	11.9	12.6	13.14	11.6
BIMSTEC	2.37	3.7	3.45	3.34	3.56	4.46	3.91	4.23	4.55
BA	3.7	5	5.1	5.5	5.5	5.7	5.2	13.12	10.7
APEC	68.3	71.8	73.1	72.6	73.4	72.6	72	66.2	69.4
IOR	4.1	6	4.4	5.6	4.3	6.1	4.3	4.6	4.7

Source: COMTRADE Database

Trade potentiality among the SAARC countries is very high, which is evident from its low intraregional trade at present in the one hand and inclusion of Afghanistan into its fold since 2007 on the other. Intraregional trade among the SAARC countries is

shown in Table 2. It shows except for India and Maldives, intraregional trade of all countries have increased from 1995 to 2008. Bangladesh's intraregional trade has increased from 2.68 per cent in 1995 to 3.06 per cent in 2008. Bhutan's entire trade has been within SAARC region in general and with India in particular. As much as 99 per cent of its trade is with SAARC countries, which means it is entirely integrated with the region. India's intraregional trade has declined marginally from 5.02 per cent in 1995 to 4.88 per cent in 2008. Due to unknown reasons, Maldives' intraregional trade has been declined from 22.63 per cent in 1995 to 8.78 per cent. This may be due to two reasons. One is its exportable items to this regional is extremely limited and therefore shrinking every years. Second reason is that it is diverting its exports to other countries. Second reason is highly unlikely in the sense that given its trade basket, its scope to exports to other countries than within the region is extremely limited. Its export earning is mainly based on service exports, which is tourism. Nepal's intraregional trade (exports) has increased tremendously over the years which is evident from the fact its share of regional trade to its total trade has increased form 9.23 per cent in 1995 to 73.89 per cent in 2008. It shows it has also increased its products diversification and also becomes competitive over the years, though it's major export market in the region has been India all along. Pakistan, which is yet to be well integrated with the region because of its rigid attitude with the neighboring country, which is supposed to be its largest trading partner due to large market. It is still bogged down in the quagmire of the politics. Though its intraregional trade has improved a lot over the years yet it is lowest among all SAARC countries except Bangladesh. Its intraregional trade was 3.15 per cent in 1995 has been increased to 4.78 per cent during 2008. Sri Lanka is one of the freest countries in this region, which on its own efforts concluded *bilateral* free trade agreement with India. As a result, its exports to India have increased significantly over the years. Its intraregional trade (exports) was 2.66 per cent in 1995, increasing to 8.39 per cent in 2008. This is owing to its bilateral free trade agreement with India, which gives good pay-off.

Table 2 : Intraregional Trade (Exports) of SAARC Countries, 1995-2008
(% of total trade)

Year	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
'1995	2.68	NA	5.02	22.63	9.23	3.15	2.66
'1996	1.84	NA	5.07	18.53	20.58	2.57	2.67
'1997	2.26	NA	4.67	16.08	25.37	2.61	2.59
'1998	2.69	98.38	4.91	17.35	36.25	4.90	2.36
'1999	1.91	99.16	4.06	19.56	29.63	3.56	3.09
'2000	1.58	NA	4.20	18.14	42.90	3.18	3.47
'2001	1.58	NA	5.38	22.19	47.78	2.87	3.34
'2002	1.33	NA	4.98	15.50	60.22	2.31	5.48
'2003	1.71	NA	6.08	13.92	53.98	2.86	6.82
'2004	1.59	NA	5.54	12.69	58.48	3.72	8.80
'2005	2.16	92.89	5.14	17.38	67.36	4.56	10.24
'2006	1.88	NA	4.96	13.36	68.57	4.19	8.71
'2007	2.34	NA	4.92	9.58	70.97	4.47	8.33
'2008	3.06	98.8	4.88	8.78	73.89	4.78	8.39

Source : DOTS, IMF

III: Trade Potential among SAARC Countries: Measuring Trade Intensities.

Trade potential of any country can primarily be measured by the intensity of its trade with its trading partners (Drysdale and Garnaut, 1982). When the intensity is high between two countries, it is obvious that two countries have much potential to trade with each other. Bilateral trade relationships between SAARC countries help to identify how intensively the countries are trading with each other. *Trade intensity index (TII)* is defined as the share of home country's trade with its partner country, divided by the home country's share of world trade. The numerator is the intraregional export of share of the source (home) country and the denominator is the share of home country in world exports. The value of index ranges from 0 to 100. If the value is 0, it implies no trade relationship between home and partner countries. On the other hand, if the value of export intensity index is more (or less) than 100, it indicates that home country is exporting more (or less) to the partner country than might be expected from that country's share in total world

trade. The *size adjusted* regional export share is a variation of the TII. Its purpose is to normalize the intra-regional export share of a regional trading bloc for group size in the world trade. This measure is useful when comparing the intraregional trade of different trading blocs which vary significantly in terms of the number or level of development of the members. The rationale for the adjustment is that we expect larger groups to have a larger share of world and intraregional exports. Therefore, in a given block, the trade intensity index is defined as the ratio of the intra-regional export share for a given trade bloc, to the share of the trade bloc's exports in the world trade. In the bilateral trade flow of the SAARC countries the trade intensity statistic is the *ratio of two export shares*. The numerator is the share of the destination of interest in the exports of the region under study. The denominator is the share of the destination of interest in the exports of the world as a whole. In other words, the numerator is the export share of the source region to the destination; the denominator is export share of the world to the destination. It has one limitation. As with the trade shares, high or low values and changes over time may reflect numerous factors other than trade policy. Trade Intensity Index (TII) can be measured as follows:

$$TII_{ij} = [X_{ij} / X_i] / [X_j / (X_w)]$$

Where:

TII_{IJ} = Trade intensity index of exporting country 'i' (source) to country 'j' (destination).

X_{ij} = Exports of source country 'i' to the destination 'j'

X_i = *Total* exports of 'i' i.e. source country

X_j = Export to country 'j' (destination)

X_w = Total world exports

t = 1995…..2008

There may be several reasons why trade intensities among several countries diverge from the unity. The entire gamut of reasons can be categorized into two broad groups viz. *objective resistance* and *subjective resistance* (Garnaut, 1972). As regards objective resistance, intensity of trade is likely be high between a combination of industrial good exporter and exporter of primary products because of strong complementary in the structure of production of two countries, which is determined by comparative advantage of the two countries. Regarding factors determining subjective resistance, among others, discriminatory commercial policies, flow of capital and economic aid from the developed (relatively) to developing economies influence the trade intensity index of the two countries (Yamazawa, 1970). Apparently, in the short run, countries can not control the objective resistance due to its structural rigidities in the mode of production, but they can eliminate subjective resistance by cooperating with enhancing economic cooperation with each other either bilaterally or in a group or multilaterally. The vision of SAFTA is to eliminate all *subjective barriers* among member countries in a mutually exclusive way.

Based on formula mentioned above, we have calculated trade intensity indices of different countries of SAARC (see Table 3). Though India's exports have been growing in leaps and bounds in recent times, especially since early nineties of the last century due to economic reform measures taken by the Govt. it does not reflect in its trade intensities with its neighboring countries. Its trade intensity with the SAARC country has declined from 5.77 in 1995 to 3.4 in 2008, which shows India has less complementary relations with the neighboring countries. Bangladesh' trade intensity remains almost same with the SAARC countries, though it is much less. Its trade intensity index was 2.88 in 1995, declined marginally to 2.15 in 2008. Maldives' trade intensity with SAARC countries has declined significantly over the years. The reasons for low level of trade of Maldives with the SAARC countries have been described earlier. Maldives' trade is basically service-dependent having neither any manufactured good to export, nor any agricultural goods except fish, though to a very little extent. Its trade intensity index has declined from 24.40 in 1995 to 6.19 in 2008.

Trade intensity of Nepal has increased quite significantly over the years due to its increasing trading relation with India due to bilateral agreements. Nepal's trade intensity index with the SAARC countries has been increased from 9.95 in 1995 to 51.78 during 2008, the highest among all countries of this region. Pakistan is yet to take advantage of the liberal trading atmosphere of this year. The reason is that it has adverse political relationship with India, which is the largest trading partner of this region. But it is gradually coming out of the shadow it had in the last century and, notwithstanding its acrimonious political relation with India, its trading relations with the latter countries has been growing significantly over the years. Pakistan's import from India is more than $ 2 billion whereas it exports not more than $ 200 million. Its trade intensity index with the SAARC countries remains the same over the years. Its TII was 3.37 in 1995, which marginally declined to 3.36 in 2008. Sri Lanka's economic integration with the SAARC is much more pronounced than other countries of this region. It has concluded bilateral free trade agreement with India. As a result of which its exports to India has increased manifold, which is reflected through its TII values. Its TIIwas 2.91 in 1995 increased to 5.9 during 2008, which shows it has increasing its trade integration with the SAARC countries over the years. The trends of TII indices of SAARC countries during 1995—2008 are shown in Table 3.

Table 3 : Trade Intensity Indices of SAARC Countries (1995-2008)

Year	India	Bangladesh	Maldives	Nepal	Pakistan	Sri Lanka
1995	5.77	2.88	24.40	9.95	3.37	2.91
1996	5.26	1.93	19.41	21.57	2.72	3.09
1997	4.86	2.39	17.04	26.87	2.76	2.81
1998	5.34	2.85	18.45	38.48	5.19	2.50
1999	3.89	1.96	20.15	30.61	3.68	3.18
2000	4.17	1.52	17.50	41.46	2.97	3.35
2001	4.36	1.50	21.01	45.38	2.71	3.17
2002	4.48	1.17	13.64	53.10	2.03	4.81
2003	5.50	1.48	12.02	46.81	2.78	5.89
2004	4.50	1.36	10.81	49.28	3.15	7.48
2005	3.95	1.65	13.44	51.31	3.49	7.84
2006	3.63	1.39	9.85	50.48	3.09	6.41
2007	3.84	1.73	7.11	52.35	3.32	6.17
2008	3.74	2.15	6.19	51.78	3.36	5.90

Source: Calculated by authors from DOTS, IMF

IV: Estimating Trade Potentials of SAARC Countries: Analytical Framework, Data and Methodology.

