

Can Trade Liberalization Promote Growth in Agriculture: Evidence from China and India.

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Abstract

A number of studies have evaluated the possible implications from agricultural trade liberalization in the context of developing economies. The results of these analyses have either differed in opinion or failed to convincingly establish as to whether the trade liberalization would contribute to the growth prospects of developing agricultures. A limitation of the earlier analyses has been that it did not shed much light on whether the impact of trade liberalization could be positive on the agricultural growth. The main objective of this study is to examine the hypothesis whether the trade liberalization process had led to growth in agriculture by employing data pertaining to the two large economies in the Asian region, viz., China and India for the time period 1976 to 2007. The statistical evidence based on various indicators of agricultural trade liberalization and growth indicates the presence of significant causal relations from trade liberalization to agricultural growth. (150 words).

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1. Introduction:

With the advent of globalization, it is now widely recognized that the trade policy of a country lies at the centre of its economic policy making. This is because the nature of the trade regime in some of the emerging economies has been proved to have important implications for the economic efficiency and growth in recent times (Dollar 1992, Sachs and Warner 1995, Krueger 1997, Edwards 1998, Dollar and Kraay, 2000 and Rodriguez and Rodrick 2001). The vast empirical literature demonstrates that liberalized trade policies promoted export-led economic growth, which is more rapid in comparison with cases, where protection policies were followed. Therefore, there is a broad consensus among economists that countries with export oriented strategies could grow faster in terms of economic growth. However, as regards the opinion on whether rapid growth in agriculture can be achieved through successive liberalization attempts, the views have remained far from uniform. One side of the view argued that a major contributing factor to the sluggish growth in agriculture today is due to the failure of successfully completing the multilateral trade negotiations under the Doha Round. The other contrarily felt that trade by itself can bear only little or no impacts in generating growth in the absence of accompanying domestic policies, which are sometimes more effective. These differences could be a plausible explanation as to why the trade liberalization has not materialized completely in agriculture, while trade opening – removal of import restrictions and reduction of export discrimination – has already become a common policy reform for the global trade in industry and services.¹

It is agreed upon that trade liberalization and opening up of the agricultural sector can potentially contribute to the prospects of developing agricultures, since roughly seventy percent of the world's poor (in developing countries) are engaged in agriculture (World Bank 2003). Regardless of this, a fair amount of doubts is often expressed on whether developing countries would actually gain from the ongoing negotiation process that attempt to liberalize the agricultural trade. Earlier, studies projecting the implications from multilateral trade liberalization indicated that the food-importing developing economies could be adversely affected by the implementation of the Uruguay Round (Goldin and Knudsen 1990, Martin and Winters 1996). Because, it was found that the prices of tropical agricultural commodities – the cash crops exported by the developing economies - are likely to grow at a much slower

¹ Koning and Pinstup-Andersen [Edt. 2007] argued that although the developing countries as a group stand to gain very substantially from trade reform in agricultural commodities, the current round of international trade negotiations offered very little before the negotiations was stalled in mid-2006. See for instance Mikic [2006] for a review of issues related to agricultural trade negotiations.

rate than the prices of temperate zone agricultural products, which are imported by the developing countries. Subsequently, a number of studies also assessed the effects of trade negotiations in agriculture but the results on the impact differed widely.² It is observed that the estimated magnitude of the income or net welfare differed widely from model to model and more importantly the benefits from agricultural reforms are found to be larger for the developed than for the developing countries. Some studies have further revealed that the concentration of welfare benefits from trade liberalization could vary among developing countries (for instance, Anderson, Martin and Van der Mensbrugghe 2005). Possibly due to these empirical findings, there is a growing awareness that opening up the domestic economy to international markets can have intimidating effects on the developing countries. Specifically, with particular regard to the large developing countries like China and India, it is often maintained that the liberalization attempts can have some adverse impacts on the food security and rural income levels, in the short to medium run. The studies examining the possible impacts of the agricultural trade liberalization policies remained debatable in both the economies and their conclusions open to doubt, so that it becomes difficult to arrive at a consensus opinion (Lardy 1986, World Bank 1991, Lu 2000, Li 2003, Huang et al 2003 and Huang and Roselle 2003, 2008 for China, and Gulati and Pursell 1991, Nayyar and Sen 1994, Chand and Jha 2001, Chand 2002 and Parikh 2004 for India, respectively). The broad consensus view that seems to have emerged is that the overall impact of trade liberalization in agriculture could be mixed, depending on the comparative advantage level of individual crops in these two economies. It is further argued that the scope for increasing benefits from trade liberalization in both China and India would depend on the extent by which domestic reforms can reduce the marketing and transaction costs. Critics have also pointed out that while liberalization may allow for the prospective food access to both China and India, there can be circumstances in which the import option may appear unworkable for these two countries with large populations (Ohaga 1999, Timmer, 2002). Finally, concerns have also been expressed that cheap imports from abroad could drive down the level of domestic agricultural prices in these economies, where a substantial segment of the population still depends on agriculture for income and employment.

In order to understand the implications of liberalizing trade in agriculture, it is important to take into account the closer links between trade liberalization and growth in

² See, for instance, Sharma, Konandreas and Greenfield [1996] and Sumner and Tangermann [2002] for a summary and comparison of the results from different models.

agriculture. While it has been empirically demonstrated earlier that countries with liberal agricultural strategies can experience economic benefits or net social welfare gains, it is not clear whether the rapid agricultural growth can be achieved with successive liberalization attempts. In this connection, it becomes crucial for countries to identify the channels through which trade liberalization in agriculture can potentially impact on their rural economies. It is possible that the liberalization can encourage the commercialization of agriculture and also lead to the diversification of agriculture by impacting on the production and marketing of high-value commodities, viz., floriculture, fisheries, marine products, etc. The examination of the growth effects of trade in agriculture may provide insights to the ongoing debate as to how trade liberalization in agriculture affect the developing economies. This study, therefore, attempts to examine the hypothesis whether the trade liberalization process can lead to changes in the agricultural growth. This examination is carried out employing data pertaining to the two large economies in the Asian region, viz., India and China. For this, we first examine the extent of agricultural trade liberalization in these two economies by analyzing indicators such as export share, export performance and trade openness in agriculture. Subsequently, we verify the link between various trade liberalization indicators and growth in agriculture by undertaking statistical tests that determine the presence of significant causal relations. Thus, the Granger causality results involving trade liberalization and growth process are individually performed for the Chinese and Indian agricultures for the period 1976-2007.

