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## *Impact of Trade Facilitation Measures and Regional Trade Agreements on Food and Agricultural Trade in South Asia*

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## *Executive Summary*

South Asia has been considered as the least integrated region in the world despite its attempts to liberalize trade using various unilateral, bilateral, regional and multilateral arrangements. It has long been argued that the limited success of South Asia to liberalize regional trade was due to limited tariff reductions and remaining barriers present in trade agreements; less complementarities in production and consumption; and political friction among the countries. More recent studies indicate that smaller trade gains in South Asia is mainly due to the fact that inadequate attention was paid to trade facilitation measures such as efficiency of customs and other border procedures, quality of transport, and cost of international and domestic transport. In this context, the objective of this study is to provide quantitative estimates on gains that can be acquired from improving trade facilitation in South Asia, focusing on exports of food and agricultural commodities.

Sectoral gravity models of exports of five product categories, i.e., all food and agriculture; live animals; vegetables; processed food; and manufactured products, were estimated using conventional explanatory variables (GDP of trading partners and Distance, and selected cultural variables) augmented by trade restrictiveness indices, presence of trade agreements, as well as trade facilitation variable. South Asian Preferential Trade Agreement (SAPTA) has improved agricultural exports.

Trade facilitation variables have significant effects on exports of different products, in varying degrees, depending upon the proxy used. The Logistic Performance Index has large positive effects on value of exports of all the product categories. The estimates for trade costs are negative and significant as expected. Improving trade costs and time delays in South Asian countries up to the average values of best performer in South Asia (least cost is recorded for Pakistan and best LPI is observed in India) bring down trade costs by over 17% and improvement in LPI s by 0.72, resulting in an increase in the value of agricultural trade of 18% and 27% respectively. These results indicate that, by reducing inefficiencies at the borders in South Asia, significant trade gains can be achieved.

## 1. Introduction

It is evident that countries with inadequate trade infrastructure are less capable of benefiting from the opportunities of expanding global trade. In most countries, the difficulty is not due to presence of high-tariffs, but due to the persistence of administrative, bureaucratic, and physical bottlenecks along their export and import supply chains (Ikenson, 2008), which are commonly called as Trade Facilitation measures. Trade Facilitation has become a significant part of the current debate on trade liberalization policy.

In a narrow sense, trade facilitation addresses the logistics of moving goods through ports or customs at the border. A broader definition includes the environment in which trade transactions take place, including the transparency of regulatory environments, harmonization of standards, and conformance to international or regional regulations. Wilson *et al.* (2003) identified four indicators that measure four different categories of Trade facilitation efforts. They are (i) Port efficiency: designed to measure the quality of infrastructure of ports and airports, (ii) Custom environment: designed to measure direct custom costs as well as administrative transparency of customs and border crossings, (iii) Regulatory environment: designed to measure the country's approach to regulations, and (iv) E-business usage: designed to measure the extent to which an economy has the necessary domestic infrastructure (telecommunications, financial intermediaries, logistics firms) and is using networked information to improve efficiency and transform activities to enhance economic activity. Consequently, World Bank (2007) considers improvements in all aspects of supply chain performance as trade facilitation.

The results of the studies done in this area indicate that the expected expansions in trade due to improvements in trade facilitation are quite significant. According to Djankov *et al.* (2006), each additional day that a product is delayed prior to being shipped reduces trade by at least one percent and delays have an even greater impact on developing country imports and exports of time sensitive goods, such as perishable agricultural products. According to UNCTAD (2001), a one percent reduction in the cost of maritime and air transport could increase Asian GDP by \$3.3 billion and a one percent improvement in productivity in wholesale and retail services could increase GDP an additional \$3.6 billion. According to Freund and Weinhold (2000), a 10 percent increase in relative number of Web hosts in one country would have increased trade flows by one percent in 1998 and 1999. Flink *et al.* (2002) find that 10 percent decrease in communication costs is associated with an 8 percent increase in bilateral trade. Otsuki *et al.* (2001) finds that 10 percent tighter EU standard on aflatoxin contamination levels would reduce African exports by 4.3 percent for cereals and 11 percent for nuts and dried fruit.

More specifically, the studies indicate that smaller trade gains in South Asia is mainly due to the fact that not sufficient attention has been paid to trade facilitation measures. World Bank (2007) identifies a number of constraints in South Asia in terms of trade facilitation: (i) limited road density, rail lines, and mobile tele-density per capita, (ii) lengthy customs and port clearance times, (iii) poor transport and communications, (iv) the fact that trucks of one country are not allowed across the border to deliver cargo, (v) regulatory constraints introduced at the gateways and border crossings, (vi) costly domestic transport owing to the distance between the production area and the major ports, and (vii) fragmented trucking industries and old and inefficient truck fleets.

Modeling of trade facilitation measures such as red tape procedures (customs clearance), health and safety regulation, competition laws, technical standards (licensing and

certification regimes, environmental standards) is of growing interest. They are mostly evaluated using gravity models, which provide a benchmark for trade under frictionless conditions. In their simplest form, trade between a pair of countries is a positive function of trade potential and mutual trade attraction. The unobservable trade costs, *i.e.*, trade equivalents, are mostly modeled usually using dummy variables. Continuous variables like Trade Restrictiveness Index by the World Bank and Freedom Index, proposed by the Heritage Foundation, have also been incorporated in gravity models. Philippidis and Sanjuan (2007) used dummy variables for technical standards, health and safety costs, licensing laws and red-tape procedures. Santis and Vicarelli (2007) included multilateral trade resistance index in the gravity equation and estimated it using panel data techniques. Wilson *et al.* (2003) used country-specific data for port efficiency, customs environment, regulatory environment, and e-business usage as measures for trade facilitation.

No attempt has been made so far to quantify the likely trade expansion effects, especially in food and agricultural sectors that can be acquired through strengthening of trade facilitation measures particularly in South Asian countries.

The objective of this study is to assess the extent to which trade facilitation in South Asia help to improve trade flows in South Asian countries and their trading partners.

The specific objectives of the study are:

- (i) To document the pattern of food and agriculture trade of South Asian countries focusing on export destinations and import sources.
- (ii) To document the status of trade facilitation in South Asia vis-à-vis other regions in the world and to document attempts made to improve intra-regional trade in South Asia through Regional Trading Agreements.
- (iii) To review previous studies on gains from intra-regional liberalization of trade in South Asia.
- (iv) To estimate a gravity equation to assess gains through improvement in trade facilitation measures vis-à-vis other factors affecting international trade.

The paper is organized as follows. Section 2 presents patterns of food and agricultural trade of South Asia, tariff and non-tariff barriers to trade and the regional trading agreements in South Asia. Section 3 presents the status of trade facilitation in South Asia using standard trade facilitation indicators. Section 4 summarizes estimates provided by other studies quantifying the impacts of RTAs and trade facilitation. Section 5 presents gravity model and data and data sources. Results of estimation and simulation are presented in section 6. Section 7 provides conclusions and policy implications.

## ***2. Intra-Regional Food and Agriculture Trade in South Asia***

### **2.1 Trade Flows in South Asia**

The South Asian countries are more involved in trading with countries outside the region than countries within the region (Table 1). Their largest trading partners are the major industrial nations in the European Union (EU), along with the United States, China and the United Arab Emirates (UAE). A substantial portion of the region's trade also takes place with countries in the Asia-Pacific region, including Australia, New Zealand and the high-income East Asian countries (Hong Kong, Japan, Korea, Singapore, and Taiwan).

Table 2 and 3 show the trading partners of India, which is the largest country in the region in terms of population, geographical size and economic size. Being the largest trading partner of Afghanistan, Bangladesh, Bhutan, and Sri Lanka, India also is the trade hub in the region. The EU, China, and Saudi Arabia account for 16.07 percent, 9.40 percent and 7.21 percent, respectively of the value of total imports, while for exports the EU, United States and United Arab Emirates account for 23.61 percent, 14.96 percent and 9.52 percent, respectively.

