The Economic Effects of State Trading Enterprises: Market Access and Market Failure

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1. Introduction

In the Doha Round of trade negotiations the overarching theme is special and differential treatment for the developing and least-developed Members of the World Trade Organization (WTO). As a consequence, in the agricultural component of these negotiations, the emphasis is now more on market access than it is on the other two pillars (domestic support and export competition) because of the need to improve the opportunities for the developing and least-developed countries to increase the values of their exports of agricultural products, especially those to the developed countries. In the early phases of the negotiations, importing STEs were on the agenda because it was claimed they restrict imports and exporting STEs were placed on the agenda because it was believed they act like an export subsidy and 'unfairly' increase exports (see WTO, 2004c). In both cases, it was claimed that, because of the lack of transparency in their commercial undertakings, STEs are 'unfair' traders. Nevertheless, by July 2004, only exporting STEs remained as an explicit agenda item (WTO, 2004b) and since the Ministerial Conference in Hong Kong in December 2005, the situation has remained unchanged (see WTO, 2005b). However, there is no reason to suppose from an economic perspective that if exporting STEs are thought to distort trade, that importing STEs will not also distort trade.

Importing country STEs are the focus of this paper. We argue that the failure to deal with importing country STEs is a missed opportunity in the WTO negotiations since STEs limit market access and act in a manner similar to more traditional policy instruments such as tariffs. Thus, the focus in the negotiations on export STEs is skewed which means that the issue of STE will be only partially dealt with and that market access opportunities will continue to be restricted in the presence of importing STEs. We set out a theoretical

framework to highlight these issues and apply it to the case of the Korean STE responsible for managing imports of rice. The paper is organised as follows. In Section 2, we present an overview of the STE issue in the context of the Doha Round negotiations and the status of state trading enterprises in the context of the WTO. We also outline some general issues concerning STEs in a formal modelling set-up. The trade effects of an importing STE are derived in section 3 and the corresponding domestic producer effects are given in section 4.[1] The welfare effects in the importing country and exporting region are given in section 5. Importantly, the approach we have developed can be used to provide estimates of the impact of STEs using observable data. We illustrate this with a case study of the STE used to manage rice imports in Korea which is presented in Section 6. A summary of the approach used and some conclusions about the trade distorting effects of STEs are presented in section 7.[2]

2. Current Perspectives on the STE Issue

In the Doha Round proposals of the major players (the European Communities, Japan and the United States), there appears to be a presumption that the exclusive or special privileges given to state trading enterprises provide them with domestic monopoly/monopsony powers and that these powers distort international markets and circumvent international obligations. However, it is also evident that some small countries take the view that a state trading enterprise is a beneficial policy instrument which provides stability, food security and countervailing power. For example, the submissions by the Mercosur countries (together with Chile and Colombia) (WTO, 2001c) and the United States (WTO, 2000a) took a balanced position in which both exporting and importing STEs were thought to distort international trade and to create an 'unfair' advantage for countries which

[1] The domestic tax/subsidy effects of STEs on domestic consumers are not pursued here in the interests of space.
[2] Given the complexity of the model and limitations on space, we confine the discussion in the paper to the basic set-up of the model, the issues that are being dealt with and the intuition for the effects that arise. An extended version of the paper with the relevant details is available.

used them and greater disciplines were proposed for both. In the submissions made by the European Communities (WTO, 2000b), Japan (WTO, 2000c) and Korea (WTO, 2001a), it was argued that exporting STEs distort trade and that greater discipline is required; but it was also claimed by Japan and Korea that importing STEs do not distort international trade and, therefore, there is no need for further discipline to be imposed on them. Amongst the developing countries, both Mauritius (WTO, 2000d) and Mali (WTO, 2001b) argued that STEs play an important role in overcoming the market failures of unstable prices and imperfect competition and that, in the absence of other instruments to correct these failures, STEs play a necessary role and they ought to be allowed to continue in that role. In the case of the developed countries, STEs are invariably used as an instrument to correct these same market failures but they are also used as an instrument to redistribute income to producers. In developing countries, the redistribution is often towards consumers.[3]

