Implications of Adopting Special Products and Sensitive Products in Doha Negotiations for World and China's Agriculture

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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 (Griswold 1999; Madeley 2000; Bhagwati and Srinivasan 2002; Bhagwati and Srinivasan 2002; Coxhead 2003; Agenor, 2004; Winter et al. 2004; Harrison 2006), there are still many concerns about the impact of trade liberalization—especially in the case of agriculture.

As a result, three new sets of arrangements are arisen —Special Products, Sensitive Products and Special Safeguard Mechanisms—that are being negotiated that will allow countries to only partially liberalize their agricultural economies. Under the July 2004 Framework Agreement, the developing country members will have the flexibility to designate a number of products as Special Products (SPs). This designation is to be based on criteria such as food security, livelihood security and rural development needs. The G-33 has proposed that 20 percent of developing country agricultural tariff lines be excluded from liberalization as special products. It is obvious that an agreement with a large share of tariff lines that are exempt would be a different agreement than one with fewer or no exemptions.

Meanwhile, there are many disagreements in how to treat special products once they are designated. Some members have suggested that special products should be fully exempt from any new market access commitments whatsoever. It is suggest that they also have automatic access to Special Safeguard Mechanisms. Others argue that there should be some degree of market opening for these products, albeit reflecting more flexible treatment than for other products. In the presence of this fundamental divergence, it is clearly important to understand the implications of the different ways to designate and treat SPs.

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 the Special Products, Special Safeguard Mechanism and Sensitive Products will affect China's agricultural production trade and the welfare of the poor in China.

To meet this goal, the paper is organized as the follows. In the next section, we briefly provide a summary on special products in Doha round negotiations. In the following section, we will describe the current relationship between China's agricultural trade and its import tariffs. The fourth section describes the methodologies, assumptions and scenarios applied in this study. The results of our analysis on the impacts of adding Special Products, Special Safeguard Mechanism and Sensitive Products to the Doha Round negotiations on China's overall economy,

the agricultural sector, in particular, and on household income and poverty are presented in section 5. The final section concludes.

2. Doha Round negotiation on SP

As the negotiations have continued, market access modalities have taken center stage. The tariff cutting formula in Doha round trade negotiation is quite aggressive, particularly relative to the Uruguay Round negotiations. Meanwhile, several groups of developing countries Recently-acceded members (RAMs) and are allowed smaller reductions. Least Developed Countries are not required to make any reductions. Small and vulnerable economies (SVEs)[1] can make reductions 10 percent smaller in each band than other developing members, or may make an average-cut of 24 percent. RAMs are allowed to: make cuts reduced by 5 percentage points in the first two bands and 10 percentage points otherwise; make zero cuts in tariffs below 10 percent; to delay their reduction commitments until one year after completion of their accession commitments; and have $1/10^{th}$ more special products with cuts 2 percentage points smaller. China is a RAM in the current negotiations. A group of very recently acceded members (VRAMs) and transition economies is not required to make any cuts.

One of the most important directions of the negotiations that are currently going on have to do with Sensitive and Special Products (Table 1, rows 3 and 4). According to current discussion, it appears as if all countries will be permitted to make smaller cuts on "sensitive" products. The key modalities under negotiations are those that involve putting a limit on the number of sensitive products, and provisions for increases in market access under Tariff-Rate-Quotas (TRQs) for products where smaller-than-formula cuts are made. If the current proposal is accepted, in developed countries between 4 and 6 percent of tariff lines will be able to be classified as sensitive, except for countries with over 30 percent of bindings in the top band, or with tariffs scheduled at the six digit level, in which case this percentage can be increased by 2 percentage points. If the formula cut is reduced by 2/3, then TRQ access must be increased by 4 to 6 percent of domestic consumption; if the reduction is by half, then the TRQ increase can be 1 percentage point less; if the reduction is by 1/3, then the TRQ increase is 0.5 percentage points less. Developing countries would have the right to one third more sensitive products than developed countries.

A key question for evaluation is how the sensitive and special products will be chosen. Some studies have assumed that these products will be the ones with the highest bound tariffs (Sharma 2006); while others have assumed that they would be those with the highest applied tariffs (Vanzetti and Peters 2008) and still others have used a tariff-revenue-loss criterion under which the products selected tend to be large imports subject to larger tariff cuts (Jean, Laborde and Martin 2006). None of these approaches has any firm conceptual basis and Jean, Laborde and Martin (2008) show that an approach that takes into account the policy makers' preferences would try to reduce the tariff cuts on products that are important shares of total imports, that have high initial applied tariffs, and would face large cuts under the formula. They also show that the consequences of sensitive products selected on this basis are likely to be

[1] Defined in general as countries with less than 0.1 percent of world trade, with some countries such as Congo, Cote d'Ivoire and Nigeria treated on the same basis in agriculture.

similar to those of the tariff-revenue loss rule—that is even small numbers of tariff lines are likely to cause large reductions in the cuts in average tariffs achieved.

It is often assumed that developing countries will be able to self-designate a set of special products guided by indicators and to make smaller-than-formula cuts on these products. The number of these products is to be negotiated between 8 and 20 percent of agricultural tariff lines. Either forty percent or zero lines would be subject to no cuts with the remainder cut by an average of 15 percent with a minimum cut of 12 percent and a maximum of 20 percent.

3. Current situation between China's agricultural trade and its import tariff

Because the issue of market access is so prominent, and because the chances of an agreement that allows countries to offer protection for special and sensitive products are growing, in this section we exam the nature of China's protection of agricultural commodities in greater detail. In particular, we will try to identify which products China might be inclined to choose to offer SP status, should the SP clauses become part of a Doha trade agreement.

In fact, when we only exam China's imports on the basis of applied tariff rates, it is possible to make a case that China has little real reason to push for the inclusion of special products in the Doha agreement. According to data on China's agricultural commodities computed from the HS96 tariff schedule with the 6-digit product codes, officials are applying import tariffs of less than 10 percent on 27 percent of China's tariff lines. From Figure 1, which maps all of China's tariff lines (when they are ranked from left to right along the horizontal axis according to the level of the applied tariff rate—with those on the left having the lowest and those on the right having the highest) against the share of total import volume that each tariff line contributes, it can be seen that the commodities with applied tariff rates of below 10 percent account for 72% of China's imports (in value terms). If China were not to change its position with regards to assessing tariffs on its TRQ (and other) products (that is, for example, even though cotton imports far exceed its TRQ, trade officials will always continue to assess a 5 percent tariff), nearly three quarters of its imports are coming into the country at a rate that is exempt from the SP conditions (that is, tariff levels on products that are less than 10 percent, do not need to be reduced). Therefore, it can be seen from this that the inclusion of SPs in the Doha agreement will not affect a large majority of China's agricultural imports,