IVa : Analytical Framework

Analytical tool for measuring the impact of preferential trading arrangements (PTAs) and free trade arrangement (FTA) among SAARC countries is an extended version of the Gravity Model popularized by Anderson (1979), and Bergestrand (1985), among others. Most of the studies have been conducted in a static partial equilibrium analytical framework, where impacts of PTAs and FTA are directly measured via increase in trade of the exporting countries, without going into details of other macroeconomic impacts, such as increase in employment, income, output and welfare of the trade partners. However, trade can be constrained by "*natural barriers*" (e.g. distance between economic regions) and (exogenous) policy-constrained "*unnatural*" or "*artificial*" barriers in the form of high tariff and non-tariff barriers. Beyond the 'natural' geographical constraints, there are constraints due to unfavorable 'policy' environments in home country, which may be named as '*behind the border*' constraints, and also in partner countries, which may be called '*beyond the border*' constraints to trade (Gawande and Krishna, 2001; Wilson et al. 2004; and Newfarmer and Nowak, 2005). Of these constraints, 'behind the border' constraints can be reduced or eliminated through *appropriate trade policy reforms* of home country, and 'beyond the border' constraints can be reduced through *policy co-ordination* between home and partner countries through trade agreements. In order to overcome these '*behind the border*' and '*beyond the border*' constraints, all countries have been vying for regional and bilateral trading arrangements. It is, therefore, rational to define *potential trade* between home and a partner country as the maximum possible trade that can occur between them, given the 'natural' constraints, *but without* the influence of any '*policy induced'* constraints to trade. Thus, potential trade here refers to the *maximum level of trade* with natural barriers that would have happened between home and partner countries had there not been any significant 'behind the border' and 'beyond the border' constraints between them (Kalirajan, 1999).

Nevertheless, literature indicates that modeling and measuring the impacts of 'behind the border' and 'beyond the border' constraints on trade in the gravity equation

framework have been difficult. Unless the impacts of these constraints are not measured, the potential trade between countries can not be identified correctly. A number of different specifications of the gravity model have been suggested in the literature. Earlier studies have estimated the gravity equation involving countries of interest and worked out the difference between observed values and predicted values that are calculated from the OLS estimates as potential trade (Baldwin, 1994; and Nilsson, 2000). The OLS estimation procedure produces estimates that represent the centered values of the data set. However, potential trade refers to free trade with no trade restrictions. In other words, this means that the estimation of potential trade requires a procedure that represents the *upper limits of the data* and *not the centered values* of the data set. The upper limit of the data is influenced by observations from countries that have liberalized trade the most, among the countries included in the analysis. The procedure involves mainly *two steps*, namely, first to identify a method to *include 'policy induced' constraints* to trade in the gravity equation along with 'natural' constraints and stimulants, and secondly to select a procedure of *estimation dealing with upper limits of the data* indicating no influence of 'policy induced' constraints.

While conventional gravity model studies admit the importance of 'policy induced' constraints on home country's exports, usually, these factors are merged with the 'statistical random error term' with 'normal properties' by implying that they are randomly distributed across observations. However, such a modeling in empirical work does lead to incorrect estimates of potential trade and does not also reflect the reality. Therefore, the lack of any appropriate measures to account for this problem in empirical studies of international trade could be insightful. Recently, Anderson and van Wincoop (2003), as a way of tackling this problem, suggested an approach to modify the conventional gravity model specification by *including a multilateral resistance term* to obtain more correct estimates. Drawing on the method suggested in Kalirajan (2007), which is an alternative to the method suggested by Anderson and van Wincoop, without imposing heavy data requirements on researchers, it is rational to argue that researchers do not have full information on all 'policy induced' constraints in home country and partner country on home country's trade. Nevertheless, the combined effects of 'behind the border' constraints for a *given level* of 'beyond the border' constraints can be

measured. Given the link between home country's trade policy reform and export growth, the interest in this paper is to model the *combined effects* of the 'behind the border' constraints for the *existing level* of 'beyond the border' constraints.

In the *generic* gravity model, trade is proportional to the product of each country's 'economic mass', which can be measured by gross domestic product (GDP) and population (POP), and inversely proportional to the distance between the countries.

$$X_{ij} = C\, Y_i^{\beta}\, Y_j^{\gamma}\, P_i^{\phi}\, P_j^{\tau}\, D_{ij}^{-\delta} \qquad (1)$$

where X_{ij} is exports of country i to country j. Y_i and Y_j are gross domestic products respectively of country i and j; P_i and P_j are population of country i and j respectively; and D_{ij} is the distance between capital cities of home country and its partner country.
Taking logarithms, the base line model (1) can be conveniently represented in the log-linear form as equation (2).

$$\text{Ln } X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j + \phi \ln P_i + \tau \ln P_j - \delta \ln D_{ij} \qquad (2)$$

The real world situation is too complex to be represented by a simple equation as (2). There are several other important factors such as trade policies of exporting countries and openness to trade of importing countries affecting trade. When sufficient information on these variables is available, the relevant variables are included in equation (2) as *additional explanatory variables*. In the *absence* of such information, generally, the impact of these variables is represented by a *statistical error term*, ε_{ij}, which is assumed to follow a normal distribution with mean 0 and variance σ^2, in equation (2). For simplicity of exposition, the time subscript is avoided.

$$\ln X_{ij} = \alpha + \beta \ln Y_i + \gamma \ln Y_j + \phi \ln P_i + \tau \ln P_j - \delta \ln D_{ij} + \varepsilon_{ij} \qquad (3)$$

Empirical estimation of gravity equations is done in a number of ways. Frankel (1993) estimated a pooled cross-country gravity equation using data from more than sixty countries to determine the existence of intraregional bias in trade and found evidence

against openness not only in North American and European trade, but also in East Asian trade. In contrast to similar studies, Dhar and Panagarya (1996) estimated both country specific and *pooled cross-country* gravity equations to examine the question of openness in North America, Europe and East Asia. An important finding of their study is that a country-specific gravity equation can explain trade flows between countries better than a cross country gravity equation because the latter makes large difference across countries. Following Dhar and Panagarya, equation (3) can be estimated in a *slightly modified way* to measure trade potentialities of countries in SAARC using data from 1995 to 2008. The empirical model may be specified as follows[1]:

$$\ln X_{ij} = \alpha_0 + \beta_1 \ln (GDPj_{)} + \beta_{2\ln} (Popn_{j)} + \beta_3 \ln (PCGDP_{i)} + \beta_4 \ln (Dist_{ij}) + \varepsilon_{ij} \text{ .....} \quad (4)$$

Now, potential exports estimated using equation (4) would represent the centered values of data and any difference between the estimated and actually realized exports would be considered as random without bearing any policy implications. As discussed earlier, potential exports would be the maximum possible exports between home and partner countries, had there not been any significant 'behind the border' and 'beyond the border' constraints to home country's exports. Drawing on the *Stochastic Frontier Production Function* literature popularized by Aigner, Lovell and Schmidt (1977), and Meeusen and van den Broeck (1977) this characteristic of potential exports can be modeled by *decomposing the statistical error term*, ε_{ij} into a single sided error term, u, which shows the combined effects of 'behind the border' constraints on exports with the assumption that data on details of factors contributing to 'behind the border' constraints within home country are not available, and a double sided error term v_{ij}, which indicates the effects of other left out variables such as 'beyond the border' constraints and 'normal' statistical errors.

$$\ln X_{ij} = \alpha_0 + \beta_1 \ln (GDPj_{)} + \beta_{2\ln} (Popn_{j)} + \beta_3 \ln (PCGDP_{i)} + \beta_4 \ln (Dist_{ij}) - u_i + v_{ij} \text{ ..} \quad \text{..... (5)}$$

[1] Due to high correlation between GDP and population of the exporting countries, per capita GDP of the exporting country is used in the estimation.

The single sided error term, u_i is the combined effects of the 'behind the border' constraints, which emanates *due to the existing socio-political-institutional rigidities* in home country. This effect creates the difference between *actual and potential exports* between the two countries concerned. u varies across observations and across time. The time varying characteristic of u is modeled as follows:

$$u_{it} = \eta_{it} u_i = \{\exp[-\eta(t-T)]\}u_i$$

The above equation means that 'behind the border constraints' to export have been varying over time. This assumption implies that if the estimate of η is positive then the 'behind the border constraints' decline exponentially to its minimum value, u_i, at the last period, T of the panel. In this case, the gap between potential and actual exports has been declining. u takes values either 0 or greater than 0 and it is usually assumed to follow a truncated (at 0) normal distribution, N (μ, σ^2_u). When u takes the value 0, this means that the influence of 'behind the border' constraints is not important and the actual exports and potential exports are the same, assuming that the influence of 'v' is not significant on the exports. When u takes the value greater than 0, this means that the influence of 'behind the border' constraints is important and it creates a gap between actual exports and potential exports. Thus, the term u_i, which is bilateral observation-specific, represents the influence of the 'behind the border' constraints, which is a function of the socio-political-institutional rigidities that are within the exporting country's control. Thus, unlike the conventional approach, the suggested method of estimating the gravity model does include explicitly the influence of 'behind the border' constraints on trade flows between two countries in the modeling of the gravity equation. The *double-sided error term* $v_{ij,}$ which is usually assumed to be $N(0,\sigma^2_v)$, captures the influence on export flows of 'beyond the border' constraints existing in partner countries, which are not under the control of the exporting country, and other left out variables, including measurement errors that are randomly distributed across observations in the sample. Maximum likelihood methods can be used to estimate the above discussed gravity model and to verify how important are 'behind the border' constraints in restricting home country reaching from its potential level with partner countries.

