

From SAPTA to SAFTA: Gravity Analysis of South Asian Free Trade

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Abstract

South Asian Association for Regional Cooperation (SAARC) was established in 1985 and South Asian Preferential Trading Arrangement (SAPTA) came into existence in 1995. Four rounds of trade negotiations have already been concluded under SAPTA by 2002. SAARC countries have signed the framework agreement on South Asian Free Trade Area (SAFTA) in 2004 and SAFTA will come into effect at the start of 2006. We use the gravity model analysis to evaluate the progress of SAPTA and the prospects for SAFTA using trade data for 1996-2002. Both panel data and cross sectional data analysis have been used. Our gravity model results show that there is a significant trade creation effect under SAPTA and find no evidence of trade diversion effect with the rest of the world. This supports the proposition that further regional integration may bring about substantial benefits to SAARC region and South Asian Free Trade Area is most likely to promote intra-regional trade through further dismantling of tariff and other non-tariff barriers to trade among members.

***Key words:* Gravity model, Regional trade agreement, Free trade, South Asia**

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Introduction

The South Asian Association for Regional Cooperation (SAARC) comprising seven South Asian countries; Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka was formed in 1985 with the adoption of its Charter at its first Summit in Dhaka, Bangladesh. It was created for the purpose of holding periodic, regional consultations on matters of mutual interest and to explore the possibility of cooperation in economics, social, cultural and other fields. The rationale was based on the success of similar regional groupings elsewhere and strength of the concerted action in international representation with enhanced competitive position ensued.

Following the Sixth SAARC summit held in Sri Lanka in 1991, an Inter-Governmental Group (IGG) was set up to prepare an agreement to establish a South Asian Preferential Trade Arrangement (SAPTA) by 1997. The framework agreement on SAPTA was approved in 1993 and implemented in December 1995, two years ahead of the scheduled. SAPTA is a preferential trading arrangement, aims at promoting and sustaining mutual trade and economic cooperation through exchange of concession within the region through step-by-step approach.

SAPTA was seen as a first step towards South Asian Free Trade Area (SAFTA) which was initially planned to establish before 2005. It was anticipated that SAPTA will facilitate greater specialisation and cost reduction generating substantial trade creation in the region in the view of significant tariff reductions and removal of other non tariff barriers (NTBs), given the existing complementarity in resource endowment, technical know-how and expanding production capability.

The present study applies the gravity model analysis to evaluate the performance of SAARC regional grouping under SAPTA and examine the prospects of the proposed South Asian Free Trade Area (SAFTA). Both panel and cross sectional data for 1996 - 2002 have been used to estimate trade creation and trade diversion effects under the existing arrangement. The regression estimates are taken as evidence of prospects for SAFTA under which deep trade liberalisation measures are contemplated.

This paper consists of four sections. Following the introduction, Section 2 provides an overview of the economic structure and intra-regional trade in South Asia. Gravity model

of South Asian free trade is analysed and presented in Section 3. Conclusions and policy recommendations are given in Section 4.

2. The economy and intra-regional trade in South Asia

Some key economic indicators on South Asian countries are provided in Table 1. World Bank classifies Maldives and Sri Lanka as lower middle-income countries (LMC) and other five South Asian countries as low-income countries (LIC). This indicates that South Asia is one of the poorest regions of the world and greater percentage of its population lives in poverty. More than one fifth of world population (22 percent) is housed in South Asia but its total GDP is only 2 percent of the total world output, according to statistics in 2002. India is the largest country and followed by Pakistan in terms both of surface area and population. Therefore, India and Pakistan play a crucial role for a successful regional cooperation in the South Asian region.