The pursuit of the twin objectives of efficiency and redistribution through the use of STEs makes their economic analysis a challenge. There are four elements to this challenge. First, to the extent that STEs are used as an instrument of redistribution, they are like most other instruments of agricultural policy and reflect a bias in government policy, a bias that varies not only from country to country but also over time. An STE may also act as a price stabilisation mechanism in the absence of other risk-reducing instruments such as futures markets. In the absence of competition policy, an STE is a means of reducing the oligopsony power exerted by firms downstream from producers and the oligopoly power exercised by these firms against final consumers. At the same time, an importing STE may also use its position to improve the country's terms of trade and an exporting STE may gain a share in export markets in excess of that achieved by private firms.

[3] It may be concluded that the objectives, exclusive rights, activities and types of STE are many. See OECD (2001) for a description of them.

The second element is to know what the market structure would be in the absence of the STE or if its exclusive rights were weakened. Clearly, any distortion of trade created by the STE has to be measured against some alternative structure. Since it is not known what this structure would be, the model has to be sufficiently flexible to provide a range of alternatives. The third element is to place some bounds on the possible range of exclusive rights granted to STEs and on the objectives being pursued by it. At one extreme could be the archetypal single-desk STE which acts in a way which is biased towards either producers or consumers; at the other could be a partially deregulated STE which competes with a given number of private firms, competition that could be based upon either price or quantity as the strategic variable for a product that is either homogeneous or differentiated. The fourth element is recognition that, as well as the international effects of an STE which can be represented as equivalent to an import tax/subsidy or an export tax/subsidy, there is also the domestic producer and consumer tax/subsidy equivalents to take into account. Hence, STEs belong in each of the pillars in the agriculture negotiations rather than just the export pillar as at present.

The negotiations on STEs need to be understood in the context of their status in the GATT/WTO.[4] In the *Understanding on the Interpretation of Article XVII of the General Agreement on Tariffs and Trade 1994*, a state trading enterprise is defined as:

> Governmental and non-governmental enterprises, including marketing boards, which have been granted exclusive or special rights or privileges, including statutory or constitutional powers, in the exercise of which they influence through their purchases or sales the level or direction of imports or exports. (WTO 1995, p. 25)

It is important to note that the ownership of the STE is not a criterion for an enterprise to be classified as an STE. It is purely the existence of exclusive rights that define an STE and which distinguishes it from a commercial firm. It was understood from the inception of GATT 1947 that state trading enterprises have the potential to distort trade (see Article

[4] For a recent description of STEs in the WTO, see WTO (2005a).

XVII:3). However, their ability to do so is curtailed by Article XVII:1(a) through which STEs are required to act in a manner consistent with the GATT principle of non-discrimination and most-favoured nation treatment (Article I); and by Article XVII:1(b) through which they must act on the basis of commercial considerations.[5] State trading enterprises in importing countries are not allowed to maintain mark-ups higher than the bound tariff levels (Ad Article XVII:4(b)) and these mark-ups should be transparent and notified to interested Members (Article XVII:4(b)). Importantly, in the context of the submission made by the European Communities and the disquiet expressed in it about price discrimination, STEs in exporting countries are permitted to price discriminate amongst markets (Ad Article XVII:1) (WTO, 1995).

In order to analyse the trade effects of an STE it is necessary to define its exclusive rights, if any, and its objective function. While the objective of importing and exporting STEs may be identical, their exclusive rights are partly determined by whether they import or export. In what follows the analysis is limited to the importing country case.[6] It is shown that they *do* interfere with market access and, for that reason, they will compromise the provision of special and differential treatment for developing countries where they export to countries which use STEs to import.