The advantages of the suggested methodology of modeling and estimation of the gravity model are as follows. Firstly, unlike the conventional OLS estimation, it does not suffer from a loss of estimation efficiency. Secondly, the suggested modeling estimates the influence of the 'behind the border' constraints, isolating it from 'beyond the border' constraints and the statistical error term. This isolating property will enable us to examine how effective has been the influence of 'behind the border' constraints on potential exports. Thirdly, the suggested approach provides potential trade estimates that are closer to frictionless trade estimates. Potential trade is *not* the level of trade without any restriction (free trade). As noted above, potential trade is determined by the upper limit of the data set. That is, by those economies who have *liberalized trade restrictions (by reducing or eliminating behind the border unnatural barriers)* to the most. Thus, potential trade for a *given* level of 'beyond the border' constraints can be defined as the maximum level of trade *given* the current level of the determinants of trade and (given) the least level of 'behind the border' constraints within the system. Finally, the suggested method bears strong theoretical and policy implications for finding ways of improving the socio-political-institutional factors in home country to achieve frictionless trade.

IVb : Comparative Static Scenario Analysis:

The Gravity Model has a number of advantages in analyzing the intraregional trade, particularly for the PTA of the 90's, sometimes known as "new regionalism".[2] We perform a comparative static analysis of tariff reductions under different scenarios and evaluate its effects on directionalities of exports for SAARC Member Countries (SMCs). The objective of this analysis is to see *costs and benefits* of different PTAs and FTA to member countries. As listed below, four *hypothetical illustrative scenarios* have been considered:

(i) 25% across the board tariff cuts by all countries;

(ii) 50% across the board tariff cuts by all countries;

(iii) 75% across the board tariff cuts by all countries; and

(iv) 100% tariff cuts i.e. free trade among all countries (SMCs).

[2] The new regionalism of the 90's, unlike the trading arrangements of the 60's, has member countries with (a) vastly different levels of development, (b) different sizes of population, (c) different levels of domestic economies, and structure of production, and (d) varying degrees of openness, etc. For details, see WTO (1995), among others.

The results of the simulations obtained are indicative as these are estimated values based on hypothetical scenarios under the conditions that respective countries offer tariff cuts, as per the magnitudes mentioned above, from the existing tariff lines. The analysis would measure the impact of PTAs by the *proportionate change in exports* (expressed in US dollars) of respective countries due to reduction of tariffs of other SMCs. The higher the initial tariff level on trade between partners, the greater would be the final effect of reduction and elimination of tariffs with gradually higher doses of tariff-cuts. However, tariff is only one of many factors that determine the impact of PTAs and FTA on trade. In assessing the impact, the *elasticities* indicating the proportionate response of bilateral trade to changes in tariffs, the initial tariff levels as well as initial level of exports are relevant for determining absolute changes in exports of SMCs under tariff-cut scenarios.

IVc : Data Sources

Data on trade (exports) of SMCs(SAARC Member Countries) are taken from the UN COMTRADE database provided through the online WITS software developed by the World Bank and the UNCTAD. There are gaps in the COMTRADE database both for years and for countries. In such cases, export data were taken from IMF's Direction of Trade Statistics. Both GDP and population data of the respective countries are taken from the online data provided by the UN Statistical Division, UN and the World Development Indicators 2006. World Bank Tariff data for the entire analysis are taken from TRAINS CD-ROM compiled by UNCTAD provided in the WITS software. The variable REXR aims to account for significant changes in real exchange rate in SMCs. REXR is an index with base 2005=100 for the real exchange rate of the domestic currencies of SMCs. REXR is calculated using the nominal exchange rate and GDP deflator from IMF's International Financial Statistics (exchange rate is market value and average of the period).

Data on distance are calculated and information is provided by some websites.
One of the most important components of the gravity model is the distance variable, which is measured in miles between capitals of the respective countries of SAARC, which is computed in the following way (Egger 2002):

$$D_{IB} = r.\ ar\cos\left[\sin(\varphi_I).\sin(\varphi_B) + \cos(\varphi_I).\cos(\lambda_B - \lambda_I)\right]$$

Where D_{IB} is the distance between the SAARC countries, say, 'B' and 'I' i.e. distance between their capitals in miles/kms , r is the earth radius in miles, φ_I and φ_B are radian measures of the parallel of latitude of the two countries' capitals, and $(\lambda_B - \lambda_I)$ is the radian measure of the difference in meridians of the two countries' capitals. Distance basically measures transport cost, which is, in other words, represents trade costs. The distance variable is computed in the following manner. Assuming that all countries are of a circular area, one can compute the radius (r) for all countries based on data provided in the world atlas. When production is concentrated in the centre of the circle (the country's capital or economic area), the *average distance (m)* between the centre and other points on the circular area is derived from the following condition:

$$m^2\pi = r^2\pi - m^2\pi$$

Thus, the circular area is splitted in an outer concentric circular area of the same size. Solving for *m* yields, $m = \sqrt{r^2/2}$.

The periods of analysis are from 1999 to 2005. The computer software Frontier 4.1 is used to estimate stochastic frontier gravity model, which is explained in details in Coelli (1996).

IVd : Discussion of the Results of Estimations

Equation (5) was estimated for *each* SAARC country *separately* to find out how far were actual exports of SAARC countries different from their potential exports to each other on bilateral basis during 1995- 2008. This analysis will indicate the influence of 'behind the border' constraints in home country on their exports to the concerned importing countries for the *existing level* of 'beyond the border' constraints. By examining the trend of the influence of the 'behind the border' constraints, it may be gauged whether home country had been reducing the 'behind the border' constraints over time through appropriate trade policies. The estimated values are given in Table 4.

There are a few diagnostic statistics to confirm the validity of the modeling of equation (5) with the composed errors, u and v. The *gamma* coefficient presents a measure of the *total variation in exports* that is due to the influence of 'behind the border' constraints represented by the term 'u'. The *gamma* coefficient is an average over the time period, which is measured as follows:

$$\gamma = [(\Sigma_t \sigma^2_{ut}) /(\Sigma_t \sigma^2_{ut} + \sigma^2_{vt})] / T$$

Where σ^2_{ut} is the variance of the one-sided error term at period t, σ^2_{vt} is the variance of the random error term at period t and T is the total number of time period i. e. 14 years in this paper (i.e. 1995 to 2008). The *gamma* coefficients are significant at the 1 percent level, which means that 'behind the border' constraints did contribute mainly to the gap between potential and actual exports. The significance of the *gamma* coefficients also implies that the specification of equation (5) including the definition of the composed errors, u and v is valid for the present data set. The large size of the *gamma* coefficients indicate that the influence of 'behind the border' constraints are responsible for a substantial proportion of the mean total variation in realized exports.

It may be interesting to see how do the *gamma* coefficients vary over time. This is equivalent to examine whether the influence of 'behind the border' constraints towards reducing actual exports from potential exports has been increasing from one period to another or not. Information on the temporal behavior of *gamma* can be obtained by examining the *eta* coefficient. If the *eta* coefficients were positive and significant, then the impact of 'behind the border' constraints on reducing actual exports from potential exports would be decreasing over time. However, if *eta* were zero or not significant, then the impact would be constant or fixed over time. Results in Table 4 shows that *eta* coefficients are positive and significant in the case of Sri Lanka, Bhutan and Nepal which means that trade policy reforms have been effective in reducing the impact of 'behind the border' constraints to export of these two countries. Though the coefficient is positive in the case of India and negative for Bangladesh, it is not significant, which means that the impact of 'behind the border' constraints remained constant without any significant changes from 1995 to 2008. On the other hand, the *eta* coefficients are negative and also significant for Pakistan, which implies that the impact of 'behind the border' constraints had been increasing during the period of analysis. This leads to an

important policy suggestion that India, Pakistan and Bangladesh within SAARC need to intensify their trade policy reforms to remove existing policy constraints hindering realization of export potentials with other members of the region.

The coefficients of GDP of importing countries appear to have statistically significant positive relationship with the exports of home country, implying that with the increase in GDP, the partner countries tend to import more from home country except Bangladesh. The coefficient of GDP for Bangladesh is negative and significant, which indicates that Bangladesh' exports appear to decline with the increase in partner countries' GDP. Besides the fact that the volume of Bangladesh's exports is very low, the negative coefficient indicates that the nature of Bangladesh's export commodities is highly income elastic and has low qualities. The coefficient of population is positive and significant in most cases, except in the case of India and Nepal. The negative and significant coefficient of population for India indicates that majority of partner countries are involved in the production of similar commodities that are exported from India. Therefore, as population in partner countries increases, not only demand, but also supply of commodities increases, though the latter seems to be offsetting the former. It is worth noting that the increase in per capita income of home country does seem to influence home country's exports to other SARC countries except Bhutan, whose exportable items are extremely limited. It only exports power to India and may be few negligible items to other SAARC countries.