The basic idea here is to examine the presence of any such mechanism through causality analyses that establishes the growth effects of trade for the agricultural sector. If the growth effects of trade liberalization are found to present in the agricultural sector, then the promoters of free trade policies are possibly justified in maintaining that developing countries would stand to gain from the trade reforms in agriculture.

The plan for the rest of the study is as follows. Our analysis begins, by examining from the available studies, as to how trade liberalization impacts on the agricultural sector in section 2. The examination of agricultural performances for both the economies is provided in section 3. In section 4, we investigate as to what extents the Chinese and Indian markets are open to agricultural trade along with the nature of tariff barriers in their partner countries. Section 5 looks at the features of agricultural trade in these two economies. The indicators of agricultural trade liberalization are explored subsequently in section 6. The results from the causality analysis performed over the period between 1976 and 2007 are presented in section 7. The final section summarizes the results and also provides the policy implications.

2. Trade Liberalization and Growth:

A large number of studies have examined the empirical relationship between international trade and economic growth on the basis of using data from various countries. While, Michaely [1977] and Balassa [1978] provided some of the early attempts, a large body of statistical evidences were forwarded subsequently and the studies by Dollar [1992], Sachs and Warner [1995], Rodriguez and Rodrick [2001], Dollar and Kraay [2000] have remained some of the most-often quoted study on the subject in recent years. Although, there has been some disagreement on the empirical relationship between trade liberalization and growth, there is a broad consensus that the growth prospects of an economy can be enhanced through integrating the domestic economy with the world economy. As regards the crucial issue regarding how international trade liberalization influences economic growth, there has been some studies which provided important insights on the subject (Feder 1982, Levine and Renelt 1992, Wacziarg 2001). According to these studies, trade impacts on growth through creating new investments, positive external effects, technology transfers, inflow of foreign direct investments, productivity growth, etc. Trade liberalization may also provide other benefits such as scale economies due to increased market size, knowledge of demand characteristics in foreign market and quality improvement in products due to international competitiveness.

While the nature of relationship between international trade and growth - the hypothesis of *export led growth* or *growth led exports* - has been widely examined using the total export of various economies, developing or developed, there have not been many attempts to examine the role of trade liberalization in the macro context for the agricultural sector. This could be one of the reasons as to why the nature of the relationship between trade policy and the growth indicator for the agricultural sector still remains unclear. Of course, there have a good number of studies – in the context of both China and India - which looked at the implications of trade liberalization for the national food security or world trade and also attempted to examine the impacts of trade liberalization on individual crop production levels. There are also studies based on the computable general equilibrium (CGE) models, which provided analysis of the impacts on the output growth and prices of individual crops.

While it was argued in the Indian context that the since the earlier policy deliberately distorted the agricultural price by using protectionist industrial and trade policies and an overvalued exchange rate, getting the domestic prices at par with the border prices could improve the incentive structure and thereby expand agricultural production (Gulati and

Pursell 1991, Parikh 1997,). Fang and Beghin [2000] maintained that China's self sufficiency policy went against its current comparative advantage, except for high quality rice production. By examining the comparative advantage and protection of major agricultural products in China, they argued that the production of grains and oilseeds suffered from a comparative disadvantage. Their results indicated certain comparative advantages in labor-intensive crops, such as vegetables, tobacco, cotton, and fruits for the world market. It may therefore be observed that the initial response from dis-protecting the respective agricultures mainly gave attention to two main areas, viz., the agriculture's incentive structure and food grain self-sufficiency. Thus, while Yan [1993], Yang and Huang [1996] expressed apprehension as to how China could continue the domestic price intervention and agricultural protection necessary for maintaining its food self-sufficiency after accepting the WTO agreement on agriculture, it was expected that the most crucial outcome of the liberalization in India would be to experience improvement in agricultural terms of trade (Rao and Gulati 1994, Gulati and Sharma 1994).

As regards the nature of impacts due to trade liberalization, the opinions differed for both the economies, see for instance, Anderson [1997], Huang and Chen [1999], Huang, Chen, Rozelle, Tuan [2003] for China and Pursell and Gulati [1995], Nayyar and Sen [1994], Storm [2001], Parikh [2004], Chand [2004] and Jha et al [2005] for India. According to Huang et al [2003], the prices could decline for most of the crops (except for rice) and grow for some of the animal and poultry products with the trade liberalization. It was therefore argued that there will be an expansion in the production of animal products particularly the production of pork and poultry in China after trade liberalization. The projections revealed that domestic grain production could fall behind the domestic grain consumption in China under the free trade scenario. In the Indian context, Pursell and Gulati [1996] argued that agricultural trade reforms could effectively eliminate the export and price bias in agriculture, whereas Nayyar and Sen [1994] argued that a large participation in agricultural trade could worsen India's terms of trade. Subsequently, Jha et al [2005] argued that there could be significant welfare gains due to full trade liberalization in Indian agriculture. Anderson [2003], by using a computable general equilibrium model, viz., The Global Trade Analysis Project (GTAP), found that the output of most agricultural products in China and India would be greater because of the multilateral trade reforms. Similar GTAP based modeling results on India have found that in the multilateral trade liberalization scenarios, the sectoral output impact would be positive for cereals, sugar and sugarcane, livestock and fishery, cattle, milk

and dairy products and negative for edible oils, raw wool and silk, vegetables, and fruits and nuts (Chadha et al 2008).

3. Agricultural Performances:

Although, the economic importance of agriculture relative to other sectors has declined in both China and India, the sector still continues to play a vital role in providing employment, generating demand and contributing to the national and global food security. Traditionally, both China and India were known for their sizable agricultural sector and still remain as the major producer of cereals, pulses, sugar, oil-crops, rubber, tea, coffee and vegetables in the world market.

Table 1: Production Index of Important Agricultural Commodities (Thousand Tonnes).