Table 1
Key economic indicators of SAARC countries 2002

Economic Indicators	COUNTRY						
	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
Surface area (Thousands sq. km.)	144	47	3287	0.3	147	796	66
Population (millions)	136	0.851	1048	0.287	24	145	19
GNP per capita US\$	360	590	480	2090	230	410	840
PPP per capita US\$	1720	-	2570	-	1350	1940	3390
% GDP growth (2001-2002)	4.4	7.7	4.4	2.3	-0.6	4.4	3.0
Gini Index*	33.6	-	37.8	-	36.7	31.2	34.4
% Population > \$2 a day**	77.8	-	86.2	-	82.5	84.7	45.4

Survey years: * Bangladesh, Nepal (1995-96), India (1997), Pakistan (1996-97), Sri Lanka (1995)

** Bangladesh, Pakistan (1996), India (1994), Nepal, Sri Lanka (1995)

Source: World Development Report 2003,2004

South Asian countries have traditionally pursued stringent economic management policies including import substitution and exchange controls. High tariff structures and import control arrangements were common and in place mainly to insulate domestic industries from stiff foreign competition. These trade control measures largely served to restrict international trade in the region. Failure of highly managed economic policies to achieve much anticipated economic fortunes and the emergence of economic miracles in the neighbouring South East Asian nations pursuing export oriented open market strategies, forced South Asian countries to rethink over their strategies and finally to adopt more market friendly policies towards their economic management.

Most South Asian countries, for example, India, Pakistan, Sri Lanka, Bangladesh and Nepal, have implemented far reaching economic and trade policy reforms, moving their economies away from protectionism toward greater trade openness and global economic integration. Sri Lanka pioneered economic reforms in the region in late 1970's but other four countries delayed their reforms until late 1980's (World Bank 2003). Trade liberalization process in India was later reversed in 1997 and but resumed again in 2002 with some tariff cuts. Bangladesh trade policy reforms has been slowed and somewhat reversed from mid-1990s. Pakistan embarked upon a comprehensive liberalization of its trade policies including those on agriculture since 1996. However, India and Bangladesh still maintain high barriers against trade primarily through State Trading Enterprises (STEs), tariff rate quotas (TRQs)¹ and quantitative restrictions (QRs)².

In line with trade policy reforms, South Asian nations have revised their exchange rate policies. India, Pakistan and Sri Lanka have now moved to a floating exchange rate regime, with Bangladesh, which had a moderately flexible exchange rate system since 1991, floating its currency since May 2003 and Nepal currency being pegged to Indian rupee.

In terms of openness to trade measured by the total trade to GDP ratio, Maldives and Sri Lanka top the list with 94% and 65% respectively, and followed by Pakistan 33% and Bangladesh, Nepal and India each having a share of trade around one fourth of their annual GDP in 2002.

Despite various initiatives to liberalize the trade between member countries under the SAARC framework, intra-regional trade has remained very low in South Asia compared to other similar regional trade blocs; approximately 2.4 percent of total SAARC trade in 1990. It increased only to 4.1 percent by 1995 with almost 96 percent still accounting for extra regional trade (Table 2). This indicates that there is a substantial growth potential in

¹ India is the principal remaining user of STEs to control imports of rice, wheat, all coarse grains excluding maize and barley, and copra. In other South Asian countries, STEs import monopolies played a significant role in the agricultural products and fertilizer earlier but currently only restricted to the petroleum sectors. TRQs are being used by India to protect its powdered milk and maize producers and introduced recently to permit small quotas of these products to be imported at a moderate tariff rate. High tariffs, probably prohibitive rate, are imposed on imports in excess of quota.

² Bangladesh still use traditional QRs to protect local industries, especially on the import of a range of textile products.

intra-regional trade provided right measures and instruments to boost the trade in the region are applied. It is imperative to identify the existing production capabilities of the region and match them with each member nation's demand structure to determine the magnitude of future trade potential. Such attempt should typically involve an extensive study to pinpoint existing impediments that have prevented or restricted potential trade in the region.

Table 2
SAARC Intra-regional Trade

Year	Intra SAARC Trade USD million	SAARC World Trade USD million	Percentage
1986	1055	44042	2.4
1987	1146	49480	2.3
1988	1732	52669	3.3
1989	1723	58595	2.9
1990	1590	65490	2.4
1991	1914	63435	3.0
1992	2488	71149	3.5
1993	2458	72211	3.4
1994	2937	82839	3.5
1995	4263	103878	4.1
1996	4928	110962	4.4
1997	4447	115370	3.9
1998	6001	123144	4.9
1999	5511	131152	4.2
2000	5884	146924	4.0
2001	6537	143443	4.6