3. Importing STEs: the effect on market access

Consider a large importing country in which the STE, as a marketing firm, has exclusive rights over procurement of a product from domestic producers, along an upward sloping, linear supply function, and the exclusive right to import, i.e., it has single desk status. The exporting region is perfectly competitive, thereby allowing an upward sloping, linear

[5] In a recent WTO Dispute Panel ruling (WTO, 2004a) involving the United States and the Canadian Wheat Board, it was concluded by the Panel and supported by the Appellate Body that commercial considerations and profit maximisation are not synonymous and that only the former matters in the context of Article XVII.

[6] The exporting and importing cases require models of different structures and space here does not permit presentation of both models. Some aspects of the exporting case are to be found in McCorriston and MacLaren (2006).

import supply function to be defined. The domestic and imported product are homogeneous in domestic consumption which is determined by a downward sloping, linear demand function. The objective of the STE, defined by government, is to maximise its payoff function which contains as arguments, producer surplus (*PS*), consumer surplus (*CS*) and profits (π). The maximisation is carried out with respect to the quantity to be procured domestically (Q_d^{STE}) and the quantity to be imported (Q_m^{STE}). Specifically, let the STE's payoff function be defined as

$$W = \alpha_1 PS + \alpha_2 CS + \alpha_3(\pi_d + \pi_m) \tag{1}$$

where: π_d refers to profits on product procured domestically and π_m to profit on the imported product; and the αs represent the policy weights which reflect the government's policy bias. Normalising on α_3, let $\alpha_P = \alpha_1/\alpha_3$ and $\alpha_C = \alpha_2/\alpha_3$. Then, reflecting the typical bias of agricultural policies across developed and developing countries, we have $\alpha_P > \alpha_C$ in the developed country case, and $\alpha_P < \alpha_C$ in the developing country case.[7]

In the absence of the STE, assume that the domestic industry is an *n*-firm, Cournot oligopoly, hereafter referred to as the benchmark, in which each firm maximises profit, π^i, defined as

$$\pi^i = \pi_d^i + \pi_m^i + s^P q_d^i + t^e q_m^i \tag{2}$$

The variable t^e is the tariff equivalent of the STE and is explained below and s^P is the producer subsidy equivalent of the STE and is explained in section 4. The *i*th firm procures the quantity q_d^i domestically, it imports q_m^i, and maximises π^i with respect to these two variables.

[7] We do not pursue here other possible objective functions such as maximising social welfare ($\alpha_P = \alpha_C = 1$) or maximising profit ($\alpha_P = \alpha_C = 0$).

In order to develop the intuition for the results which follow, compare the quantity imported by an STE which has a bias towards producers (by solving the first-order conditions from maximising equation (1) with respect to Q_d^{STE} and Q_m^{STE}) and the quantity imported by the benchmark which, for the moment, is defined as a private monoposonist/monopolist (by solving the first-order conditions from maximising equation (2) with respect to q_d^i and q_m^i).[8] Such a firm will behave identically with the STE as far as imports are concerned by exploiting the country's terms of trade but it will behave very differently with respect to domestic procurement. It will exploit its monopsony power by restricting purchases from domestic producers and it will exploit its monopoly power by restricting sales to domestic consumers. On the other hand, an STE which places some weight on producer surplus, as well as profits from sales, will purchase more from domestic producers than the monopsonist/monopolist will and, as a consequence, will import less than it for any given level of total sales. However, the total quantity sold will differ between equations (1) and (2) and it is not possible to conclude *a priori* whether the quantity imported by the STE will be greater or less than the quantity imported by the private firm, even if it is concluded that the share of imports is greater. Nevertheless, it is possible to conclude that the STE does have an effect on trade: it acts like a tariff when it imports less than does the benchmark; and it acts like an import subsidy if it imports more than does the benchmark.

The model is set up in such a way that the tariff equivalent of the STE, t^e, which may be positive or negative, is solved for such that $Q_m(t^e) = Q_m^{STE}$, where Q_m is quantity imported by the private firm(s) in the benchmark. In other words, we find a t^e such that the import volumes under the two market structures are identical and where, in each case, the optimal

[8] The intuition which follows can be modified to account for an objective function which is biased towards consumers rather than producers. In comparing the outcomes for the consumer-biased with the producer-biased cases, it would be anticipated that the STE would import more in the former than in the latter case and, thus, would generate a smaller tariff equivalent.

volumes of imports and domestic procurement are solved from equations (1) and (2) as a third-degree, price discriminating single buyer problem.

