

Market Access and the Reform of State Trading Enterprises

Steve McCorriston

University of Exeter

and

Donald MacLaren

University of Melbourne

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Introduction

Much of the focus on trade liberalisation in the agricultural sector in the Doha Round negotiations relates to identifiable trade policy instruments such as subsidies, tariffs and tariff rate quotas. Such instruments appear under the three pillars of market access, domestic support and export competition. Of these three pillars, it has been recognised that the first is the most important in achieving the development objectives of the Doha Development Agenda (see Hoekman *et al.*, 2004). However, market access can also be influenced by other methods of government intervention that are less readily identifiable in terms of their trade distorting effect. One example is state trading enterprises. While state trading is an element in the current round of negotiations, there exists little formal economic analysis of how they may distort trade and how their reform may expand import market access and reinforce the benefits of trade reform.¹

State trading enterprises arise in exporting and importing countries. Although the negotiations at present are restricted to state trading enterprises in exporting countries (see WTO 2004, Annex A, para. 18 dot-point 4, and para. 25), the focus in this paper is on those in importing countries. With improved market access being the key to progress in the negotiations, it is important to evaluate whether an opportunity is being missed to improve market access by not imposing discipline on importing state trading enterprises.

¹ For an analysis of exporting state trading enterprises which is built on a model similar to the one presented below in Section 1, see McCorriston and MacLaren (forthcoming).

The specific issue with state trading is the nature of the exclusive rights that the government bestows on the enterprise rather than its ownership *per se*. These different rights give rise to alternative characterisations of the way in which a state trading enterprise may affect market access. Specifically, the enterprise may have single desk authority over imports together with sole control over domestic procurement and sales; or it may compete with private sector firms for domestic procurement and sales but have exclusive rights only with regard to imports. It may also co-exist with private firms in both markets. The effect of the reform of state trading on market access and welfare will depend on the nature of these exclusive rights, how these rights are changed in the process of de-regulation and the extent of the private sector competition that subsequently arises.

The paper is divided into two parts. First, a theoretical model is presented that provides a direct tariff equivalent measure of the trade distorting effect of state trading enterprises which is contingent on the nature of the exclusive rights that apply (Section 1). These exclusive rights are modelled to reflect the position in developed countries in which the principal objective of the state trading enterprise is to maximise returns to farmers. In the second part, we use a computable partial equilibrium model to apply this theoretical framework in order to evaluate quantitatively the effect of a state trading enterprise on market access and welfare (Section 2). The case study relates to the wheat sector in Japan. This choice is of relevance because the Japan Food Agency traditionally has been the main mechanism for managing the wheat market in relation to both domestic procurement and sales and to imports. Recent reforms now restrict these exclusive rights to apply only to imports. A measure of the trade distorting and welfare effects of the Japan Food Agency prior to its reform, and subsequently, are calculated.

1. Theoretical Framework

The Benchmark

In order to identify the potential trade distorting and welfare effects of a state trading enterprise with a given set of exclusive rights, a benchmark must be specified from which to define and to measure the distortion. To do this, an n -firm private sector oligopoly is defined in which each private firm can procure from both the import and domestic markets and sell to domestic consumers. Hence, each firm trades but it does not produce. This benchmark is sufficiently flexible to account for the unknown structure of the market that would exist in the absence of the state trading enterprise and enables answers to be provided about the trade distortion created by the state trading enterprise if the alternative were an oligopoly with n firms, where n can be varied.

To measure the trade distorting effect of the state trading enterprise, the implicit tariff is identified that would bring about equality between the level of imports generated by the state trading enterprise, Q^{STE} , and the private sector benchmark, $Q^p(t^e)$, i.e. t^e is calculated such that $Q^p(t^e) = Q^{STE}$. Intuitively, the tariff equivalent measures the tariff that would have to be imposed on the n private trading firms to give the same level of imports that would arise when the state trading enterprise exists. This implicit tariff equivalent can be either positive, if the actual level of imports were higher in the benchmark than with the STE; or negative, if the actual level were lower. The sign will depend on the specific characteristics of the exclusive rights bestowed on the state trading enterprise in combination with the definition of its pay-off function, which is discussed in detail below.