Source: Direction of Trade Statistics Yearbook 1997, 2002 (International Monetary Fund)

Mukherji (2000) shows using intra-regional trade data for 1997 and 1998 for the region that top 100 items (using six-digit HS classification) traded between SAARC members do not even meet the twin criterion of having adequate demand in receiving countries and adequate supply capabilities in the supply countries (source countries). He finds that SAPTA trade negotiations up to Third round have accommodated only a meagre of products having trade potential for concession³. It is extremely important that these types of issues must be addressed in future negotiations in order to achieve regional trade

³ World exports of supply country, world imports of importing country and current bilateral exports between supplying and importing contracting states in 1997 have been used to construct the potential trade.

expansion. Nevertheless, intra-regional trade in South Asia has increased to only 4.6 percent in 2001, indicating that 95.6 percent of SAARC trade is still extra regional.

During the period 1995-2001, SAARC intra-regional trade has registered an average of 8.9 percent growth against 6.2 percent average growth of total SAARC trade with rest of the world (ROW). Increased concentration of trade growth within the region can perhaps be attributed to the progress made under SAPTA agreement. It is indeed important that regional trade share is increased without substantial trade diversion with ROW. Regional blocs that generate net trade diversion effect will deteriorate the welfare of not only member countries of the bloc but also of the ROW.

A close investigation of individual SAARC member's trade statistics and direction of trade reveals that their trade is heavily concentrated on only a fraction of potential markets in the region, specially with countries of historical trade relation. This has resulted in virtually ignoring the opportunities for trade expansion with other member nations which could be a major obstacle to long term goal of South Asian Custom Union and Economic Union (Hirantha 2003).

Outcome of the descriptive analysis of SAARC trade data remains ambiguous and is not much help in drawing conclusion as to the trade creating effect of the preferential trade arrangement in the SAARC region. It is, therefore, necessary to search for an alternative approach that is capable of capturing the impact of regional grouping on the bilateral trade flows of member countries. Numerous studies have shown that gravity typed model is one of the most appropriate ways to model international trade flows (Baldwin 1994, Eichengreen and Irwin 1998, Feenstra 1998). Tinbergen (1962) and Poyhonen (1963) independently developed simple gravity model of trade and numerous adjustments and additions have subsequently been made to the standard gravity model. Regional dummies are used in gravity equations to isolate influence of regional agreements on trade flows which otherwise would have been soaked up in gravity variables. Although, the gravity modelling in international trade has become so popular and widely used, it has still been subject to number of criticism

Owing to limited data availability, potential trade has been calculated only for Bangladesh, India, Pakistan and Sri Lanka.

The choice of independent variables: using GDP at current price versus purchasing power parity adjusted GDP, and that of independent variables: choosing imports or exports versus total trade (exports plus imports) in gravity models has been heavily debated in the literature⁴. Similarly, using pooled data to estimate regression, although it increases the degree of freedom available, has also been questioned as it imposes a common gravity relationship on all reporting countries. Since this is likely to bias the results many researchers allow individual countries to deviate from average gravity relationship by controlling country-specific effect by adopting fixed and random effects panel data techniques. Possibility of heteroscedasticity is controlled by using robust standard errors (Greenway 2000). We, however, use generalized least square (GLS) regression corrected for heteroscedasticity and autocorrelation in our estimation of gravity equation for South Asia and execute two regression estimations, i.e. one for full sample period and another for individual years as explained in the following section.

3. Gravity Model of South Asian Trade:

Basic gravity model of international trade postulates that the trade between country_{*i*} and country_{*j*} is proportional to the product of GDP_i and GDP_j and inversely related to the distance between two countries. Other explanatory variables that are typically included in the model are country size represented by population or per capita GDP and dummy variables reflecting contiguity; geographical and cultural proximity such as common borders and common language, and also participation in various regional trading arrangements.