We assume specific values for the parameters of the linear demand and supply equations in the model.[9] Using these representative values, the *ad valorem* tariff equivalent of the STE was computed for different values of *n*, the number of firms that might replace the STE were it totally deregulated, for two different objective functions and sets of exclusive rights.[10] The results are shown in Figure 1.

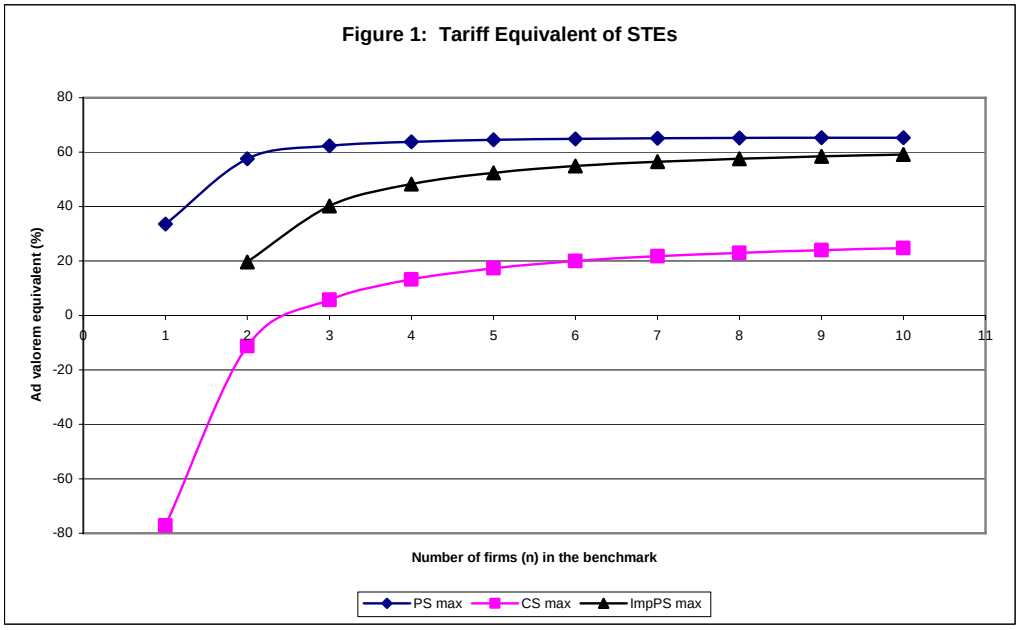
For the producer-biased, single desk STE (*PS* max) the results confirm the intuition presented above, namely, that the STE impedes market access from the perspective of the exporting region. In particular, as *n* increases and the buying power of the industry diminishes, imports increase because total sales increase with reduced selling power, and the gap between the quantity imported by the private firms and the STE widens, as reflected in the monotonically increasing tariff equivalent of the STE. The tariff equivalent of the STE ranges from 33 per cent (at $n = 1$) to 65 per cent (at $n = 10$). Therefore, the more competitive the benchmark that would replace this STE, the greater is the apparent restriction of market access caused by the STE. In the consumer-biased case (*CS* max), the tariff equivalent of the STE is smaller than that for the producer-biased STE but for values of $n > 2$, the STE still restricts imports when compared with the benchmark; the tariff equivalent ranges from an import subsidy of 77 per cent to a tariff of 25 per cent. Hence, an STE tends to be less trade distorting if its objective function is biased towards domestic consumers rather than producers.

Now change the exclusive rights of the STE from single desk to import only and exclude the STE from domestic procurement but retain the assumption that the STE is

[9] Details of the derivations used to solve this model and the values used for the demand and supply parameters are available upon request.