Table 2 shows the major trading partners of India according to the value of exports and imports of food and agricultural commodities. Indonesia (18.99 percent), Argentina (10.88 percent) and Canada (8.28 percent) are the major suppliers of India's imports. On the export side, the European Union (18.32 percent) the United States (9.44 percent), and UAE (5.77 percent) are the major export destinations for Indian agricultural and food products. However, India's trade is not highly concentrated by source or destination in comparison with many developed countries.

Table 9 also demonstrates that among the South Asian countries, percentage trade contribution to the GDP is much higher in Maldives followed by Sri Lanka, Nepal, Bangladesh, Pakistan and India. The contribution of agriculture to trade is high in Sri Lanka and followed by Maldives, Pakistan, Nepal, India, and Bangladesh.

## 2.2 Trade Restrictions by South Asian Countries

Notwithstanding the attempts made to liberalize trade, South Asian countries maintain a great many trade barriers against each other. These include high customs duties, non-tariff barriers like technical and health certifications and standards and also quantitative restrictions. Tariff barriers are in several forms ad valorem, specific tariff quotas and ad valorem equivalents of specific tariffs. Table 4 illustrates how the applied tariff imposed by each South Asian country on their partners.

The types of Non Tariff restrictions imposed by the South Asian countries are multi-fold. Bangladesh has imposed non-automatic licensing and prohibitions as a quality control measures on goods that are imported. For the importation of goods on the restricted list, a Letter of Credit Authorization (LCA) form is needed. Prohibitions are imposed to ban products like drugs and related goods, live animals and animal products etc. Bangladesh also imposed technical measures such as standard and certification on processed food items, Marking, labeling and packaging requirements.

Bhutan also imposed non-automatic licensing in a way of import permits for the importation of some agricultural products. Technical measures such as Sanitary and phytosanitary (SPS) certificates, marking and labeling requirements also act as non-tariff barriers.

India imposed antidumping measures as a price control measure to protecting domestic production. India has also imposed prior authorization for sensitive product categories specially focusing genetically modified food. India prohibited in importing certain items that can damage to the environment or wildlife and human by import restrictions of certain animal products, fresh fruits and vegetable coated with edible and non-edible wax. The Bureau of Indian Standards is responsible for developing mandatory standards and certifications enforced by the appropriate government authority. The goods that are entered to India should fulfill the marking requirements and labeling requirements of India.

Maldives has imposed non-automatic licensing, quotas and prohibitions due to human health, safety, security, environmental concerns and religious reasons as a quality control

measure. Sanitary certificates on live animals and phyto-sanitary certificate on live plants. Labeling is also became a significant requirement specially importing food items.

Sri Lanka is also engage in setting prohibition on some meat products. Agricultural products are subjected to licensing and prior authorization is necessary for some imports for example GM foods. Marking and labeling requirements for some products also defined according to the country prerequisite.

### 2.3 Regional Trade Agreements in South Asia

Intraregional trade is less than 5% of its total trade in South Asia (World Bank, 2009). The South Asian region has attempted to strengthen regional economic integration through regional, sub-regional and bilateral arrangements. The following paragraphs describe the trade agreements in South Asia.

#### *South Asian Preferential Trading Agreement (SAPTA) and South Asian Free Trade Area (SAFTA).*

The framework agreement on SAPTA was finalized and signed in 1993 by SAARC member countries (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka). The SAPTA came into force in December 1995 after conclusion of first round of negotiations in April 1995. Four rounds of trade negotiations had taken place under the aegis of the SAPTA and it has graduated into South Asian Free Trade Area (SAFTA) in 2004, which came into effect in 2006 with the objective of creating a FTA to include eight South Asian countries. Afghanistan was given the membership of SAARC in year 2005. It was agreed that SAPTA is a stepping-stone to higher levels of trade liberalization and economic co-operation among SAARC member countries. The Agreement reflected the desire of the member states to promote and sustain mutual trade and economic cooperation within the SAARC region through the exchange of concessions.

#### *Indo- Sri Lanka Free Trade Agreement (ISFTA)*

The Indo-Sri Lanka Free Trade Agreement was signed in 1998 having the objective of promoting economic relations between India and Sri Lanka through the expansion of trade and the provision of fair conditions of competition for trade between India and Sri Lanka. The aim was to remove barriers to trade in attaining harmonious development and expansion of world trade. The contracting parties also agreed to establish a Free Trade Area for the purpose of free movement of goods between their countries through elimination of tariffs on the movement of goods.

#### *Pakistan-Sri Lanka FTA (PSFTA)*

The free trade agreement between Pakistan and Sri Lanka was signed in 2002 and came into effect from July 2005. The objectives of this agreement are to promote harmonious development of economic relations between Pakistan and Sri Lanka through the expansion of trade in goods and services, to provide fair conditions of competition for trade in goods and services between Pakistan and Sri Lanka and to contribute in this way, by the removal of barriers to trade in goods and services, and to harmonious development and expansion of bilateral as well as world trade.

#### *Bhutan-India Free Trade Agreement*

Bhutan India FTA was signed in 2006 with the objective of expanding bilateral trade and collaboration in economic development of member nations in India and Bhutan. It came into force in July 2006 and plan to remain in force for a period of ten years.

#### *India- Afghanistan Preferential Trade Agreement*

India-Afghanistan PTA was signed in 2003 for strengthening intra-regional economic cooperation through removal of barriers to trade and the harmonious development of national economies. It is in force since 2003.

#### *India –Bangladesh Bilateral Trade Agreement*

The original bilateral trade agreement between India and Bangladesh was signed in 1980 for a three year period. The amended agreement between was signed in 2006, recognizing the need and requirement of member nations to explore all possibilities, including economic and technical cooperation, for promotion, facilitation, expansion and diversification of trade between the two countries on the basis of equality and mutual benefit.

#### *India- Nepal Treaty of Trade*

This PTA was signed in 1991 and in force since 1991. The objective of the agreement was to strengthen the economic cooperation between the nations and thereby develop their economies and to convinced of the benefits of mutual sharing of scientific and technical knowledge and experience to promote mutual trade.

#### *Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)*

BIMSTEC was emerged in 1997 as a linkage between South and Southeast Asia. The member countries were Bangladesh, India, Sri Lanka and Thailand. At the bigining this was known as Bangladesh, India, Sri Lanka ,Thailand Economic Cooperation (BIST-EC). Nepal and Bhutan also took their membership in 2004. The agreement was formed for strenthening economic cooperation within the region and to fully realise the potential of trade and development for benefit of their nations. BIMSTEC act as a stumulus to the strengthening not only economic cooperation among partners but also lower the costs, increase intra-regional trade and investment, increase economic efficiency, create a larger market with greater opportunities and larger econommies of scale for businesses of the parties and enhance the attractiveness of the partners to capital and talent.

#### *Asia Pasific Trade Agreement (APTA)*

APTA was formed in 1975. Initialy it was known as the Bangkok agreement. It is the oldest preferential trade agreemet among developing countries in the Asia Pasific Region. Bangladesh, China, India, Republic of Korea, Lao PDR and Sri Lanka are the members in this agreement. It aims at promoting regional trade through exchange of mutually agreed concessions by the member nations.

### **3. Trade Facilitation: Measurements and Status**

As stated earlier, trade facilitation has been defined in a narrow sense as the transportation logistics and custom administration associated with cross border trade. In the recent past, this definition was broadened to include environment where the trade transactions take place. This includes the transparency of trade policy and regulation as well as product standards, infrastructure and technology as it applies to lowering trade costs (World Bank,

2009). With this broader definition, four aspects are commonly addressed under trade facilitation. They are namely (i) port efficiency, (ii) custom environment, (iii) regulatory environment and (iv) service sector infrastructure. Port efficiency measures the quality of infrastructure of maritime and airports. Custom environment measures the direct custom costs and administrative transparency of customs and border crossings. Regulatory environment deals with the institutional issues and regulations. The service sector infrastructure represents the extent to which an economy has the infrastructure on telecommunications, financial intermediaries and logistic firms (Wilson *et al.*2005).

