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Where is the balance? Implications of adopting Special Products and Sensitive Products in Doha negotiations for world and China's agriculture

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ABSTRACT

This paper analyzes the potential impacts of the agreements of Special Products and Sensitive Products (SPs) in Doha negotiations on world and China's Agriculture. By linking a global trade model to a national policy model which itself is connected to a set of disaggregated household data, we are able to assess the effects of the inclusion of SPs into a Doha agreement on agriculture in China and the rest of the world and different farmers across China. Our results show that since the inclusion of SPs in a Doha agreement adds more protection in agriculture, the total quantity of resources used in world agriculture increases. Although increasing, it is important to note that the total rise is only a fraction of a percent of agricultural value added and the gains to rural income per capita are likewise small. Moreover, an important difference between the apparent benefits of SPs is highlighted when they are considered for one country alone and when they are made available to all WTO members. The benefits to agriculture in China (and other countries) from increases in protection resulting from SPs are typically offset when these flexibilities are made available to all countries. While there are some positive benefits for certain vulnerable groups in society (in China), we show that there are adverse effects on equity and the impacts differ largely among regions.

1. Introduction

The Doha Development Agenda of World Trade Organization negotiations aims to lower barriers to trade around the world, with a focus on making a more fair system of trade for developing countries. While economists have repeatedly shown that trade is efficiency-increasing and has benefits in both the short and the long run, there are many voices in the global economy that worry about the poverty effects on individuals (Griswold, 1999; Madeley, 2000; Bhagwati and Srinivasan, 2002; Bhagwati and Srinivasan, 2002; Coxhead, 2003; Agenor, 2004; Winter, McCulloch, & McKay, 2004; Harrison, 2006). Like the rest of the world, there is an ongoing debate in China on these issues (Huang, 2002; Wang, 2002; Mao and Liu, 2005; Hu, Zhang, & Xiang, 2007).

In some sense, however, the debate about further liberalization in China should be simple to resolve. When China acceded to the WTO in 2001, it agreed to liberalize its agricultural economy to a degree that few countries had experienced (Huang, Rozelle, & Chang, 2004). Despite the sharp reduction in tariffs, the opening of many subsectors of agriculture—for example, soybeans and cotton—to competition from rising imports, China's rural sector not only has not faltered, it has flourished (Huang, Liu, Martin, & Rozelle, 2008). It has also been shown that the impact on poor producers has been much less than others predicted (Huang, Yang, & Rozelle et al., 2007; Huang, Yang, & Xu et al., 2007). Given that China has already cut tariffs so low, and given that newly acceding

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countries (including China) will be allowed smaller cuts than other members, it would seem obvious that China has a lot to gain from pushing for more global trade liberalization (Rosen, Huang, & Rozelle, 2004).

So, why is China hesitant to join the group of nations that are pushing for an ambitious Doha agenda? There are two issues that may underlie its reticence. The first arises from the risk that some households will be hurt by trade reform. As in any round of trade reforms where tariffs are reduced for a large number of commodities, it is inevitable that there will be both winners and losers. China's government is making an enormous push to alleviate poverty and raise rural incomes in the entire rural economy so any element that even potentially may undermine this effort needs to be fully understood. In Huang, Yang, and Rozelle et al. (2007), it is shown that, in fact, the positive impacts are more than the negative ones (albeit, it is important to note that most of the impacts—both positive and negative ones—are small in terms of their share in domestic production). Moreover, Huang, Yang, and Rozelle et al. (2007) show that the impact of a Doha Round would differ significantly from China's WTO accession since a Doha Round would involve improvements in China's market access opportunities as well as liberalization of China's own trade barriers. Whether or not farmers engaging in the production of a particular agricultural commodity will gain or lose due to the Doha Round is likely to depend on the *relative changes* in China's tariffs and in the tariffs of other countries, and on China's comparative advantage in these commodities.

The second uncertainty arises due to provisions allowing members to cut agricultural tariffs by less than the tariff-cutting formulas—Special Products and Sensitive Products (SPs, for short). The emergence of SPs creates considerable uncertainty about the actual outcome of the Modalities. Under the July 2004 Framework Agreement, developing country members will have the flexibility to designate a number of products as SPs. This designation is intended to be based on criteria such as food security, livelihood security and development needs. The G-33 originally proposed that 20% of developing country agricultural tariff lines be exempted from liberalization as SPs. Sensitive products apply to all WTO members, and allow for smaller cuts, rather than no cuts at all.

While most observers agree that flexibilities of this type will be needed to get an agreement, there is wide disagreement about how many tariff lines should be covered. The EU originally proposed to exempt 8% of agricultural tariff lines under this rubric, while the United States, proposed that only 1% of agricultural tariff lines be treated as sensitive. The latest draft of the Modalities in WTO (2008, para 71) is that industrial countries are allowed 4% of tariff lines as sensitive unless they have more than 30% of their tariff lines in the top tier, in which case they may increase the number of products by two percentage points. Developing countries are allowed one-third more sensitive products. Developing countries would be allowed 12% of tariff lines as SPs, with no cuts required on 5%.

The overall goal of this paper is to understand if China's agriculture will gain or lose from the proposed Doha liberalizations. In particular, we are interested in understanding how SPs will affect China's agriculture and the welfare of the poor in China under a Doha agreement. To meet this goal, the paper is organized as follows. In the next section, we briefly provide an overview of China's agricultural trade and describe the details of the proposed SPs. The third section describes our approach to analyzing the impact of Doha liberalization (including SPs) on China, including our methodologies, assumptions and scenarios. The results of our analysis on the impacts of adding SPs to the Doha Round negotiations on China's overall economy, the individuals in the agricultural sector and on household income and poverty are presented in Section 3. The final section concludes.

2. China's trade and trade liberalization

The volume and structure of China's agricultural trade has changed dramatically over the past two decades. Between 1985 and 2005 trade grew dramatically. The exports of food products during the period rose more than seven-fold. On the import side, total imports also grew fast, rising by a factor of 11 between 1985 and 2005.

The rise of both imports and exports of food products demonstrates that since accession to the WTO, China's agricultural trade regime has become quite open. When looking at the tariff rates, most are below 20%; while many are below 10%. And, while the tariff rates may overstate the degree of liberalization (since for key products, such as rice, wheat and maize, the tariffs are low because the volume of imports are able to be regulated by tariff rate quotas), for many other products—such as fish products, oilseeds, pork and poultry—protection rates are relatively low and higher out-of-quota rates are not applicable. In general, the general trend in the protection to agriculture since the early 1980s, however, is complicated. For import-competing products (e.g., maize, cotton, sugar), the rate of positive protection has risen somewhat (Huang, Yang, & Rozelle et al., 2007); for export-oriented sectors (such as, rice and fruits and vegetables) there was a large fall in the implicit rate of taxation.

One of the most relevant set of facts to understand when analyzing the effect of trade liberalization is the levels of protection relative to the rest of the world (and relative to the tariff rate levied on imports by other countries). In the case of China, the record is mixed. The tariffs imposed on imports into China are in some cases above world average tariff rates, and in others below them. Perhaps the most striking tendency evident in the table, however, is that the tariffs levied by other countries on exports from China are generally above both world average rates and the rates imposed by China on imports from other nations (Tang and Martin, 2007). Of course, this pattern of distortions is most undesirable for China, and the only means by which it is likely to be effectively addressed is through Doha-type negotiations.

2.1. Early Doha round negotiations

The Doha agenda envisages a reduction in tariff rates using a so-called tiered-formula that makes larger cuts in higher tariffs. WTO negotiators reached a tentative agreement on such a formula in 2008 (WTO 2008, para 61) although, as always in the WTO,

Table 1
Proposed tariff reductions of industrial and developing countries in Doha negotiations.