	China			India		
	1994-96	1999-01	2004-06	1994-96	1999-01	2004-06
Cereals	422930	420308	428867	213568	238012	237576.3
Index (1994-96=100)	100.0	99.4	101.4	100.0	111.4	111.2
Starchy Roots & Tubers	168888	187086	179720	24830	30961	30947.67
Index	100.0	110.8	106.4	100.0	124.7	124.6
Pulses	4713	4842	5235	13808	13677	13619.33
Index	100.0	102.7	111.1	100.0	99.1	98.6
Sugar Crops	83751	84343	101099.3	262111	296976	179582
Index	100.0	100.7	120.7	100.0	113.3	68.5
Oil Crops	12187	14623	16170.33	8850	7793	9795.667
Index	100.0	120.0	132.7	100.0	88.1	110.7
Vegetables	205816	321834	423637	55661	73993	84865.67
Index	100.0	156.4	205.8	100.0	132.9	152.5
Coffee	3156	12504	22192.67	203667	286000	273333.3
Index	100.0	396.2	703.2	100.0	140.4	134.2
Tea	612954	707400	952809	754300	849000	860160
Index	100.0	115.4	155.4	100.0	112.6	114.0
Tobacco	2609480	2466997	2614475	554933	532067	550400
Index	100.0	94.5	100.2	100.0	95.9	99.2
Rubber	400159	483000	542119	457667	627667	794333.3
Index	100.0	120.7	135.5	100.0	137.1	173.6

Source: Derived from FAO (2009): Statistical Yearbook 2007-08.

It has been indicated elsewhere that the overall agricultural production in these economies has started experiencing a decline in recent years (Zhou and Tian 2004, Cheng 2009, Bhalla 2006, Vaidyanathan 2010). The deceleration or slow growth of production during the triennium ending 2006 is visible in the case of cereals, starchy roots and tubers, pulses and sugar crops (Table 1). On the other hand, the production of commercial and high value crops, viz., coffee, vegetables and rubber registered significant improvements.

Although, the traditional base of both these economies remained as predominantly agrarian, major structural changes towards the industry and services sector is visible in the economy. Both China and India has recorded higher overall growth in their economies, whereby the growth rates the industry and services sector were recorded to be much higher than the agricultural growth rates in recent times. Agriculture constituted about less than one-fifth of the gross domestic product in the economy (Table 2). On the other hand, the share of rural population in the total population or the share of economically active population engaged in agriculture recorded a much slower decline in both the economies. There is a higher concentration of workers in the Chinese agriculture as compared to India. The share of trade flows in the domestic output levels appear to have declined for agriculture during the triennium ending in 2006 as compare to the triennium ending in 2001.

Table 2: Agricultural Output, Employment and Trade in China and India.

	China			India		
	1994-96	1999-01	2004-06	1994-96	1999-01	2004-06
Agriculture's Share in GDP (current market prices).	19.8	15.3	12.3	27.5	23.8	18.8
Share of Rural Population in Total Population (%)	68	64	59	73	72	71.33
Economically Active Population in Agriculture as % of Total EAP	69	67	63.67	62	60	57.33
Per capita Agricultural Production Index	82	100	114.33	96	100	100
Share of Agricultural Exports in GDP (current prices).	3.4	1.9	1.67	1.7	1.4	1.40
Share of Agricultural Imports in GDP (current Prices)	4.7	3.0	2.90	0.8	1.0	0.97

*Source: Derived from ADB (2009): Key Indicators for Asia and the Pacific and
FAO (2009): Statistical Yearbook 2007-08.*

However, while the relative importance of the agricultural sector has declined in the respective economies, agriculture plays a vital role in providing employment, generating domestic demand and contributing to the food security at the global level (Table 3). The data indicates that both these Asian giants at present command a higher share of world agricultural GDP in comparison to the world total GDP at constant (=2000) prices. Similarly, the intensity of the population engaged in the farm sector in these countries is much higher than the intensity of the population in the economy. Finally, and most importantly, the share in world food consumption of both China and India remained higher than their respective shares in world food production. It appears that as economic growth progressed, the demand for food (agricultural products) has climbed rapidly in both China and India.

Table 3: Agriculture in China, India and the World Economy.

	China			India		
	1994-96	1999-01	2004-06	1994-96	1999-01	2004-06
Share in World GDP at constant (=2000 prices)	3.38	4.19	5.53	1.25	1.41	1.68
Share in World Agricultural GDP at constant (=2000 prices)	13.22	13.70	14.58	7.69	7.73	7.57
Share in Total World Population	21.36	20.85	20.27	16.69	17.08	17.41
Share in World Agricultural Population	33.46	32.91	32.20	21.13	21.73	22.26
Share in World Food Production	18.40	18.6	17.71	9.92	9.95	9.28
Share in World Food Consumption	22.81	22.61	21.74	14.56	14.71	14.73

Source: Derived from FAO (2009): Statistical Yearbook 2007-08.

Given the production base of agricultural sector, the potential impact of successive trade liberalization initiatives in China and India could be significant on the world market for agricultural commodities. Along with the faster economic growth of their economies, opening up of their agricultural sector also allows them to potentially turn into a large importer/exporter of agricultural products. For a given economy, the divergence between the shares in world food consumption and production is an indication that the growth rate of domestic production has been below (above) that of the effective demand. In the context of China and India, it is sometimes maintained that they are currently able to meet their own food demands by making good use of the international markets. In fact, the contemporary demand from China and India for several agricultural products e.g., food grain, and feed grain, cotton, sugar, pulses or edible oil played a key role in the recent world commodity

market developments. In some years, grain exports coupled with lower domestic production led to import decisions to contain increase in domestic grain prices. Nevertheless, the fact that the growth rate of domestic agricultural production has lagged behind the effective demand, could have had an impact on the pattern of agricultural exports and imports and also the net agricultural trading position of the economy.