World Economic Forum's Global Enabling Trade Report presents 10 pillars and the indicators related to trade facilitation are given in: (i) Efficiency of custom administration (Burden of custom procedures and Customs services index), and (ii) Efficiency of import-export procedures (Effectiveness and efficiency of clearance, Time for import, Documents for import, and Cost to import). The following section highlights the different indicators of trade facilitation under these categories

### 3.2 Port Efficiency and Customs Environment

#### *Logistics Performance Index (LPI):*

Improving logistic performance has become an important development policy because it encompasses array of actions such as the performance of customs, trade-related infrastructure, inland transit, logistics services, information systems, and port efficiency. The efficiency of such areas determines whether countries can trade goods and services on time and a lower cost. The complexity of these procedures made it difficult to develop an indicator to measure logistic performance of a country because it is not easy to collect global basis information on these issues. The other problem is even if the information is available; it is not easy to aggregate inherent differences in the supply chain structure among countries.

The LPI developed by the World Bank is a closest proxy in this regard. The LPI and its indicators reflect the overall perception of a country's logistics. The subsections of LPI include (i) Efficiency and effectiveness of the clearance process by customs and other border control agencies, (ii) Quality of transport and information technology infrastructure for logistics, (iii) Ease and affordability of arranging shipments, (iv) Competence in the local logistic industry, (v) Ability to track and trace shipments, (vi) Domestic logistics costs (cost of local transportation, terminal handling and warehousing) and (vii) Timeliness of shipments reaching destination. The LPI and its indicators are based on information gathered in a worldwide survey of thousand logistic professionals. Each respondent were asked to evaluate the logistic performance and the environment and institutions in support of logistics operations in the country, and to provide time and cost data. LPI is given as a score ranging from one to five (One being the worst performance and five being the best performance).

The survey results revealed that all developed countries are top performers and they are considered as major global transport and logistics hubs. Table 5 shows that some developing countries also record a better performance (World Bank, 2007). For an example, India records a LPI of 3.1 and is the top most country among the low income countries in terms of LPI. Pakistan with a LPI of 2.62 is also included in the top ten representing the position of logistic performance in South Asia.

#### *Trading Across Borders:*

Doing Business project of the World Bank group provides a number of measures on trading across borders. They show the procedural requirements for exporting and importing a standardised cargo of goods. Data under this topic are based on the response to a detailed questionnaire developed by the World Bank in 2005 provided by samples of freight-forwarding companies from 146 countries. The survey includes the exporting procedures which are divided into four stages, ie. Pre-shipment activities (such as inspections and technical clearance), inland carriage and handling, terminal (port) handling, including storage if a certain storage period is required, and finally customs and technical control. At each stage, the respondents describe what documents are required, where do they submit these documents and whose signature is necessary, what are the related fees, and what is an average and a maximum time for completing each procedure (Djankov *e. al.* 2005).

The export procedures range from packing the goods at the factory to their departure from the port of the exporting country. The measures were introduced with several assumptions. The products are assumed to be traveled in a dry cargo (the product does not require refrigeration or any other special environment), 20 foot full container load and the product does not require special Phyto-Sanitary or environmental safety standards other than accepted international standards (World Bank, 2008).

The data base has introduced six measurements. Table 8 shows the main indicators in trading across border, *ie.* Number of documents, days for exports/ imports and the cost involve in exports/ imports.

*Number of documents for exports/imports:*

The number of documents for exports and import includes all the documents required to export/ import goods assuming the contract has already been agreed and signed by both parties. The documents considered include bank documents, custom declaration and clearance documents port filling documents, import licenses and other official documents exchanged between the concerned parties.

*Number of days for exports/imports:*

Number of days for exports/imports measures the time taken to the entire export/import procedure. If a procedure accelerated for an additional cost, the fastest legal procedure is chosen. It is assumed be that neither the exporter nor the importer waste time. The waiting time between two procedures is also included in this measure.

*Cost for exports/imports:*

Cost involve in the export/import is the fees for a 20 foot container in US dollars. Cost components are the cost for documents, administrative fees for custom clearance and technical control, terminal handling charges and the cost of inland transport. This does not include tariff or trade taxes and only official costs are recorded.

*Other Indexes:*

Freight cost to US: The freight cost to US shows the ratio of total freight charges and insurance costs to the net value of merchandise goods imports. This is calculated at the origin of US ports and is reported as a percentage of total import value. This includes all shipments through air, maritime and land freights but excludes domestic transportation costs between cities.

Liner shipping connectivity index (LSCI): LSCI is a computed average index which combines the available information about a country's maritime transport.

Pump price for diesel fuel (US \$ per liter): This measure reflects the prices at the pump of the most widely sold diesel fuel within the country.

Electricity cost for industry (\$ per kilowatt\*hour): This measure is based on the information posted by the Energy Information Administration of the US Department of Energy on the industry electricity prices per kilowatt-hour from 1997 to 2005 (in US Dollars). The kilowatt-hour prices are based on the energy enduses prices including taxes.

## 3.2 Regulatory Environment

### *Non Tariff Barriers (NTB)*

The NTBs are the regulations or standards imposed on goods with the objective of advancing domestic social goals such as public health by establishing minimum standards or prescribing safety requirements and accomplishing environment conservation. The World Trade Organization strikes a balance between these competing uses of standards in international trade. As an example, Sanitary and Phyto-Sanitary (SPS) agreement of the WTO acknowledges that governments have the right to take necessary measures for the protection of human, animal and plant health and they should avoid using strict health and safety regulations. This agreement also encourages countries to adopt international standards as a move towards global harmonization of product standards. However, there is a growing discontent among WTO members, particularly among developing countries, that developing and least-developed countries so far have played a very minor role in setting international standards and they have suggested that developed countries use these measures for protectionist purposes by prescribing stringent trade restrictive standards.

NTBs are found in different ways. One of the common ways is the prohibition or restriction on imports through import licensing. Another way is setting standards, testing, and labeling and certification requirements. Testing and certification requirements are part of the international trade. However, over bearing of them can act as barriers because the above measures incur significant amount of money and time. Anti-dumping and countervailing measures are permitted to be taken by the WTO agreements in specified situations to protect the domestic industry from serious injury arising from dumped or subsidized imports.

Overall Trade Restrictiveness Index (OTRI) and Tariff Trade Restrictiveness Index (TTRI) can be introduced as the measurements of tariff and non Tariff barriers. Both the TTRI and OTRI are measures of the uniform tariff equivalent implied by observed trade policies imports of a country. TTRI summarizes the impact of each country's trade policies on its aggregate agricultural imports. It is the uniform equivalent tariff that would maintain the country's aggregate agricultural/ non agricultural import volume. OTRI summarizes the impact of each country's trade policies including non tariff barriers on its aggregate agricultural/non agricultural imports (World Trade Indicators, 2008). The difference between the TTRI and OTRI capture the effect of NTBs (Hoekman and Nicita, 2008).

## 3.3 Service Sector Infrastructure

The service sector infrastructure represents the extent to which an economy has the infrastructure on telecommunications, financial intermediaries and logistic firms. The cost of telecommunication is measured by using several indicators. Average cost of 3-minute call to US (US\$) reflects the average cost of a peak rate 3-minute with the fixed line call from a

particular country to the United States, in current US Dollars. Another measure is the telephones (fixed and mobile) per 100 inhabitants. It is the total number of fixed telephone mainlines connecting a subscriber to the telephone exchange equipment and cellular mobile phone subscribers to a public mobile telephone service using cellular technology and it is measured per 1000 people.

There are also few measures to capture the level of IT facilities in a country. A personal computer per 100 inhabitants indicates the number of self-contained computers designed for individual users, measured per 100 people. Internet users per 100 inhabitants reflects the number of people with access to the worldwide network through dial-up, leased, or broadband connection, measured per 100 people.

Gross school enrollment either secondary or tertiary reflects the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown (World Trade Indicators, 2008).