Given that the aim in the paper is to derive an explicit measure of the trade distortion, specific functional forms are assumed. The utility function is given by

$$U = Q_0 + u(Q_1, Q_2) \quad (1)$$

where: Q_0 is the outside good; and $u(Q_1, Q_2)$ is quadratic and given by:

$$u(Q_1, Q_2) = a_1 Q_1 + a_2 Q_2 - 0.5(b_1 Q_1^2 + b_2^2 Q_2 + 2\gamma Q_1 Q_2)$$

The inverse demand functions that are derived from this utility function are given by:

$$p_1 = a_1 - b_1 Q_1 - \gamma Q_2 \quad (2)$$

$$p_2 = a_2 - b_2 Q_2 - \gamma Q_1 \quad (3)$$

where: subscripts 1 and 2 refer to the home-produced and imported good respectively; $b_1 b_2 - \gamma^2 > 0$ implies that the goods are not perfect substitutes; $Q_1 = n q_1$ and $Q_2 = n q_2$ represent sales of the domestically produced and imported good respectively; q_1 and q_2 are the quantities of goods 1 and 2 bought and sold by the typical firm; and n is the number of competing firms.

To capture the potential for market power to be exerted in the procurement market, upward-sloping, inverse supply functions are assumed. For the domestically-procured commodity, this function is given by:

$$p_A = f + k Q_1 \quad (4)$$

and for the imported good the function is:

$$p_w = F + K Q_2 \quad (5)$$

A representative private firm maximises profits by procuring commodities 1 and 2 from the domestic and import markets, respectively, and selling them to domestic consumers. Its only costs are assumed to be its purchases of the domestic and import good. Explicitly, for the i th firm:

$$\begin{aligned} \pi_i &= \pi_i^h + \pi_i^m \\ &= (p_1 - p_A) q_{i1} + (p_2 - p_w - t^e) q_{i2} \end{aligned} \quad (6)$$

where t^e is the specific tariff equivalent of the state trading outcome relative to this private sector benchmark, i.e., it is the tariff that would have to be implicitly imposed on the private firms to result in the same level of imports as that arising in the state trading case.

Assuming Cournot behaviour amongst the n firms, the first-order conditions for profit maximisation are:

$$\begin{pmatrix} (b_1 + k)(n+1) & \gamma(n+1) \\ \gamma(n+1) & (b_2 + K)(n+1) \end{pmatrix} \begin{pmatrix} q_1 \\ q_2 \end{pmatrix} = \begin{pmatrix} (a_1 - f) \\ (a_2 - F - t^e) \end{pmatrix} \quad (7)$$

Aggregating over n gives total sales of the domestically-procured good, Q_1 , and of imports, Q_2 . As is well-known, as n increases, this outcome converges to the competitive outcome. The benchmark, therefore, is flexible enough to capture the debate about how (un)competitive the market would be in the absence of the state enterprise.

State Trading Enterprise: Alternative Characterisations

State trading enterprises are an instrument of government policy: their objective reflects the overall bias of policy towards a specific group and this bias in turn is reflected in the exclusive rights given to it.² In the case of the OECD countries, the bias is generally towards producers: in developing countries the bias is generally towards consumers. A weighted social welfare pay-off function for the state trading enterprise can be specified to reflect these possibilities. The arguments represent producer welfare (PS), consumer welfare (CS) and profits from sales ($\pi_1 + \pi_2$) by the state trading enterprise which are assumed to be revenue

² State trading enterprises in the form of statutory marketing boards exist also to correct a market failure in the form of the monopsony power of marketing firms operating downstream from the farm gate. This reason forms part of the justification for the special and differential treatment to be given to state trading enterprises in developing countries (see WTO 2004, Annex A, para. 25).

for the exchequer. The weights reflect the importance placed by government on each of these arguments. Such a function is given by:

$$W = \alpha_1 PS + \alpha_2 CS + \alpha_3(\pi_1 + \pi_2)$$

Normalising on α_3 , the pay-off function is:

$$W = \alpha_p PS + \alpha_c CS + (\pi_1 + \pi_2) \quad (8)$$

where $\alpha_p = \alpha_1 / \alpha_3$ and $\alpha_c = \alpha_2 / \alpha_3$. Hence, in developed countries, $\alpha_p > 1 > \alpha_c$.

The exclusive rights given to the state trading enterprise reflect its objective function. With rights in the import and domestic markets categorised as exclusive, competitive and excluded, there are nine possible cases. Of these nine, only three will be considered in what follows. In each of the three cases the state trading enterprise has exclusive rights to import but its rights in the domestic market differ. In Case 1, the state trading enterprise has exclusive rights in the domestic market and thus has monopsony power in both markets and monopoly power in the domestic market. In Case 2, it competes with m private trading firms in the domestic market for procurement and sales. In comparison with Case 1, the monopsony power of the state trading enterprise is weakened but only in the domestic market; its monopoly power is also weakened. In Case 3, the state trading enterprise is excluded altogether from procuring in the domestic market. In comparison with Case 1, the monopsony power is restricted to the import market, it can no longer price discriminate across the import and domestic markets, and its monopoly power is weakened. As compared with the benchmark defined above, in each of the three cases, there will be different outcomes for prices, quantities and welfare.