4. Trade Policy in Agriculture:

The rapid economic growth and transformation in China and India are sometimes typically mentioned to justify the economic policy of choice. Thus, there are observers who argue that the recent economic successes in these two economies are mainly because of the opening up of their foreign trade and investment policies. But, while significant progresses was made since the economic reform in liberalizing the industrial trade regime, trade in agriculture remained a state monopoly for a long time in both the economies (Huang and Chen 1999, Rao 2005). It has been indicated earlier that both the Chinese and Indian economy were relatively closed and agricultural trade flows were perceived as residual after meeting the consumption demand out of the domestic production (Srinivasan 1994 edited). A combination of quantitative restrictions in the form of licenses or quota on imports and canalization of trade through state trading agencies has often been used to regulate the value or volume of agricultural trade flows. The main objective of the regulated agricultural trade policy regime for agriculture was to ensure stable domestic price levels and smooth macro economic management. Thus, while an elaborate system of measures (foreign exchange) was used to control trade in India, China followed a policy of monopolizing the national trade through foreign trade corporations. In India too, the trade of several agricultural products and raw materials was deliberately canalized through the state trading operations, so as to ensure that the domestic market remains insulated from fluctuations in world prices.

Table 4: Tariff Rates in China and India, 2007.

	China	India
<i>Simple Average Final Bound</i>		
Total	10.0	50.2
Agricultural	15.8	114.2
Non-Agricultural	9.1	36.2
<i>Simple Average MFN Applied 2007</i>		
Total	9.9	14.5
Agricultural	15.8	34.4
Non-Agricultural	9.0	11.5
<i>Trade Weighted Average</i>		
Total	5.0	8.0
Agricultural	16.0	41.9
Non-Agricultural	4.6	6.5

Source: Derived from WTO (2008): World Tariff Profiles

Therefore, the two economies did not have any clear outward-oriented trade policies until the 1980s and initiated systematic trade liberalization since then (Fan et al 2007). The attempt to link economies with the global market has however proceeded in different degrees and pace in these two economies. While India became member countries of the WTO in 1995, China joined in 2001. Of late, it has been claimed that the prevalent distortions to incentive (difference between the international and domestic market price) as well as distortions in policy towards agriculture has been reduced in both China and India (Huang et al 2009, Pursell et al 2009. Some specific studies have also pointed out that both the economies made significant efforts in agricultural trade liberalization by binding their tariff rates, offering preferential tariffs or duty-free imports to a number of countries, and removing some of the import controls and licensing (see Huang, Rozelle and Min 2004, Yao 2006, Anderson et al 2009 for China, and Gulati 2003, Jha 2006, Chadha et al 2008 for India). The remaining of this section provides a detailed examination on the extent to which agricultural import restrictions were liberalized.

Table 5: Tariff Duty Ranges in China and India, 2007.

	Duty Free	0 ≤ 5	5 ≤ 10	10 ≤ 15	15 ≤ 25	25 ≤ 50	50 ≤ 100	> 100
China								
Agricultural								
Final Bound	5.8	8.1	25.0	25.2	26.3	7.0	2.5	0
MFN Applied 2007	7.7	6.9	26.8	25.2	25.5	7.4	2.6	0
Imports 2006	7.8	27.3	29.0	5.4	4.6	24.4	1.5	0
Non-agricultural								
Final Bound	6.8	18.3	46.9	14.7	12.0	1.4	0	0
MFN Applied 2007	6.8	18.9	47.1	14.4	11.3	1.3	0	0
Imports 2006	44.2	16.9	30.6	5.7	2.3	0.3	0	0
India								
Agricultural								
Final Bound	0	0	1.3	0.1	2.7	6.7	52.9	36.2
MFN Applied 2007	3.4	3.4	0.7	6.1	4.6	69.0	11.2	1.2
Imports 2006	6.9	6.9	2.4	3.2	3.4	55.2	24.2	0.7
Non-agricultural								
Final Bound	3.2	8.8	0	0	14.6	49.5	1.1	1.0
MFN Applied 2007	3.9	8.8	78.5	0.5	1.1	4.9	1.2	0.7
Imports 2006	9.7	44.5	45.3	0	0.2	0.1	0.2	0.1

Source: Source: Derived from WTO (2008): World Tariff Profiles.

Note: Tariff lines and import values are in percentage.

The tariff rates (final bound and MFN applied) are classified for agricultural and non-agricultural commodities in these two economies (Table 4). The simple average of final bound, MFN applied or the trade weighted averages of applied tariffs in both the economies

are found to be higher for agriculture in comparison to non-agricultural imports. However, the gap between the agricultural and non-agricultural tariff rates remains much wider in the case of India. This is due to the reason that the bound rates in India were set at an exceedingly high level as compared to the levels in China. In fact, the divergence between the bound and applied rates remained very high for agriculture in India, whereas there seems to be some convergence between the bound and applied tariff rates in China.

In Table 5, the frequency distribution of tariff lines are categorized against duty ranges separately for agriculture and non-agriculture in both the economies. It is interesting to note that while about 75 percent of the MFN applied agricultural tariff rates in China fall between 5 to 25% duty rates, the largest group of agricultural tariff line (about 69 percent) in India belongs to the 25 to 50% applied duty ranges in India. Further, the final bound tariff duty range enclosing the largest group of agricultural products turns out to be higher than the applied duty range containing the same in India. There is a better semblance between the bound and applied tariff rates for agricultural imports in China, where the largest group of tariff lines fell under the 5 to 25% rate according to both bound and applied duty rates. The divergence between the applied and bound duty rates is also observed for non-agricultural imports in India as compared to China, where the largest group of non-agricultural tariff lines is contained under the same applied and bound rates. Overall, Table 5 confirms the alleged tariff protection to agriculture in India, where duty rates are much higher in relation to non-agriculture. The corresponding analysis for China reveals that the largest tariff line (according to both bound and applied rates) for non agriculture is contained under the same duty range as agriculture.

Table 6: Bound and Applied Tariff Duties by Product Groups in Agriculture 2007.

Product Groups	Average Final Bound		Average MFN Applied	
	China	India	China	India
Animal Products	14.8	105.0	14.8	31.6
Dairy Products	12.2	65.0	12.2	34.5
Fruits, Vegetables, Plants	15.0	100.8	14.9	30.8
Coffee, Tea	14.9	133.1	14.9	55.9
Cereals and Preparations	23.7	119.4	24.5	31.1
Oilseeds, Fats and Oil	11.6	168.9	11.2	48.8
Sugars and Confectionery	27.4	124.7	27.4	34.4
Beverages and Tobacco	24.1	127.5	23.0	63.3
Cotton	22.0	110.0	22.0	17.0
Other Agricultural Products	11.9	104.1	11.7	22.0

Source: Source: Derived from WTO (2008): *World Tariff Profiles*.