[10] Elsewhere in the importing country case, we have analysed the trade and welfare effects of partial deregulation of the STE rather than its total removal as here (for example, see McCorriston and MacLaren (2005a)).

producer-biased (Imp *PS* max). Domestic procurement is carried out by a number of private, profit-maximising firms. This change is accomplished in equation (1) by removing π_d and in equation (2) by removing q_m^i. The effect on trade is to reduce the tariff equivalent when compared with the corresponding single desk STE because the STE now can only obtain profits from imports and influence producer surplus indirectly. Hence, this weakening of exclusive rights reduces the size of the trade distortion even where the objective function is the same (Figure 1).



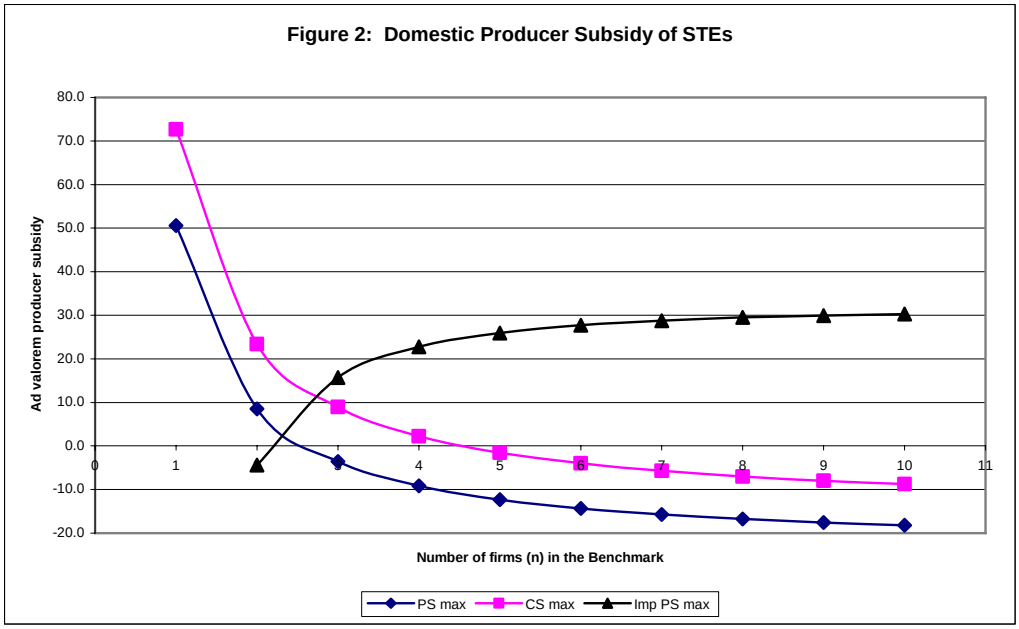
4. Importing STEs: the effect on producer subsidy equivalent

The STE not only affects imports and generally acts like a tariff but it also affects the sales of domestic producers and acts like an amber box instrument because it determines the producers' selling price. To measure the domestic producer subsidy equivalent of the STE, s^P, which may be positive (a subsidy) or negative (a tax), the model is solved for s^P such that $Q_d(s^P) = Q_d^{STE}$, where Q_d is quantity purchased from domestic suppliers by the private firm(s) in the benchmark. In other words, we find s^P such that the quantities purchased from

domestic suppliers under the two market structures are identical. Using the calibrated model as before, the values of the domestic producer subsidy equivalent were calculated for both types of single desk STE. The results are shown in Figure 2.