Maximising welfare as given by (8) and contingent upon the exclusive rights, the first-order conditions for each of these cases is given as follows.

Case 1: STE has exclusive import rights and exclusive domestic rights

$$\begin{pmatrix} b_1(2-\alpha_c)+k(2-\alpha_p) & \gamma(2-\alpha_c) \\ \gamma(2-\alpha_c) & b_2(2-\alpha_c)+2K \end{pmatrix} \begin{pmatrix} Q_1^{STE} \\ Q_2^{STE} \end{pmatrix} = \begin{pmatrix} (a_1-f) \\ (a_2-F) \end{pmatrix} \quad (9)$$

Case 2: STE has exclusive rights to import but competes with m domestic firms for domestic procurement and sales

$$\begin{pmatrix} b_1(2-\alpha_c)+k(2-\alpha_p) & \gamma(2-\alpha_c) & m[b_1(1-\alpha_c)+k(1-\alpha_p)] \\ \gamma(2-\alpha_c) & b_2(2-\alpha_c)+2K & m\gamma(1-\alpha_c) \\ (b_1+k) & \gamma & (b_1+k)(m+1) \end{pmatrix} \begin{pmatrix} Q_1^{STE} \\ Q_2^{STE} \\ q_1^p \end{pmatrix} = \begin{pmatrix} (a_1-f) \\ (a_2-F) \\ (a_1-f) \end{pmatrix} \quad (10)$$

Case 3: STE has exclusive import rights, it is excluded from domestic procurement and it competes with m private firms for sales

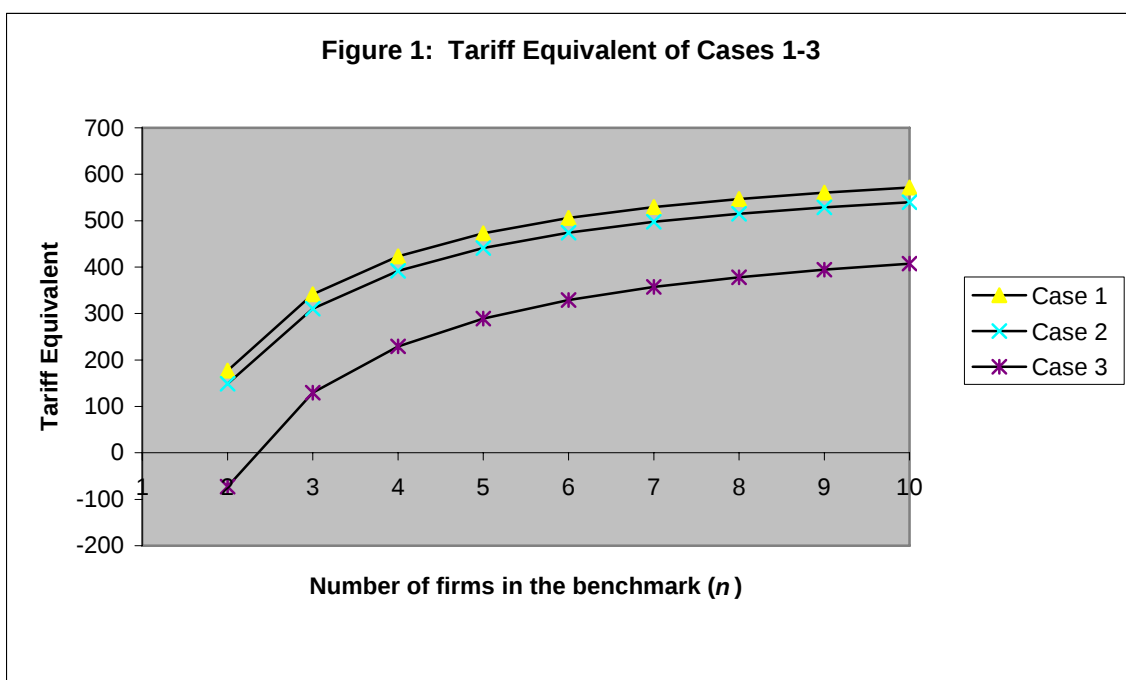
$$\begin{pmatrix} b_2(2-\alpha_c)+2K & m\gamma(1-\alpha_c) \\ \gamma & (b_1+k)(m+1) \end{pmatrix} \begin{pmatrix} Q_2^{STE} \\ q_1^p \end{pmatrix} = \begin{pmatrix} (a_2-F) \\ (a_1-f) \end{pmatrix} \quad (11)$$

