



Effects of environmental regulations on South Asian food and agricultural exports: A gravity analysis





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Abstract: Regardless of the occasional dissenting voices, free trade is now being embraced by many of the nations of the world. South Asian countries joined the global consensus for frictionless trade by forming regional trade blocs under the banner of the South Asian Association for Regional Cooperation (SAARC). However, intra- and interregional trade in SAARC has not yet reached the desired stage, and a range of empirical studies have therefore been carried out with the objective of determining the causes. This current study is also motivated by the poor performance of the South Asian countries in world trade and it investigates the effects of environmental regulation on the food and agricultural trade of four South Asian nations, i.e., Bangladesh, India, Pakistan and Sri Lanka. For this study, the Gravity Model for international trade analysis was used with country- and time-specific fixed effects followed by Heckman sample selection model to avoid possible biases that are widely cited in the gravity literature. Trade data were retrieved from Trade Map while data for other gravity variables were retrieved from relevant recognized data sources. The Environmental Performance Index (EPI) was utilized as a proxy measure for the environmental regulation of the four SAARC nations and their trade partners to denote environmental regulation of reporting and partner countries. The results of the coefficient estimates revealed that even though there appears to be a relationship between stringent regulations and foreign trade without these specific effects, its significance fades as soon as both the importing and exporting country-specific effects are taken into consideration.

#### JEL classification: F14, F15, F18

**Keywords:** Food and agricultural exports, fixed effects, Heckman Selection Model, Environmental Performance Index, South Asia

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### 1. Background

During the present era of human civilization, international trade has become widely accepted as a vehicle for welfare gains to nations around the world, a fact that is being proved continuously by empirical research despite occasional dissenting voices. Apart from the integration of nations in world trade through global consensus, such as the General Agreement on Trade and Tariff (GATT) and its successor the World Trade Organization (WTO), a growing trend in regional cooperation to achieve perceived benefits from free regional trade has been witnessed since the 1990s. As of early 2013, some 546 notifications of Regional Trade Agreements (RTAs) (counting goods, services and accessions separately) had been received by GATT/WTO; of these, 354 were in force (WTO, 2013). The best-known regional trade agreements, i.e., the European Union, the European Free Trade Association (EFTA), North American Free Trade Agreement (NAFTA) and the Association of Southeast Asian Nations (ASEAN) Free Trade Area (AFTA), were catalytic in the emergence of more regional cooperation in free trade.

Under the banner of the South Asian Association of Regional Cooperation (SAARC), the South Asian countries also attempted to catch up with this trend as the welfare gains from open trade were being realized by the pioneer East Asian nations. The phenomenal urge of the SAARC nations to harvest from free trade is evident from the number of free trade agreements (FTAs) that have been reached in the region – currently 23, of which 21 are bilateral trade agreements. However, the actual benefits realized have not been particularly encouraging for the member countries (Dissanayake and Weerahewa, 2009). As a result a range of empirical studies, including the present study, have been carried out with the objective of determining the causes.

Despite significant trade liberalization attempts, progress in both intraregional and interregional trade has not been achieved at the desired rate and SAARC's recent share of exports and imports of goods as a percentage of world exports and imports amounted to 2.4 per cent and 3.9 per cent, respectively (IMF, 2010). More recent studies have indicated that smaller trade gains in South Asia are mainly due to insufficient attention being given to trade facilitation measures, such as efficiency in customs and other border procedures, the quality of transport, and costs of international and domestic transportation (Dissanayake and Weerahewa, 2009; Weerahewa, 2009). In addition, while tariff levels have declined as a result of trade liberalization in the region, environmentally-related, non-tariff measures (NTMs) and other technical standards have emerged as significant factors in determining world trade.

The impact of environmental regulation on trade has received steadily increasing attention since the early 1970s, following the introduction of stringent environmental regulations in developed countries (Xu, 2000). Van Beers and van den Bergh (2003) argued that relatively strict environmental policies could have a strong impact on foreign trade. One side of the argument is that countries that face relatively strict environmental regulations domestically tend to experience deterioration in international competitiveness and a decline in foreign trade, at least in the pollution-intensive industries (Harris and others, 2000). On the contrary, it is believed that by applying more strict environmental regulations, countries tend to become technologically innovative, thereby reducing production costs and improving their

ability to export in a long term (Costantini and Crespi, 2008). This view opens a novel avenue to understanding trade-impeding factors in the South Asian region.