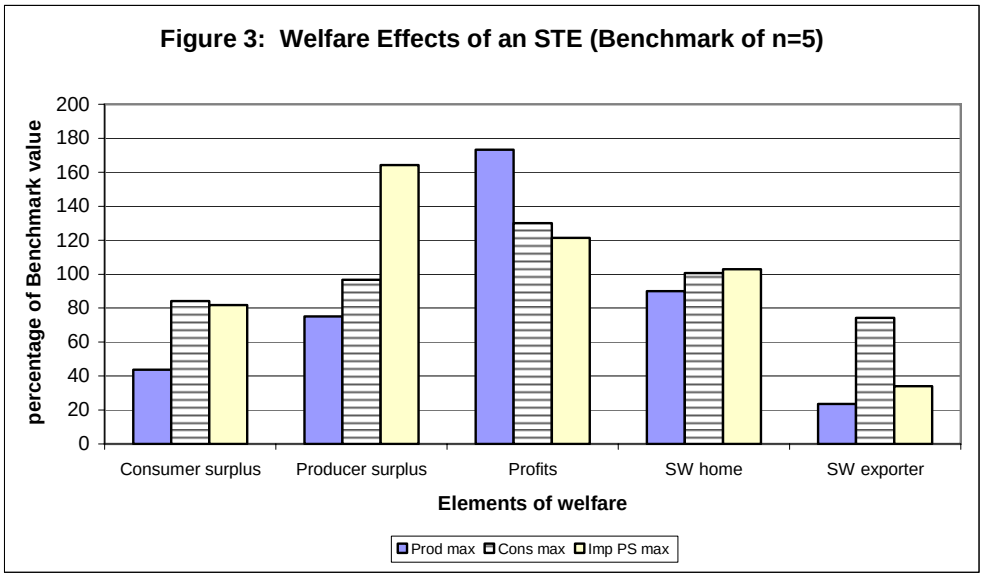
The producer-biased and consumer-biased STEs tax domestic producers except for $n \leq 2$ and $n \leq 4$, respectively. In conjunction with the results in Figure 1, it may be concluded that both types of STE restrict imports and decrease domestic procurement relative to that in the benchmark. Given the bias towards producers in the STE's objective function, the first result should hold no surprises, whereas the second does. The explanation is that the pro-competitive effect of an increasing number of firms in the benchmark eventually outweighs the domestic expansion effect of the STE when compared with a monopsony/monopoly benchmark. The case of the import-only STE and $(n - 1)$ domestic firms may be regarded as a partially deregulated STE when compared with the producer-biased single desk STE. Such deregulation changes the producer tax to a producer subsidy for $n \geq 3$.

Figure 2: Domestic Producer Subsidy of STEs



5. Importing STEs: The Welfare Effects

As a consequence of distorting trade, domestic production and domestic consumption, the STE will also affect the components of social welfare within the country and the gains from trade for the exporting region. These components of welfare were calculated from the calibrated model and are shown in Figure 3 for the STE when compared with the corresponding values for a benchmark of $n = 5$ firms. When the STE has only import rights, the number of private firms with exclusive procurement in the domestic market is set to 4, giving a total of 5 firms, as in the benchmark. Each of the single desk STEs reduces the level of overall welfare in the exporting region regardless of the policy bias in its objective function or the nature of it exclusive rights but it is most detrimental in the producer-biased case and least so in the consumer-biased case in which there are additional sales. Welfare for the importing country is reduced by a producer-biased STE but is increased slightly in the import-only case. The STE reduces the welfare of consumers in all cases but particularly where is producer-biased and has single desk status. It also reduces the surplus of producers in the single desk cases but increases it otherwise. These outcomes can be explained as follows. Compared with a benchmark of 5 firms, the producer-biased single desk STE acts like a domestic producer tax (see Figure 2) and reduces producer surplus, whereas the consumer-biased STE acts in an almost neutral fashion in the neighbourhood of n=5. For the import-only STE, domestic procurement is from 4 firms which is not very different from the number of firms in the benchmark. The level of profits in the economy is higher in all cases than in the benchmark with the producer-biased single desk STE bringing about the greatest increase.