Table 4 Maximum Likelihood Estimates of the Stochastic Frontier Gravity Equation for Trade among SAARC Countries, 1995-2008

Variables	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Constants	-18.01	41.46	-17.76	24.68	-28.67	-26.61
	(-2.93)	(2.14)	(-12.42)	(2.11)	(- 18.79)	(- 7.83)
GDP_i	-1.26**	1.54	0.76	0.99	0.68	0.67
	(-2.38)	(0.64)	(2.39)	(2.10)	(3.73)	(2.38)
$POPN_i$	2.11	0.67	-0.014	-0.15	0.57	0.83
	(4.62)	(0.26)	(- 0.06)	(- 0.35)	(3.42)	(3.21)
$PCGDP_i$	9.64	-0.77	1.88	1.08	1.02	0.21
	(3.20)	(-0.28)	(2.42)	(0.53)	(2.62)	(0.28)
$DIST_{ij}$	-2.56	-6.3	1.86	-4.27	3.17	3.11
	(-2.07)	(- 2.76)	(4.17)	(-7.33)	(20.77)	(7.21)
TIME	-0.07	-0.19	-0.026	-0.19	0.0041	-0.08
	(- 0.76)	(- 0.79)	(- 0.43)	(1.03)	(0.79)	(- 1.26)
σ^2	4	6	0.75	2.11	0.68	0.62
	(5.04)	(1.34)	(3.17)	(3.67)	(5.16)	(2.89)
γ	0.75*	0.63**	0.64*	0.1	0.51*	0.25**
	(8.70)	(2.16)	(5.70)	(0.49)	(5.28)	(1.19)
μ	3.45	3.04	1.39	0.25	1.19	-0.79
	(2.15)	(1.30)	(2.04)	(0.32)	(2.13)	(- 0.92)
η	-0.014	0.05	0.001	0.17	-0.25	0.17**
	(-0.7)	(2.07)	(0.04)	(2.93)	(- 3.18)	(3.47)
Log Likelihood Function	-107.8	-136.38	-61.06	-128.76	-68.21	-77.69

* : Significant at the 1 % level, ** : Significant at the 5 % level,
Note: Values in the parentheses are t-ratios, i= exporting country (source), j=importing country(destination)

Source: Authors' estimation using equation (5)

The coefficient of distance, which serves as a 'natural' constraint to exports, is negative and significant for all sample countries except for India, Pakistan and Sri Lanka. In case of SAARC countries, distance factor does not play a very significant role since all countries are contagious and adjacent to each others. For example, transaction costs between India and Pakistan, India and Bangladesh and India and Nepal are minimal in the sense that all these countries are adjacent and goods many be transported though the land routes. Even India Sri Lanka trade is routed through sea, its distance is minimal. Therefore, it has hardly any effect on transaction costs. The result indicates that the production process in India is able to absorb the distance effects much more efficiently than other SAARC countries. Though India is technologically much advanced than Bangladesh, the production cost in Bangladesh is comparatively lower than that in India.

The advantage derived from this is reflected in the size of the distance variable. It may be noted that average distance among SAARC countries are more or less the same. Therefore, other SAARC countries need to be more efficient in cost management in order to be efficient like India in the same product group or else it has to design alternative strategies related to product and market.

The impact of policy induced 'behind the border' constraints on home country's exports, which is estimated as the variable 'u', is presented in terms of realization of home country's export potential in average percentage form in Table 5 for the periods 1995-2000 and in Table 6 for the periods 2001-2008. Percentage change in realization of export potentials of different SAARC countries during 1995-2008 is shown in Table 8. Increasing values over the periods indicate more exploitation of export potential of the exporting countries with rest of the group included in the study. The increasing values also mean that 'behind the border' constraints have been declining significantly in home country through its effective trade policy reforms for the existing levels of 'beyond the border' constraints.

Table 5 : Realization of Potential Exports (%) among the SAARC Countries, 1995-2000

	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Bangladesh		4.79	3.93	0.7	2.2	49.6
Bhutan	0.02		2.99	0.18	0.11	45.73
India	21.09	15.28		79.74	13.42	12.26
Nepal	4.02	0.57	34.78		3.95	63
Pakistan	91.07	80.61	97.12	84.59		95.06
Sri Lanka	74.2	80.84	12.38	31.32	75.85	

Source: Values are estimated by authors using equation (5).

Results in Table 5 show that Pakistan's *realization of exports* to almost all SAARC countries is highest among all members during 1995-2000. Realization of its exports to Bangladesh was 91.07 per cent, to Bhutan it was 80.61 per cent, to India it was 97.12 per cent, with Nepal it was 84.59 per cent and with Sri Lanka it was 95.06 per cent. Next

best country is Sri Lanka, whose export realization with Bangladesh was 74.2 per cent, with Bhutan it was 80.84 per cent, with India it was 12.38 per cent and figures were 31.32 per cent and 75.85 per cent respectively with Nepal and Pakistan. Among all SAARC countries, Bhutan's realization of export potential was lowest at least during 1995-2000. Except Sri Lanka with who its export realization was 45.73 per cent, with other SAARC members' realization of potential exports was much below 5 per cent. Bangladesh follows the same trend. India is the largest economy of this region and it has been consistently opening up its economy since early nineties. Despite this its export orientation towards SAARC has been very insignificant during 1995-2000. India's realization of potential exports was highest with Nepal among other SAARC countries, which was 79.74 per cent. With other countries of SAARC realization of its potential exports much less than 20 per cent.

Table 6 : Realization of Potential Exports (%) among the SAARC Countries, 2001-2008

	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Bangladesh		3.51	2.83	0.58	1.49	46.27
Bhutan	0.23		7.8	1.04	0.76	55.88
India	21.29	15.46		79.84	13.59	12.42
Nepal	34.93	18.23	70.48		34.72	85.76
Pakistan	59.9	33.4	84.78	41.59		75.35
Sri Lanka	90.54	93.18	50	73.98	91.21	

Source: Values are estimated by authors using equation (5)

Table shows the realization of export potentials of different SAARC countries during 2001-2008. Though values are different in two periods, the trend *remains the same*. Most important part of the second part is Pakistan's realization of export potential has declined to all SAARC countries compared to previous period. Same is true in case of Bangladesh, whose realization of export potentials has declined with all SAARC countries. Changes in realization of export potentials of SMCs between these two periods are shown in Table

7. It is pertinent to mention here that realization of export potential is the *technical efficiency (TE)* of equation (5) using stochastic frontier gravity model.

Table 7 : Change (%) in realization of export potentials of SAARC(1995-2000 to 2001-2008)

Export of/to	Bangladesh	Bhutan	India	Nepal	Pakistan	Sri Lanka
Bangladesh		-26.72	-27.99	-17.14	-32.27	-6.71
Bhutan	1050		160.87	477.78	590.91	24.38
India	0.95	1.18		0.13	1.27	1.31
Nepal	768.91	3098.25	102.65		778.99	36.13
Pakistan	-34.23	-58.57	-12.71	-50.83		-20.73
Sri Lanka	22.02	15.26	303.88	136.21	20.25	

Source: Valued are estimated by authors using equation (5)

Table 7 shows that changes in realization of export potentiality of Pakistan and Bangladesh between these two periods are negatives to all SAARC countries. Both these countries have depicted negative changes in realizing their export potentialities, which means realization of export potentials were so high in the first period they could not hold the momentum of exports to the region. India's change in realization of export potentiality is marginal or it remains almost at the same level during two periods. Most spectacular find is Nepal's realization of export potentiality has increased several times during second period compared to earlier one. Especially with Bangladesh, Bhutan and Pakistan, its technical efficiency of realization of export potential has gone up several times. Same is true in case of Bhutan also. Its technical efficiency in export to neighboring countries especially to Bangladesh, India, Nepal and Pakistan has increased tremendously. This may be explained by the fact that it has addressed its "beyond the border "constraints to its exports most efficiently first, and second, it might have started new exports to these countries from the negligible level of the previous years. Sri Lanka has also increased its realization of export potentials in the second period especially with

India and Nepal. With India, it may due to successful implementation of Indo-Sri Lanka Bilateral Free Trade Agreement (ISLBFTA).

V: Modeling the impacts of PTAs and FTA among SAARC Countries.

The impact of the 'beyond the border' constraints can be divided into two groups, viz. '*explicit beyond the border constraints*' and '*implicit beyond the border constraints'*. Of these, the impact of '*explicit* beyond the border constraints' on home country's exports may be measured from the coefficients of variables such as *average tariffs* (T_j) and *real exchange rate* ($REXR_j$). These two variables are included in our gravity model estimating the impact of PTAs and FTA on exports of all countries of SAARC. *Including these two variables* and time as the *control variables* in equation (5), we may write equation (6) as:

$$\ln X_{ij} = \alpha_0 + \beta_1 \ln (GDPj) + \beta_2 \ln (Popn_j) + \beta_3 \ln (PCGDP_i) + \beta_4 \ln (Dist_{ij}) + \beta_5 \ln (Tariff_j) + \beta_6 \ln (REXR_j) + \beta_7 \ln (Time) - u_i + v_{ij} \quad \text{.....(6)}$$

where

X_{ij} = Exports of country 'i' to country 'j'

GDP_j = Gross Domestic Product of country j (i.e. importing country)

Pop_j = Population of country 'j' (i.n. population of importing country)

PCGDPi = Per capita GDP of exporting country 'i'

$Dist_{ij}$ = Distance between country 'i' and 'j'

$Tariff_j$ = Average weighted tariffs of the importing country

$REXR_j$ = Real exchange rate of the currencies of importing countries

T = Time i.e. no of years viz. 1,2…….14 (for the years 1995….2008)

ε_{ij} = $\exp (v_i - u_i)$ [as mentioned in equn. (4)

u_i = Combined effects of "behind the border" constraints. This is the one sided disturbance term, which represents the combined effects of the country-specific socio-political-institutional factors that prevents exports from reaching its potential. In other words, exp(u), which is the ratio of actual to potential exports, shows how much of county i's potential exports to the jth country is achieved.

v_i =Combined effects of "beyond the border" constraints and other left out variables. This is the random disturbance terms which truncated with a distribution N $(0, \sigma^2_v)$ at period t.

i, j = Exports from country 'i' (source) to country 'j' (destination)

Both the error terms are assumed to be independent of each other. In the above equation, period t= 1995….2008. Further, all the above data except the relative distance, v_i and ui are in yearly aggregates. The estimation involves the use of panel data, which does not require the assumption that the one-sided error term (u_i) and other independent variables in the above gravity equation are independent. The estimation of the u is carried out with the assumption that they are time-varying over a period of time and are non-negative truncations of the N (μ, σ^2). The time varying characteristic of u is modeled as

$$u_i = \eta (u_i) = \{ \exp [- \eta (t- T)] \} u_i$$

where η is the parameter to be estimated and T is the total number of time periods, which is 1995-2008 in our case. Maximum Likelihood Methods (MLE) can be used to estimate the above modified gravity model along with the magnitude of 'u' (Coelli, 1996).