State Trading Enterprises: Trade Distorting Effects

To determine the trading distorting effect of the state trading enterprise, the value of Q_2^{STE} in each of the equations (9), (10) and (11) is compared with the actual value of $Q_2 = nq_2$ obtained from equation (7). Note that the volume of imports in each case of the state trading enterprise depends not only upon the parameters of the supply and demand functions but also upon the policy weights. In equation (7) the total volume of sales, Q_2 , is a function of the implicit tariff t^e . The task is now to find the value of t^e which brings the import volume in the benchmark (equation (7)) equal to that in each the three examples of a state trading

enterprise. While it is possible to derive algebraic expressions for these values of t^e , they are not easy to interpret intuitively. Instead, representative parameter values were chosen.³

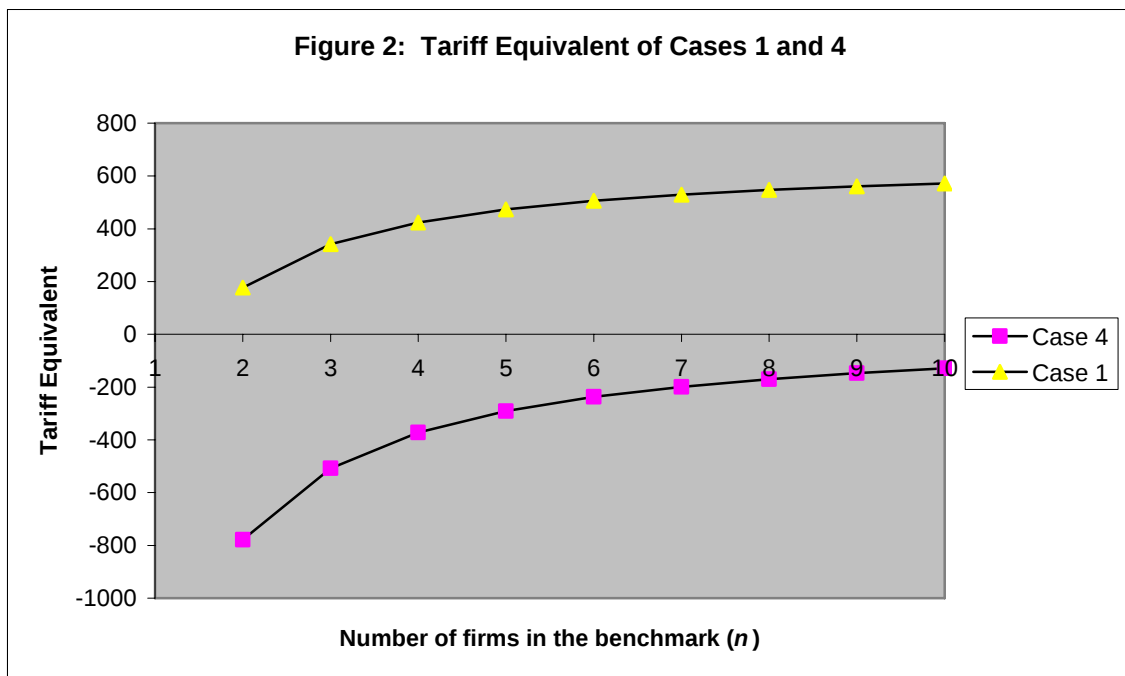
There are three aspects to this exercise: first, exploring how the three sets of exclusive rights lead to different levels of trade distortion; second, considering the extent to which the policy bias in the state enterprise's pay-off function affects the trade distortion; and third, assessing how each of these cases depends on the underlying degree of competitiveness, as captured by the private sector benchmark. These three effects are summarised in Figures 1 and 2.



First, the exclusive rights matter in determining the trade distorting effect (Figure 1). Case 1 gives the greatest trade distorting effect and Case 3 the lowest for a given value of m . This ranking is not surprising. In Case 1, the state trading enterprise has monopsony and monopoly

³ The values chosen were: domestic demand elasticity, 0.5; elasticity of substitution, 5; elasticity of domestic supply, 0.25; export supply elasticity, 20; $p_1 = 1000$; $p_2 = 800$; $Q_1 = 100000$ and $Q_2 = 1200000$. A value for m is assumed such that inclusive of the STE in the relevant cases (Cases 2 and 3), $m + STE = n$. It is also assumed that the policy bias is towards producers with $\alpha_p = 1.5$ and $\alpha_c = 0.5$.