This analysis is supported when we push further into China's (6-digit) tariff lines and looking at products for which trade officials levy a tariff rate between 10 and 20 percent. According to our data, beyond the 27 percent of the tariff lines that are being imported at tariff rates of less than 10 percent, 47 percent of the tariff lines are being imported at tariff rates between 10 and 20 percent. Moreover, as seen in Figure 1, these next highest 47 percent of tariff lines account for 23 percent of more of China's agricultural trade. What this means, of course, is that when working with applied tariff rates more than 95 percent of China's imports (72 + 23) are being assessed a tariff levy rate of between 0 and 20 percent. This means that the remaining 5 percent of the agricultural trade is being assessed a tariff rate higher than 20 percent (21 percent of the tariff lines are being assessed a rate of 20 to 30 percent and account for 4.7 percent of China's imported volume; and 5 percent of the

tariff lines are being assessed a tariff rate greater than 30 percent and these account for only 0.3% of China's imported volume. Therefore, from Figure 1, which is based on applied tariff rates, it seems clear that China should not have much interest in supporting the SP negotiations, since so little of its current agricultural imports would be affected.

The graph in Figure 2, however, demonstrates why China at the very least might be interested in the negotiations—and why our analysis is needed (to provide information about the effect of SPs on China's agricultural sector).[2] Specifically, when we use bound tariff rates (as opposed to applied tariff rates), the 24 percent of the tariff lines—for which imports are assessed a tariff less than 10 percent—only account for 51 percent of the total value of agricultural imports (versus 72 percent when using applied tariff rates). Notably, when using bound tariff rates, 8 percent of the tariff lines have bound rates between 30 and 65 percent (or above 30 percent) and they account for 22 the value of China's imports (versus 0.3 percent 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, it is possible that SPs could offer protection to the producers of tariff lines that account for a significant (though not majority) of imports (when assessed in value terms).

The information in Table 2 demonstrate that the differences between Figure 2 and Figure 2 are due to the fact that all of China's TRQ commodities today are entering China at a low applied rate (the assumption for Figure 2) and that the analysis changes when considering the impact of these products entering at their out-of-quota, bound tariff rates (the assumption for Figure 2). What Table 2 allows us to do is to answer the question: what products might China want to consider specifying as its SPs—given the two alternative assumptions. The table does so by listing out the individual types of agricultural products that are being imported at applied tariff rates of greater than 10 percent (since when the applied rate is under 10 percent, according to the current market access negotiations, the tariffs do not need to be cut—which means that a country does not need to "use up" their SP designations on such products). 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 imported values (when compared to the imported value of all commodities that are being imported at applied tariff rates greater than 10 percent—row 1). Edible fruits and nuts, meats and sugar account for 15 percent more (8+7—rows 2 and 3). Since it would be difficult for a country—even like China—to argue that lobster and almonds are sensitive products, the information in Table 2, column 2 supports the argument that if only applied rates were used, there is little reason for China to support the push to include SP products. Indeed, the six commodity categories that account for the largest volumes of imports (and account for at least 5 percent of total imports of commodities that enter for over 10 percent)

[2] In Figure 2 we rank China's 6-digit tariff lines from left to right starting with those with the lowest rates and moving to those with the highest rates (as we did in Figure 1). In this case, however, we use the bound tariff rates (instead of only relying on the applied rates as we did in Figure 1). More specifically, we use applied rates on commodities that do not have TRQs (or non-TRQ commodities, under the assumption that China charges exactly the allowable tariff rates on non-TRQ commodities—which is mostly true) and we use the out-of-quota rates for TRQ commodities. Although not precisely true, for simplicity in the rest of the paper, we call this analysis our analysis using "bound tariff rates."

account for nearly two-third (or 65 percent—32+8+7+7+6+5) of the total value of imports included in this category (rows 1 to 6). It is almost certain that none of tariff lines in these seven 2-digit product categories could be argued to be an SP. It is important to note that those TRQ commodities do not account for any of the imported.

The conclusion when using bound rates (i.e., using applied rates for non-TRQ commodities and out-of-quota rates for TRQ commodities) changes sharply (Table 2, column 3). When using the bounded tariff rate assumption, cotton by itself accounts for 30 percent of the total value of imported agricultural commodities that are entering China now with bound tariff rates that exceed 10 percent. Wool, raw sugar, rice and wheat all also contribute to the total volume of imports that are in this category of imports. In fact, according to our data, TRQ commodities account for 44 percent of the imported value of the 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 percent in column 2 to 37 percent—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 we have argued are the rates that will be affected by global trade agreements), it is more evident why China may be considering supporting the inclusion of SPs in a Doha agreement. In the rest of the paper, we define the modeling approach that will be needed to answer the question—how much will China gain and/or lose by including SPs in a Doha agreement (in Section 4) and then will look at the findings of our analysis (in Section 5).

4. Methodology and Scenarios

To understanding 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 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 a Doha agreement on China's agricultural production and the incomes of farmers and other households by region and by income groups in different regions.

Two Basic Models

GTAP is a well known multi-country, multi-sector computable general equilibrium model and is often used for international trade analysis (Hertel, 1997). The model is based on the assumptions that producers minimize their production costs and consumers maximize their utilities subject to a set of certain common constraints. Supplies and demands of all commodities clear by adjusting prices in perfectly competitive markets. Representative consumers of each country or region are modeled as having non-homothetic Constant Difference of Elasticity (CDE) demand functions. On the production side, firms combine intermediate inputs and primary factors (e.g., land, labor, and capital) to produce commodities with constant-return-to-scale technology. Intermediate inputs are composites of domestic and foreign components

with the foreign component differentiated by region of origin (the Armington assumption). 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 relative small subset of crops/commodities.

Because of this limitation in GTAP (that is, because China enters the analysis as a single region), in order to meet our goals of tracking the effects of trade liberalization to households (and do so on a more disaggregated basis), 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 the incomes of farmers at both the national level and by province. In addition, the nature of the model and the data used with the model allow the analyst to measure the effect of trade policy on various groups of farm households (across income groups or in different regions or provinces).

While the two models (GTAP and CAPSiM) are ultimately built for the same purpose, there are a number of basic differences between GTAP and CAPSiM. Specifically, CAPSiM is a partial equilibrium model. Most of the elasticities used in CAPSiM are estimated econometrically by ourselves 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 the income levels. In addition, cross-price elasticities of demand (supply) depend on the food budget shares (crop area shares).

In CAPSiM, the component crops/commodities also are more disaggregated. The model can analyze 19 crops, and livestock and fishery commodities, including all of the main cereals (four categories), sweet potato, potato, soybean, other edible oil crops, cotton, vegetables, fruit, other crops, six livestock products, and one aggregate fishery sector. The 19 commodities account for more than 90 percent of China's agricultural output.