Proposed tariff reductions in industrial country agriculture, around 2003 (%)						
	EU proposal		G20 proposal		US proposal	
	Tiers	Cut	Tiers	Cut	Tiers	Cut
1	0<30	35	0<20	45	0<20	65
2	30<60	45	20<50	55	20<40	75
3	60<90	50	50<70	65	40<60	85
4	>90	60	>70	75	>60	90
Tariff cap		100		100		100

Proposed developing country cuts to bound tariffs, around 2003 (%)				
	G-20 proposal		Falconer's proposal	
	Tiers	Cut	Tiers	Cut
1	<30	25	<30	32 to 34.6
2	30–80	30	30–80	36.6 to 40
3	80–130	35	80–130	41.3 to 43.3
4	130 +	40	130 +	44 to 48.6
Tariff cap		150		No cap

Recent Doha Round proposed tiered formula for agricultural tariff cuts, around 2008 (%)				
	Developed countries		Developing countries	
	Tiers	Cut	Tiers	Cut
1	0–20	50	0–30	33.3
2	20–50	57	30–80	38
3	50–75	64	80–130	42.7
4	>75	70	>130	46.67
Average cut	Min	54	Max	36

nothing is agreed until everything is agreed. The most recent, tentative WTO draft proposal presented in Table 1 involves cuts in industrial country tariffs that increase from 50% for the lowest tariffs to 70% for the highest (WTO, 2008, para 61). The cuts for developing countries are two-thirds of those for the industrial countries.

The formulas for developing countries are important for our study both because they influence the adjustments that China needs to make in its own tariff bindings, and because these tariff formulas are applicable in export markets such as the Republic of Korea, which are eligible for developing-country treatment in agriculture. The proposed tiered-formula cuts for developing countries are given in Table 1. As is clear from the table, the proposed tiers for developing countries are broader than those for the industrial countries. This reflects the fact that bound tariffs in developing countries are much higher than in the industrial countries and so the same cuts in the same bands would mean larger cuts in developing countries. A consequence is that the largest tariff cuts in developing countries do not come into play until tariffs are much higher than in the industrial countries.[1]

2.2. The continuing negotiations: market access modalities take center stage

In this paper we focus on the modalities for market access because previous work suggests that market access is much more important than the other pillars (domestic support and export competition) in terms of the overall welfare impact (Anderson and Martin, 2006). In addition to the tiered formula discussed above, the proposal includes average cut conditions shown in the final row of Table 1. If the average-cut in tariffs resulting from the formula is less than 54% in an industrial country, the cuts in all bands will be increased until this target is achieved. If the average-cut in a developing country exceeds 36%, the cuts in all bands can be proportionately reduced to bring the average-cut to 36%.

As might be expected, however, the precise categories defined in Table 1 are an oversimplification. There are many exceptions and special cases that are being considered.[2] For example, special provisions apply for "Tariff Escalation" products grouped in a set of processing chains. Here the general principle is that processed products subject to tariffs higher than their raw or intermediate product counterparts are moved into the next higher band. In addition, a list of "tropical" and diversification products will be subjected to deeper-than-formula cuts.

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[1] Since these tariff formulas are to be applied to bound, rather than applied, tariffs, their ultimate effect on applied rates will depend upon the gap between bound and applied tariff rates. It will also depend upon the extent to which some countries are excluded from the formula cuts, and particular products are selected for more flexible treatment than is allowed under the formula. In this stage of our analysis, we focus on the impacts of formula cuts to provide a benchmark against which these questions of flexible treatment can be addressed.

[2] See Huang, Yang, Rozelle, and Martin (2009), Table 4 for a summary of the key elements of the agricultural tariff cuts that are being considered. The paper can be accessed on www.ccap.org.
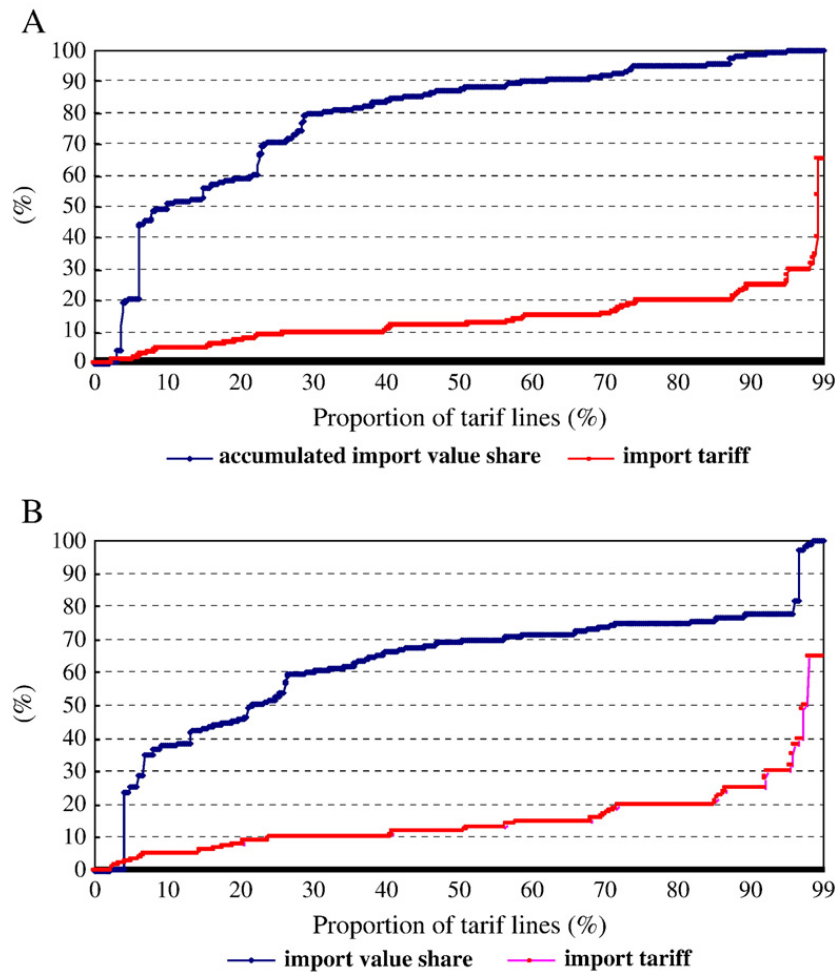
A

B

Fig. 1. (Panel A). The distribution of China's import tariffs (applied tariffs) and import values of agricultural commodities in 2006. (Panel B). The distribution of China's import tariffs (out of quota tariffs) and import values of agricultural commodities in 2006. Note A: 1. The classification of agricultural commodities is similar to the WTO agricultural definition. The difference is that the fish and fish products are also included. 2. The tariff lines (HS 6-digit) whose import tariff (applied tariff) is lower than 10%, 20% and 30% account for 27%, 75% and 95% respectively (total agricultural lines are 785). 3. The import value of agricultural commodities whose import tariffs (applied tariff) lower than 10% and 20% takes up 71.7% and 95% of total agricultural import respectively. Note B: 1. The tariff lines (HS 6-digit) whose import tariff (using out of quota tariff) is lower than 10%, 20% and 30% account for 24%, 72% and 92% respectively (total agricultural lines are 785). 2. The import value of agricultural commodities whose import tariffs (using out of quota tariff) lower than 10% and 20% takes up 51.5% and 74.9% of total agricultural import respectively.
Source: Based on the (HS96) system tariff schedules (6-digit) of the protocol of China's WTO accession (http://www.wto.org/english/thewtoe/acce/completeacce.htm).