Entire exercise rests on the reductions in tariffs under different scenarios *including* free trade option. We have taken *weighted average tariffs* of total exports of five SAARC countries viz. Bangladesh, India, Nepal, Pakistan and Sri Lanka during 1995-2008. We have not taken Bhutan and Maldives since information on tariffs and real exchange rates are not available on a time series basis for the period we are studying. Tariffs are basically MFN tariffs rather than ad valorem duty. On the basis of tariff information provided by TRAINS, we have estimated tariff elasticities of 5 SAARC countries to their total exports from 1995 to 2008. In our model, we have estimated increase in exports of country 'i' to country 'j' and vice versa due to reductions of tariffs at different levels followed by complete elimination of tariffs. Given the estimated parametric value of β_5 from the fitted regression equation (6) for total exports and changes in tariff rates at different scenario as mentioned earlier in the methodology, the percentage increase in exports of country 'i' (source) to country 'j' (destination) and vice versa are worked out.

The methodology for calculation of *increase in exports* of one country due to PTAs and FTA to the markets of other countries is as follows:

$$[\exp\{ \beta\text{^}_5 \log ((TR_{i,j})_1 / (TR_{i,j})_0) + \tfrac{1}{2} \sigma^2 \} - 1] * 100$$

i.e., an increase in exports of country 'i' (source) to country 'j' (destination) (1,2…6) due to change in tariffs of the latter country.

$$[\exp \{ \beta\hat{}_5 \log ((TR_{J,I})_1 / (TR_{i,j})_0) + \tfrac{1}{2} \sigma^2 \} -1] *100$$

That is, an increase in exports of 'j' (i.e. 1,2….6) to country 'i' due to change in tariffs of the latter country in the form of PTAs and FTA.

where $\sigma^2 = \sigma\hat{}^2 \beta 5 \log (TR\ I,J) + \beta 5 \log (TR\ J,I)$

In our estimation, we have taken weighted average tariffs (TR) of total exports of SAARC instead of 1 plus tariff (1+TR).

Va : Empirical Results from the Model

Equation (6) has been estimated using MLE separately for Bangladesh, India, Nepal, Pakistan and Sri Lanka, the results of the stochastic frontier gravity model is shown in Table 8. All variables have significant signs barring a few at different levels. The bigger is the trading partners, the more significant is the bilateral trade due to high GDP and thus domestic demand of the importing country. The longer is the distance between two trading partners, higher is the transaction cost, therefore, less is traded. Higher the population of the importing country, higher is the trade between two countries. Higher are the tariffs in the importing country, less is the trade due to trade costs. Finally, higher is the real exchange rate means export earnings are more, therefore, more will be exported.

Equipped with such analytical framework, we may now interpret the results of MLE estimates of equation (6) showing exports of SAARC countries. Table 8 shows the coefficients of all explanatory variables of total exports of five SAARC countries. Coefficients of GDP of SAARC countries have expected signs in total exports except Bangladesh and Sri Lanka, where signs are negative though these are significant. Negative signs in GDP mean that exports of Bangladesh and Sri Lanka do not increase with the increase in GDP of its neighboring countries. This may be because lack of

demand for items exported by these two countries on the one hand or their export basket is limited to fulfill the demand of its neighboring countries on the other.

Table 8 : Maximum Likelihood Estimates (MLE) of the Stochastic Frontier Gravity for Trade among SAARC Countries, 1995-2008

Variables	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Constants	-64.3	-3.74	17.29	-26.68	43.27
	(-5.23)	*(-0.84)*	*(1.71)*	*(-7.31)*	*(4.50)*
GDPj	-0.52***'	0.72**	0.63***	1.09*	-0.93***'
	(-1.45)	(2.73)	*(1.55)*	*(7.50)*	*(-1.1)*
$POPN_i$	2.5*	-0.062	0.23	0.3**	2.35***
	(7.33)	*(-0.31)*	*(0.59)*	*(2.10)*	*(2.76)*
$PCGDP_i$	9.88*	1.65*	1.71***	0.53	-0.77
	(4.29)	*(2.53)*	*(1.00)*	*(0.90)*	*(-1.0)*
$DIST_{ij}$	3.41	-1.66	-3.2	3.32	-1.0***'
	(3.68)	*(- 0.44)*	*(-5.75)*	*(13.35)*	*(-1.6)*
TR_i	0.16	-0.28**'	0.86**	-0.36**'	0.55**
	(0.90)	*(-1.61)*	*(2.18)*	*(-2.28)*	*(1.40)*
$REXR_{ij}$	-3.19**'	0.5***	-0.95***'	-0.32***'	-5.3*'
	(- 3.51)	*(1.78)*	(1.70)	*(1.87)*	*(-4.01)*
TIME	-0.31	-0.016	-0.16	-0.12	0.05
	(- 5.04)	*(-0.32)*	*(-0.9)*	*(-3.21)*	*(0.46)*
σ^2	36.07	2.67	1.66	0.55	2.52
	(1.38)	*(1.64)*	*(4.81)*	*(6.78)*	*(0.88)*
γ	0.98	0.91	0.09	0.000037	0.8
	(55.47)	*(16.29)*	(0.63)	*(0.01)*	*(3.45)*
μ	-11.87	-3.12	0.23	0.0028	1.36
	(- 2.34)	*(-1.05)*	*(0.36)*	*(0.01)*	*(0.94)*
η	0.017***	0.02***	0.18*	-0.04	0.03***
	(1.91)	*(1.09)*	*(4.22)*	*(-0.26)*	*(1.11)*
Log likelihood function	-122.84	-66.13	-145.34	-94.52	-102.48

Source: Values are estimated by authors based on equation (6)

* : Significant at 1 % level, ** : Significant at 5 % level and *** : Significant at 10 % level

Similarly, population and exports have positive relations on the premises that more population of the importing country will create more demand for goods both domestic and foreign, except for India, where the sign is negative contrary to theoretical basis. This implies India's export does not grow with the growth of population of neighboring

countries at least in the case of total exports. This scenario may change if we disaggregate total exports in some major commodities at 2-digit HS categories and see their relationship with the population. Population growth of the neighboring countries does not play a dominant role in determining India's exports at least for the period under study. Intuitively, export of any country is positively correlated with its per capita GDP. Several studies have shown such relationship. Our study shows that exports of SARRC countries are positively correlated with its per capita GDP except for Sri Lanka. Negative sign in per capita GDP implies that though per capita income of Sri Lanka increases, it does not reflect to its export pattern to neighboring countries. This may be due to the fact that weight of items it imports from SAARC countries and its balance of trade. If it imports more from the SAARC countries than exports and exports are limited to some items whose demands are inelastic. In that case, it is unlikely that export will growth with the growth of per capita GDP. But picture will be clear if we do *disaggregated analysis* rather than see totality of exports. Decomposition of Sri Lanka's exports will give better picture about the reason of negative relationship between its per capita income and exports. Other signs are normal and as expected. As mentioned earlier that exports are negatively correlated with the distance because distance increases trade costs by increasing transaction cost. Therefore, except two countries viz. Pakistan and Bangladesh, which are adjacent to India and transport costs are not very significant to their total transaction costs to their exports into larger markets like India, export is negatively correlated with the distance, which is consistent with our analytical argument. Exports of these two countries do not have any relation with distances whatsoever. May be, natures of goods exported by these two countries are inelastic in demand and highly unrelated to price and distance. Moreover, as explained earlier, they have common border with India and have both rail and road connection. Therefore, costs factor does not play a very significant role in determining their exports to SAARC countries.

Coefficients of tariffs have expected signs for India and Pakistan and not with Bangladesh, Nepal and Sri Lanka. This may be explained by the fact that items exported by these three countries are price inelastic rather than price sensitive. Secondly, items exported by these three countries face low tariffs in the markets of the neighboring countries. As it is noted earlier, exports of Bangladesh and Nepal to SMCs are very

negligible and comprises low value added items. Therefore, these are not very sensitive to price. Picture is different in case of India and Pakistan, which basically export which are elastic and price sensitive. Therefore, any change is tariff has negative impact on its exports, which is also consistent with the theoretical underpinning.

Export performance has positive correlation with the real exchange rate of the importing country. Export will increase if real exchange rate increases. This relationship is valid in the long run, but in the short run, this rule may not always follow especially in all commodities on yearly basis. We have calculated real exchange rate. The variable REXR aims to account for significant changes in real exchange rate in South Asian countries. REXR is an index with base 2005=100 for the real exchange rate of the domestic currencies of South Asian countries and the USA dollars and it is set at 1 for any other country. REXR is calculated using the nominal exchange rate and GDP deflator from IMF's IFS and exchange rate is market value, period average. The effect of real exchange rate is expected to be positive on exports. But this sign is expected in the long run, while in the annual basis trade-exchange rate relationship for some commodities may not always follow the long-run direction, principally because of contractual rigidities. However, in our estimations the real exchange rate shows positive correlation only with India but with other countries signs are negatives but significant. Real exchange rates seem to be positive with the manufactured goods but may not follow the same statistical relations with the primary goods. Obviously, the explanations for the signs and sizes of the estimated coefficients have to be found in the likely influence of the real exchange rate on the demand and production of the relevant commodities. Keeping this thing into mind, the significance of real exchange rate on total trade for non-primary goods should empirically have positive effects. The negative signs of real exchange rate (REXR) with the exports of Bangladesh, Nepal, Pakistan and Sri Lanka may be explained by the fact that these countries basically export primary goods to the markets of neighboring countries without giving much emphasis on export of non-primary manufactured goods, which are much sensitive to the movement of real exchange rates.

Vb: Comparative Statics: Scenario Analysis of Impacts of PTAs and FTA for SMCs

Objective of this study is to evaluate the impact of PTAs and FTA among SAARC countries. In this exercise, we hypothetically measure the PTAs and FTA between SAARC countries on a comparative static basis under *ceteris paribus* assumption. The logical argument behind such phenomenon is that the more initial tariff level of any country compared to others, the greater the final effect of such arrangement because of elimination of tariffs and vice versa. This means if tariff level of any SAARC country is higher than its trading partner, any reduction in tariff of that country following a particular formula would result higher imports of that country from the partner country, whose tariff level is already low compared to the former country. Therefore, in the short run, imports of country having higher tariffs would increase much more than increase in imports of partner country (source) because of its lower base-level tariffs. However, tariff is only one among many factors that determine the impact of PTAs/FTA on trade. To calculate the increase in exports of any country, it requires base level exports of that country and elasticity of the importing country. The elasticities will determine the proportionate response to change in exports due to change in tariffs, given the initial tariff level as well as the initial value of exports. These factors determine the absolute change in exports due to change in tariffs.