However, although substantial empirical evidence exists of the trade flow determinants in the SAARC region, the effect of environmental regulation by SAARC member States and their trading partners on bilateral trade flows has not been considered in contemporary trade analyses. Existing empirical studies on the effects of environmental regulation on trade flows, which have been carried out mainly in Organisation for Economic Co-operation and Development (OECD) countries, have provided mixed results. Therefore, it is important to address the subject in the South Asian context. Since food and agricultural exports play a vital role in South Asian trade, this study attempts to quantify the effects of environmental regulation on the flow of agricultural exports by South Asian countries. Specifically, the study uses gravity model, incorporating the stringency of environmental regulation as an explanatory variable, under different model specifications.. The study focuses on trade flows of Bangladesh, India, Pakistan and Sri Lanka with their trading partners from 2003 to 2007..

This study is organized as follows. Section 2 reviews the current state of the integration of South Asian countries in the world markets in general and the state of agricultural trade in particular. Section 3 contains a brief review of the gravity model, focusing on the theoretical and econometrical issues that influence the selection of the models and techniques used in standard gravity estimates. Section 4 explains the methodology. Section 5 presents the results and discussion, followed by the conclusion in section 6.

### 2. Trade in South Asia

### 2.1 South Asia in the global trading system

The world trading system has become increasingly open and competitive in the past few decades. The elimination of the quantitative restrictions and reduction of tariffs in developed and developing countries through global consensus have paved the way for most countries to (a) adopt outward-looking economic policies, (b) seek ways of promoting growth and employment through expanding export production and (c) attract inward investment. The empirical studies on the relationships between trade and growth show supports to free trade (Kraay and Dollar, 2001). More than half of the developing countries, i.e., China, India and several other large countries, are now globalizing economies that have more or less embraced free trade. South Asia is no exception to this global trend in free trade as it has moved from import substitution to more liberal trade policies and export promotion. During the late 1970s in Sri Lanka and in the late 1990s in other South Asian countries, the tariff structures were simplified and the number of tariff bands was reduced. The changes in the tariff structures and exchange rate regimes as well as relaxation of payment restrictions during the 1990s are indicative of the move by South Asian countries towards greater openness in their trade (Samaratunga and others, 2007).

Following their significant trade liberalization attempts, South Asian countries have recorded rapid growth in international trade. India, which is the largest economy in South Asia and accounts for nearly 75 per cent of regional GDP, more than doubled its trade-to-GDP ratio from about 15 per cent to 35 per cent between 1990 and 2005. Similarly, other countries in the region, including Bangladesh and Sri Lanka, have also experienced impressive increases in their international trade. However, despite the gains from international trade, the region continues to have a smaller share of global trade and its exports still play a limited role in GDP. The region's share in the total world trade was less than 2 percent from 2003 to 2012 (table 1), which puts South Asia far behind the trade blocs of ASEAN and NAFTA.

Another significant phenomenon in the South Asian export pattern is the dominance of India, a fact that challenges the claim that South Asia has gained welfare improvements due to free trade. Accounting for the largest land area and population in South Asia, India claims the largest share in total and agricultural exports of South Asia exceeding 70 per cent in recent years (figures 1 and 2). Conversely, the contributions by smaller nations such as Bhutan, Nepal and Maldives are substantially less. This skewed distribution of trade within the region raises grave concerns over the viability of regional cooperation in enhanced regional trade, as inequality of this magnitude will discourage the smaller players.

### 2.2 Agricultural trade: A way towards the elimination of rural poverty in South Asia

South Asia, which comprises three developing countries and five least developed countries, is densely populated with 1.5 billion people. The region has experienced robust economic growth, averaging 6 per cent a year, during the past 20 years. This strong growth has translated into declining poverty and impressive improvements in human development. The percentage of people in South Asia living on less than US\$ 1.25 per day fell from 61 per cent to 36 per cent between 1981 and 2008. However, the South Asian region is remains home to many of the developing world's poor. According to the World Bank's most recent poverty estimates, about 571 million people in the region survive on less than US\$ 1.25 dollars per day, accounting for more than 44 per cent of the developing world's poor. About 70 per cent of the population and about 75 per cent of the poor live in rural areas. Most of the rural poor depend on rain-fed agriculture, livestock raising, fragile forests, and/or casual and often migratory employment (World Development Report, 2008b). Rural poverty, fuelled by the free trade policies and with the agricultural sector left in the backseat in the drive for development, has become a burning issue in the region. Thus, elimination of rural poverty

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