Recent versions of CAPSiM are designed to track changes in policies, including trade liberalization, 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, on its regional food economies and on 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 transmitted to local level, each group of households in each region change their production and consumption of each commodity based on the production and consumption elasticities which also differ among regions and household groups.

New Trade Modules Linking CAPSiM to GTAP

While there is a rich description of CAPSiM at national level in Huang and Li (2003), here we introduce briefly the trade module of CAPSiM as it is important part

of the model that links China's agricultural economy with the international prices generated by GTAP.

The first step in describing the linkages is to define some key variables. To do so we denote q_x and q_{im} as the percentage changes of exports and imports in CAPSiM. These two variables are determined as:

$$q_x^i = \sigma_{ex}^i (p_x^i - p_d^i) \quad (1)$$

$$q_{im}^i = q_d^i + \sigma_{im}^i (p^i - p_{im}^i) \quad (2)$$

where, q_x^i and q_{im}^i, are, respectively, the percentage changes of exports and imports of the i^{th} commodity; σ_{ex}^i is a constant elasticity of transformation for exportsand σ_{im}^i a constant elasticity of substituton for imports of the i^{th} commodity; p_x^i, p_d^i, p_{im}^i and p^i are the percentage changes of the i^{th} commodity's export price, domestic price, import price and composite price.

Linkage Strategy for the Two Models

The linkages between GTAP and CAPSiM can be carried out in two ways. In the first approach, we directly transfer the results from the macro general equilibrium model (GTAP) to micro equilibrium model (CAPSiM) without any feedback. Such a method has been used in many previous research efforts. For example, Adams et al. (1998) has linked GTAP with the Australian ORANIG model. There is a general description about how to link GTAP with regional models in Horridge and Zhai (2006).

The second way that researchers have linked GTAP with regional models is "with feedback." Although this method is attractive in theory, linking models with feedback is complicated by the fact that there must be a serious effort made to make sure that when a final outcome is attained that both models are in equilibrium. There have been several efforts to link GTAP with regional models with feedback. For example, Horridge and Ferreir Filho (2003) linked the GTAP to the ORANIG model. In fact, he did so even more directly, by replacing the Australian module of GTAP altogether. Rutherford (1997) developed an iterative procedure to link macro general equilibrium models and partial energy models.

For several reasons, in this paper we use the model without feedback. First, there are a lot more models without feedback meaning our results will be consistent with them. Second, the procedure is more mature and there is less chance of not being able to solve the model because an equilibrium cannot be obtained. Specifically, in our paper, we have decided to use the price changes from GTAP (e.g., the percentage change in import and export prices of each commodity faced by China) and transfer these changes to the richer, more detailed domestic model, CAPSiM, without feedback.

In doing this we need to take care to define exactly how the price that is transferred from GTAP to CAPSiM is generated. Specifically, China's export prices, P_x in equation (1), are determined as follows. In GTAP, there is no explicit commodity export price for individual countries (or regions). The exports from one country are determined by the demands of other countries. Therefore, the downward slope on the export demand schedules are derived from the Armington assumption applied in other regions. Because of this, we estimated China's export prices using the following formula developed by Horridge and Zhai (2006).

$$p_x^i = p_{fob}^i + \frac{q_x^i}{ESUBM(i)} \qquad (3)$$

where, p_x^i is the demand curve shift of the i^{th} commodity; p_{fob}^i, is the percentage change of China's export price of the i^{th} commodity simulated by GTAP; q_x^i is the percentage change of China's export quantity of the i^{th} commodity simulated by GTAP; and $ESUBM(i)$ is the elasticity of substitution of imports from GTAP.

We also need to establish the import price. When creating China's import prices, both GTAP and the CAPSiM model also adopt the Armington structure. Because of this assumption, imports and domestic goods can be used as substitutes according to a constant elasticity substitution (CES) equation. Therefore, we transfer the GTAP import prices directly into the CAPSiM model.

It is worthwhile to note that while the results from GTAP and CAPSiM are not exactly same, they are highly consistent. Unfortunately, one can not generate exactly the same results from these two models. But, at least, we are able to isolate several reasons for this. First, the databases differ between these two models. These differences persist even though we have made substantial efforts to improve the databases in both models. Second, there are also differences in consumption elasticities. Third, the two models differ in a number of other assumptions, such as the rate of future technological change.

Despite these slight differences, there are a number of reasons why we should not be too concerned. The numerical examples done by Horridge and Zhai (2006) show that the results of export and import quantity changes or other changes between GTAP and regional models were consistent. In our study, we also found that the results on domestic production and consumption of each commodity between GTAP and CAPSiM using the linkage method are consistent and similar in terms of both changing trends (sign of the percentage change) and the magnitudes (e.g., the percentage changes).

Should these differences be a reason to be concerned? We believe linking models still is superior. If we think the single country model best describes the particular country, and world demand changes are well summarized by the demand shifts in the global model, then linking two models will improve the results for the country (e.g., China). Linking the two models also can generate more information and policy implications since CAPSiM has a much more power (more detail; more disaggregation; etc.) in assessing the impact of policy shocks by region and by income groups.

Policy Scenarios

In this study, five scenarios are considered in assessing the impacts of sensitive and special products in Doha on China's agriculture at the national, regional and household levels. The five scenarios include one baseline scenario (Doha without sensitive and special products) and four alternative scenarios. The first three alternative scenarios are used to evaluate the impacts as only China adopts specific commodity as special products. Through these scenarios, the marginal contributions to China's agriculture are evaluated (in the rest of this paper, we call these three when taken as a group as: scenario 2). As to the fourth alternative scenario, we assume that all WTO member countries adopt sensitive and special products (scenario 1). The impacts on world economy and China's agriculture and farmers' income will be assessed based on this scenario. In the analysis we are going to assume that all of the parts of the Doha agreement are realized by 2015. As such, we estimate the impact of special products by comparing the baseline results with those under policy scenarios in 2015.

Baseline scenario *(Doha without sensitive and special products)*. In this scenario, every country will continue their existing policies, such as the continued implementation of the Uruguay Round commitments, China's WTO accession promises (which are continuing to take effect until 2010), the phase-out the Multi-fiber Agreement (MFA—by January 2005). Meanwhile, the Doha round trade liberalization will be also fully implemented by 2015. Currently, the Doha negotiations have three pillars (i.e., market access, export competition and domestic support). However, our research will focus on the effects of market assessment. There are several reasons for us to do this. The first reason is that our goal of this research is targeted to evaluate the impacts of sensitive and special products in Doha negotiation, which is only related to the issues of market access. The second is that the modality of market access is quite complex, whose impact requires careful evaluation if it is to be accurately assessed. A third reason is that previous work has identified market access as being the overwhelming factors among three pillars (Anderson and Martin, 2005). Therefore, we think it much clearer to put our assessment on sensitive and special products inside the framework of market access.