Table 6 provides the bound and applied tariff duties in China and India, which are classified for several product groups in agriculture. It can be seen that the bound tariff duties for all the important product groups in China is kept at a substantially lower level in relation to India. In fact, the Chinese bound duties on several agricultural product groups are about one-fifth of what prevails in India. Similarly, the applied tariffs in China remained low in comparison to India for almost all the agricultural product groups except for cotton. It appears that the attempt by India to bind its tariffs at relatively higher levels has subsequently made the bound and applied rates to diverge widely for agricultural imports.

Table 7: Tariffs Structure in Major Trading Countries.

	MFN Average of Traded Tariff Lines		Duty Free Imports	
	Simple	Weighted	Tariff Lines (%)	Value (%)
China				
Major Partners:				
Japan	15.7	9.6	36.4	24.1
European Community	10.6	7.1	32.5	54.2
US	4.7	2.7	28.1	47.5
Hong Kong	0	0	100	100
Korea	16.0	15.9	2.4	2.7
India				
Major Partners:				
European Community	9.9	5.3	29.5	57.7
China	15.6	30.6	21.3	3.0
US	3.1	1.6	81.9	83.8
Saudi Arabia	7.8	3.9	22.8	70.1
Pakistan	11.8	9.5	0	0

Source: Source: Derived from WTO (2008): *World Tariff Profiles*.

In Table 7, we provide the tariff structure of economies, which are the major trading partners of China and India. It can be observed that the simple as well as weighted average of agricultural tariffs lines in most of the partner countries are lower as compared to the domestic tariffs in India but not in China. However, while the tariff barriers are higher for Indian agricultural exports to China and Pakistan, the same applied for the Chinese agricultural exports to the European Community and Korea. It may, however, be remembered that a direct comparison of border protection through agricultural import tariffs between China or India vis-à-vis developed countries can sometimes be deceptive. It is often claimed that the export success of agricultural products from developing countries has been limited due to the complex trade barrier practices used by developed countries featuring high and escalating tariff walls, quota restrictions, and state subsidies, which the trade negotiations have failed to discipline.

Nevertheless, it is stated over and over again that reductions in tariff duties can signify integration of the economy with the world economy. Since the applied tariff rates in each of the economies fell below the bound rates, it would appear that the Uruguay Round Agreement on Agriculture (URAA) commitments has been fulfilled. Thus, India undertook tariff reductions for a number of commodities, viz., edible oils, pulses, and cotton, and also eliminated quantitative restrictions on agricultural import during 2001. Similarly, the agricultural trade policies started to change in view of the general trade policy reforms in China, which included elimination of export subsidies and merging of the two-tier exchange rate system. Although, China ended the system of direct subsidies to grain export in 2002 subsequent to the joining the WTO, however, provided some indirect support in the form of fee waiver and tax refund (Zhou and Tian 2004). These measures, along with fluctuating world corn and wheat prices facilitated China's grain trade in recent years. Today China is a major importer of food grain, cotton and sugar, whereas India imports edible oils, pulses, raw cotton, fresh fruits and processed foods. It appears that both these economies have moved away from the self-sufficiency perception and started to consider the global supplies so as to achieve the food security objectives.

Although both China and India have started to follow market rules and opened up their markets, the reinforcement of export barriers or speculative trading has also played an important role in their trading behaviors. For instance, when world prices of almost all agricultural commodities experienced extreme volatility during the three-year period from 2006 to 2008, the most common policy responses of China and India have been to impose export restrictions or tax on exports. While, reduction of import tariffs and creating export barriers made some impact in controlling domestic food price inflation in the importing country, these measures also lowered the world supply by providing distorted price signals. In this connection, it would be interesting to examine the developments of agricultural trade patterns in these two economies, which we forward in the following section.

5. Agricultural Trade Features:

It was observed earlier that agricultural imports in both China and India have started to rise faster due to their import liberalization following the WTO commitments as well as falling international prices. As a result, some analyses have commented on how liberalization of agricultural trade had made these two countries a net importer from the rest of the world. Today the demand from China for several commodities e.g., food grain, cotton, sugar continue to play a key role in world commodity market developments. It is also observed that

the trade liberalization of agriculture has made India the world's largest market for edible oils and pulses (Landes 2004). The following analysis examines the changing share of agricultural trade in relation to total economy trade and further attempts to identify the changing nature of trade within agriculture in these two economies.

Historically, the role of foreign trade in the economy remained small in both China and India due to conservative economic policies, which relied more on the domestic markets. It is not the principle of comparative advantage but the immediate need to fill the gap between the domestic production and consumption demand was the major motivation in formulating the national grain import plans. Thus, trade remained a state monopoly wherein imports were mainly allowed to fill in the domestic production shortfalls. However, when trade expansion started due to changing economic policies, the exports of agricultural commodities by China exceeded their imports for most of the years since 1950 (Surl 1982). The net export surplus in agriculture was used to finance the non-agricultural imports to China (Lin 1992). Subsequently, the period from 1977 to 1984 was marked with a massive increase in grain imports, which made China an important player in the world grain market (Lu 2000). However, while trade in most other commodities started to become liberalized during the economic reform of the 1980s in China, the national import and export plan of food grains trade remained under the state control and was monopolized by the state trading corporations (Ke 1999, Lu 2000). It is also maintained that despite an increase in the overall trade, the trade expansion along comparative advantage lines remained limited for Chinese agriculture (Carter and Li 1999). The export of agricultural products has grown subsequently but only at a slow rate. The phenomenon that exports have lagged behind the imports - leading to gradual erosion of the traditional surplus in agricultural trade - is an outcome of the fact that the growth rate of domestic agricultural production has been below that of the effective demand. The volumes of grain imported and exported during the successive period changed abruptly so that China became a net importer in some years and net exporter in others. Tian et al [2005] maintain that there has been no clear pattern of China's grain import and export in recent years. China's grain trade in recent years remained active along with the drastic fluctuations in grain exports and imports. On the other hand, the total agricultural exports from India demonstrated signs of growth following the devaluation and successive depreciation of the exchange rates during the reform years in early 1990s. The exchange rate convertibility on trade account also enabled many farm based products to become internationally competitive. Some of the crucial measures that were initiated during early-90's to accelerate the growth of agricultural exports from India were the removal of minimum

export prices, de-canalization and de-regulation of several items and removal of export duties. Although, the flow of agricultural imports started to rise in the corresponding period, the trade balance in agriculture was positive due to higher exports growth.