In this exercise we have considered four hypothetical scenarios, viz. (i) 25 per cent reduction in tariffs, (ii) 50 per cent reduction in tariffs, (iii) 75 per cent reduction in tariffs in finally, (iv) 100 per cent reductions in tariffs i.e. free trade between the countries. In our simulation exercise we have excluded Bhutan and Maldives from SAARC countries due to the following reasons: First, four major countries in SAARC are India, Pakistan, Bangladesh and Sri Lanka, the contribution of other countries in total SSARC trade is marginal. Secondly, India has free trade arrangement with Nepal and Bhutan simultaneously, and India is the largest trading partners of these countries. Thirdly, there has been tremendous lack of tariff data of Bhutan and Maldives. Fourthly, any increase in trade of these tiny countries would not increase intraregional trade substantially. Finally, coefficients of commodity concentration of exports of these countries are much higher

due to few items available for exports, therefore, less benefit out of free/preferential trade, unless they broaden their export base.

Simulated increase in exports of SAARC countries (except Bhutan and Maldives) due to PTAs and FTA is shown in Table 9. In Table 9, we have shown likely increase in intraregional export of different SAARC countries due to PTAs and FTA. In a hypothetical scenario, if any country reduces its tariffs in a phased manner and then eliminates it completely, present exercise shows how much increase in exports of SMCs under different scenarios. In our analysis, we have simulated increase in exports under four hypothetical scenarios viz. 25 % , 50 %, 75% and 100 % reduction in tariffs. Consolidated figures of likely increase in intraregional exports of all SMCs after 100 per cent per cent reduction in tariffs i.e. under free trade, are shown in Table 10. In this exercise, we have simulated increase in intraregional trade of SAARC countries based on tariff level of 2008 and export value of the same year. Under FTA (with all SAARC countries), Bangladesh' export growth will be highest with Nepal i.e. 6.89 per cent followed by India i.e. 4.99 per cent. Its export growth to Sri Lanka will be 3.31 per cent followed by Pakistan (1.24 per cent). This indicates that Bangladesh has much export potential with Nepal and India if it completely eliminates its tariffs with SMCs. Due to FTA, India's export to Nepal market will grow by 11.57 per cent i.e. highest of all countries, followed by Sri Lanka i.e. 4.96 per cent Its export growth to Pakistan and Bangladesh is marginal due to FTA.

If Nepal goes whole hog with the FTA with the SMCs i.e. completely eliminates tariffs with the base of 2008 level, it will registrar highest increase in export to Sri Lankan market i.e. 5.36 per cent followed by India (5.12 per cent). Even its intraregional trade with Pakistan will grow by 3.12 per cent from the 2008 level of trade. But its exports to Bangladesh market will grow only by 0.67 per cent. Due to FTA, Pakistan will consistently increase its exports to almost all countries with highest in the Nepal market i.e. 10.61 per cent followed by India (6.41 per cent) and Bangladesh (2.40 per cent), while with Sri Lanka will registrar will 1.94 per cent increase in export. Protectionism in Sri Lanka is the least as far as tariff is concerned. Therefore, growth of intraregional trade of all SMCs is not very high in the Sri Lankan market. Sri Lanka will be one of the major beneficiaries of FTA in the SAARC region. Due to successful implementation of SAFTA,

Sri Lanka's export to Nepal will increase by 9.37 per cent, whereas with India likely increase in export is 5.63 per cent followed by Bangladesh and Pakistan, where increase in intraregional trade will be 2.81 per cent and 2.62 per cent respectively. One thing is evident from Table 10, increase in intraregional trade due to SAFTA will be highest with Nepal and India. This may be due to the fact that tariff levels of these two countries are among the highest in the region. Obviously tariff levels of both India and Nepal are very high despite the fact that India has been consistently reducing tariffs over the years since 1991 and presently its peak tariff is at ASEAN level, but its collection rate is highest in this region. Therefore, all SMCs will get better market access if India eliminates its high tariff wall at the earliest. Though MFN tariff in India is very low at this moment, its bound tariff is 100 per cent to primary goods, 150 per cent with process goods and 300 per cent to edible oils, which gives much leeway to increase protectionist barriers if the situation is warranted so. Simultaneously, Nepal should also be insisted on reducing and then eliminating tariffs under SAFTA at the earliest.

Table 10 : Likely Increase in Intraregional Trade among SAARC Countries due to FTA, 2008

(Value in '000 $)

Exports fm/to	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Bangladesh		16441.38 ***4.99***	415.77 ***6.89***	977.89 ***1.24***	359.48 ***3.31***
India	42708.77 ***1.32***		196221.64 ***11.57***	30697.38 ***1.73***	140638.25 ***4.96***
Nepal	473.22 ***0.67***	40803.63 ***5.12***		114.15 ***3.12***	4.23 ***5.26***
Pakistan	6176.52 ***2.40***	37865.12 ***6.41***	362.15 ***10.61***		3587.76 ***1.94***
Sri Lanka	752.20 ***2.81***	25001.73 ***5.63***	17.47 ***9.37***	1893.31 ***2.62***	

Figures in bold and italics are percentage increase in exports
Source: Figures are based on simulations estimated by authors.

Table : 9 Likely increase intraregional exports among SAARC countries due to PTAs & FTA
(Value in '000 $)

Exports fm/to	Bangladesh				India				Nepal				Pakistan				Sri Lanka			
	Scen.I	Scen.II	Scen.III	Scen.IV	Scen.I	Scen.II	Scen.III	Scen.IV	Scen.I	Scen.II	Scen.III	Scen.IV	Scen.I	Scen.II	Scen.III	Scen.IV	Scen.I	Scen.II	Scen.III	Scen.IV
Bangladesh					4110.3	8220.7	12331.0	16441.4	103.9	207.9	311.8	415.8	244.5	488.9	733.4	977.9	89.9	179.7	269.6	359.5
					1.25	***2.49***	***3.74***	***4.99***	***1.72***	***3.44***	***5.17***	***6.89***	***0.31***	***0.62***	***0.93***	***1.24***	***0.83***	***1.65***	***2.48***	***3.31***
						60.00														
India	10677.2	21354.4	32031.6	42708.8					49055.4	98110.8	147166.2	196221.6	7674.3	15348.7	23023.0	30697.4	35159.6	70319.1	105478.7	140638.3
	0.33	***0.66***	***0.99***	***1.32***					***2.89***	***5.78***	***8.68***	***11.57***	***0.43***	***0.87***	***1.30***	***1.73***	***1.24***	***2.48***	***3.72***	***4.96***
Nepal	118.3	236.6	354.9	473.2	10200.9	20401.8	30602.7	40803.6					28.5	57.1	85.6	114.2	1.1	2.1	3.2	4.2
	0.17	***0.34***	***0.51***	***0.67***	***1.28***	***2.56***	***3.84***	***5.12***					***0.78***	***1.56***	***2.34***	***3.12***	***1.31***	***2.63***	***3.94***	***5.26***
Pakistan	1544.1	3088.3	4632.4	6176.5	9466.3	18932.6	28398.8	37865.1	90.5	181.1	271.6	362.1					896.9	1793.9	2690.8	3587.8
	0.60	***1.20***	***1.80***	***2.40***	***1.60***	***3.20***	***4.81***	***6.41***	***2.65***	***5.31***	***7.96***	***10.61***					***0.49***	***0.97***	***1.46***	***1.94***
Sri Lanka	188.1	376.1	564.2	752.2	6250.4	12500.9	18751.3	25001.7	4.4	8.7	13.1	17.5	473.3	946.7	1420.0	1893.3				
	0.70	***1.41***	***2.11***	***2.81***	***1.41***	***2.82***	***4.22***	***5.63***	***2.34***	***4.68***	***7.02***	***9.37***	***0.66***	***1.31***	***1.97***	***2.62***				

Figures in bold and italics are percentage increase in exports.
Source: Simulations are based on authors' calculation using stochastic frontier gravity model.

VI: Synergy between Trade & Development Goals of SAARC

In general, surge in South-South economic, social and political interrelations has reshaped international development policy. It is imperative to see the relative effectiveness of trade promotion *versus* trade diversion from a growth-development perspective. Given the preceding picture of potential trade expansion between SAARC nations, it is pertinent to investigate the prospects for development behind these trade agreements. According to Singh and Singh (2009), some of the regions experience development gaps or development deficits, which needs urgent attention. The priority areas identified are: education and literacy, basic health care, gender bias, favorable institutions ensuring good governance and social capital, and transparencies, transport costs, infrastructure, among others. Thus, the factors inhibiting SAARC development goals (SDGs) are the domestic (i.e., behind the border) impediments as well as some external stimuli via less-than-potential trade constraining movement towards the potential frontier and achievement of desired targets. Promoting regional trade integration and cooperation on a sustained basis and achieving growth and development dividends needs removal of these constraints. However, intraregional trade among the SAARC member countries (SMCs) can induce establishment of such enabling factors on a mutually compatible basis. As all these constituent regions are not at same status in economic ladder, trading with *relatively* advanced country in the group would enable the relatively laggard to reach their potential frontiers and narrow the intra-group development deficits. For example, trading with relatively innovative 'India' could unleash the scope of trade and investment-led diffusion of technological know-how to follower countries like Bhutan, Maldives or Nepal and simultaneously, the removal of unnatural barriers (policy induced or structural) constraining its successful implementation and assimilation would help reaching these backward countries to reach the potentials. Given the fact that the share of manufactured exports in total intra-regional exports of SAARC is about 70%, these types of high technology manufactured exports have tremendous potentials for closing the growth deficits.[3]