In the process of modeling the Doha liberalization, there are two key modeling issues that need to be addressed when one seeks to embed the proposals into the GTAP model. The first is what kind of import tariff line (applied tariffs or bound tariffs) is used for calculating the tariff reduction. The gap between bound tariffs and current applied tariffs can be significant in the case of many countries, especially when modeling developing countries (Laborde, 2007).[3] Choosing applied or bound tariffs will have significant effect on the results since the nature of the change will vary greatly. As only the applied tariffs are available in GTAP database and WTO negotiations are based on bound tariff rates, we endeavor great effects to calculate the bound tariff in different countries. To provide a preliminary assessment of the implications of the modalities for the applied protection, we begin with the MAcMapHS6 database for 2004 together with a set of bound tariff rates for which *ad valorem* equivalents have been calculated on the same basis. Since the "tiered"

[3] The gap between bound import tariff and current applied import tariff is usually called "binding overhang".

formula is nonlinear in the tariff rate, we must have estimates of protection in *ad valorem* form. We first cut the bound tariff rates using the approaches considered in the modalities, and then assess their implications for applied rates. In this analysis, we use 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). The second is how to incorporate the TRQ in our model. Currently there exist two common methods used by literatures. The first method is easily used and it is not necessary to modify standard GTAP model. Under this method, the import of TRQ commodities is switched into exogenous and import tariff endogenous (Van Tongeren and Huang 2004). The second is more complex and some modifications are required. Such a method has been demonstrated by Elbehri and Pearson (2005). With this method, the quota rents could be estimated. 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.

Alternative scenarios. Besides the evaluation on the effects of adopting sensitive and special products across all countries, we also want to assess the marginal contribution of selecting different agricultural commodities as sensitive and special products by Chinese government. Then two kinds of policy scenarios are designed. The first is the *individual commodity scenario*, which try to assess the impacts of taking specific commodity as special products only by China. The second is the *comprehensive SP scenario* to evaluate the effect of adopting sensitive and special products by all WTO member countries. the detailed description on each scenario are given following.

Individual commodity Scenario. In this scenario, we mainly focus on assessing the marginal contribution of selecting certain agricultural commodities as sensitive and special products by Chinese government, three agricultural commodities (i.e., cotton, sugar and milk) are selected, based on above analysis on China's agricultural tariff and import structure, also with information by consulting some trade negotiators from Ministry of Agriculture of People Republic of China. The effects of every commodity are assessed by increasing its import tariff to the level as special products, with the import tariff of other commodities and the same commodity in other countries fixed as baseline. Through the comparison to the baseline, the economic impacts by adopting each commodity as special products by China could be estimated. For example, if China could take cotton as special products, the import tariff[4] on cotton could be raised from 26.8% in baseline to 34%. However, the import tariffs of other commodities (exempting cotton) and cotton in other countries (excluding China) are kept as same to baseline. As to sugar and milk, the method is exactly same.

Such three individual commodities scenarios are arbitrarily assumed. Surely, it is unrealistic. However, through these scenarios, we could assess the effects and the marginal contributions to agricultural productions and farmer's income by the three

[4] 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.

commodities. Moreover, it could provide valuable information of priority as choosing special products during the decision of policy-makers in China. The shortage of this assumption will be remedied by the following ***comprehensive SP scenario,*** which takes into account other countries response to capture the interaction among countries.

Comprehensive SP Scenario. Although the current modality provide relatively clear definition on the proportion of sensitive and special products to the total tariff lines by different types of countries (table 1), the lists of sensitive and special products by different countries are far from determination. Therefore, a key question for evaluation is how the sensitive and special products will be chosen. For this study, the selections of special products are based on the work done by Jean, Laborde and Martin (2008), which takes into account the policy makers' preferences would try to reduce the tariff cuts on products that are important shares of total imports, have high initial applied tariffs, and would face large cuts under the formula.

The adoption of sensitive and special products by all WTO member countries will have significant impact on import tariff of agricultural commodities. As shown in appendix table 1, excluding the oilseeds, cotton, fish and processed food, the world average import tariff (*ad valorem* equivalent) of other agricultural commodities will increase more 21.5%. As to sugar, cattle and mutton, the import tariff will rise even higher by 44.4% and 43.8% respectively. Meanwhile, the sensitive and special product is like "two-edged sword" for all countries. When one country raises its protection on certain countries by adopting sensitive and special products, it may also confront the big loss of exporting opportunities to other countries. Taking China for example, as China increases its import tariff on sugar, cotton and certain animal products, the tariff levied by other countries on its export commodities will also rise dramatically (appendix table 2). Because of adoption of special products by its trade partners, the tariffs levied by other countries on China's export of rice, vegetable and fruit and other corps exportable commodities will increase by 43.3%, 38.3% and 33.1% respectively, which would lead to significantly negative effects on China to explore its comparative advantage in these commodities (appendix table 2). Therefore, the final effects whether one country gains or losses in its agricultural sectors will be determined by the two contrary effects of the reduction both in import and export. Such a complex mechanism of will be evaluated by comparing the scenario with sensitive and special products to the baseline.

5. Results: Impacts of SP on China and the Rest of the World

If Doha round were to allow countries to designate Special Products the world's agriculture would benefit. In total, all of the countries in our GTAP database would enjoy an increase in agricultural value added by 3.943 billion dollars (Table 3, row 13, column 2). In total, this would mean that global agricultural value added would rise by 0.15 percent. This rise in value added is, of course, expected since under the SP scenario, almost all countries in the world are allowed to increase protection—in many cases substantially.

However, one of the most fundamental lessons is that if the Doha negotiations were to allow SPs, overall the world would be worse off than if it would implement the same Doha trade pact without SPs. This is so because to produce the added 3.943

billion dollars of agricultural value-added, it would cost the world 6.248 billion dollars in non-agricultural commodities (or about 0.02 percent of total non-agricultural value added). This means that in total the world would lose 2.305 billion dollars (6.248-3.943). This fall would occur because SPs can be thought of as a distortion to the freer flow of resources that would occur under a Doha agreement without SPs. In response to the higher agricultural prices in most countries of the world after the implementation of the SP regime, capital, land and labor that would have otherwise have gone into the production of non-agricultural commodities (at the non-SP level of prices) would be reallocated to produce the additional 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 3—columns 1 and 2). Specifically, when looking at agriculture, the main losers are the producers in major agricultural exporting countries/regions, Australia and New Zealand, NAFTA and South America. In contrast, agricultural producers in Japan and Korea, Other Asian countries and the EU15 benefit.