The negotiations are also allowing several groups of developing countries to make smaller reductions. Least Developed Countries are not required to make any reductions. Small and vulnerable economies (SVEs) can make reductions 10% smaller in each band than other developing members, or may make an average-cut of 24%. Recently-acceded members (RAMs), such as China, are allowed to reduce their tariff cuts by 8 percentage points (WTO, 2008, para 66); they need not make cuts when the tariff rate is below 10%; they can delay their reduction commitments until two years after completion of their accession commitments (para 69).

2.3. Sensitive and Special Products (SPs)

The key modalities for SPs put a limit on their number and provide for increases in market access under TRQs for SPs. Under the current proposal the general rule would allow developed countries about 4% of tariff lines as sensitive, except for countries with over 30% of bindings in the top tier (or with tariffs scheduled at the six digit level). In these cases and additional 2% of tariff lines can be classified as sensitive. Countries have flexibility to reduce the tariff cut by different fractions of the formula value. If the reduction is by two-thirds, then TRQ access must be adjusted. Developing countries would have the right to one third more SPs than developed countries.[3] The latest WTO (2008 para 129) proposal allows for 12% of agricultural tariff lines to be classified as special products, with up to 5% being subject to no cut and an average-cut of 11% required across Special Products. Recently Acceded Members (RAMs) such as China will be allowed 13% of agricultural tariffs as special products, with an average-cut of 10%.

A key question for evaluation of any proposal for flexibility relative to a tariff formula is how the SPs will be chosen when countries implement the modalities agreement. Some studies have assumed that these products will be the ones with the highest bound tariffs (Sharma, 2006). Other studies have assumed that the chosen SPs would be those with the highest applied tariffs

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[3] For a more complete discussion of China's TRQs and their administration, see Huang et al. (2009), Appendix A. The paper can be accessed on www.ccap.org.

(Vanzetti and Peters, 2008). A third approach involves a tariff-revenue-loss criterion under which the SPs selected tend to be large imports subject to larger tariff cuts in applied tariffs (Jean, Laborde, & Martin, 2006).[4]

2.4. The nature of China's agricultural protection in the post accession years

In this section we examine China's protection of agricultural commodities with a view to identifying products China might be inclined to choose as SPs. These products will then be the focus of analysis. We first consider China's SP choices on the basis of applied rates and then see how the discussion changes when considering the bound tariff rates (or out-of-quota tariff rates). This focus on applied rates is much more useful for China than for many other countries as virtually all of China's tariffs were reduced during the accession process, resulting in much less binding overhang than in other countries. As we will see, it is less useful for commodities subject to tariff rate quotas (TRQs), for which China's bound tariffs are out-of-quota tariffs and currently-applied rates are frequently the lower in-quota tariffs.

In fact, when we examine China's imports on the basis of applied rates, it is possible to make a case that China has little real reason to push for the inclusion of SPs in the Doha agreement. According to data on China's agricultural commodities computed from the six-digit HS96 tariff schedule applied import tariffs are less than 10% on 27% of China's tariff lines. From Fig. 1 (Panel A) it can be seen that the commodities with applied tariff rates of below 10% account for 72% of China's imports (in value terms). This means that nearly three quarters of its imports are coming into the country at a rate that would not need to be reduced because RAMs do not need to cut tariffs that are below 10%.

According to our data, 47% of these products, accounting for 23% of imports, have applied tariffs between 10 and 20%. This means that more than 95% of China's imports (72 + 23) are being levied a tariff between 0 and 20%. Only the remaining 5% of agricultural trade is being assessed a tariff over 20%. Following this line of reasoning (using applied tariff rates), China would not have much interest in supporting the SP negotiations since so little of its current agricultural imports would be affected.

Fig. 1 (Panel B), however, demonstrates why China might be interested in the negotiations—and why our analysis is needed. Specifically, when we use bound tariff rates in Panel B (as opposed to applied tariff rates in Panel A), the 24% of lines with tariffs less than 10% only account for 51% of the total value of agricultural imports. Notably, when using bound tariff rates, 8% of lines have bound rates between 30 and 65% and they account for 22% of the value of China's imports (versus 0.3% when using applied tariff rates). While such figures do not necessarily mean that China will or should support the inclusion of SPs in the Doha negotiations, it means that given current trade patterns, a special products clause would give China the option to offer protection to producers of commodities with high tariff lines that account for a significant share of imports (though not a majority when assessed in value terms).

The information in Table 2 demonstrates that the differences between Panels A and B in Fig. 1 are because China's TRQ commodities are entering China at a low applied rate (the assumption for Panel A) and that the analysis changes when considering the impact of these products entering at their out-of-quota, bound tariff rates (the assumption for Panel B). What Table 2 allows us to do is to answer the question: what products might China want to consider specifying as SPs—given the two alternative assumptions. The table does so by listing the products that are being imported at applied tariff rates no less than 10%. When only considering the current applied tariff rates, the 6-digit (and other more narrow) tariff lines included in the 2-digit category (according to the HS96 coding system) of fish and crustacean account for nearly one-third (32%) of all imports (when compared to the value of all commodities imported at applied tariff rates greater than 10%—row 1). Edible fruits and nuts, meats and sugar account for 22% more (8 + 7 + 7—rows 2, 3 and 4). Since it would be difficult for a country to argue that lobster and almonds are Special Products, the information in Table 2, column 2 suggests that, if applied rates were being used, there would be little reason for China to support the push for SP products. Indeed, the six commodity categories that account for the largest volumes of imports account for nearly two-thirds (or 65%—32 + 8 + 7 + 7 + 6 + 5) of the total value of imports included in this category (rows 1 to 6). Few of tariff lines in these six 2-digit product categories would appear to fit the stated goals of SPs, although the broad nature of the indicators, and the fact that the selection of products is only "guided" by these indicators, might potentially allow virtually any product to be classified as special if policy makers wanted to do so. It is important to note that TRQ commodities do not account for any of the import value in column 2.

This conclusion changes sharply when using bound rates (and when including TRQs at their out-of-quota rates—Table 2, column 3). When using the bound tariffs, cotton by itself accounts for 30% of the total value of imported agricultural commodities entering China with bound tariffs above 10%. Wool, raw sugar, rice and wheat (also TRQ commodities) also contribute to the total volume of imports that are in this category. In fact, according to our data, TRQ commodities account for 44% of total imports (which are included in Table 2, column 3). The share of fish (row 1) and the other five important commodity categories (when using applied tariff rates only—e.g., fruits/nuts, meat, confectionaries, beverages and tobacco) all fall in importance (from 65% in column 2 to 37%—18 + 5 + 4 + 4 + 3 + 3). Clearly, it would be possible for China to designate many more of the products in column 3 of Table 2 as SPs. Therefore, when using bound tariff rates (which are the rates directly affected by global trade agreements), it is more evident why China may be considering supporting the inclusion of SPs in a Doha agreement.

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[4] The highest-bound-rates approach has obvious disadvantages in a situation where bound tariffs are frequently much higher than applied rates. If the bound tariff on a product is sufficiently above the applied rate, the required cuts in applied rates may be small or zero, making these products less likely to be chosen as sensitive. The highest-applied-rates criterion has the disadvantage of paying no attention to the importance of the product or the extent to which—in the presence of binding overhang—the formula would require cuts in applied tariffs. Jean et al. (2008) show that the tariff-revenue-loss rule yields results similar to approaches based on a careful specification of policy makers' objective functions. Both of these approaches suggest that even relatively small numbers of SPs will greatly reduce the reduction in average tariffs. This contrasts with the highest-tariff-rate rules, which suggest that SPs would have only a modest impact on the reductions in average tariffs.

Table 2
The import value shares (%) of commodities with import tariff no less than 10% on 2006 in China.
Calculated by authors, based on UNCOMTRADE and NSBC trade data.