### 3.4 Status of Trade Facilitation in South Asia

Table 6 presents the status of trade facilitation in South Asia vis-à-vis other regions in the world as measured by LPI, number of documents for export/imports, days for exports/imports and cost to exports/imports. It is clear that according to all the indicators (with an exception to NAFTA which shows a higher cost to imports) average South Asian performance is worse than other regions in the world.

Trade facilitation measures of South Asian countries are also included in the table 7. Maldives has been ranked as 69<sup>th</sup> position among 181 countries based on ease of doing the business. On the other hand, all the other South Asian countries have been ranked above 100. Applied tariff for Agriculture is highest for India followed by Bhutan, Sri Lanka and Pakistan.

India records the highest score for LPI among the South Asian countries. The worst performance is recorded Afghanistan which obtained an average score of 1.2. The scores for all the other countries in South Asia lie in between 2.1 and 2.6. Trading across borders rank represents a country's trade facilitation capabilities based on six indicators: number of documents for import/export, time (in days) for import/export, cost (US\$ per container) to import/export. According to trading across border rank, Sri Lanka is the best performer in South Asia. Pakistan is the best performer followed by Sri Lanka, Bangladesh and India, with respect to number of days required for exports. Sri Lanka is the best performer when compared the number of days required for exports among South Asian countries. According to the available data on trade restrictiveness, trade is more restricted in Nepal compared to other South Asian countries.

Trade Agreements in South Asia had also taken several attempts to address issues related to trade facilitation. SAFTA has taken a number of trade facilitation measures for consideration. For example, simplification and harmonization of customs clearance procedure, harmonization of national customs classification based on Harmonized System (HS) coding system, customs cooperation to resolve dispute at customs entry points, simplification and harmonization of import licensing and registration procedures, simplification of banking procedures for import financing, transit facilities for efficient intra-SAARC trade, especially for the land-locked contracting states, removal of barriers to intra-SAARC investments, development of communication systems and transport infrastructure for the mutual benefits of the member nations. BIMSTEC has identified many specific areas for

cooperation there were few suggestions for improving trade facilitation such as harmonization of standards; introduction of e-commerce, improving customs cooperation and technical assistance for LDCs in the group. Although there are suggestions like this some of the trade agreements for example Pakistan-Sri Lanka FTA, Bhutan-India FTA and India-Afghanistan PTA do not take trade facilitation in to consideration.

#### *4. Previous Estimates on Gains from Improved Trade in South Asia*

Govindan (1994) who used econometric estimates of price elasticities of demand for food imports by several SAARC countries to gauge the trade effects of SAPTA, indicate that SAPTA will improve economic welfare through a substantial expansion of intra-bloc trade in food commodities.

DeRosa and Govindan (1996) used an import demand framework employing an Armington system of bilateral trade. According to DeRosa and Govindan (1996), SAFTA gives rise to a significant expansion of intra-SAARC trade that amounts to US\$841 million. The largest increase in intraregional imports occurs in Bangladesh followed by Pakistan. The largest increase in intraregional exports occurs in Pakistan followed by India. SAFTA however will be associated with a substantial trade diversion.

According to Weerahewa (2007), regional welfare in South Asia can be improved by SAFTA, unilateral liberalization by South Asia and multilateral liberalization. SAFTA would be a good move to Sri Lanka, modest move to India and loss to Bangladesh. The rest of South Asia also gains. Unilateral liberalization by South Asia and multilateral liberalization are clearly welfare improving for all countries in South Asia (0.17% and 0.87% of GDP respectively) and for the world. Liberalization of SAARC trade along with China or East Asia is certainly not welfare improving for South Asia, yet they help to improve welfare of China and East Asia, where applicable.

Weerahewa (2007) quantifies the welfare impacts of a potential India-China FTA vis-à-vis SAFTA (to be implemented in 2013), and other proposed regional integrations. The GTAP model (version 6) aggregated to ten regions and four sectors was used for the analysis. The results of the policy simulations suggest that India incurs a loss in welfare when it completely eliminates import tariffs on Chinese products and the losses are mainly due to allocative inefficiency arising from existing import tariffs and deterioration in its terms of trade. The welfare impacts of China joining with India or SAFTA, on the rest of the South Asian countries, are modest. Multilateral and unilateral liberalization leads to significant welfare improvements in the SAARC region, compared to those associated with various regional trading arrangements originating from SARRC.

Wilson *et. al* (2005) measures and estimates the relationship between trade facilitation and trade flows in manufactured goods in 2000-2001 in global trade, considering four important categories: port efficiency, customs environment, regulatory environment, and service sector infrastructure. They have concluded that gains from own reforms are much larger in South Asia. When consider port efficiency South Asia gains more as an exporter with their own improvements.

## 5. Estimation of a gravity model with trade facilitation measures for south asia and its trading partners

### 5.1 Econometric Model

The Gravity model of international trade is one of the most popular models that had been designed to predict trade flows between two countries. The model estimates trade flow as a function of the variables that directly or indirectly affect trade flows. The conventional gravity model treats that trade between two countries is dependent on the size of their economies, and information and transportation costs (which are normally proxied by the geographical distance). In this study, the conventional model has been extended with trade facilitation measures. The general model was specified as follow.

$$\ln EXPORTS_{ei} = \beta_0 + \beta_1 \ln(GDP_e \cdot GDP_i) + \beta_2 \ln DIST_{ei} + \beta_3 LPI_e \cdot LPI_i + \beta_4 \ln COST_e + \beta_5 \ln COST_i + \beta_6 COM\_LAN_{ei} + \beta_7 COM\_COL_{ei} + \beta_8 ASEAN + \beta_9 BIMSTEC + \beta_{10} APTA + \beta_{11} SAPTA + \varepsilon_{ei}$$

The subscript  $e$ , denotes the exporting country and  $i$  denotes the importing country.  $EXPORTS_{ei}$  are the log value of bilateral exports of agricultural commodities/ live animals and animal products/ vegetable products/ prepared food stuff /manufacture goods between two countries,  $GDP_e$  and  $GDP_i$  are Gross Domestic Production of two countries.  $DIS_{ei}$  is the geographical distance from  $e$ th country to  $i$ th country. Trade facilitation measures are denoted as  $LPI$  for Logistic Performance Index and cost involve in exports/ imports are denoted by  $COST$ . Common language and common colony are denoted by  $COM\_LAN$  and  $COM\_COL$  respectively.  $ASEAN$ ,  $BIMSTEC$ ,  $APTA$  and  $SAPTA$  are the RTAs dummies included in this equation.

### 5.2 Data and Data Sources

Five separate equations were estimated treating bilateral exports of food and agriculture commodities in aggregate, three sub categories of food and agriculture commodities and manufactured goods as the dependent variables. Food and agriculture commodities are defined as the group comprises of commodities from Harmonized System (HS) codes 1-24. The sub categories of food and agriculture commodities were defined as follows. Live animals and animal product include HS codes 1-5. The vegetable products category consists of HS codes 6-14. The prepared food stuff category consists of HS 15-24. Annual data on values of bilateral exports of all the categories of food and agricultural commodities HS1-24 were obtained from Trademap for the year 2005. The export values for the manufactured goods were gathered from the UNComTrade. The manufactured goods category includes SITC 6 (i.e., leather, leather manufactures and dressed fur skins, manufactures of metals, rubber manufactures, cork and wood manufactures (excluding furniture), paper, paperboard and articles of paper pulp, of paper or of paperboard, textile yarn, fabrics, made-up articles, and related products, non-metallic mineral manufactures, iron and steel, non-ferrous metals, manufactures of metals).

The countries covered included members of the SAARC, the top five export destinations and import sources of the SAARC, and countries engaged in trade agreements with the members of the SAARC. The data on GDP were obtained from the World Economic Outlook of the International Monetary Fund (IMF). Geographical distance between two

partner countries, existence of colonial relationships and plausible use common language were gathered from the data base CEPII of the French Research Center in International Economics. Data on trade facilitation measures were extracted from World Trade Indicators 2008 of the World Bank. Table 8 shows the summary statistics for the variables used in the analysis.