The agricultural exports from China remained wide ranging in the past and included live animals, meat and animal products, fruits and vegetables, textile fibers/silk and rice. Whereas the Indian agricultural exports are comprised of fish and fish products, oil cakes, cashew kernels, tea, coffee, tobacco, spices, fruits and vegetables, pulses, basmati and common rice and sugar (Pursell and Warr 2008). Table 8 examines the agricultural trade in these two economies by individually exploring indicators such as the magnitude of agricultural export and import shares, net traded position and share of food in agricultural trade.

Table 8: Agricultural Trade Characteristics in China and India.

	1994-96	1999-01	2004-06
Share of Agricultural Exports in Total Exports			
China	4.9	3.0	1.87
India	15.5	11.8	8.83
World	8.8	6.9	6.37
Share of Agricultural Imports in Total Imports			
China	6.5	4.5	3.83
India	6.5	7.0	4.13
World	9.1	7.1	6.47
Net Total Trade (Export minus Imports)			
China	5427	29652	107742.67
India	-4057	-8891	-42885.00
World	-	-	-
Net Agricultural Trade (Export minus Imports)			
China	-6417	-6896	-20273.33
India	2649	1352	3263.67
World	-	-	-
Share of Food in Agricultural Exports			
China	57.9	64.5	68.57
India	71.5	57.9	58.57
World	67.6	68.1	69.27
Share of Food Agricultural Imports			
China	57.9	63.5	60.23
India	71.5	72.6	76.77
World	67.6	68.2	69.57

Source: Derived from FAO (2009): Statistical Yearbook 2007-08.

We notice that the share of agricultural exports in total exports has recorded a rising trend for India but a declining trend for China. However, while China is a surplus in the net trading position of their overall trade, it also recorded a deficit with regard to the net trading position in agriculture. India, on the contrary, recorded a surplus in the net trading position of

their agriculture but a deficit in the overall trade. It may be mentioned in this context that the total merchandise exports from China have witnessed an impressive growth over the past decade due to a number of factors, viz., declining import tariffs, reduction in transport costs and expansion of the intra-industry and intra-firm trade. The result of the rapid export growth in industry and services relative to that in agriculture caused a perceptible drop in the share of agricultural exports in total exports. We finally examine the characteristics of agricultural trade by looking at the share of food in the respective trade flows. It is apparent that the share of food remains not only significant but kept on getting bigger in both the export and import flows for China and India. As the share of food in the agricultural exports is concerned, it recorded an increase for China but declined in India.

6. Indicators of Agricultural Trade Liberalization:

To examine the extent of trade liberalization in the Chinese and Indian agricultures, we have employed the standard trade liberalization indicators, e.g., export share, export performance, net trade performance and trade openness in agriculture. Table 9 examines these indicators at different trienniums between 1976 and 2007 in these two economies.

Table 9: Agricultural Trade Indicators in China and India.

	Agricultural Export Share		Agricultural Export Performance		Agricultural Net Trade Performance	
	China	India	China	India	China	India
Triennium ending 1978	28.20	32.97	4.16	4.80	26.01	9.22
Triennium ending 1983	15.39	33.33	3.60	4.36	-26.14	29.79
Triennium ending 1988	17.52	24.07	7.62	3.48	26.83	37.25
Triennium ending 1993	13.28	18.13	9.88	4.45	30.41	44.63
Triennium ending 1998	8.76	19.85	8.73	6.49	2.93	28.73
Triennium ending 2003	5.69	13.37	9.73	6.76	-10.95	13.23
Triennium ending 2007	3.44	10.63	9.88	8.10	-23.45	20.59

Source: Derived from UNCTAD (various issues): *Handbook of Statistics and ADB (various issues): Key Indicators for Asia and the Pacific*.

Notes:

1) Agriculture is the sum of all food items and agricultural raw materials. The data on all food items refer to the sum of food, beverages, tobacco, oilseeds and oleaginous fruits, animal and vegetable oils and fats. It includes the sum of SITC section 0, section 1, section 4 and division 22. The data on agricultural raw materials excludes synthetics and includes the SITC section 2 (less division 22, 27, 28, and groups 233, 244, 266 and 267).

2)

$$\text{Agricultural export share} = \left(\frac{\text{Export}_{\text{Agriculture}}}{\text{Export}_{\text{Total}}} \right),$$

$$\text{Agricultural export performance} = \left(\frac{\text{Export}_{\text{Agriculture}}}{\text{GDP}_{\text{Agriculture}}} \right),$$

$$\text{Net trade performance in Agriculture} = \left(\frac{\text{Export}_{\text{Agriculture}} - \text{Im port}_{\text{Agriculture}}}{\text{Export}_{\text{Agriculture}} + \text{Im port}_{\text{Agriculture}}} \right).$$

The agricultural sector in China and India are the two largest agricultural economies in the world. The small export share of agriculture in these two economies is due to the size of total production in these two economies. It is found that the agricultural export share declined for both the economies during the sample period between 1976-78 and 2005-07, although the magnitude of the decline remained sharper for China in relation to India. While there is an indication of improvement in India's export share immediately after becoming a member of the WTO in 1995, no such sign is visible for China after joining WTO in 2001. The declining agricultural export share in China could also be a result of the spectacular growth in the total merchandise exports aided by the industrial products. Thus, an important element of the trade profile in both the economies has been a remarkable export growth for industrial products along with stagnating growth of agricultural exports. The agricultural export performance indicators however point towards a clear and steady improvement for both the economies, particularly since the respective years of joining WTO. Finally, the net trade performance figures reveal that while India remains as a net exporter of agriculture, China has turned into a net importer after 2001.

Table 10: Agriculture and the Economy Trade Openness in China and India.