HS96 code	Products name	Import value (million)	Shares based on applied tariff (%)	Shares (non-TRQ: applied rate and TRQ: if use out-of-quota rate
03	Fish and crustacean	2909	32	18
08	Edible fruit and nuts	739	8	5
02	Meat and edible meat offal	686	7	4
17	Sugars and sugar confectionery	618	7	4
22	Beverages, spirits and vinegar	559	6	3
24	Tobacco	463	5	3
15	Animal and vegetable fats and oils	404	4	2
04	Dairy products	371	4	2
19	Prep. of cereal, flour, starch/milk	359	4	2
21	Miscellaneous edible preparations	322	4	2
38	Miscellaneous chemical products	254	3	2
11	Malt and starches	229	3	1
35	Albuminoidal subs; modified starches	184	2	1
05	Products of animal origin	181	2	1
43	Fur skins and artificial fur	167	2	1
33	Essential oils	145	2	1
	Others	558	6	3
TRQ commodities				
	Cotton	4869	0	30
	Wool	1360	0	8
	Sugar	549	0	3
	Rice	294	0	2
	Wheat	119	0	1
	Maize	17	0	0
	Subtotal of TRQ	7207	0	44
All total			100	100

3. Methodology and scenarios

To understand the impacts on China of different proposals for trade liberalization under the Doha Round WTO negotiations, we use two models, the Global Trade Analysis Program (GTAP) and the Chinese Agricultural Policy Simulation and Projection Model (CAPSiM). The national-level economic impacts of Doha are assessed with the GTAP model. The simulated price changes of international agricultural products are then fed into CAPSiM in order to analyze the potential impacts of SPs on China's agricultural production and the incomes of farmers by region and by income groups.

3.1. Two basic models

GTAP is a well known multi-country, multi-sector computable general equilibrium model and is often used for international trade analysis (see Hertel, 1997, for details of the basic assumptions of the model). As is the case with all countries that are part of the GTAP database, when an analyst from China uses GTAP by itself, it is possible to study the effect of changes to the world trade regime (e.g., a proposed set of trade rule changes of the Doha round) on China as a whole and examine the impacts on a relatively small subset of crops/commodities.

To meet our goals of tracking the regionally disaggregated effects of trade liberalization to households, we have chosen to use another modeling framework, CAPSiM (China's Agricultural Policy Simulation Model). When using CAPSiM it is possible to explore the impacts on agricultural production and farmer income by province. The model also allows the analyst to measure the effect of trade policy on various groups of farm households (across income groups or in different regions).

There are important differences between GTAP and CAPSiM that must be taken into account in the analysis. Specifically, CAPSiM is a partial equilibrium model. Most of the elasticities used in CAPSiM are estimated econometrically using state-of-the-art econometrics and with assumptions that make our estimated parameters consistent with theory. Both the demand and supply elasticities change over time as income elasticities depend on income levels. In addition, cross-price elasticities of demand (supply) depend on the food budget shares (crop area shares). Finally, in CAPSiM the component crops/commodities are more disaggregated. The model can analyze 19 crop, livestock and fishery commodities accounting for more than 90% of China's agricultural output: including all of the main cereals, sweet potato, potato, soybean, other edible oil crops, cotton, vegetables, fruit, other crops and six livestock products and one aggregate fishery sector.

Recent versions of CAPSiM are designed to track the effects of changes in policies on both national and regional (provincial) aggregates and households. CAPSiM is simultaneously run at national, provincial (31) and household (by different income groups) levels. It is the first comprehensive model for examining the effects of policies on China's national economy, its regional food economies and the income and poverty rates of households. The equilibrium solutions in CAPSiM are simulated at the national level and domestic prices are transmitted to each region (province) and various households within each region. Given the prices

Table 3
The world average import tariff in 2015 under baseline, Doha liberalization with and without special products scenarios.
Calculated by authors based on MacMap tariff database weighted by import values in 2001 from GTAP version6 database.

	The world average import tariff (%)			The tariff change comparing to baseline (%)	
	Baseline	Doha	Doha-SP[a]	Doha	Doha-SP[a]
	(I)	(II)	(III)	(II–I)/I*100	(III–I)/I*100
Rice	31.89	23.85	30.07	−25.22	−5.71
Wheat	16.11	11.92	15.93	−26.04	−1.12
Coarse grain	14.20	9.28	11.85	−34.69	−16.59
Vegetable and fruits	6.76	4.81	5.92	−28.86	−12.42
Oilseeds	9.17	8.06	8.64	−12.09	−5.73
Sugar	33.40	20.70	29.89	−38.03	−10.51
Cotton	2.45	2.32	2.36	−5.39	−3.92
Other crops	6.65	4.58	5.98	−31.10	−10.09
Beef and mutton	14.05	7.65	11.00	−45.55	−21.71
Pork and poultry	10.40	5.87	7.38	−43.56	−29.07
Milk	11.10	7.75	9.42	−30.20	−15.15
Fish	2.96	2.19	2.21	−26.00	−25.23
Processed food	8.53	6.57	7.37	−22.92	−13.63
Nature resource	0.00	0.00	0.00	0.00	0.00
Textile and apparel	7.20	4.85	4.89	−32.64	−32.05
Natural ind.	2.83	2.58	2.59	−8.90	−8.47
Metal and machinery	2.52	2.32	2.33	−8.10	−7.66
Transport ind.	3.13	2.62	2.75	−16.19	−11.96
Electronic ind.	0.96	0.86	0.86	−10.79	−10.58
Manufacture ind.	3.81	3.32	3.33	−12.87	−12.40
Service	1.82	1.644	1.645	−9.67	−9.62

[a]The estimation of special products are based on the study by Martin and David (2008).

transmitted to each region, each group of households in each region changes production and consumption of each commodity based on the production and consumption elasticities which also differ by region and household group.[5]

3.2. Policy scenarios

In this study, five scenarios are considered in assessing the impacts of including SPs in the Doha negotiations on China's agriculture at the national, regional and household levels. The five scenarios include one baseline scenario and four alternative scenarios. In the analysis we assume that the Doha agreement is implemented by 2015. As such, we estimate the impact of SPs by comparing the baseline results with those under policy scenarios in 2015.

3.2.1. Baseline scenario (Doha without SPs)

In the baseline, every country continues its current policies, except where it has already made an international commitment to change these barriers, such as through the final stages of its Uruguay Round commitments; China's accession commitments or the phase-out of the Agreement on Textiles and Clothing (ATC). As discussed above, because of the importance of market access, we focus on the market access pillar.[6]

In modeling the effect of Doha liberalization policies, there are two key modeling issues that need to be addressed. The first is what kind of tariffs (applied or bound tariffs) should be used for calculating the tariff reductions. The second is how to model the commodities that are subject to TRQs. As shown above, the gaps between bound and applied tariffs are significant in many cases, especially when modeling developing countries (Laborde, 2007).[7] The approach for creating the data is discussed in Appendix A.

3.2.2. Alternative scenarios

We use two types of policy scenario. The first is a *comprehensive SP scenario* examining the effect of the adoption of SPs by all WTO member countries on a range of commodities (scenario 1 or the Comprehensive SP Scenario). The second is an *individual commodity scenario* under which we assess the different impacts if China abdicated designation of three specific commodities as SPs (and doing so one at a time in order to be able to assess the marginal impact of the inclusion or exclusion of a particular

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[5] For a more complete discussion of the modeling approach and description of the module that links GTAP to CAPSiM see Huang et al. (2009), Appendix B.