However, the benefits to agricultural producers in some of the countries that benefited from the inclusion of SPs are offset by the losses by non-agricultural producers (Table 3—columns 3 and 4). For example, the losses from lower non-agricultural value-added in Japan and Korea and Other Asian countries is greater than the gains to agricultural producers. South America loses both in agriculture and non-agriculture. Of the major players, only the EU15 benefits from gains in both the agricultural and non-agricultural sectors.

Interestingly, China is a net loser (Table 3, row 1). The nation's agricultural producers earn 53 million more in agricultural value added. Importantly, this is only a very small fraction of total agricultural value added (0.01 percent). This gain, however, is only earned at the much larger expense in the non-agricultural sector. While agricultural producers increase earnings (of value-added) by 53 million, it comes at the loss of 1.647 billion in the non-agricultural sector.

As is expected, the rise in agricultural value-added from the inclusion of SPs in a Doha agreement means that agricultural trade falls (Table 4). Specifically, agricultural trade falls by 9.7 billion dollars, a total of 1.94 percent of the level that would have been realized if the Doha agreement did not include SPs. Since GTAP requires that global imports and exports are equal, exports fall with import declines.

Like the case of value-added in agriculture, our results show that not all countries are treated equal (Table 4). The main agricultural exporters, Australia and New Zealand, NAFTA and South America, suffer falls in exports in excess of 1 billion dollars, levels that are 3.37 to 4.11 percentages of their total export values. Their losses of exports account for around 70 percent of all export declines. In contrast, Japan and Korea are the ones that experience that largest falls in imports. With the inclusion of SPs, agricultural importers in Japan and Korea bring in 2.861 billion dollars in imports, a level that is 5.65 percent of their total level of imports under a Doha agreement without SPs. The reduction in imports in Japan and Korea accounts for about 30 percent of the world's total import decline.

China experiences both falls in both imports and exports (Table 4, row 1). China combined imports and exports fall by 1827 billion (896+931). This means that China's trade falls about 3.5 percent. Like a number of other countries, China loses in both imports and exports because the inclusion of SPs allows China to protect its own agricultural sector, which leads to a fall in imports. At the same time, however, the inclusion of SPs in a Doha agreement means that China's trading partners also raise protection. Because of this, agricultural exporters reduce their shipments by 3.76 percent. In value terms, then, the inclusion of SPs only shifts China's agricultural trade balance by 35 million dollars, which is only 0.06 of 1 percent of total agricultural trade. Hence, it is safe to say that the inclusion (or the exclusion) of SPs has no impact on China's agricultural trade.

To isolate the impact of the inclusion of SPs in a Doha agreement on China (and by China's joining), we use the GTAP to run a set of parallel scenarios and compare them versus the baseline (a Doha round agreement with no SP measures—Table 5). The first scenario is the same that was run to generate Tables 3 and 4—that is, comparing the effect of having all countries choosing a set of SPs (a Doho agreement with SPs) with the effect of a Doha agreement with no SP (scenario 1). The second scenario is comparing the effect of having only China choose a set of SPs (and not other countries) with the effect of a Doha agreement with no SP (scenario 2). The main difference between scenario 1 and 2 from the point of view of China is that in scenario 2, China mainly protects its own farmers; in scenario 2, China trading partners protect themselves, too. Note that scenario 1 generates results that are identical to those in Tables 13 and 14.

As expected when only China gets to designate SPs (scenario 1, Table 5, rows 1 to 3), China's farmers benefit much more—especially when they are able to protect cotton—than when the whole world can designate SPs (row 4). Producers earn 25.2 million more (as value-added) when they are the only ones to protect sugar; 13.9 million more when they are the only ones to protect milk and 730.1 million more when they are able to protect cotton. In contrast, as seen above, when the whole world can designate a set of SPs, China only raises value-added by 53 million. The difference, of course, is that when only China gets to protect its products, its own sugar/milk/cotton producers gains while producers in the rest of China's agricultural sector get the benefits of the Doha Round tariff cuts and with no country having the ability to protect its SPs.

As our analysis shows the protection of a single crop in China only (scenario 1), while not leading to falls in exports due to additional protection in other countries (from the SPs of other countries) does lead to a falling exports. The reason that exports fall, however, is not from higher protection. Rather, it is because resources (capital, land and labor) flow to the SP (sugar/milk/cotton) instead of to the crops that were otherwise being exported. Because there is only a single sided effect, the drop in exports in scenario 1 (-2.2/-0.9/-432.9) is less than when all countries get to designate SPs (-896—scenario 2—Table 5, column 2). As would be expected, agricultural imports of the commodities move in the opposite direction (column 3) as the case of production (column 1). The impact in scenario 1 (rows 1 to 3), however, is less than scenario 1 (row 4).

In Table 6, we decompose our results from Table 5 to see how the producers of all of the crops in the agricultural economy fare (in terms of production—measured in tons) when there is a Doha agreement with and without SPs (for China only—scenario 2, columns 1 to 6; and for the whole world—scenario 1, columns 7 and 8). There are three main findings from Table 6. First, it is clear from the case of cotton (and sugar) that when a nation can specify a single product as an SP, the producers of that crop gain (and the production of cotton; milk; sugar) rise, while in the case of cotton and sugar, the production of most other crops fall. For example, when cotton (sugar) is designated by China only, its production rises b 278 thousand tons (row 8/row 10). The production of all other crop falls. Since the value added of producers rise in scenario 1 (in the case of either cotton, milk or sugar), we know the overall production (price weighed) rises for producers, but, the main point is that although there are winners (cotton producers), this is in part supported by the losses of others.

The second finding is that when all other countries are allowed to designate their special products (Table 6, columns 7 and 8) versus the case where only China designates a single commodity (cotton—columns 1 and 2; milk—columns 3 and 4; sugar—columns 5 and 6), in some cases the production of the commodity rises, in other cases it falls and in other cases it is about the same. For example, in the case of cotton, there actually is more production of cotton in China when all countries designate SPs than when only China designates cotton. The opposite is true fro milk. In the case of sugar, there is not much difference between scenarios 1 and 2.

The third finding is really a combination of findings 1 and 2. When the whole world, including China, designates SPs (Table 6, columns 7 and 8), while the crops that China protects (cotton, sugar and milk) all benefit, the producers of many other crops reduce production (e.g., rice, vegetables and fruit). The reason that this happens is twofold. First, when China protect cotton, milk and sugar, the price of these commodities rise and resources flow towards these crops away from the other crops. In addition, although China has a comparative advantage in producing labor-intensive rice, vegetables and fruit, these products are often considered SPs in the agricultural economies of many of China's trading partners. For this reason we see falls in rice, vegetables and fruit. However, it is important to remember that since value added rises in scenario 1 (by 53 million dollars—see Table 5), the price weighted sum of all of the commodities in Table 6, column 7 is still positive.