	Agricultural Trade Openness		Economy Trade Openness	
	China	India	China	India
Triennium ending 1978	6.77	8.85	9.04	10.58
Triennium ending 1983	9.74	6.72	14.21	11.23
Triennium ending 1988	12.02	5.19	24.73	10.20
Triennium ending 1993	15.17	6.18	31.01	14.48
Triennium ending 1998	17.00	10.09	32.17	18.09
Triennium ending 2003	21.95	11.93	44.35	22.04
Triennium ending 2007	25.50	13.69	64.86	32.59

Source: Derived from UNCTAD (various issues): *Handbook of Statistics and ADB (various issues): Key Indicators for Asia and the Pacific.*

Notes:

1) Agriculture consists of all food items and agricultural raw materials.

2)

$$\text{Agricultural Trade Openness} = \left(\frac{\text{Export}_{\text{Agriculture}} + \text{Im port}_{\text{Agriculture}}}{\text{GDP}_{\text{Agriculture}}} \right),$$

$$\text{Economy Trade Openness} = \left(\frac{\text{Export}_{\text{Total}} + \text{Im port}_{\text{Total}}}{\text{GDP}_{\text{Total}}} \right).$$

Table 10 compares the trade openness in agriculture vis-à-vis the respective economy, which informs that the trade openness in manufacturing and services has proceeded at a much faster rate in relation to the same in agriculture, so that the overall economy nowadays is more open to trade than the relevant agricultural sectors in both China and India. The comparable estimates also reveal that the Chinese economy is more open in agricultural as well as overall trade in comparison to India. Further, while the overall trade openness in the past remained twice the size of the agricultural trade openness in both the economies, the divergence between the two seems to have widened in the most recent period.

7. Causality Analysis:

The pattern of trade liberalization in the two large Asian economies raises a relevant issue, namely, whether the impact of liberalization would be positive on the agricultural growth process or whether the process of liberalization is a reflection of the agricultural growth progression. We attempt to examine this relationship using comparable data from the Chinese and Indian agricultures.

7.1. Methodology and Data

The Granger causality tests have been widely used to discern the cause and effect of economic variables including changes in the trade liberalization and growth process of the economy.³ The hypothesis that an explanatory variable (x) does not cause the dependent variable (y) is tested by estimating the following regressions:

$$y_t = \alpha + \sum_i \beta_i y_{t-i} \quad \text{:Restricted Form}$$

$$y_t = \alpha + \sum_i \beta_i y_{t-i} + \sum_i \delta_i x_{t-i} \quad \text{:Unrestricted Form}$$

and then performing a F-test to test the null hypothesis that $H_0: \delta_i = 0$, against the alternative that $H_1: \delta_i \neq 0$. Further, to confirm that a reverse causality does not exist, we repeat the process in the opposite direction. This test verifies whether the causation is bi-directional.

The Granger causality results involving trade liberalization and growth process in the Chinese and Indian agricultures has been performed for the period 1976-2007. For our statistical analysis, we have alternatively used three different proxies of agricultural trade liberalization, viz., export share, export performance and trade openness, which were derived in the previous section. To capture the growth in respective agricultures, we have used two

³ See Granger [1969] for details.

series, viz., the index of agricultural production and the estimates of gross value added in agriculture at constant prices. The data on agricultural GDP at constant prices in respective currencies, which is available for a shorter time period (viz., 1990-2007), has been collected from various issues of the *Key Indicators* (ADB). On the other hand, the agricultural production indexes in respective economies are derived from the individual country publications. The Chinese data on agricultural production index has been collected from various issues of *Statistical Yearbook of the Republic of China*, published by the Accounting and Statistics Executive of the Directorate General of Budget. Whereas, the publication *Agricultural Statistics at a Glance* brought out by the Ministry of Agriculture, Government of India, has been used to gather the Indian data on agricultural production index.

7.2. Causality Results

Table 11 provides the Granger causality results involving trade liberalization and growth indicators in agricultures for our sample economies. Since, the causality results are known to be sensitive to the choice of lag lengths, the selection of lag length in each regression has been carefully determined. For deciding the optimal lag structure in our regressions with a sample size of 32 observations, we start with a lag length of 3 and then pare down the model by using information from the usual t-test. Similarly, for regressions with a sample size of 18 observations, we start with a lag length of 2 and then reduce the number of lags until the last lag included is still significant with the standard t-test.

The causality results presented in Table 11 indicate the presence of statistically significant causation from specific indicators of trade liberalization to growth in agriculture as well as from agricultural growth to certain indicators of trade liberalization. In one occasion the direction of causality remained inconclusive due to the presence of bi-directional causal relations. However, there seems to be some similarity between results from the Chinese and Indian samples. That is, the evidence of statistically significant one-way causal relation from export share to production level in agriculture is present for both the Chinese and Indian agriculture. Similarly, the presence of significant causality from export performance (or from trade openness) to real value added in agriculture is evident for both China and India. On the contrary, there is also evidence of significant causal relations from production level to export performance and trade openness in agriculture for both China and India. Overall, the statistical evidence based on various indicators of trade liberalization and growth process in agriculture lends support for both side of the hypothesis that trade liberalization causes growth in agriculture as well as the agricultural growth causes trade

liberalization process in the economy. This finding could possibly be an indication that the benefits from trade can result in higher growth, which in turn can stimulate growth in trade.

Table 11: Causality Tests between Trade Liberalization and Growth in Agriculture.