[6] There are several reasons for our focus on the market access pillar. The first is that the goal of our research is targeted to evaluate the impacts of SPs in the Doha negotiations, which are dealt with under the market access pillar of the negotiations. The second is that the market access modalities are quite complex and require careful evaluation if their effects are to be accurately assessed. A third reason is that previous work has identified market access as contributing more than 90% of the global impacts of a potential Doha agreement (Anderson and Martin, 2006). A fourth reason is that neither the domestic support nor the export competition pillars are likely to require changes in China's own agricultural policies. Therefore, we believe that it is most productive to focus our attention on SPs inside the framework of market access.

[7] The gap between bound import tariff/current applied import tariff is called "binding overhang".

commodity as an SP commodity). In the rest of this paper, we call these three sub-scenarios when taken as a group as: scenario 2. Since we eliminate the impact of each of three commodities individually, we call these sub-scenarios 2a, 2b and 2c.

3.2.2.1. Comprehensive SP scenario. Although the current modality provide a relatively clear definition of the shares of tariff lines that may be classified as SPs in different types of countries, the actual list of SPs will not be finalized until after the modalities have been approved. Therefore, a key question for evaluation is how the SPs will be chosen. For this study, the selections of SPs are based on the work done by Jean, Laborde, and Martin (2008).

The adoption of SPs by all WTO members might be expected to have a significant effect on tariffs for a number of agricultural commodities. As shown in Table 3, excluding oilseeds, cotton, fish and processed food from the Doha tariff cuts, the world average import tariff (in *ad valorem* equivalents) of other agricultural commodities would increase by more than 21.5%. For sugar and beef/mutton, the import tariff would rise by 44.4% and 43.8%. In modeling the Comprehensive SP Scenario (alternative scenario 1) we can see whether the concept of an SP is a "two-edged sword." While SPs allow China to raise their protection against imports, they also allow other countries to raise barriers against China's exports. According to our analysis, because of the adoption of SPs by China's trade partners, the tariffs levied by other countries on China's exports of rice, vegetables and fruit and other key agricultural exports would increase by 43.3%, 38.3% and 33.1% respectively. The ultimate net effect on the output of any given commodity in any particular country will depend heavily on in the overall balance between the reduction in import competition and the reduction in export opportunities.

3.2.2.2. Individual commodity scenario. In this scenario (scenario 2) we seek to quantify the gains and costs to China's economy if they should include cotton (Scenario 2a); sugar (Scenario 2b) or dairy products (Scenario 2c) as an SP. This information can inform policy makers in China and other observers of China's role in the Doha SP negotiations of what might be the expected gains and losses from including different products as SPs. In the scenarios we also examine the income distribution effects (by commodity by region) in Scenarios 2a to 2c.

In deciding to take this approach, we decided to select cotton, sugar and dairy products (milk) for inclusion into our study as commodities that China might be interested in protecting as SPs. This decision is based on the analysis in the previous section of the paper that examines China's agricultural tariff schedule and import structure.[8] Moreover, these three commodities are important in any effort to increase farmer incomes and poverty alleviation (Li, 2007). As such, we believe that they are among the agricultural commodities that will be considered for protection in the SP negotiations.[9]

The marginal effects of selecting each of these commodities are assessed by decreasing import tariffs from their level that we believe would apply under the SP assumption to the level after the application of the basic Doha formula (without applying the exception for SP status). For example, if China decided to not designate cotton as an SP (that is, originally it was designated as an SP, then they removed it from the SP list), the import tariff on cotton would drop from 34% (Table 4) to 26.8% (which is the same level as under the baseline Doha scenario).[10] Through these scenarios, we will assess the marginal contribution to agricultural production and farmer income of China's proposals to designate each of these commodities as an SP.[11]

4. Results: impacts of SPs on China and the rest of the world

According to our analysis, if the Doha round negotiations included SPs (scenario 1), compared to a Doha agreement with no SPs (baseline scenario), the cost of producing that food in the world would rise (Table 5). Global agricultural GDP (calculated at market prices) would increase by $US 3.9 billion or 0.15%. This rise in the cost of producing the world's food would come about because more food would be produced in higher-cost regions. The result found when moving from the baseline to scenario 1 is not surprising because most countries in the world are allowed to increase protection—in many cases substantially.

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[8] China's agricultural import structure both in terms of import volume and the level of each commodity's import tariff are analyzed in detail in the part of the paper that we call: "The Nature of China's Agricultural Protection in the Post Accession Years." The analysis provides valuable information on the impact that a commodity would have on farmer income and poverty alleviation if it were selected as a SP in the Doha negotiations.

[9] Our interviews with China's agricultural trade negotiators from the Ministry of Agriculture, in fact, indicate that these three commodities are under consideration as candidate commodities to be protected as SPs during the Doha negotiations.

[10] As our estimation, China's import tariff equivalent on cotton would be as high as 40%, same to out-of-quota tariff, if the TRQ management was strictly implemented during 2001–2015. The driving force of high domestic cotton price are from the quick rising demand on cotton by China's booming textile and apparel industries, and limitation of domestic cotton supply.

[11] There is also another possible, even more extreme scenario. What would happen in China unilaterally decided to NOT set PS, which the rest of the world went ahead and did. In the scenario, the world implements Scenario 1 with the exception of China, which gives up its right to set SPs. The results of this simulation show that China's agricultural net export will decrease 0.81 billion US dollar. The value-added to agriculture also drops by 0.31% (about 1.3 billion), relative to Scenario I. Agriculture clearly is hurt in this scenario. However, because fewer resources are absorbed by agriculture, there are more available for the industrial sector. In fact, although net export of industrial sectors will increase by only 0.24 billion US dollar (less than the fall in agricultural exports), the value added for the industrial sector by 0.09% (about 2.1 billion). In other words, if China were to unilaterally decide to not declare any special products, when the rest of the world implemented an SP plan, the level of value added in the economy would rise. Does this mean that China should (or will) unilaterally decide to not declare any products to come under SP protection, even if an SP agreement comes into being. From an economywide point of view, this might be rational. However, agriculture gets hurt. Producers in agriculture are one of the most vulnerable sectors in China. Therefore, this might induce China to participate even though there is a cost to the entire economy. In addition, the cotton, sugar and dairy sectors will be hurt even more. Since there are even more poor farmers associated with some of these sectors, there would be even a greater impetus to not unilaterally withdraw.

Table 4
China's import tariff and tariff levied by other countries in 2015 under baseline, Doha liberalization with and without special products scenarios.
Calculated by authors based on MacMap tariff database weighted by import values in 2001 from GTAP version6 database.

	China's import tariff (%)			Tariff levied on China's export (%)		
	Baseline	Doha	Doha with SP [a]	Baseline	Doha	Doha with SP [a]
Rice	1.00	1.00	1.00	84.53	54.58	78.20
Wheat	1.00	1.00	1.00	20.94	14.78	20.91
Coarse grain	1.59	1.57	1.58	10.46	6.16	7.70
Vegetable and fruits	12.59	11.17	11.70	29.05	15.84	21.90
Oilseeds	4.38	4.32	4.34	24.65	15.74	22.13
Sugar	50 (15) [b]	33.5 (15) [b]	42.5 (15) [b]	78.98	34.79	63.53
Cotton	40 (1)	26.8 (1)	34 (1)	3.69	3.36	3.37
Other crops	7.98	7.13	7.40	18.08	12.49	16.63
Beef and mutton	7.66	6.84	7.13	4.17	3.26	3.41
Pork and poultry	8.49	7.82	8.12	10.25	5.72	6.63
Milk	9.28	8.02	8.54	7.63	5.50	6.42
Fish	9.64	8.30	8.38	6.64	3.63	3.68
Processed food	11.58	10.11	10.51	12.73	8.13	9.65
Nature resource	0.00	0.00	0.00	0.00	0.00	0.00
Textile and apparel	9.52	8.03	8.05	9.79	5.38	5.47
Natural ind.	6.89	5.97	5.98	3.72	3.08	3.09
Metal and machinery	5.70	5.03	5.03	3.57	3.02	3.03
Transport ind.	8.77	7.15	7.15	5.62	5.05	5.19
Electronic ind.	1.48	1.24	1.24	1.23	0.96	0.96
Manufacture ind.	14.08	11.18	11.18	3.20	2.31	2.37
Service	2.21	2.01	2.01	2.37	2.23	2.24

[a] The estimation of special products are based on the study by Martin and David (2008).
[b] The data in bracket is the in-quota tariff of sugar.