Our analysis, as expected, shows the exact opposite findings when comparing the relative effect on imports and exports of China only protecting a SP (versus the baseline) and the relative effect on imports and exports with all countries can designate their own set of SPs (Table 7). Whereas cotton (milk/sugar) production rises when China only designates these commodities as SPs, imports fall (columns 2, 4 and 6). Moreover, while the import of the protected commodity falls, imports of the other commodities rise.

According to the results from CAPSiM, the impact of allowing countries to designate SPs (that is under scenario 1) on rural income per capita is positive, but small (Table 8, row 1, column 4). On average when the SP versus no SP Doha Round agreement is compared rural income per capita rises 0.42 yuan per capita. While positive the most obvious characteristic of the finding is that it is very small. With rural income per capita in China over 2000 yuan, this means that the gain of income is

only fractions 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. As expected (and similar to the findings above), the average gain in rural income per capita is larger in scenario 2 when only China is allowed to designate a single SP (row 1, columns 1 to 3).

But while the gain is fairly small, on average, decomposing the change in income by income group shows that, in fact, there are negative equity effects. We can see this 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 groupings, 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. According to this finding, the adoption of the SP system is a regressive move.[5]

So why does this happen? Why do the largest farmers gain more than the poorer ones? To answer this, we need to look at Appendix Table 3. In this table, we show the amount of income that each group of farmer is able to generate from cotton, milk and sugar. When looking at this table, we can see 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, therefore, when these crops are designated as SPs, the farmers with the higher earnings of each of the crops benefits more. Appendix Table 3 also will help us understand why richer farmers gain from scenario 1. The higher gain is due to the fact that the production of commodities that *net* benefit from the inclusion of SPs into a Doha Agreement is greater for richer farmers. This is seen by comparing the absolute level of income produced by farmers in different categories of commodities that benefit from the inclusion of SP into a Doha Agreement to the absolute level of income produced by farmer of commodities that get hurt by the inclusion of SP into a Doha Agreement. The net benefit which is column 4 minus column 5 in Appendix Table 3 is greatest for the highest income groups and lower (negative) for the lower income groups.

By this same logic, when we use CAPSiM to divide the sample into different subgroups we find that certain groups of farmers benefit more than others; and some groups actually get hurt (Table 8, rows 7 to 9). For example, farmers who farm on the plain benefit in general, since this is where most of the cotton and sugar area is. However, those in the hills and mountainous areas actually get hurt under scenario 1. This is likely because much of China's fruit production is in the hilly and mountainous area. There also is a lot of rice in south China that is grown in hilly areas. Both rice and fruit/nut farmers get hurt by the inclusion of SP into a Doha agreement. Since richer farmers tend to be in the plains areas and poorer farmers tend to be in mountainous areas, the results also suggest a certain regressiveness.

However, there is one positive distributional finding in our analysis (Table 8, rows 10 and 11). In fact, there is a large gap between Han and Minority farmers. Why

[5] 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. See Appendix Table 2b.

is this so? Most likely the minorities gain so much because they are concentrated in the sugar producing regions of Guangxi and Yunnan and the cotton producing regions of Xinjiang. Since farmers in these areas tend to specialize, they are double winners since they gain from the protection afforded the inclusion of SPs and they are less hurt when other countries protect fruits, vegetables and rice. Hence, the inclusion of SPs in a Doha agreement, according to our results, would be pro-minority.

Finally, the results of our by-region analysis support the findings in the minority analysis (Figures 3. The regions of 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, fruits and vegetables, lose because they gain no protection inside China and it is likely that other nations use the SP system to protect these commodities, thereby reducing the prospects of exports and depressing price within China. Interestly, this means that the inclusion of SP in a Doha agreement would have offsetting effects on inequality. In the one hand, it increases income inequality across the rural population. On the other hand it reduces interregional inequality.

6. Conclusions 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 the farmers and others in the world and in China. This paper has used a number of novel and special approaches. It is the first paper to use bounded tariffs to examine the effect of SPs.

In our findings, regardless of the modeling approach, we find that unsurprisingly, since the inclusion of SPs in a Doha agreement is adding more protection to agriculture, that farmers in general gain. However, the gain is very small. It is only fractions of a percent of agricultural value added. The gains to rural income per capita are likewise small.

Moreover these gains to not come without a cost. In fact, overall, the world loses. According to the GTAP model, the loss in non-agricultural value added is greater than the gain to value added in agriculture. There is also less trade. And we show how although the producers of some crops gains, those of other lose. In other words, the gains of some are financed by the losses of others.

While there are some positive benefits that are found for certain vulnerable groups in society, there are adverse effects on equity in others. Minority gain, mainly because they often specialize in sugar and cotton. 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 including SP in a Doha agreement, there is a complicated and finely tuned balance that needs 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; east and west; Han and non-Han.

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Table 1. Key elements of the agricultural tariff cuts used in the analysis

	Developed	**Developing**		**LDCs**	**SVEs**	**RAMS**
Bands	0/20/50/75	0/30/80/130		no lib	no lib	
Proportional cut	50/57/64/70		33.3/38/42.7/48.7			-5% pts in bands 1 & 2; -10%pts if in bands 3,4
	Scaled proportionately if the average-cut (including sensitive, tropical & tariff escalation products) <54% in industrial countries; if > 36% in developing					
Sensitive products	5% of lines	6.7% of lines				
	If >30% in top tier, 2%pts more					
Special products		14% lines; 40% no cut & 60% with 15% cut				
Tariff Escalation Products	Cut from next higher tier applied. In top tier add 6 percentage points to the cut					
Tropical products	t ≤ 10, Cut to zero; 10 <t≤ 75, 70% cut; t>75, 78%					
Cotton	Cut to zero if originated in LDC countries					

Notes: Republic of Korea treated as a developing country for agriculture. LDCs are identified in the UN list of Least Developed Countries. Economies given Small and Vulnerable (SVE) treatment for agriculture were: Antigua & Barbuda, Barbados, Belize, Bolivia, Botswana, Brunei Darussalam, Cameroon, Congo, Côte d Ivoire, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Fiji, Gabon, Georgia, Ghana, Grenada, Guatemala, Guyana, Honduras, Jamaica, Jordan, Kenya, Macau, Mauritius, Mongolia, Namibia, Nicaragua, Nigeria, Panama, Papua New Guinea, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sri Lanka, Trinidad and Tobago, Uruguay and Zimbabwe. Paragraph 6 economies (those with less than 35% tariff bindings) were identified as Cameroon; Congo, Cuba, Ghana, Kenya, Macau, China; Mauritius; Nigeria; Sri Lanka; Suriname; Zimbabwe.
RAM treatment: China, Croatia, Ecuador, Jordan, Mongolia, Oman, Panama, and Chinese Taipei. VRAM treatment in agriculture (no cuts). Albania, Armenia, Georgia, Kyrgyz Republic, Moldova, Former Yugoslav Republic of Macedonia, Saudi Arabia, Tonga, Ukraine, Vietnam. .