China: Null Hypothesis	Lag	F-Statistics
(Sample: 1976-2007)		
Export Share does not cause Production Growth in Agriculture	2	2.59 ***
Production Growth does not cause Export Share in Agriculture	1	0.18
Export Performance does not cause Production Growth in Agriculture	3	0.21
Production Growth does not cause Export Performance in Agriculture	2	2.98 ***
Trade Openness does not cause Production Growth in Agriculture	2	2.09
Production Growth does not cause Trade Openness in Agriculture	2	6.98 *
(Sample: 1990-2007)		
Export Share does not cause Value Added Output in Agriculture	1	0.91
Value Added Output does not cause Export Share in Agriculture	1	2.34
Export Performance does not cause Value Added Output in Agriculture	1	8.66 **
Value Added Output does not cause Export Performance in Agriculture	1	0.36
Trade Openness does not cause Value Added Output in Agriculture	1	20.85 *
Value Added Output does not cause Trade Openness in Agriculture	1	1.39
India: Null Hypothesis		
(Sample: 1976-2007)		
Export Share does not cause Production Growth in Agriculture	1	7.89 *
Production Growth does not cause Export Share in Agriculture	2	2.09
Export Performance does not cause Production Growth in Agriculture	2	0.96
Production Growth does not cause Export Performance in Agriculture	1	8.72 *
Trade Openness does not cause Production Growth in Agriculture	1	0.89
Production Growth does not cause Trade Openness in Agriculture	1	10.45 *
(Sample: 1990-2007)		
Export Share does not cause Value Added Output in Agriculture	1	1.07
Value Added Output does not cause Export Share in Agriculture	1	1.09
Export Performance does not cause Value Added Output in Agriculture	1	7.64 **
Value Added Output does not cause Export Performance in Agriculture	2	2.82
Trade Openness does not cause Value Added Output in Agriculture	1	9.62 *
Value Added Output does not cause Trade Openness in Agriculture	1	3.66 ***

1) Note: *, ** & *** indicate statistical significance at 1%, 5% & 10% level of significance, respectively.

8. Conclusions:

In the context of the examining the implications of agricultural trade liberalization in China and India, some opinions argued that the overall impact on domestic agriculture would

be modest with some specific sector specific impacts, while others believed that the effects could be wide-ranging. In the same way, while some argued that the impact of trade liberalization process would be positive on the rural economy, others believed that the liberal external trade in general did not have beneficial impacts on cultivators (Wilson 2002, Huang and Rozelle 2003, Bhalla 2004, Ghosh 2005). Furthermore, there are some, who believed that the complete trade liberalization could even challenge the food security goal defined by the respective governments of these two economies. It is therefore apparent that the nature of the relationships between trade policy and specific development indicators remained unclear for the agricultures of these two economies. A limitation on the earlier statistical analysis of agricultural trade liberalization literature has been that it did not shed much light on whether the impact of liberalization would be positive on agricultural growth. Thus, while it was agreed that lower trade barrier could lead to more trade, it was never clear whether higher trade would lead to higher growth in agriculture. In view of that, this study had set the objective to examine the specific hypothesis whether the trade liberalization process had led to changes in the agricultural sector growth in a macro economic context. In this connection, it becomes essential to mention about the weakness of this study, which is about the bi-variate model used in the analysis. We recognize that there are crucial variables from the domestic front that can potentially impact on the agricultural growth rates, for instance, the technology, the investments or the incentives. However, since our focus was directed towards examining the existence of a causal link between trade liberalization and growth in agriculture, and not to study the determinants of agricultural growth, we have deliberately limited our exercise to examine only the bi-directional causal relations between the two.

Although, China and India remained as the major producers of agricultural products, viz., cereals, pulses, sugar, oil-crops, rubber tea, coffee and vegetables in the world, the recent production trends demonstrates declining agricultural growth in both the economies. The agricultural production process is also characterized by some noticeable shift from the standard cereals-pulses to high-value crops in recent years. Correspondingly, the traditional agrarian base has visibly declined in both the economies due to the structural transformation of the economies. However, the dependence on agriculture for employment still remains substantial and does not seem likely to diminish radically in the near future. The share of agricultural trade flows as a proportion of domestic output levels appear to be low. It is however recognized that a key role is played by both China and India in generating demand for agricultural products as well as contributing to the global food security. The demand for

food (or agricultural products) is expected to climb further as economic recovery progresses in both China and India.

Our analysis reveals that while China by now records deficit with regard to the net trading position of agriculture, India on the contrary is a surplus in their agricultural trading. Further, the food items remains not only significant but recorded a rising trend in the import flows for both the economies. The agricultural tariffs are found to be higher than the non-agricultural tariffs in both the economies, further the gap between the two remains wider in India due to exceedingly high bound rates in agriculture. A comparison of tariff duties across product groups in agriculture indicate that the applied tariffs in China remained low in comparison to India for almost all the agricultural product groups, except for cotton. It is also apparent that the agricultural tariff in most of the partner countries remained lower as compared to the domestic tariffs in India.

A comparison of trade openness in agriculture vis-à-vis the economy reveals that not only the overall economy remains more open to trade in relation to the relevant agricultural sectors, but the gap between the two seems to have widened for both China and India in recent years. However, there are indications of improvement in agricultural export performance for both the economies, particularly since after joining the WTO. The Granger causality results involving trade liberalization and growth indicators in agricultures turn out to be noticeably similar. There is an evidence of statistically significant one-way causal relation from export share, export performance or trade openness to agricultural growth in both the Chinese and Indian sample. In contrast, there are also indications that significant causality existed from agricultural production growth to export performance or trade openness in China and India. On the whole, the results seem to suggest that while trade liberalization generated growth in agriculture, the growth in agriculture also simultaneously impacted on the trade liberalization process.

Although, both China and India have not completely turned away from their earlier preoccupation of achieving self-sufficiency in food grain production, in the present day both the countries remain as the potential major players in the global food economy. Accordingly the recent Chinese and Indian grain trade policies have become the subject of major academic and policy interests (World Bank 2008, OECD 2009 and FAO 2009). If their food security goals rely on the world market in the liberalized regime, both may turn out to be net importer of agriculture unless there are improvements in their domestic agricultural productivities. The main issue involved in examining the relationship between trade and growth, in this study,

was to evaluate the role of trade policy, viz., whether liberalized policies are preferable to protective policies in agriculture. According to our results, the benefits of liberalized and greater agricultural trade turned out to bear a statistically significant causal effect on the two large developing agricultures of India and China. This empirical finding can potentially have crucial relevance for the policy decision as to why developing economies should liberalize their trade policies in agriculture. Given their current trends of domestic agricultural production levels, managing the food security objectives along with dealing with the trade negotiations would remain a challenging policymaking task in both China and India. Thus, while it would be rational for these two highly populated economies to import food items (agricultural commodities) in which they do not have comparative advantages, it would also remain necessary that they are able to develop exportable that are cost-competitive globally.

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