Another fundamental lesson from comparing the results of the baseline with scenario 1 is that a Doha agreement with SPs unambiguously leads to lower world income. This is so because to produce the added $US 3.9 bn of agricultural value-added, costs the world $US 6.25 bn in non-agricultural commodities (or about 0.02% of total non-agricultural value added). This means that in total the world would lose $US 2.31 bn (6.25–3.94). This fall occurs because SPs distort the freer flow of resources that would occur under a Doha agreement without SPs. In response to the higher prices in most countries after the SP regime, capital, land and labor are reallocated—from agricultural and non-agricultural products that would be more efficiently produced—to produce import-competing agricultural commodities.

The other lesson from our initial look at the impact of including SPs in a Doha agreement is that not all countries are affected equally (Table 5). Specifically, when looking at agriculture, the main losers are producers in major agricultural exporting countries/regions, Australia/New Zealand, NAFTA and South America. In contrast, agricultural producers in Japan/Korea, other Asian countries and the EU15 benefit.

Table 5
The impact of the inclusion of SPs in a Doha agreement on value-added in agriculture and non-agriculture in 2015 relative to a "no-SP" scenario (that is the impact of moving from the baseline scenario to scenario 1).
Authors' GTAP simulation results.

	Agriculture		Non-agriculture	
	(%)	Mil. US$	(%)	Mil. US$
China, Mainland	0.01	53	−0.08	−1647
Hong Kong, China	0.02	1	0.01	28
Taiwan, China	0.28	45	0.01	28
ASEAN	0.21	300	−0.02	−188
Other Asia	0.42	1107	0.02	102
Australian and New Zealand	−2.40	−811	−0.24	−1184
Japan and Korean	2.11	5048	−0.10	−5792
NAFTA	−0.39	−1836	0.01	1757
South America countries	−1.08	−1948	−0.08	−1256
EU15	0.14	492	0.02	1278
CEEC	0.27	133	0.03	114
ROW	0.23	857	0.02	511
Total	0.15	3943	−0.02	−6248

Table 6
The impact of the inclusion of SPs on agricultural exports and imports under Doha liberalization in 2015 assessed in world price, relative to a "no-SP" scenario. Authors' GTAP simulation results.

	Export		Import	
	(%)	Mil. US$	(%)	Mil. US$
China, Mainland	−3.76	−896	−3.05	−931
Hong Kong, China	0.77	3	−0.03	−2
Taiwan, China	−1.18	−28	−0.86	−50
ASEAN	−1.21	−386	−1.74	−540
Other Asia	−0.13	−9	−1.55	−358
Australian and New Zealand	−4.11	−1175	−1.60	−64
Japan and Korean	−5.61	−410	−5.65	−2861
NAFTA	−3.94	−4075	−3.48	−2430
South America countries	−3.37	−1894	−1.13	−269
EU15	−0.12	−192	−0.60	−965
CEEC	0.48	127	−0.06	−10
ROW	−1.37	−819	−1.62	−1273
Total	−1.94	−9754	−1.94	−9754

However, the benefits to agricultural producers in some of countries where agriculture benefits from the inclusion of SPs are offset by the losses of non-agricultural producers (Table 5).[12] For example, the losses from the lower levels of non-agricultural value-added in Japan and Korea and other Asian countries are greater than the gains to agricultural producers. South America loses both in agriculture and in non-agriculture. Of the major players, only the EU15 benefits from gains in both agricultural and non-agricultural sectors.

Importantly, China also is a net loser (Table 5, row 1). The nation's agricultural producers earn $53 million more in agricultural value added. It is notable, however, that this is only a small fraction of total agricultural value added (0.01%). This gain comes at a much larger cost to the non-agricultural sector. While agricultural producers increase earnings (of value-added) by $53 million, there is a corresponding loss of $1.65 billion in the non-agricultural sector.

As expected, the rise in agricultural value-added from the inclusion of SPs in a Doha agreement means that agricultural trade falls (last row of Table 6). Specifically, agricultural trade falls by $9.7 billion, or 1.94% of its level without SPs.

As with the case of value-added, our results show that the impact (between the baseline and scenario 1) on agricultural exports and imports differs sharply among countries. Countries with a strong focus on agricultural exports, such as Australia and New Zealand, NAFTA and South America, suffer sharp decreases in exports (often exceeding $1 billion). The fall in exports reaches 3.37 to 4.11% of total exports for these countries. In contrast, Japan and Korea are the two countries that experience that largest falls in imports. With the inclusion of SPs, agricultural importers in Japan and Korea bring in $US 2.861 billion dollars less in imports, 5.65% of their total imports without SPs.

China experiences falls in both imports and exports. China's combined agricultural imports and exports fall by $US 1.83 billion (Table 6). This means that China's agricultural trade falls about 3.5%. Like a number of other countries, China loses in agricultural imports and exports as resources are moved out of export-oriented agricultural activities into import-competing activities. At the same time the inclusion of SPs further reduces China's agricultural exports by reducing market access opportunities. The combined impact of these changes is to reduce China's agricultural exports by 3.76%. In value terms, then, the inclusion of SPs only shifts China's agricultural trade balance by $US 35 million, which is only 0.06% of total agricultural trade. This shows that inclusion (or the exclusion) of SPs has effectively no impact on China's net agricultural trade balance.

To isolate the impact of the inclusion of SPs in a Doha agreement on China (and by China's joining in the agreement), we use the GTAP model to run a set of parallel scenarios (scenarios 2a, 2b and 2c) and compare them with the results of scenario 1 (Doha with SPs). The idea of running these scenarios is to produce a set of results that allows us to understand the consequences of SPs on China, if China and only China decided to forgo designating some of its important potential SP commodities in an SP agreement. In other words, we will set up the scenarios 2a, 2b and 2c to measure the effect of excluding 3 individual commodites (sugar, milk and cotton) from an SP agreement (that was in every other way unchanged).

As expected when only China decides to remove a single commodity from an SP agreement, China's farmers would be hurt. As seen above, when the entire world designate a set of SPs, China's total value-added in agriculture would only rise (albeit only marginally) by $US 53 million (Table 7). However, if China (and only China) decided to unilaterally withdraw protection on cotton (i.e., cotton was no longer designated as an SP), producers would lose $US 1191.3 million compared to the case under scenario 1 (Table 7, row 4).[13] Similarly, sugar producers would lose $US 25.0 million (as value-added) and milk producers would lose $US 13.5 million (Table 7, rows 2 and 3). The difference between rows 1 and row 2–4 indicates that when other countries are able to protect crops as SPs, China would lose if it decided to not designate the crop as an SP. Turning the analysis around the results also

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[12] We want to point out here that in talking about "winners and losers," we are talking about total shifts in sectoral GDP and not welfare.

[13] Martin (2008) concludes that there is a number of obstacles to raising tariffs on cotton, most importantly the fact that China is likely a net exporter of cotton when exports in the form of textiles and clothing are taken into account.

Table 7
Using GTAP to compare the contribution to China's agricultural value-added, exports and imports under scenario 1 (comparing to the baseline—that is a Doha agreement with no-SPs) and scenario 2 (comparing to the Scenario 1) in 2015 (million USD).[a]
Authors' GTAP simulation results.