Table 2. The import value shares (%) of commodities with import tariff no less than 10% on 2006 in China

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**

Source: calculated by authors, based on UNCOMTRADE and NSBC trade data.

Table 3. 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

	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 andNew 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

Source: Authors' GTAP simulation results

Table 4. The impact of the inclusion of SPs on agricultural exports and imports under Doha liberalization in 2015, relative to a "no-SP" scenario.

	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

Source: Authors' GTAP simulation results

Table 5. Using GTAP to compare the contribution to China's agricultural value-added, exports and imports when China is able to designate sugar, milk or cotton as special products versus the no SP baseline (and an additional comparison of an SP versus no-SP baseline) (million USD)

	Ag. value added	Ag. export	Ag. Import
Effects of having only China adopt the following commodities as SPs—and not having other countries adopt any SPs (scenario 2)			
Sugar	25.2	-2.2	-21.4
Milk	13.9	-0.9	-11.2
Cotton	730.1	-432.9	-793.7
Effects of having all countries designate a set of SPs (scenario 1)*	53	-896	-931

Source: Authors' GTAP simulation results

* Note that the result in this row for value added (column 1) is exactly the same as Table 13, row 1. The results in this row for agricultural exports (column 2) and agricultural imports (column 3) are exactly the same as Table 14, row 1.

Table 6. Using CAPSiM to measure the impacts on production in China under different scenarios (scenario 1 and scenario 2) in 2015 (comparing both scenarios to the baseline—that is, a Doha agreement with no-SPs, thousand tons).

	Scenario 2 Only China designates SP for:						Scenario 1	
	Cotton		Milk		Sugar		All countries designate SPs	
	1000 tons	%	1000 tons	%	1000 tons	%	1000 tons	%
Milled Rice	-3	0.00	1	0.00	-10	-0.01	-116	-0.09
Wheat	-10	-0.01	0	0.00	-7	-0.01	-28	-0.03
Maize	-57	-0.03	16	0.01	-16	-0.01	142	0.08
Sweet potato	-2	-0.01	1	0.00	0	0.00	11	0.05
Potato	0	0.00	0	0.00	-1	-0.01	-1	-0.01
Other Coarse Grain	-12	-0.07	0	0.00	-5	-0.03	-11	-0.07
Soybean	-39	-0.20	0	0.00	-6	-0.03	-16	-0.08
Cotton	278	2.70	0	0.00	-1	-0.01	318	3.09
Oil Crop	-4	-0.04	0	0.00	-3	-0.03	-5	-0.05
Sugar Crop	0	0.00	0	0.00	139	1.13	136	1.11
Vegetable	-52	-0.01	-1	0.00	-10	0.00	-1184	-0.25
Fruit	-24	-0.02	0	0.00	2	0.00	-572	-0.36
Pork	-12	-0.02	-1	0.00	-1	0.00	37	0.06
Beef	0	0.00	-1	-0.02	-1	-0.02	2	0.03
Mutton	1	0.03	0	0.00	0	0.00	1	0.03
Poultry	-7	-0.03	0	0.00	0	0.00	19	0.10
Egg	-7	-0.03	0	0.00	0	0.00	12	0.05
Milk	-8	-0.02	46	0.10	-2	0.00	19	0.04
Fish	0	0.00	0	0.00	0	0.00	-6	-0.02

Source: Authors' CAPSiM simulation results

Table 7. Using CAPSiM to measure the impacts on exports and imports in China under different scenarios (scenario 1 and scenario 2) in 2015 (comparing both scenarios to the baseline—that is, a Doha agreement with no-SPs, thousand tons).

	Scenario 2 Only China designates SP for:						Scenario 1	
	Cotton		Milk		Sugar		SP	
	Export	Import	Export	Import	Export	Import	Export	Import
Milled Rice	-9	3	0	0	-1	0	-304	-12
Wheat	-1	21	0	1	0	2	2	89
Maize	0	0	0	0	0	0	0	0
Sweet potato	0	0	0	0	0	0	0	0
Potato	0	1	0	0	0	0	-14	-2
Other Coarse Grain	0	13	0	0	0	3	0	26
Soybean	0	82	0	0	0	-16	-21	17
Cotton	0	-496	0	0	0	2	0	-514
Oil Crop	0	7	0	0	0	-5	-1	10
Sugar Crop	0	0	0	0	-6	-223	-19	-223
Vegetable	-37	1	0	0	-1	0	-1569	-18
Fruit	-15	5	-1	0	-3	1	-905	-100
Pork	0	0	-1	0	-1	0	23	-7
Beef	0	0	0	0	0	0	1	1
Mutton	0	0	0	0	0	0	0	0
Poultry	0	0	0	0	0	0	22	-3
Egg	0	0	0	0	0	0	2	0
Milk	0	1	-1	-89	0	1	-2	-35
Fish	-5	1	0	0	0	0	-14	-7

Source: Authors' CAPSiM simulation results

Table 8. Using CAPSiM to measure the impacts on rural income (per capita) in China under different scenarios (scenario 1 and scenario 2) in 2015 (comparing both scenarios to the baseline—that is, a Doha agreement with no-SPs).

	Scenario 2 Only China designates SP for:			Scenario 1
	Cotton	Milk	Sugar	**SP**
		Yuan per capita		
National average	4.39	1.51	2.63	0.42
Income group 1 (lowest income)	3.92	1.32	2.16	-0.66
Income group 2	6.28	1.99	2.08	-2.54
Income group 3	8.95	2.77	1.92	0.94
Income group 4	12.02	3.72	5.90	5.71
Income group 5 (highest income)	11.39	3.55	2.73	5.13
Farmers in plain area	9.34	3.12	1.90	3.50
Farmers in hill area	0.69	0.29	3.14	-3.47
Farmers in mountain area	0.07	0.14	3.54	-1.36
Farmers: Han	3.94	1.37	2.53	-0.12
Farmers: Minority	9.64	3.19	10.02	14.02

Source: CAPSiM simulation results.