## 6. Results of the Estimation and Simulation

### *Issues pertaining to choice of proxies to measure trade facilitation*

A number of models were specified considering various proxies that are available to measure the degree of trade facilitation in various secondary sources as described in the previous section.

More specifically, LPI and cost to import and export were used as proxies for trade facilitation. It should be noted that there exist correlations among some of the above variables, by definition of those variables, even if the correlation coefficients among the variables are small. For example, correlation coefficients range from -0.8016 (between days to import and the LPI of importer) to 0.9767 (between efficiency of customs of the exporting country and LPI of the exporting country) as depicted in table 9. By definition, efficiency of customs is a measure of overall LPI. Similarly, efficiency of customs is an indicator for time and cost of trade. It is also possible that longer time durations are associated with larger trade costs. Therefore, one should be cautious in interpreting coefficient estimates obtained from models containing multiple trade facilitation variables.

The descriptive statistics of the trade facilitation variables as shown in table 10 suggest that, for the countries used in this estimation, the degree of trade facilitation, as measured by all the proxies, is more or less the same. For example, when a country or a region is ranked as good by one proxy, the other proxies come up with a similar ranking. In a scale of 1 to 5, the average value for South Asia is 2.30 for LPI, 1221.6 for cost for export. The values for developed countries are much higher than South Asian averages and they are 3.84 for LPI, 900.10 for cost for export.

### *Issues pertaining to econometric estimation*

As stated earlier, the models were specified in log-log form and coefficient estimates show elasticity estimates with respect to various continuous variables specified in log form. Fixed effect models with dummy variables for exporting countries were estimated. The LPI is a scale and the values range from 0 to 5, and was included as a level variables. Therefore the coefficients of the LPI, once multiplied by 100, show percentage change in the value of exports due to one unit change in the LPI.

In order to preserve degrees of freedom resulting from arithmetic errors, the zero export values were converted to very small positive numbers (one dollar) prior to log transformation. The number of observations, after deleting missing values in other variables, is over 1806 (with a maximum of 2070) in all the specifications.

The models were initially estimated using the Ordinary Least Squares and subsequently, corrections for heteroskedasticity were performed using the robust procedure in STATA. The t-statistics presented in table 13-15 are t statistics obtained from robust estimations. It is clear from the results presented that the most of the co-efficients are statistically significant with  $R^2$  ranging from 65% to 75%.

## 6.1 Results of the Econometric Estimation

A number of variants of the model specified were estimated and the results of the econometric estimation of few selected models are presented in tables 11-13. Table 11, 12 and 13 presents LPI, LPI and cost and cost as trade facilitation measures respectively. All the models have been estimated with exporter fixed effects and the coefficient estimates for the country dummies were suppressed.

### *Coefficient estimates of conventional gravity variables*

In all the specifications, GDP<sup>1</sup> variables have positive and highly significant impacts on the value of exports, regardless of the type of product under consideration. The results indicate that an increase in GDP in either in the exporting country or importing country by 10 percent will increase value of exports by 12.94, 13.66 and 13.25% (agriculture), 10.83, 11.71 and 13.45% (live animals), 12.28, 13.24 and 13.12% (vegetable), 10.88, 11.62 and 12.18% (prepared food stuff) and 12.55, 13.24 and 11.89% (manufactured) according to the econometric results of the specifications presented in table 11, 12 and 13 respectively.

The co-efficients for the distance variable are negative and highly significant indicating that if countries are further far apart by 10% the value of exports would decrease by around 9.22-19.87% in all specifications. The coefficient for manufacture is smaller than those for agricultural good suggesting that distance makes a bigger difference when exports of agricultural items are concerned than that of manufacturing items. Among agricultural product categories preparatory food items affected lesser by distance.

### *Coefficient estimates of Regional Trading Agreements*

The results of RTAs provide mixed signals and they vary across specifications and product groups. According to the results presented in table 11, only ASEAN has positive and significant influence particularly on exports of live animals and prepared food stuff. The results presented in table 12 indicate that ASEAN has positive and significant impact on the exports of live animals and manufactured products. The results presented in table 13 also confirms that ASEAN has a significant and positive effect on live animal exports but it also indicates that SAPTA has a positive and significant effect on exports of all products except for live animals. Quite unexpectedly, APTA has a negative and significant affect on exports of live animals. Such a result could be due to the fact that the export values of live animals of none. APTA countries are higher than due fact that APTA prevents discourages exports of live animals.

### *Coefficient estimates of Cultural factors*

Common language has a significant and positive effect on value of exports of agricultural commodities, vegetable products, prepared food stuff and manufacture products. According to the results presented in tables 11-13 the export values of countries which speak the same official language tend to export 6.12-12.6% more than those of other countries. This is particularly recorded for exports of vegetables, prepared food and manufacture products. A positive and significant impact of common colony on the value of exports of agricultural

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<sup>1</sup> The GDP of the exporting country and the GDP of the importing country were included in the specifications as a multiplicative term forcing co-efficients of both variables to be the same.

commodities, live animals, and vegetable products can be also observed (Table 13). The countries which were under the same colony tie tend to export 9.4%, 11.12% and 12.38% more of agricultural items, live animals and vegetables.

### *Coefficient estimates of Trade facilitation*

The LPI of exporter as well as importer have significant and large effects on the value of exports in all product categories in all specifications. An increase in exporters and importers LPI by one point lead to an increase in the value of agricultural exports by 25.01%, live animals, by 63.32% for vegetables by 38.63% and prepared food stuff they are 40.49. There is no significant effect of LPI on the exports of manufactured items (Table 11). According to the results reported in table 12, one unit increase in LPI can increase exports of live animals vegetables and prepared food by 48%, 18%, 22% respectively. Contrary what was expected, the coefficient of LPI for manufactured products is negative and significant.

### *Costs:*

The cost for exports and cost for imports have significant impacts on value of exports. A 10% reduction in cost of exports can increase value of agricultural exports, live animals, vegetable, prepared food, and of manufacture products by 11.25%, 6.45% and 10.04% and 14.32% respectively as per the results reported in table 12 and 15.83%, 17.24%, 16.01% 15.35% and 13.68% respectively as per the results reported in table 13.

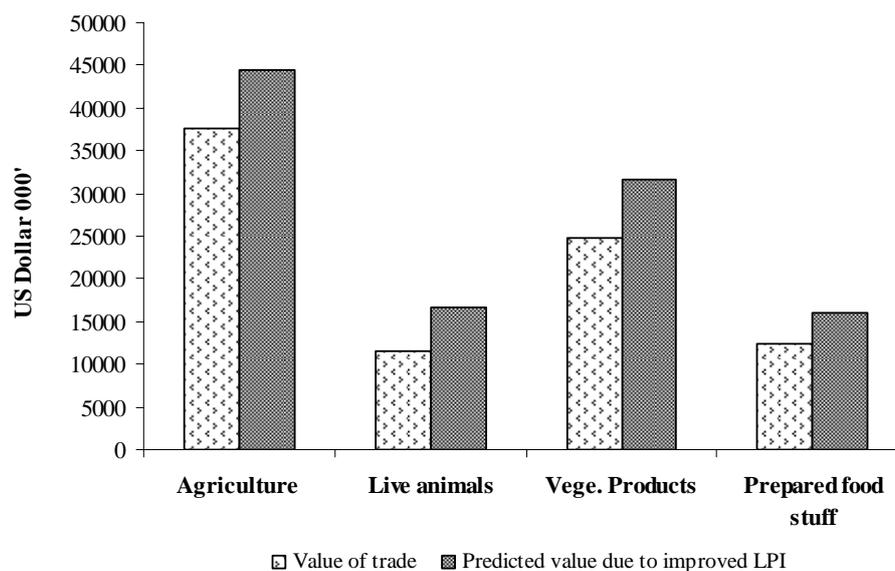
## 6.2. Results of Simulation

Two specifications containing either the LPI or cost as trade facilitation measures as shown in table 11 and 13 were purposely selected for the simulation exercises. Two simulation experiments were done (i) Assume that all South Asian countries improve their trade facilitation up to the South Asian best performer. (ii) Assume that trade costs in South Asian countries would decrease their trade cost up to the best performer (least cost is recorded for Pakistan) in South Asia., while keeping all other factors affecting value of trade at constant levels.