We estimate the following equation for South Asia using annual data for 1996-2002.

$$\begin{aligned} \log(Trade_{ijt}) = & \alpha_0 + \beta_1 \log(GDP_{it}.GDP_{jt}) + \beta_2 \log(PGDP_{it}.PGDP_{jt}) + \beta_3 \log(Distance_{ij}) \\ & + \beta_4 (Boarder_{ij}) + \sum_k \gamma_k (RTA_{ijk}) + \varepsilon_{ijt} \end{aligned} \quad (1)$$

$Trade_{ijt}$ is bilateral trade (exports plus imports) between country_{*i*} and country_{*j*} at time t (measured in US\\$ millions). GDP is the gross domestic product at current price, $PGDP$ is per capita domestic product at current price, $Distance_{ij}$ is the distance between country_{*i*} and country_{*j*} and $Boarder_{ij}$ is the dummy variable for a pair of countries sharing common

⁴ See Kandogan (2004) for a quite comprehensive analysis of the choice of variables.

boarder and RTA_{ij} is the dummy variable for regional trading blocs and ε_{ijt} is the error term.

The first two explanatory variables capture the idea that larger and richer countries trade more than small and poor countries. The third variable indicates that geographical proximity promotes bilateral trade flows as it reduces transport and information costs. The fourth variable reflects that sharing borders increase the trade flows between any given pair of countries. The final variable captures the influence of trade agreements on the bilateral trade. A negative coefficient is expected in the distance variable and positive coefficients in all other variables.

Annual data on bilateral trade flow for the period 1996 to 2002 for SAARC countries and their major trading partners has been collected from IMF Direction of Trade Statistics. GDP and per capita GDP data has been gathered from IMF World Economic Outlook data. The problem of zero bilateral trade flows that exists between some countries has been addressed by substituting the value of one⁵.

We estimate the gravity equation in (1), first using panel data for year 1996 –2002. We use the generalised least square (GLS) regression corrected for heteroskedasticity and autocorrelation. Subsequently, we run the GLS regression for individual years 1996, 1999 and 2002 separately to examine the behaviour of regional trade over time. Seven regional blocs and two bilateral trade arrangements were considered in our analysis. SAPTA1, SAPTA2, INDOLAK, INDONEP, ASEAN1, ASEAN2, NAFTA1, NAFTA2 and EU. Last five regional blocs have been included as they consist of countries that have regular and significant trade with the South Asian countries. A detail list of countries is given in Appendix I. Following Hassan (2001), we introduced an additional variable for each bloc indicated by the suffix “N” that stands for trade with countries outside the bloc to capture trade diversion (TD) effect.

We perform three regression run to check the robustness of our results. First, with the all the blocs including bilateral trade agreements; second, with South Asian trade blocs and bilateral trade agreements, and finally, with all regional blocs excluding bilateral trade

⁵ The literature identifies three methods to handle the zero bilateral trade issue. Discard such trade flows from the sample, substitute small values for zeros or use threshold Tobit estimation techniques proposed by Eaton and Tamura (1994). However, studies have shown that the choice of approach has not substantial effect on the estimation results (Wang and Winter 1991, Baldwin 1994).

agreements. The panel results for period 1996-2002 is summarised in Table 3. All three standard gravity variables are statistically significant at acceptable levels and retain their expected signs. The estimated coefficient on the log of the product of two countries GDPs is around 0.771, suggesting that trade increases with country size but less than proportionately. The coefficient for the log of the product of two countries per capita GDPs is about 0.13, indicating richer countries trade more. The results confirm the importance of distance and common boarder in intra regional trade. The coefficient on the log of distance is around -0.641 , indicating that when distance between two countries is increased by 1%, trade between them falls by about 0.64%. The coefficient on boarder is about 0.171. This means that two countries sharing a common boarder trade 18% [$\exp(0.171) = 1.18$] more than two otherwise similar countries.