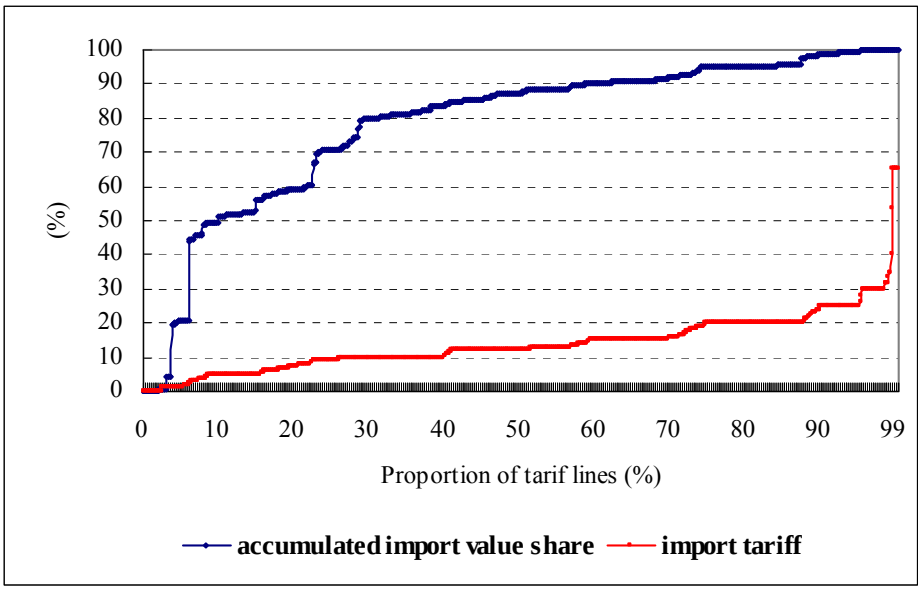

Figure 1. The distribution of China's import tariff (applied tariff) and import value on agricultural commodities in 2006

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)
Note: 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.

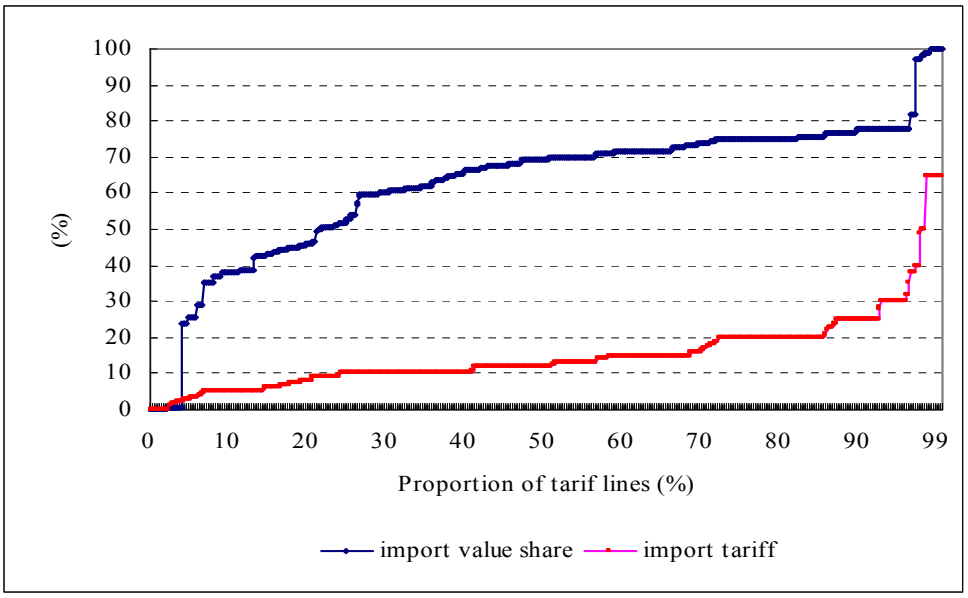

Figure 2. The distribution of China's import tariff (out of quota tariff) and import value on agricultural commodities in 2006

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)
Note: 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 (using out of quota tariff) is lower than 10%, 20% and 30% account for 24%, 72% and 92% respectively (total agricultural lines are 785). 3. 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.

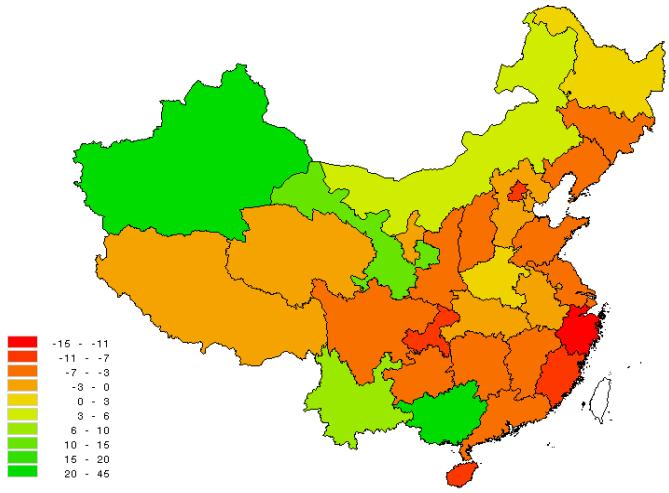

Figure 3. The impacts on per capita agricultural income for average farmers by province under Doha trade liberalization with special products in 2015 (comparing to "Doha without special products", yuan/person)

Appendix table 1. China's import tariff and tariff levied by other countries in 2015 under baseline, Doha liberalization with and without special products scenarios

	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
Cattle 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

Source: calculated by authors based on MacMap tariff database weigted by import values in 2001 from GTAP version6 database

Notes: [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

Appendix table 2. The world average import tariff in 2015 under baseline, Doha liberalization with and without special products scenarios

	The world average import tariff (%)			The tariff change comparing to baseline (%)	
	Baseline	**Doha**	**Doha-SP**	**Doha**	**Doha-SP**
	(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
Cattle 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

Source: calculated by authors based on MacMap tariff database weigted by import values in 2001 from GTAP version6 database

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

Appendix table 3. The share of production (%) in farmer's total production of commodities that benefit by SP and of commodities that get hurt by SP under different scenarios (scenario 1 and scenario 2) in 2015 (comparing both scenarios to the baseline—that is, a Doha agreement with no-SPs—2015.

	Share of farmers' total production of commodities that benefit from the inclusion of SP into a Doha agreement*	Share of farmers' total production of commodities that get hurt from the inclusion of SP into a Doha agreement**	Share of cotton in farmer total area of production	Share of milk in farmer total area of production	Share of sugar in farmer total area of production
Average	491	694	303	22	176
Group1	357	384	209	8	95
Group2	461	516	267	23	171
Group3	560	708	329	19	212
Group4	665	975	414	31	221
Group5	637	1365	392	42	203
Plain	917	920	747	45	125
Hill	288	877	55	7	226
Mountain	233	455	5	10	218
Han	515	796	317	25	174
Minority	1345	410	821	7	518

* The commodities in this (beneficial) group include cotton, sugar and milk.
** The commodities in this (get hurt) group include vegetable, fruits and rice.