[3] See Das (2007) for illustrating this kind of mechanism in a cogent framework of North-South and South-South trade. As this paper does not consider sectoral study, for limitations of space and volume of a single

In other words, the results are indicative for exploring the implications of such trade arrangements for meeting the SAARC development goals (SDGs), namely, poverty alleviation, economic growth, catch-up of the laggards with the forerunners, and removal of institutional-infrastructural bottlenecks impeding regional growth and convergence (ISACAPA 2004).[4] Quite appropriately, 'SAARC Leaders at the Thirteenth Summit (Dhaka, 13 November 2005), agreed to make important strides in the areas of science, technology and higher education, to meet the challenges of the twenty-first century and decided to give priority attention to encourage regional cooperation in these areas to derive benefits from the synergy of collective, well-planned and focused initiatives undertaken by Member States.'[5] The Leaders had directed that a SAARC Plan of Action for Science, ICT and Technology be elaborated for consideration during a Meeting of Science, ICT and Technology Ministers. Not only these, considering UN's Millennium development goals and targets, 'developing a global partnership for development' is necessary for eradicating poverty, hunger and income inequality afflicting the subsets of countries in SAARC. [6] By regional cooperation and integration via SAPTA, access to recent technologies via trade and investment from other markets like India (major source) and, relatively less advanced Bangladesh and Sri Lanka, will reduce the lag in the technology flows and also promote exchange of skills and resources. Quite pertinently, as has been mentioned in Section IV above, in the estimated stochastic frontier gravity model the realization of export potential is the technical efficiency (TE) in Equation (5).

Although East Asian FTAs and ASEAN have a juggernaut effect in terms of trade expansion and open regionalism, as has been discussed elsewhere in this paper, SAFTA's experience is much different due to inward-orientation and socio-political institutional constraints reinforcing the 'behind the border' policy impediments. As the mandate and challenges for SAARC development goals go, there is a clear objective 'for a comprehensive and strategic response to the problem of poverty and social development'

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article, in future, a separate study is in our research agenda. Current paper offers qualitative argument in this line.

[4] SAARC development goals for 2005-2010 are alike Millennium Development Goals of the United Nations. See 'An Engagement with Hope' by ISACAPA (2004).

[5] See http://www.saarc-sec.org/main.php?t=2.6

[6] Target 12 aims at non-discriminatory trading and financial system, good governance, development while Target 13 and 18 emphasize the needs for access to exports via dismantling of barriers and most importantly, spreading of new ICT technologies to turn digital divide into enabling digital opportunities.

by regional cooperation in priority areas such as: health, education, environment, and environment. However, although the countries in this group differ in terms of growth and development experiences and impediments, it is important to consider the development potentials of regional cooperation in narrowing the existing gap. In the context of SAARC and BIMSTEC, apart from resource mobilization via capital flows, skill and knowledge exchange, the provision of development and technical assistance is one of the priorities. Thus, regional integration under SAFTA needs to be viewed from an angle of growth and development.

As has been emphasized by Arora and Vamvakidis (2004), Fugazza and Robert-Nicoud (2006), World Bank (2008), a country's development and growth experience depend on it trading partners' economic performance and often, leads to conditional convergence. Thus, there is both North-south and South-South spillover of benefits under increased trade potentials. In fact, South-South cooperation via increased trade can promote North-South trade via, for example, low-cost inputs and manufactures. Under cooperation-based integration (like the case of SAFTA for SMCs or BIMSTEC), several channels work for stimulating partners' economic growth, viz., knowledge production, knowledge sharing, human capital, institutional development, social capital, political stability, and a network based on trust (Greenwald and Stiglitz 2006, Liu and San 2007). These help infant economies in the regions to grow based on the leaders. Industrialization is major engine of growth in countries like India, China, Russia and other emerging economies with backward and forward linkages. According to World Bank (2007), 'India is increasingly becoming a top global innovator for high-tech products and services' (p. xv). By improving the business investment climate, stronger skills, better information infrastructure, R&D, India has promising invention potential and scope of intersectoral spillover across sectors—formal and informal—to pave the way for inclusive innovation. For example, '*New Millennium Indian Technology Leadership Initiative*' program and commercializing knowledge locally and across the border are some of the initiatives for trans-border diffusion of benefits via technical cooperation. India's small miracle has largely been attributed to the emergence of the IT sector. Singh (2002, 2004) has discussed 'the possibility for broad-based IT-led economic growth' via offshore production sharing, grater neighborhood spillover to local economies, and improving

functioning via better policy environment, E-commerce, governance, and removal of distortions, infrastructural bottlenecks, and thus, facilitating trade. Apart from IT sector, Biotechnology sector is also being promoted by the Government and the establishment of science and technology parks for exports is a prime mover in this direction (Vaidyanathan, 2008) .

Das (2007) has shown that North-South as well as South-South trade under different scenarios could enhance technological spillover and other factors facilitating trade. [7] Technological infrastructure enhances trade facilitation and efficiency of transshipments of goods across the border. Diffusion of technology helps countries to 'catch-up' with their advanced counterparts. Geographical distance, volumes of trade, market access, logistics infrastructure and per capita income work in tandem for facilitating trade flows. For reduction of inefficiencies related to transport costs, technological progress is necessary. The empirical model and estimated impacts, as described in Sections 4 and 5, offer a comparative perspective of export potentials of these regions and their performances from the frontiers. Revealed effectiveness of these trade flows depend on realization of growth and development potentials under SAARC's SDG initiatives. For all these countries having *similar* resource endowments, following Heckscher-Ohlin presumption, the scope of gains from specialization and exchange is limited. The production modes are typically labor-intensive in semi-skilled, unskilled or low-tech goods. Country-specific non-economic factors stand in the way of narrowing the relative divergence across these nations. Since 'natural' barriers due to geography or topography do not pose major impediments for these countries, it is essential to consider the role of unnatural barriers like transparency, corruption, underinvestment, openness. Apart from developing these factors, increased intra-regional cooperation via trade and investment will help overcoming the gaps in per capita GDP. In other words, increase in trade and FDI flows, *ceteris paribus*, will enable reducing the inequality in productivity levels among the SAARC countries at different stages of economic growth. Physical capital formation as well as human capital acquisition both helps attainment of such

[7] Literatures abound with the prospect of South-South trade liberalization as a complement to North-South trade. In fact, south-south trade flows could open up trade in intermediates with cost-advantages and thus, lead to increasing market access. Not only that, technologically superior inputs could also cause voluminous trade across the trading regions. Thus, in terms of development co-operation South-South induced effects are of considerable importance.

capacity. Thus, the emergence of the dynamic sectors along with constellation of complementary factors like human capital, better governance, and technological excellence via R&D enables them to become dynamic.

According to Muni and Jetly (2008), despite concluding SAFTA, SAARC experience has been a 'failure' in terms of achieving the developmental objectives. Consolidation of overlapping FTAs into a single SAARC related SAFTA could mitigate the harmful "noodle bowl" effect and preference erosion by encouraging the partners. As has been documented in the context of Japan vis-à-vis India, regional cooperation open up the avenues for growth and development between participating regions via removal of obstacles of trade-impediments as well as factors inhibiting them. In the context of Bay of Bengal Initiative for Multisectoral Technical and Economic Cooperation (BIMSTEC)—a subset of regions under SAARC in cooperation with South-East Asian countries with coexistence of different levels of development experiences—export potential with Japan and realization of growth and development dividends via investing in resources has been analyzed. Among the high-performing economies in SAARC and BIMSTEC, emergence of India as hub of global sourcing, knowledge-intensive services and technologies is discussed at length. Thus, it is evident from the results of trade-potential (Tables 4 and 6) that the prospect of 'mutual' benefit and catch-up for the regional prosperity of SAARC regions loom large. Intra-SAARC development cooperation the relatively backward nations in the bloc could close the education and technology gap with the (relatively) high-performing economies like India and Sri Lanka; in other words, this trade agreement between South Asia (and some of South-East Asia) could facilitate the laggards to move towards the technological frontier of the dynamic emerging economies like India. Concept of convergence and catching-up are discussed in the macro literature; however, here we emphasize on the convergence of distance between technological frontiers along with actual vis-à-vis potential trade frontier.[8] From section IV.d, we see that the *gamma* coefficient stands for a measure of the total variation in exports owing to the influence of 'behind the border' constraints represented by the term 'u'. As *gamma* coefficient is an average over the time period, it will capture the role

[8] Concept of convergence is a debatable concept and definition differs depending on the research purpose at hand. We do not go into that debate in the current research.

of improvements of socio-institutional barriers in narrowing the technological gap between SAARC nations, especially between India vis-à-vis other relatively laggard nations such as Bangladesh, Bhutan, Nepal, amongst others. As the results in Table 4 shows, other SAARC countries need to be more efficient in terms of technical efficiency and cost management in order to be efficient like India in the same product group or else it has to design alternative strategies related to product and market. Thus, tariff cut among these less-developed economies could lead to diffusion of technology. Gamma coefficients depend on the variance of the random error term and measure the total variation of exports due to constraints. Temporal evolution of gamma, however, will depend on dynamic comparative advantage depending upon trade-induced technology diffusion, say '*external factors'*. Thus, we can think of effect of gamma variations as *split* into components such as unnatural and 'external factors.' As 'gamma' determines the gap in potential and actual exports, it will influence the gap in actual and potential TFP across SMCs. Gamma decomposition via 'barrier to diffusion' (external factors) and 'domestic unnatural barriers' would enable us to see the prospect of reducing the development deficits across SAARC member. Thus, realizing trade potentials under SAARC could pave the way for the emergence of the dynamic sectors along with constellation of complementary factors like human capital, better governance, social capital and technological excellence via R&D. This enables them to reap dynamic comparative advantage and helps countries to 'catch-up' with their advanced counterparts. As the results from estimation of Equations (5) and (6) corroborate, 'behind the border' constraints—conceptualized as composite of trade frictions as well as institutional-social-infrastructural bottlenecks—fall significantly to cause a further exploitation of trade potentials; thus, India's predominant role as a technological leader in the frontier areas of invention, namely, ICT and BT sectors will have strong impact on regional economic integration arrangements in achieving economic growth. Considering India as a hub and Bangladesh, Pakistan, Nepal, Maldives, Bhutan as less-developed spokes, SAFTA under SAARC could harness the development potentials as envisaged under SDGs. Considering such development potential, it is indeed worthwhile to consider the prospective *sectors* and measure revealed comparative advantage and trade intensity. In fact, it has been shown that manufacturing sectors like agricultural machinery and inputs, electronic and

electrical equipment, hi-tech and medium tech sectors bear strong promises over long-run (Aggarwal and Pandey, 1992, World Bank 2007). According to Muni and Jetley (p.7, 2008), "India, being the largest economic power in SAARC will have the greatest impact through its policies. The other countries can also contribute to intra-SAARC trade, especially if there is a competitive advantage to trading *within* SAARC as compared to trading with countries outside the bloc."