Table 3
Regression results of gravity model of bilateral trade flows, 1996-2002

Variable	Coefficient	z-statistics ^a	Coefficient	z-statistics ^a	Coefficient	z-statistics ^a
Constant	-9.334*	37.55	-5.725*	31.02	-9.616*	38.62
GDP	0.804*	110.51	0.792*	145.56	0.771*	111.25
GDP per capita	0.087*	7.91	-0.008	1.18	0.130*	11.97
Distance	-0.665*	44.66	-0.801*	64.56	-0.641*	41.88
Boarder	0.121*	2.77	-0.033	0.73	0.171*	3.82
SAPTA1	0.338	0.47	0.455	0.68	1.562*	2.76
SAPTA1N	0.618*	9.25	0.698*	11.04	1.072*	21.36
SAPTA2	0.311**	2.52	-0.957*	13.08	0.156	1.25
SAPTA2N	-0.714*	11.03	-1.264*	28.88	-0.863*	13.52
INDOLAK	1.549**	2.14	1.845*	2.74		
INDOLAKN	0.484*	7.96	0.549*	8.69		
INDONEP	-0.323*	3.34	-0.386*	3.51		
INDONEPN	-0.497*	10.82	-0.691*	19.79		
ASEAN1	0.264**	2.10			0.270**	2.10
ASEAN1N	0.273*	7.00			0.251*	6.35
ASEAN2	1.274*	14.63			1.543*	18.11
ASEAN2N	0.225*	4.49			0.342*	6.97
NAFTA1	0.823*	6.53			0.731*	6.02
NAFTA1N	-0.195*	4.52			-0.191*	4.38
NAFTA2	0.671*	6.39			0.831*	7.93
NAFTA2N	-0.116***	1.81			-0.047	0.74
EU	0.309*	5.37			0.454*	7.93
EUN	0.004	0.10			0.069***	1.89

*, **, and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively.

a. Absolute values

Over the full sample period, SAPTA1 appears to have been important and statistically significant. If two countries are members of SAPTA1, they would trade 4.8 times higher than two otherwise similar countries [i.e. $\exp(1.562)=4.7683$]. This shows that there is a significant trade creation among SAPTA1 members. The results also indicate substantial

trade creation between members of SAPTA1 and non-members [$\exp(1.072)=2.9212$]. However, when SAPTA1 is expanded to include other SAARC members, i.e. SAPTA2, it is not statistically significant. Nonetheless, SAARC countries taken together show significant trade diversion effect during the full sample period. They tend to trade 58% less with non-members than do typical countries in our sample [$\exp(-0.863)=0.421$].

The estimated coefficients of ASEAN1, ASEAN2, NAFTA1, NAFTA2 and EU are statistically significant and positive. ASEAN1, ASEAN2 and EU demonstrate increased trade with non-member countries, but NAFTA1 and NAFTA2 indicate slight trade diversion effect with non-members, i.e. 17% and 4% less trade respectively with non-members [NAFTA1N: $\exp(-0.191)=0.8261$ and NAFTA2N: $\exp(-0.047)=0.954$].

Table 4

Regression results of gravity model of bilateral trade flows, 1996, 1999 and 2002

Variable	1996		1999		2002	
	Coefficient	z-statistics ^a	Coefficient	z-statistics ^a	Coefficient	z-statistics ^a
Constant	-13.844*	148.54	-15.446*	92.65	-15.897*	92.03
GDP	0.778*	298.36	0.842*	264.42	0.857*	198.89
GDP per capita	0.314*	66.08	0.332*	47.22	0.339*	48.64
Distance	-0.635*	120.44	-0.653*	59.15	-0.701*	63.81
Boarder	0.109*	3.22	0.308*	14.80	0.388*	8.50
SAPTA1	1.134***	1.70	1.013	1.45	1.367***	1.77
SAPTA1N	1.006*	39.47	0.650*	22.54	0.810*	25.82
SAPTA2	2.206*	26.40	2.325*	30.71	2.348*	21.85
SAPTA2N	0.101*	3.31	0.343*	8.73	0.394*	9.36
ASEAN1	0.741*	3.81	1.802*	23.69	1.821*	22.43
ASEAN1N	0.683*	47.87	0.948*	30.39	0.932*	35.20
ASEAN2	1.869*	45.62	1.758*	24.91	2.192*	36.05
ASEAN2N	0.556*	27.10	0.475*	15.53	0.742*	21.90
NAFTA1	0.183	0.85	-0.287*	5.76	-1.036*	6.61
NAFTA1N	-0.339*	16.79	-0.610*	81.15	-0.947*	31.72
NAFTA2	1.496*	17.53	1.538*	22.80	2.414*	28.09
NAFTA2N	0.367*	13.23	0.537*	17.82	0.965*	24.24
EU	0.649*	18.52	0.418*	11.80	0.671*	16.81
EUN	0.201*	9.96	0.075*	3.05	0.251*	8.89

*, **, and *** indicate statistical significance at the 1%, 5% and 10% levels, respectively.

a. Absolute values.