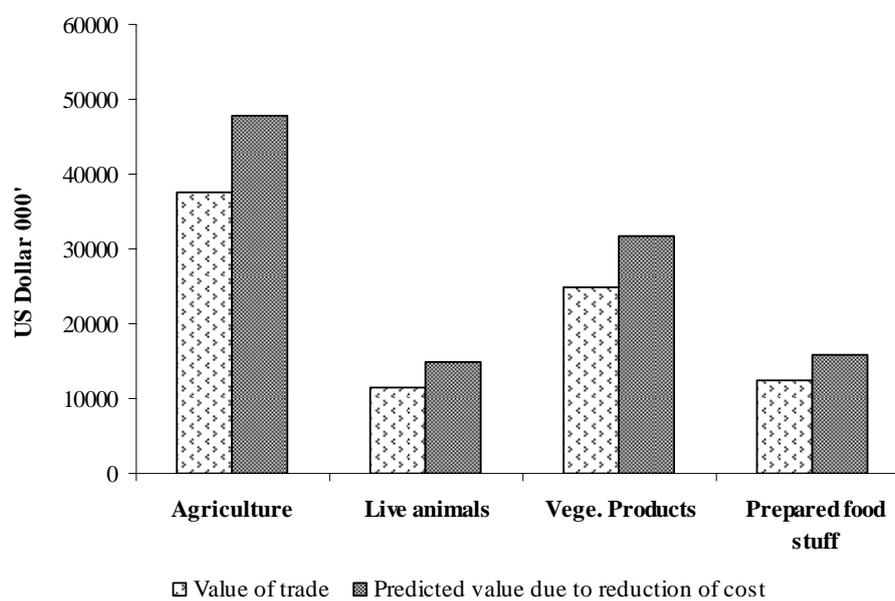
The models were used to simulate an increase in LPI in trade in South Asian countries up to the South Asian best performer (highest LPI is observed in India), on the values of trade in different product categories, while keeping all other factors affecting value of trade at constant levels. The results indicate that this would increase agricultural exports by 18.01%, live animals and animal products by 45.59%, vegetable and vegetable products by 27.81, and prepared stuff by 29.15%. Figure 1 shows the trade gains in South Asia due to the improved LPI in South Asia.

The results indicate that this would increase Agricultural exports by 27.14%, live animals and animal products by 29.54%, Vegetable and vegetable products by 27.48, prepared stuff by 26.45% and Manufactured goods by 23.53%. Figure 2 shows the trade gains in South Asia due to the cost reduction in South Asia.

One of the limitations of the above simulation is that they do not consider general equilibrium effects; i.e., there will be reallocations of trade flows across countries due to changes in the relative levels of trade barriers, and the simulations performed do not account for such. Therefore, the results of the simulations should be interpreted as an upper bounds and it was assumed there are no binding quotas or NTBs that will put a ceiling on exports.



**Figure 1:** Increase in Value of trade in South Asia due to increase in LPI up to the performance of the best South Asian country.



**Figure 2:** Increase in Value of trade in South Asia due to reduction in trade cost up to the performance of the best South Asian country.

## *Summary and Conclusions*

The overall objective of the study was to assess the extent to which trade facilitation in South Asia help to improve values of agricultural trade. The specific objectives of the study were (i) to document the pattern of food and agriculture trade of South Asian countries focusing on export destinations and import sources, (ii) to document attempts made to improve intra-regional trade in South Asia through Regional Trading Agreements, (iii) to document the status of trade facilitation in South Asia vis-à-vis other regions in the world, (iv) to review previous studies on gains from intra-regional liberalization of trade in South Asia and (v) to estimate a gravity equation to assess gains through improvement in trade facilitation measures vis-à-vis other factors affecting international trade.

The study concludes that the key trading partners of the South Asia are Non-South Asian developed countries and the food and Agricultural trade among South Asian countries is rather small. Even though attempts have been made to improve intra-regional trade in South Asia through trade formation of RTAs, they are considered to be not successful in improving trade in South Asia. It is evident that the status of trade facilitation in South Asia is quite low and there is an opportunity to improve trade flows by improving trade facilitation. Trade facilitation variables have significant effects on exports of different products, in varying degrees, depending upon the proxy used. The Logistic Performance Index has large positive effects on value of exports of all the product categories. The estimates for trade costs are negative and significant as expected. Improving trade costs and time delays in South Asian countries up to the average values of best performer in South Asia (least cost is recorded for Pakistan and best LPI is observed in India) bring down trade costs by over 17% and improvement in LPI s by 0.72, resulting in an increase in the value of agricultural trade of 18% and 27% respectively. These results indicate that, by reducing inefficiencies at the borders in South Asia, significant trade gains can be achieved. The Gravity model estimated and simulated in this study indicate that there exists a room to expand bilateral trade by reducing trade costs and time delays in South Asian countries.

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**Table 1:** Top five exporters and importers of SAARC members

Country	Top 5 importers*	Top 5 exporters*
Afghanistan	Pakistan, Iran, USA, Germany, India	Pakistan, USA, India, Denmark, Finland
Bangladesh	China, India, Japan, Singapore, Korea	USA, Germany, UK, France, Italy
Bhutan	India, Japan, Germany, Thailand, USA	India, Hong Kong, Thailand, USA, Israel
India	China, Saudi Arabia, USA, Switzerland, UAE	USA, UAE, China, Singapore, UK
Nepal	India, China, Singapore, Malaysia, Thailand	India, USA, China, Germany, UK
Maldives	Singapore, UAE, India, Malaysia, Sri Lanka	Thailand, Japan, Sri Lanka, UK, Taiwan
Pakistan	UAE, Saudi Arabia, China, USA, Kuwait	USA, UAE, Afghanistan, UK, Germany
Sri Lanka	India, Singapore, Hong Kong, China, Iran	USA, UK, India, Germany, Belgium

Source: Trademap,2008

\* Countries were selected on the basis of the value of exports/imports as percentage of South Asian countries' trade with world.

**Table 2:** Major Trading Partners of India by value of Total Imports and Exports, 2006 ('000 US dollars)

Import Sources			Export Destinations		
Exporters	Imported value	% of total	Importers	Exported value	% of total
European Union (EU 27)	29,782,482	16.07	European Union (EU 27)	29,782,482	23.61
China	17,427,948	9.40	United States of America	18,862,084	14.96
Saudi Arabia	13,358,831	7.21	United Arab Emirates	12,003,386	9.52
United States of America	11,721,040	6.32	China	8,278,968	6.56
Switzerland	9,090,356	4.90	Singapore	6,057,952	4.80
United Arab Emirates	8,641,323	4.66	Hong Kong (SARC)	4,672,113	3.70
Iran (Islamic Republic of)	7,613,523	4.11	Japan	2,857,529	2.27
Nigeria	7,013,769	3.78	Saudi Arabia	2,583,497	2.05
Australia	6,994,988	3.77	Republic of Korea	2,510,179	1.99
Kuwait	5,980,923	3.23	South Africa	2,242,426	1.78
World	185,384,928	100.00	World	126,125,504	100.00

Source: Trade Map (downloaded in February, 2009)

**Table 3:** Major Trading Partners of India by value of Food and Agricultural Imports and Exports, 2006

('000 US dollars)

Import Sources			Export Destinations		
Exporters	Imported value	% of total	Importers	Exported value	% of total
Indonesia	1,175,446	18.99	European Union (EU 27)	2,108,645	18.32
Argentina	673,735	10.88	United States of America	1,086,379	9.44
Canada	512,495	8.28	United Arab Emirates	664,064	5.77
Myanmar	496,146	8.02	Japan	627,993	5.46
Russian Federation	474,260	7.66	Bangladesh	541,698	4.71
European Union (EU 27)	430,428	6.95	Pakistan	540,538	4.70
Australia	346,366	5.60	Saudi Arabia	539,447	4.69
United States of America	28,0044	4.52	Viet Nam	378,039	3.28
Malaysia	237,617	3.84	Malaysia	364,126	3.16
Sri Lanka	146,758	2.37	Indonesia	346,949	3.01
World	6,190,203	100.00	World	11,510,070	100.00