VII: Concluding Observations: Scope and Limitations

SAARC is a newly emerging trading bloc in Asia. It might be tempting to argue that SMCs' '*beyond the border*' constraints influence its trade policies to be more protective and inward-oriented. Most of the member countries of SAARC do not follow liberal trade policies related to agricultural and consumer goods. Every country in the SAARC region has huge negative list of imports virtually restrict imports of all agricultural and consumer goods. Also "*beyond the border*" constraints are significant to all SMCs. Given the level of 'beyond the border' constraints, in the absence of full information on all '*behind the border*' constraints, the combined effect of the latter on actual exports of individual SAARC country is modeled in the gravity equation, which is estimated using the methods suggested in the literature for estimating stochastic frontier production functions. Empirical results indicate that the *combined effect* of '*behind the border'* constraints has significantly contributed to substantial gaps between potential and actual exports among all members of the SAARC, despite the fact that these countries have initiated export promotion measures since last one and a half decade to integrate its economies with each other. The policy implication from such wide variations in the realization of export potential of SAARC countries is that country-specific 'behind the border' constraints, which are not addressed seriously by trade policy reforms, need to be scrutinized and improved further. *Without eliminating* or reducing such 'behind the border' constraints, forming trade blocs and attempting to increase exports among members and also with developed countries will not yield expected results towards trade creation.

The analysis in this paper shows that intraregional trade among the SAARC countries is low at present, which implies the existence of sufficient potential to enhance intraregional trade. However, such a low figure is not unusual in the early stages of formation of such trading blocs, as similar trend was observed for several years in the case of ASEAN. SAARC will be much stronger with the active participation of Pakistan and Afghanistan in this bloc. Given the existence of trade resistance factors among the SAARC countries, our analysis shows that are substantial potential for improvement of trade complementarities among them. Trade integration will be strengthened further if members of SAARC vigorously pursue preferential trading arrangements (PTAs), with the objective of free trade arrangements (FTA), among the members. While moving towards this objective, countries will experience many other complicated problems faced by other agreements. As suggested by Plummer (2007), if SAARC would follow the '*best practice trade*', there would be a win-win agreement for the parties concerned. First of all, all countries of the SAARC need to define "*rules of origin*". Given that already regional agreements are in operation in SAARC viz. BIMSTEC and Ganga-Mekon Regional Initiative, Bangkok Agreement, etc. , there is bound to be a "spaghetti bowl" type of phenomenon, where for a given product, there could be several different tariff rates depending on what origin it is assigned to. Another problem is harmonization of standards and uniform certification procedures among members of SAARC. The third problem is the identification of negative list of commodities of the respective countries and a detailed plan to prune it in a phased manner and to prepare comprehensive national schedules of items to be offered for concessions among members.

Our study shows that major beneficiary of FTA among SAARC will be the members having lower tariffs than the countries with higher tariffs viz. India. Once intraregional trade is completely free from tariffs, almost all SAARC countries will be able to increase their exports to India substantially since India's tariff rates are higher than other countries of this region. Whereas India's trade gain is not so substantial at least in the short run, mainly because of its high customs tariffs compared to other countries concerned. But in the long run, its gain will be much higher because of its trade and overall economic integration with other countries of this region.

In the *short run*, gains of India from free trade are considered to be much less because of its higher tariffs compared to other SMCs. When India gives duty free access to other SMCs, tariff revenue previously collected on the imports from SMCs turn into export revenues for the exporting firms of SMCs, which is obviously very high because of higher levels of tariffs in India. In this process, firms of SMCs will gain more compared to Indian exporters because of lower tariffs in the former country. Due to low tariffs in the SMCs market, exporting firms of India will enjoy less gain, at least in the short run, from the tariff free access to SMCs. But as a second best solution, apart from declining tariff revenues of the SAARC countries, it can gain substantially in some other ways. Increase in duty free imports from SMCs might translate into at least partial reduction in consumer prices in India. Therefore, welfare gains of Indian consumers will be higher. Nevertheless, as long as India continues to have higher tariffs than SMCs, the danger of potential losses from the transfer of tariff revenue to the firms of the SMCs in the form of higher profits will remain. Therefore, to extract maximum benefits from the free trade arrangements between SAARC countries, it is desirable that latter countries should bring down its tariff level to that of former country as suggested by Panagaraiya (1997). Finally, formation of SAARC FTA is a part of bigger exercise in the Asian region, which has been undergoing for quite sometimes. The ultimate objective of trade liberalization and trade integration of this region is to integrate the entire Asian economies. At present there have been 49 major sub-regional and bilateral trade and cooperation agreements in the Asian region of 47 countries. ASEAN has already formed a free trade union with PTAs in vogue. Since India and China are two big emerging markets in the Asian region, it has been mooted for quite sometimes to bring Korea, China, Japan and India into its fold to form a bigger and stronger *JACIK* (Japan-ASEAN-China-India- Korea) economic group. China has been playing a leading role in all FTAs in the Asian region and all are actively engaged in evolving the FTAs between the pairs. SAARC free trade arrangement is a part of the overall exercise to form a bigger economic union in the Asian region.

Due to lack of uniform data across SAARC countries, this paper could not elaborate on what are the *actual* 'behind the border' constraints that create significant gap between potential and actual exports in SAARC countries. Nevertheless, some

conjectures can be made that the 'behind the border' constraints to export mainly emanate from country-specific socio-economic-political and institutional factors such as port inefficiency, cumbersome procedures in obtaining export licenses, shortage of electricity supply and lack of proper transportation facilities. However, this present exercise will throw some lights on the rationale of the formation of FTAs in the Asian region based on win-win situation. Present study provides some important observations on the formation on greater economic union in the Asian region or the Asian Economic Community. Not only that, as mentioned in Section VI, realization of trade potential via PTA/FTA in SMCs would eliminate development deficits via growth dividends through surge in trade and investment and exchange of skills and knowledge. Removal of 'behind the border' barriers and 'gap' in actual vis-à-vis potential trade would close 'productivity lags' afflicting the followers. Our model is an attempt to quantify that prospect.

Although the Stochastic Frontier Gravity Model has a number of advantages in analyzing the intraregional trade, particularly for the PTA, after isolating the "behind the border" and "beyond and border" constraints to trade from the statistical error terms, it has some drawbacks. It identifies the country-specific "socio-political-economical-institutional" rigidities, which form the "behind the border" constraints to trade. It explains much better the phenomenon of the 90's, sometimes known as "new regionalism".[9] Though it provides a good measure of trade creation, there are few limitations. It does not take into account the possible terms of trade effects associated with trade creation. Hence, the simulated results based on the Gravity Model are generally upward biased. The estimates also give the results in a static framework, and the extent of intraregional trade will possibly further increase if the estimation is carried out in a dynamic framework, incorporating the effects of factors like terms of trade, scale economies, technology spill-over, investment inflows, trade liberalization, etc. These could reinforce the short-term trade creation.

Due to lack of basic information to quantify the required variables, the estimation of the parameters related to aforementioned factors becomes difficult. For example, some price elasticities could be approximated but information on scale economies do not exist.

[9] The new regionalism of the 90's, unlike the trading arrangements of the 60's, has member countries with (a) vastly different levels of development, (b) different sizes of population, (c) different levels of domestic economies, and structure of production, and (d) varying degrees of openness, etc. For details, see WTO (1995), among others.

However, a number of existing studies have shown that the short-term impact is higher than the dynamic impact. The results in this paper do not take into consideration the concessions offered in the form of non-tariff barriers; it only considers reduction of tariffs under different illustrative scenarios. The results of alternate scenarios have also not measured the effect of PTAs/FTAs on different variables related to welfare.[10] Even if the simulations undertaken here correctly measure the impact on trade creation, it should be realized that this impact is not the only factor to be taken into account in evaluating FTAs. The negative effect on bilateral trade with countries not entering in the simulated arrangement is not assessed in these simulations. Also, as we do not focus on dynamic aspects and welfare considerations, the simulation results do not offer insights on welfare indicators. Although the results of the simulations presented here provide an estimate of the potential effects on bilateral trade between each SAARC country and its partner under alternative scenarios of simulated PTA, it offers valuable insight for achieving growth-development goals via intra-regional trade promotion in SAARC. However, given the limited scope of a paper, namely measuring trade potentialities and simulating trade liberalization scenarios, it is too ambitious to deal with all the multi-faceted issues together, which is in our future research agenda.

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[10] Pigato, et al. (1997) have estimated the welfare consequences of a scenario when all tariffs between India and rest of the SAARC member countries (SMCs) are removed. The welfare gains are trade creation benefits - trade diversion losses + terms of trade gains. The welfare results generate significant benefits for both India and the rest of the SMCs. However, it should be noted that the simulation is based on tariff rates of 1993-94 and 1997-98. There is free trade between India-Nepal and India-Bhutan under bilateral trading arrangements.

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