6. Case Study: Korean Rice

Korea is a major player in agricultural trade, being one of the main agricultural importers for a range of agricultural commodities including rice, barley, wheat, beef, soybeans. To manage these imports, it typically employs state trading enterprises. Our focus is on rice where the STE (specifically the Ministry of Agriculture and Forestry, MAF) is the sole importer. Agricultural policy in Korea is biased towards producers, with this bias being reflected in high values for the Producer and Consumer Subsidy Equivalents. Korea has resisted attempts to put importing state trading on the Doha Round negotiating agenda arguing that the main distortion arises from exporting, not importing, countries. To consider this argument, we collected price and quantity data to calibrate the theoretical model to the Korean rice market for a single year. Reflecting the bias in Korean rice policy, the assumed weight on consumer surplus is zero and it is assumed that MAF is concerned solely with domestic producer surplus and profits (equation (1)). Given its role in managing imports of rice, we concluded that the import-only STE model described above (section 3) is the most appropriate

representation of the situation in Korea, i.e. that MAF is responsible for all imports but plays no role in the domestic procurement market.[11]

The values for the trade distorting and producer subsidy measures and the associated welfare effects are shown in Table 1. We assume in terms of the underlying benchmark that it would be competitive with n=20. As can be seen from the table, the STE gives rise to a

Table 1: The Impact of the STE in the Korean Rice Market: percentage change from the benchmark

Ad Valorem Tariff Equivalent	178
Ad Valorem Producer Subsidy	25
Change in Domestic Producer Surplus	4
Change in Domestic Consumer Surplus	–6
Change in Profits (Domestic and Import)	13
Change in Domestic Welfare	–0.4
Change in Exporter Welfare	–70

significant *ad valorem* tariff equivalent, although the producer subsidy equivalent is much smaller. The reasons for the relative sizes of these effects are two-fold. First, since MAF has exclusive rights relating to imports only, it is more likely to affect imports than domestic output. Second, the *ad valorem* effects also depend on the denominator used to calculate each tax/subsidy. This is especially pertinent if the government uses additional measures to distort (i.e. increase) the domestic price producer received hence making the producer subsidy effect relatively low and, if it can generate terms of trade effects making the tariff equivalent effect relatively high. It is nevertheless clear that the Korean STE can inhibit market access significantly which will remain even if other traditional policy measures are reduced in any Doha Round agreement. The welfare effects are consistent with these outcomes. The effect

[11] Further details on the data and the calibration are available upon request.

on domestic producers and consumers is relatively low with the more substantive effects arising through the increase in profits due to the restrictions on imports and the associated terms of trade effects and a significant decrease in exporters' gains from trade. In effect, with the STE having exclusive rights to import only, there is a profit shifting effect from exporters to importers (via the STE) though domestic welfare still falls, albeit marginally.

7. Summary and Conclusions

In the Doha Round of trade negotiations in agriculture, the emphasis is being placed on improving market access, especially for the agricultural products from the developing and least-developed countries destined for the markets of the developed countries. Despite this aim, importing STEs are not a separate item on the agenda as is the case with exporting STEs. It has been shown through the results obtained that the negotiators are missing an opportunity to improve market access because they are ignoring the trade effects of importing STEs. If importing STEs in developed country were to be removed and the domestic and import markets totally deregulated, the volume of imports and the prices received for imports would increase, and exporting countries would gain substantially in terms of welfare. The importing country would also gain from this deregulation as overall welfare would increase. Even producers would benefit from the removal of the producer-biased single desk STE but not from the other two STEs. It has also been shown that the single desk STE with a producer bias acts like a producer tax when compared with the benchmark, although with import rights only it behaves like a producer subsidy. This characteristic of an importing STE is also missing from the negotiations. Similar conclusions hold for importing STEs in developing and least-developed countries which are consumer-biased, although the magnitudes of the various results tend to smaller than in the developed country case but, nevertheless, are significant.

It was remarked earlier that the twin objectives of efficiency and redistribution make the analysis of STEs difficult. It has been shown in the analysis undertaken that it is interaction of market structure (and the degree of market failure), exclusive rights and objectives which make the analysis a challenge. Importantly, the framework outlined here can be used to analyse the impacts of STEs that arise in different environments and where differences in exclusive rights apply. The framework also provides a basis for evaluating the welfare effects of STEs that arise in practice, as the case study of the Korean STE involved in importing rice demonstrates. Given the various assumptions made, and consistent with the results of the Korean case study, both exporting countries and the importing countries that use STEs would be better off without them.

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