	Ag. value added	Ag. export	Ag. import
Effects of having all countries designate a set of SPs (scenario 1)	53	−896	−931
Effects of China abdicates the following commodities as SPs—and other countries adopt SPs (scenario 2)			
Sugar (scenario 2a)	−25.0	2.2	21.4
Milk (scenario 2b)	−13.5	0.9	11.3
Cotton (scenario 2c)	−1191.3	46.3	752.4

[a] Scenario 1 is the scenario in which China and the rest of the world implement the basic Doha Agreement and also are allowed to protect a number of predetermined SPs. In Scenario 2, China abdicated specifying sugar, milk or cotton as a SP, while other countries still adopted SPs as Scenario 1.

shows the marginal value to China's agricultural producers of being able to designate one additional commodity as an SP (given the rest of the world's SP schedules were already set).

As our analysis in scenarios 2a to 2c (Table 7, column 2, rows 2 to 4), shows that when China foregoes protections of sugar, milk and cotton as SPs, there is an increase in overall exports. However, the rise of import would be much higher than the rise in export, implying a deterioration of China's net trade balance for agricultural commodities. For example, if China decide not to designate cotton as an SP, cotton imports would increase by $US 752.4 million. However, exports would only rise by $US 46.3 million (Table 7, row 4).

In Table 8, we decompose our results from Table 7 to see how the producers of different crops in China's (and the world's) food economy fare. There are two main findings. First, when all other countries are allowed to designate a set of commodities as SPs (Table 8, columns 1 and 2), there are negative effects on production of the commodities for which China has the potential to increase exports. In contrast, the production of commodities for which China has no comparative advantage would increase. As shown in Table 8, China's production of vegetables, fruit, rice and fish (commodities for which China has a potential for exporting) will drop by 1184, 572, 116 and 6 thousand tons, respectively. In contrast, the production of cotton, sugar and milk rise by 318, 136 and 19 thousand tons.

The second finding is that if China decides to unilaterally withdraw an individual commodity from the protection that that commodity could receive as an SP, the producers of that crop would lose. For example, when cotton (milk/sugar) is removed as an SP commodity by China (and only China), its production drops by 312 thousand tons (45/111 thousand tons). The production of all

Table 8
Using CAPSiM to measure the impacts on production in China under scenario 1 (comparing to the baseline—that is a Doha agreement with no-SPs) and scenario 2 (comparing to the Scenario 1) in 2015.
Authors' CAPSiM simulation results.

	Scenario 1 [a]		Scenario 2 [a]					
			Only China abandons SP for					
	All countries designate SPs		Cotton		Milk		Sugar	
	1000 tons	%	1000 tons	%	1000 tons	%	1000 tons	%
Milled rice	−116	−0.09	14	0.01	−1	0.00	1	0.00
Wheat	−28	−0.03	71	0.07	0	0.00	0	0.00
Maize	142	0.08	86	0.04	−7	0.00	2	0.00
Sweet potato	11	0.05	1	0.01	0	0.00	0	0.00
Potato	−1	−0.01	4	0.03	0	0.00	0	0.00
Other coarse grain	−11	−0.07	5	0.04	0	0.00	0	0.00
Soybean	−16	−0.08	16	0.12	0	0.00	1	0.01
Cotton	318	3.09	−312	−2.82	0	0.00	1	0.01
Oil crop	−5	−0.05	5	0.07	0	0.00	0	0.00
Sugar crop	136	1.11	11	0.07	0	0.00	−111	−0.68
Vegetable	−1184	−0.25	139	0.04	0	0.00	3	0.00
Fruit	−572	−0.36	34	0.02	0	0.00	0	0.00
Pork	37	0.06	7	0.01	0	0.00	0	0.00
Beef	2	0.03	0	0.00	0	0.00	0	0.00
Mutton	1	0.03	0	0.00	0	0.00	0	0.00
Poultry	19	0.10	4	0.09	0	0.00	0	0.00
Egg	12	0.05	2	0.01	0	0.00	0	0.00
Milk	19	0.04	7	0.03	−45	−0.22	5	0.02
Fish	−6	−0.02	1	0.00	0	0.00	0	0.00

[a] Scenario 1 is the scenario in which China and the rest of the world implement the basic Doha Agreement and also are allowed to protect a number of predetermined SPs. In Scenario 2, China abdicated specifying sugar, milk or cotton as a SP, while other countries still adopted SPs as Scenario 1.

Table 9
Using CAPSiM to measure the impacts on rural income (yuan/per capita) in China under scenario 1 (comparing to the baseline—that is a Doha agreement with no-SPs) and scenario 2 (comparing to the Scenario 1) in 2015.
CAPSiM simulation results.

	Scenario 1 [a]	Scenario 2 [a] China abandons SP for		
		Scenario 2c	Scenario 2b	Scenario 2a
		Cotton	Milk	Sugar
National average	0.42	−4.38	−0.14	−0.4
Income group 1 (lowest income)	−0.66	−2.01	−0.05	−0.12
Income group 2	−2.54	−2.95	−0.08	−0.39
Income group 3	0.94	−4.38	−0.13	−0.36
Income group 4	5.71	−5.89	−0.22	−0.48
Income group 5 (highest income)	5.13	−7.7	−0.27	−0.71

[a] Scenario 1 is the scenario in which China and the rest of the world implement the basic Doha Agreement and also are allowed to protect a number of predetermined SPs. In Scenario 2, China abdicated specifying sugar, milk or cotton as a SP, while other countries still adopted SPs as Scenario 1.

other crops increases. Since the value added of producers drops in scenarios 2a, 2b and 2c (in the case of either cotton, milk or sugar), we know the overall production (price weighted) decreases for producers.

According to the results from CAPSiM, the impact of allowing all countries to designate SPs on rural income per capita is positive, but very small (Table 9, row 1, column 1). On average, rural income per capita rises 0.42 yuan per capita. With rural income per capita in China over 2000 yuan, this means that the gain in income is only a tiny fraction of a percent. Perhaps it is most accurate to call it zero. While small, this finding from CAPSiM is more or less consistent with the small gains in value-added in agriculture from the GTAP model (shown in Table 7). As expected (and similar to the findings above), the average gain in rural income per capita becomes even smaller (or even negative) in scenario 2 when China decides to unilaterally remove a commodity from SP protection (Table 9, row 1, columns 2 to 4).

But while the gain from the protection as an SP in China is fairly small in the aggregate decomposing the change in income by income group shows that, in fact, there are negative equity effects for certain groups of producers (Table 9, rows 2 to 6). The analysis of these group-specific equity effects can be carried out using a feature of the CAPSiM model that allows the modeler to break up the findings into different income groups. In this paper, we divide the findings into quintiles (or five income groups, with income group 1 being the poorest and income group 5 being the richest). When looking at the results in this way, we see that, in fact, for each of the crops under scenario 2 and for all crops under scenario 1, the farmers in the richest income groups earn more in per capita income than those in the poorer groups under protection. Such a result indicates that the adoption of the SP system is a regressive move.[14]

So why is this? Why do the richer farmers gain more than the poorer ones (as China is able to protect commodities under the SP program)? To answer this, we need to look at the findings which decompose that the amount of income that each group of farmers obtains from cotton, milk and sugar (results not shown for brevity). In short, it can be seen that farmers in higher income categories tend to earn a higher absolute amount of income from cotton, milk and sugar than farmers in lower income categories. Because their earnings from these crops are higher, when these crops are designated as SPs, the farmers in higher income categories benefits more. Of course, the reverse is also true. As shown in Table 9, when China unilaterally decides to remove these commodities from protection under the SP program, the richer farmer would lose more.