Source: Trade Map (downloaded in February, 2009)

**Table 4:** Trade Barriers of SAARC: Applied Tariff

Country	Product	SAARC Countries (%)	Non-SAARC Countries (%)
Afghanistan	Agriculture	6.48	6.48
	Non Agriculture	5.05	5.08
Bangladesh	Agriculture	12.66	12.84
	Non Agriculture	13.02	13.16
Bhutan	Agriculture	33.86	50.14
	Non Agriculture	13.91	17.10
India	Agriculture	47.47	62.83
	Non Agriculture	12.04	15.67
Nepal	Agriculture	15.48	15.94
	Non Agriculture	12.11	12.61
Maldives	Agriculture	26.98	27.17
	Non Agriculture	24.19	24.32
Pakistan	Agriculture	16.20	18.76
	Non Agriculture	11.34	12.89
Sri Lanka	Agriculture	25.82	27.02
	Non Agriculture	5.47	6.31

Source: Market Access Map,2008

**Table5** : Top ten countries of LPI ranking, by the income group

Top ten countries upper middle income		Top ten countries Lower middle Income		Top ten countries Low Income	
Country	LPI	Country	LPI	Country	LPI
	Score		Score		Score
South Africa	3.53	China	3.32	India	3.07
Malaysia	3.48	Thailand	3.31	Vietnam	2.89
Chile	3.25	Indonesia	3.01	São Tomé and Príncipe	2.86
Turkey	3.15	Jordan	2.89	Guinea	2.71
Hungary	3.15	Bulgaria	2.87	Sudan	2.71
Czech Republic	3.13	Peru	2.77	Mauritania	2.63
Poland	3.04	Tunisia	2.76	Pakistan	2.62
Latvia	3.02	Brazil	2.75	Kenya	2.52
Argentina	2.98	Philippines	2.69	Gambia, The	2.52
Estonia	2.95	Elsalvador	2.66	Cambodia	2.50

Source: LPI report of the World Bank, 2007

**Table 6:** A comparison of South Asian Trade Facilitation measures with different regions 2005-2006

Indicators	South Asia	ASEAN	NAFTA	EU 25	World
No. of documents for export	8.38	7.69	4.50	4.82	7.22
Days for export	32.88	29.13	20.50	28.80	28.80
Cost to export (US\$ per container)	1,221.10	732.50	1,101.50	875.30	1,232.00
No. of documents for import	11.31	9.31	5.17	5.64	8.68
Days for import	41.50	29.81	13.17	13.73	32.96
Cost to import (US\$ per container)	1,449.40	834.30	1,569.50	947.60	1,431.00

Source: World Trade Indicators 2008

**Table 7:** The status of trade facilitation in South Asia

	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka	
<b>Trade Outcome</b>	Trade outcome (rank out of 161) Year 2008	-	31	1	89	-	71	160	113
	Trade integration: Trade as % of GDP	-	36.3	-	30.1	153.6	48.4	34.2	80.8
	Agriculture share in total merchandise trade (%) Year: 2000 - 2004	-	6.7	-	9.3	15.4	10.2	10.5	18.0
	TTRI	-	12.1	-	14.6	-	16.4	12.2	6.6
<b>Trade Policy</b>	Overall TRI	-	21.6	-	21.2	-	-	-	6.6
	Applied tariff	6.2	13.5	18.1	12.1	-	16.1	15.3	9.3
	Applied tariff: Agriculture	5.9	11.1	37.3	55.9	-	15.8	17.7	22.6
	Non-tariff measures frequency ratio Year: 2005 - 07	-	-	-	-	-	-	-	-
	Ease of doing business (rank out of 181) Year: 2008	162	110	124	122	69	121	77	102
<b>Institutional Environment</b>	Logistic performance indicators	1.2	2.5	2.2	3.1	-	2.1	2.6	2.4
	Efficiency of customs and other boarder procedures	1.3	2.0	2.0	2.7	-	1.8	2.4	2.3
	Quality of transport and other IT infrastructure	1.1	2.3	1.9	2.9	-	1.8	2.4	2.1
	International transportation costs	1.2	2.5	2.1	3.1	-	2.1	2.7	2.3
	Logistics competence	1.3	2.3	2.2	3.3	-	2.1	2.7	2.5
	Track ability of shipments	1.0	2.5	2.3	3.0	-	2.3	2.6	2.6
	Domestic transport costs	3.1	3.1	3.4	3.1	-	3.3	2.9	3.1
	Timeliness of shipments	1.4	3.3	2.6	3.5	-	2.8	2.9	2.7
	Doing business -Trade across boarder (rank out of 181)	177	104	153	81	116	157	67	60
	No. of documents required for exports	10	7	8	9	8	9	9	7
	No. of days process required for exports	67	33	38	23	26	22	44	6
	Cost to export (US\$ per container)	2500	883	1150	849	1200	1600	675	801
	No. of documents required for imports	11	11	11	13	9	10	9	10
	No. of days process required for imports	80	49	38	35	20	35	26	25
	Cost to imports (US\$ per container) Year: 2005 - 07	2100	1241	2080	1133	1200	1725	996	807

Source: World Trade Indicators, 2008.

**Table 8:** Descriptive statistics of the variables used in gravity estimation.

Variable	Units	Source of data	Mean	Standard Deviation
Trade Value of agricultural exports	US Dollar 000'	Trademap	120518.7	639839.5
Trade Value of live animals and animal products exports			38283.3	209003.5
Trade Value of vegetables products exports			38571.7	220746.2
Trade Value of prepared food stuff exports			61856.2	336389.7
Trade Value of manufacture goods exports	US Dollar 000'	UNComtrade	3.32e+08	1.77e+09
GDP country e	US Dollar 000'	IMF World Economic Outlook	6.52e+08	1.87e+09
GDP country i			6.52e+08	1.87e+09
Distance	kilometers	CEPPII	8024.67	4785.32
Logistic performance Index of country e	Score	World Trade Indicators 2008	2.98	.67
Logistic performance Index of country i			2.98	.67
Efficiency of customs and other border procedures country e			2.77	.65
Efficiency of customs and other border procedures country i			2.77	.65
Number of documents for Imports/Exports of country e	Number		7.44	2.00
Number of documents for Imports/Exports of country i			9.14	2.72
Number of days for Imports/Exports of country e			26.09	16.73
Number of days for Imports/Exports of country i			29.15	18.43
Cost for Imports/Exports of country e	US Dollars		1053.15	538.81
Cost for Imports/Exports of country i			1194.55	548.77
Overall Trade Restrictiveness Index (Non Agriculture)	Percentage		9.41	5.85
Tariff Trade Restrictiveness Index (Non Agriculture)			4.99	3.99
Tariff Trade Restrictiveness Index ( Agriculture)			9.96	10.81

**Table 9:** Correlation coefficients among trade facilitation measures

	effcuse	effcusi	docex	docim	daysex	daysim	cosiex	costim	lpie	lprii	doc	days	cost
effcuse	1.0000												
effcusi	-0.0240	1.0000											
docex	-0.7375	0.0177	1.0000										
docim	0.0174	-0.7087	-0.0175	1.0000									
daysex	-0.7785	0.0187	0.6936	-0.0166	1.0000								
daysim	0.0192	-0.7911	-0.0151	0.7114	-0.0225	1.0000							
cosiex	-0.5471	0.0131	0.4065	-0.0077	0.7142	-0.0148	1.0000						
costim	0.0147	-0.5915	-0.0113	0.3931	-0.0173	0.6121	-0.0223	1.0000					
lpie	0.9767	-0.0233	-0.7175	0.0157	-0.7929	0.0191	-0.5550	0.0139	1.0000				
lprii	-0.0231	0.9760	0.0170	-0.6554	0.0187	-0.8016	0.0131	-0.5830	-0.0238	1.0000			
doc	-0.4247	-0.5665	0.5807	0.8038	0.3992	0.5703	0.2356	0.3133	-0.4142	-0.5235	1.0000		
days	-0.5165	-0.5781	0.4617	0.5201	0.6651	0.7316	0.4760	0.4454	-0.5264	-0.5860	0.6982	1.0000	
cost	-0.3775	-0.4170	0.2802	0.2779	0.4942	0.4307	0.6933	0.7050	-0.3837	-0.4109	0.3930	0.6587	1.0000