To shed further light on how trade between SAARC countries has changed over time, especially as trade negotiation under the regional grouping proceeds, we have estimated GLS regression for selected years 1996, 1999 and 2002. The estimation results are reported in Table 4. The estimated coefficients of all variables are statistically significant for individual years except SAPTA1, which is not significant in year 1999. The values of

the coefficients of gravity variables, i.e. GDP, per capita GDP and distance, more or less the same compared to panel data estimation earlier. Any two SAPTA1 member countries trade almost 4 times higher than otherwise similar countries in 2002 relative to 3 times as much as trade they had in 1996. There is no evidence of trade diversion between SAPTA1 members and non-members but intensity of trade has dropped marginally in 2002 in comparison to 1996. The estimated results for 2002 show that bilateral trade between any two SAARC (SAPTA2) members is 10.5 times higher than two otherwise similar countries in our sample. According to estimated coefficients, SAARC countries not only have promoted intra-regional trade by 2002, but also have increased bilateral trade with non-members [$\exp(0.394)=1.48$], thereby ruling out possibility of any significant trade diversion emanating from the regional trade bloc.

4. Conclusions and recommendations

Our gravity model results in the preceding section are quite in contrast to previous studies on the South Asian regional trade agreement using different sample periods. For example, Hassan (2001) found that SAARC countries have not only reduced trade among them but also reduced trade with non-members⁶. However, our analysis shows strong evidence of trade creation in the region under SAPTA with no trade diversion effect as far as trade with non-members is concerned. This is not a surprising outcome as most South Asian countries relies heavily on countries outside the region for most their imports requirements. As a result, increased intra-regional trade is sustained by increased trade with non-members. Evidence of trade creation under SAPTA bode well for the proposed Free Trade Area (SAFTA), which will come into effect in 2006. SAFTA consists of far reaching trade and investment liberalization measures that go beyond the removal of tariffs and NTBs. Free trade agreement makes substantial provisions on simplification of banking facilities for import financing, transit facilities for the landlocked countries, removal of barriers to intra-SAARC investments, macroeconomic consultation, rules for fair competition and promotion of venture capital, development of communication systems and transportation infrastructure, easing foreign exchange controls on repatriation of profits, and simplification of procedures for business visa etc that may remove existing impediments to further expansion of intra regional trade.

⁶ This study has used 1997 annual trade data for twenty seven countries and run GLS regression adjusted for heteroskedasticity and autocorrelation.

However, intra regional trade between SAARC countries can be further promoted with positive spill over effect on trade with non-members, if serious efforts are made to expedite necessary structural adjustments in member states and inefficiencies in the economic system are addressed without further delays.

Future research using gravity analysis to model international trade flows should incorporate the impact of infrastructure and geographical disadvantages on the transport costs and ensuing effect on bilateral trade flows⁷. These additional variables may allow us to capture higher level of effective protection that may discourage intra regional trade. South Asia consists of landlocked countries and countries with zero bilateral trade flows. An augmented gravity model will, therefore, help explain some salient features of South Asian trade that are not describe by standard models.

Appendix I:

List of trade blocs and countries

SAPTA1: India, Pakistan, and Sri Lanka

SAPTA2: SAPTA1 plus Bangladesh, Bhutan, Maldives, and Nepal

INDOLAK: India, Sri Lanka

INDONEP: India, Nepal

ASEAN1: Indonesia, Malaysia, Myanmar, Philippines, Thailand, and Vietnam

ASEAN2: ASEAN1 plus Australia, China, Japan, and Korea

NAFTA1: Canada, USA, and Mexico

NAFTA2: NAFTA1 plus Chile, and Brazil

EU: Belgium, Denmark, France, Germany, Italy, Netherlands, Spain, Sweden, and UK

⁷ Limao and Venables (2001) demonstrate the importance of these additional variables in the real cost of trade.

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