Finally, the gains from SPs vary across regions (Fig. 2). Guangxi, Yunnan and Xinjiang benefit. This result is mostly because these provinces specialize in the crops that are being designated by China as SPs. At the same time, the largest losers are Zhejiang, Shanghai and Beijing. These regions, which specialize in rice and fruits and vegetables, lose because they do not receive any additional protection inside China and it is likely that other nations use the SP system to protect these commodities in their economies (and reduce the prospects of exports and depress prices within China). This means that the inclusion of SPs in a Doha agreement would have complicated effects on equity. On the one hand, an SP agreement would actually increase inequality across the rural population. On the other hand, an SP agreement appears to be able to reduce interregional inequality.

5. Concluding remarks

In this paper we have used two models, GTAP and CAPSiM, to examine how the inclusion of SPs into a Doha agreement will affect farmers and others in the world and in China. This paper has used a number of novel approaches/data sets. For example, it is the first paper to use bound tariffs to examine the effect of SPs in China.

In our findings, regardless of the approach, we find that since the inclusion of SPs in a Doha agreement adds more protection in agriculture, the total quantity of resources used in world agriculture increases. Although increasing, it is important to note that the total rise is only a fraction of a percent of agricultural value added. Even more notably, the gains to rural income per capita are likewise small.

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[14] It is important to note, that in percentage terms, the finding that adoption of the SP system is regressive is not true. Because the incomes of the highest income group is many times greater than that of the lowest income group, the relative differences in the income effect of adopting an SP system is less.
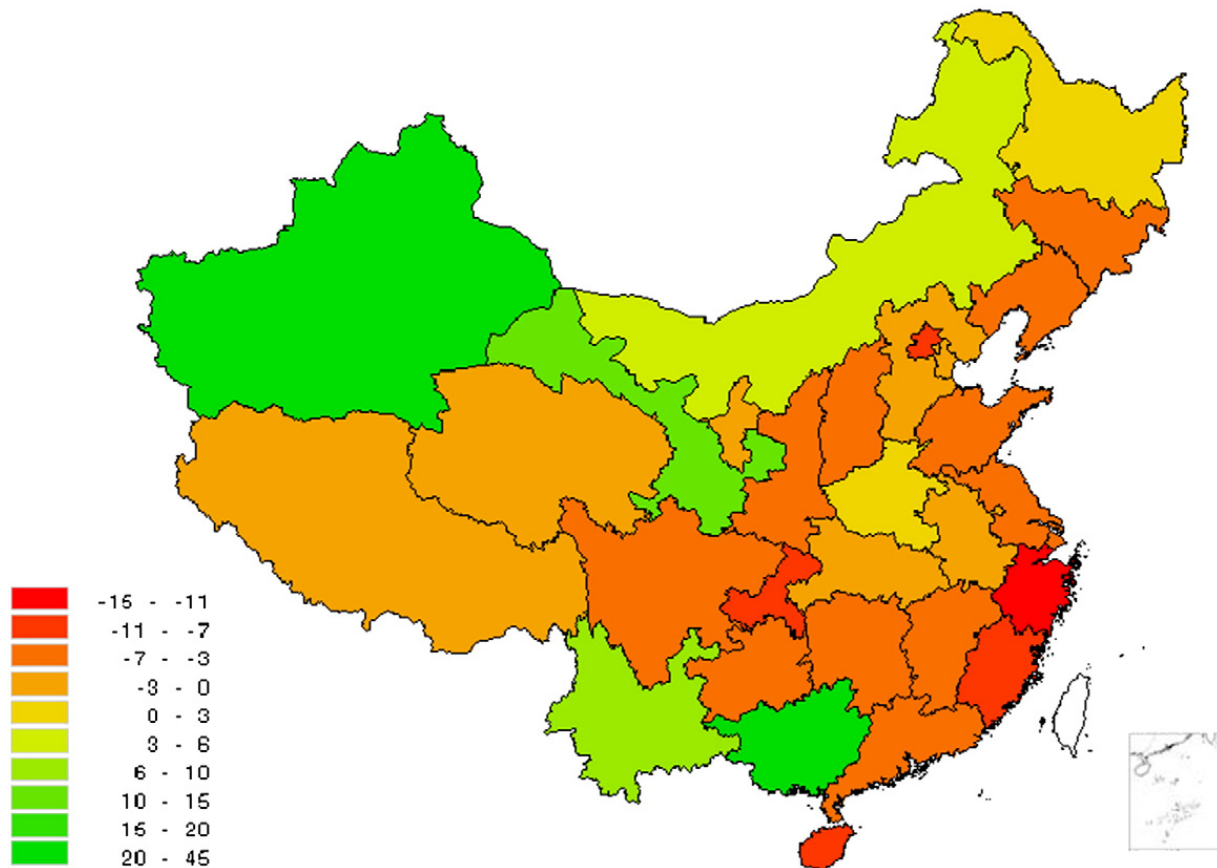
Fig. 2. The impacts on per capita agricultural income for average farmers by province under Doha trade liberalization with special products in 2015 (comparing to baseline "Doha without special products", yuan/person).

The results in this paper show the "double-edged sword" effects of SPs. Although it provides protection on certain commodities, the benefits to agriculture in one country would be typically offset when these flexibilities are made available to other countries. The fact that other countries are using SPs reduces the export opportunities for all countries. International competition falls as trade volume falls; world prices also fall. The world loses in net terms since the losses in non-agricultural value added are greater than the gains to value added in agriculture.

While there are some positive benefits for certain vulnerable groups in society (in China), we show that there are also adverse effects on equity. For example, some poor regions (e.g., Guangxi, Yunnan and Xijiang) gain, mainly because they specialize in sugar and cotton production. However, the poor, in general, lose. These complex tradeoffs and the small gains from the policy make it a difficult choice for policy makers.

The important lesson is that in choosing to support or not support proposition to include SP in a Doha agreement, there is a complicated and finely tuned balance to be considered. This balance is many dimensional. It is between agricultural and non-agricultural. It is among commodities. It is between rich and poor. Perhaps due to the small gains and the complicated balances the best thing for China is to NOT support the inclusion of SPs. As to the alleviation to pain of trade liberation, there are more direct, less distorting ways to help minorities in China. Likewise, regional inequalities and income inequities can also be addressed by alternative policies.

Acknowledgments

Appendix A. Creating a set of applied tariff rates

Because of this gap it is likely that choosing applied or bound tariffs will have a significant effect on the results. Therefore, in the paper we look at the effect using both applied and bound tariffs. However, since only applied tariffs are available in the GTAP database and the WTO negotiations are based on bound tariff rates, we put a great deal of effort into calculating the bound tariff rates in different countries. To provide a preliminary assessment of the implications of the modalities for the applied protection, we began with the MAcMapHS6 database for 2004 together with a set of bound tariff rates for which *ad valorem* equivalents that were calculated on the same basis.

With these data, we first cut the bound tariff rates using the approaches considered in the modalities, and then assessed the implications for applied rates. In this analysis, we used the conventional assumption that applied rates are not reduced unless the new bound rate falls below the initial applied rate (assumed to be the applied rate in the MAcMAPs dataset, which is generally for 2004). For TRQs, there are currently two common approaches in the literature. The first method involves estimating the effective tariff rate implied by the TRQ regime initially and assuming that this rate continues to hold even after reform (Van Tongeren and Huang, 2004). The second allows for switching between the in-quota and out-of-quota regimes as the gap between internal and external prices increases. Such a method has been demonstrated by Elbehri and Pearson (2005). As detailed information is available on China's TRQ commodities and we focus on the impacts on production and trade, we adopt the first method to simulate the effects by TRQ management.

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