**Table 10:** Measures of Trade Facilitation (Averages by country group)

	South Asian Countries	Developing Countries	Developed Countries
Logistic Performance Index	2.30	2.80	3.85
Efficiency of Customs	2.06	2.62	3.59
No of Days for exports	36.06	29.46	10.52
Cost of Exports	1221.06	1065.76	900.10

Source: World trade indicators, 2008

**Table 11:** Results of the Econometric Estimation with models including LPI

Independent Variable	Dependent Variable				
	Agricultural exports	Live animals and animal products	Vegetable Products	Prepared Food Stuff	Manufacture Products
GDP <sub>e</sub> *GDP <sub>i</sub> (Log)	1.2942*** (21.55)	1.0826*** (16.54)	1.2275*** (19.97)	1.0882*** (17.71)	1.2551*** (15.35)
Distance (Log)	-1.6920*** (-12.04)	-1.9835*** (-11.96)	-1.9871*** (-13.72)	-1.7476*** (-12.21)	-1.2803*** (-6.67)
LPI <sub>e</sub> *LPI <sub>i</sub> (Scale)	.2501*** (4.36)	.6332*** (9.05)	.3863*** (6.32)	.4049*** (6.75)	.0908 (1.12)
ASEAN dummy	1.1470** (2.16)	1.3849** (2.28)	-.0563 (-0.09)	.9864* (1.90)	1.2004* (1.91)
BIMSTEC dummy	-.4075 (-0.54)	-.4391 (-0.53)	-.4954 (-0.66)	.1750 (0.24)	-.5030 (-0.56)
APTA dummy	-.3358 (-0.58)	-.9483 (-1.62)	-.3882 (-0.63)	-.9596 (-1.27)	.2865 (0.35)
SAPTA dummy	.2712 (0.30)	-.4672 (-0.53)	.0002 (0.00)	.5371 (0.55)	.3103 (0.32)
Common language dummy	.6264** (1.91)	.1503 (0.43)	1.0581*** (3.15)	.9666*** (2.87)	1.2508** (2.59)
Common colony dummy	.9472** (2.34)	1.1253** (2.64)	1.2389*** (3.19)	.5818 (1.51)	.5162 (0.85)
constant	-32.8448*** (-13.40)	-25.2769*** (-10.24)	-32.427*** (-14.06)	-25.6375*** (-10.96)	-27.5436*** (-8.34)
Adj. R2	0.7429	0.6607	0.7162	0.7488	0.7542
Number of Observations	2070	2070	2070	2070	2070

Significance level of 1%, 5% and 10% are indicated by \*\*\*, \*\*, \* respectively. Robust t-statistics are in parenthesis.

**Table 12:** Results of the Econometric Estimation with models including LPI and trade costs

Independent Variable	Dependent Variable				
	Agricultural exports	Live animals and animal products	Vegetable Products	Prepared Food Stuff	Manufacture Products
GDP <sub>e</sub> *GDP <sub>i</sub> (Log)	1.3664*** (21.41)	1.1710*** (16.81)	1.3244*** (19.96)	1.1623*** (17.20)	1.3340*** (14.77)
Distance (Log)	-1.5187*** (-10.49)	-1.7919*** (-10.10)	-1.8132*** (-11.78)	-1.5330*** (-10.19)	-.9222*** (-4.54)
LPI <sub>e</sub> *LPI <sub>i</sub> (Scale)	.0172 (0.27)	.4798*** (6.04)	.1838** (2.57)	.2270*** (3.23)	-.2265** (-2.38)
Cost <sub>e</sub> *Cost <sub>i</sub> (Log)	-1.1255*** (-5.12)	-.6450** (-2.50)	-1.0047*** (-4.04)	-.8860*** (-3.92)	-1.4327*** (-5.09)
ASEAN dummy	.9383 (1.66)	1.6473** (2.60)	-.1250 (-0.20)	.8057 (1.45)	1.6427* (2.15)
BIMSTEC dummy	-.1620 (-0.22)	-.3409 (-0.35)	-.4015 (-0.54)	1.1374 (1.28)	-1.0101 (-0.75)
APTA dummy	-.5113 (-0.86)	-.9696 (-1.63)	-.5447 (-0.88)	-1.1311 (-1.48)	.3887 (0.47)
SAPTA dummy	.7355 (0.80)	.1468 (0.15)	.6112 (0.67)	.4382 (0.42)	1.6497 (1.43)
Common language dummy	.4695 (1.34)	-.0564 (-0.15)	.8551** (2.37)	.7621** (2.10)	1.1362** (2.16)
Common colony dummy	.2379 (0.49)	.3846 (0.76)	.5205 (1.07)	.1672 (0.36)	-.5475 (-0.70)
constant	-17.34154*** (-4.82)	-20.0814*** (-4.64)	-22.3084*** (-5.60)	-16.6808*** (-4.45)	-11.42462** (5.7895)
Adj. R2	0.7580	0.6703	0.7248	0.7523	0.7576
No of obs	1806	1806	1806	1806	1806

Significance level of 1%, 5% and 10% are indicated by \*\*\*, \*\*, \* respectively. Robust t-statistics are in parenthesis.

**Table 13:** Results of the Econometric Estimation with models including trade cost

Independent Variable	Dependent Variable				
	Agricultural exports	Live animals and animal products	Vegetable Products	Prepared Food Stuff	Manufacture Products
GDP <sub>e</sub> *GDP <sub>i</sub> (Log)	1.3259*** (29.66)	1.3475*** (28.58)	1.3124*** (29.00)	1.2181*** (26.74)	1.18974*** (19.38)
Distance (Log)	-1.7399*** (-11.73)	-1.8764*** (-11.12)	-1.9171*** (-12.90)	-1.6858*** (-11.37)	-1.1858*** (-5.83)
Cost <sub>e</sub> *Cost <sub>i</sub> (Log)	-1.5835*** (-7.90)	-1.7244*** (-7.56)	-1.6010*** (-7.41)	-1.5356*** (-7.54)	-1.3687*** (-5.24)
ASEAN dummy	.4147 (0.71)	1.1606* (1.82)	-.4820 (-0.75)	.4214 (0.74)	.8913 (1.18)
BIMSTEC dummy	-1.0723 (-1.42)	-1.3334 (-1.44)	-1.3342* (-1.87)	-.0051 (-0.01)	-1.7936 (-1.47)
APTA dummy	-.7358 (-1.21)	-1.5275* (-2.49)	-.7085 (-1.13)	-1.4391* (-1.83)	.2451 (0.29)
SAPTA dummy	1.4202* (1.71)	1.1079 (1.23)	1.4006* (1.84)	1.5942** (1.78)	2.0733** (2.34)
Common language dummy	.3841 (1.10)	-.1200 (-0.34)	.6118** (1.77)	.8365** (2.41)	1.2635** (2.53)
Common colony dummy	.2141 (0.50)	.2296 (0.53)	.3515 (0.83)	-.0695 (-0.17)	-.0299 (-0.05)
constant	-7.7796** (-2.14)	-6.9440* (-1.65)	-11.2798*** (-2.93)	-6.6850* (-1.79)	-7.46792 (-1.50)
R2	0.7355	0.6500	0.7131	0.7313	0.7420
No of observations	2070	2070	2070	2070	2070

Significance level of 1%, 5% and 10% are indicated by \*\*\*, \*\*, \* respectively. Robust t-statistics are in parenthesis.