power over imports and the domestically-produced commodity. Restricting the level of imports allows it to increase purchases of the domestically-produced commodity and in so doing to increase producer welfare when compared with the benchmark. However, in Case 3, the state trading enterprise has only control over imports and it competes for sales with a relatively large number of private firms (as captured by $m = n - 1$). Accordingly, it generates a smaller trade distortion as compared with Case 1. The size of the distortion in Case 2 lies between the values for Cases 1 and 3. For the parameter values used, the tariff equivalent for Case 2 lies only slightly below that for Case 1. The margin between the two is sensitive to the number m of private firms: as m tends to zero, the difference between the two cases decreases and Case 2 converges on Case 1. In sum, the more extensive the exclusive rights (i.e., whether the monopoly/monopsony power of the state enterprise extends across domestic procurement and imports), the greater the likely level of trade distortion for any given policy bias in the pay-off function.



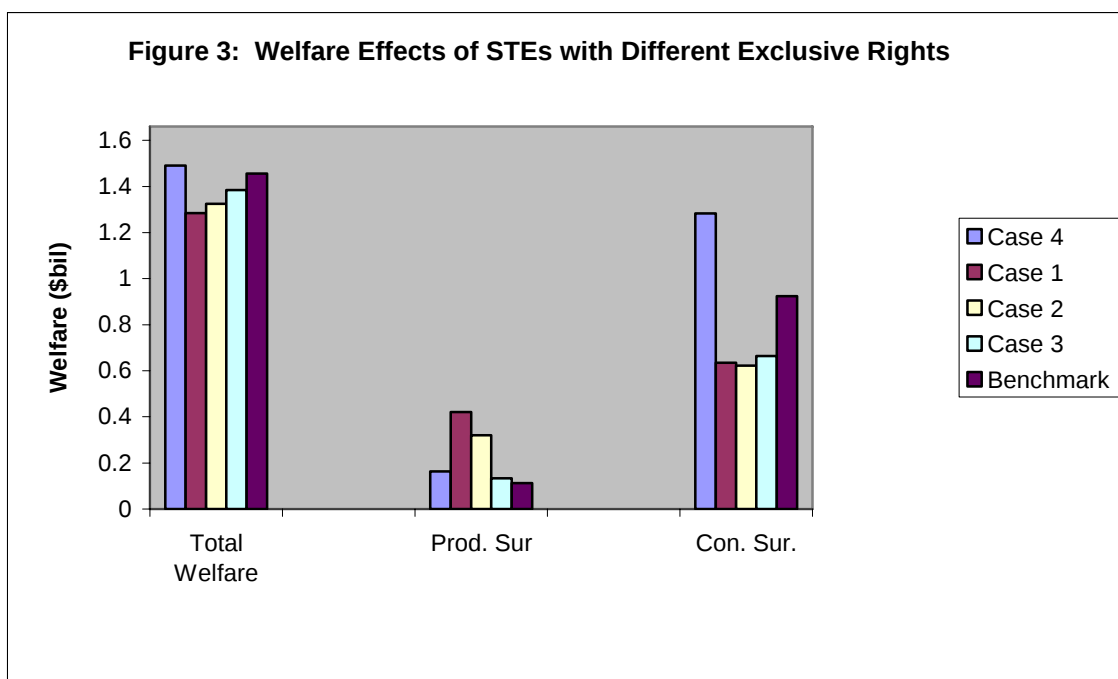
Second, there is the influence of the policy bias on the size of the trade distortion. Comparing the result for the unbiased welfare function (referred to as Case 4 for which $\alpha_p = \alpha_c = 1$) with that for the politically-biased welfare function (Case 1 for which $\alpha_p = 1.5$ and $\alpha_c = 0.5$) for any given value of m , the tariff equivalent is greater in the biased than in the unbiased case (Figure 2). In the biased case, imports are implicitly taxed by the existence of the state trading enterprise: in the unbiased case they are implicitly subsidised. In the biased case, the state trading enterprise increases procurement of the domestically produced commodity at the expense of imports and the tariff equivalent is an import tax. In the unbiased case and when compared with the biased case, the state trading enterprise has to balance its loss of profits from reducing imports against the gain in producer surplus and it has also to consider the level of consumer surplus in determining its overall levels of procurement and sales.

Third, each of these outcomes is sensitive to the underlying characterisation of the private firm benchmark. Consider first of all Case 4. If the underlying benchmark is competitive, a social welfare maximising state enterprise has little effect on trade as the market is already competitive (Figure 2). But if the underlying benchmark were less competitive, the welfare maximising state trading enterprise corrects this distortion by expanding trade, because it values consumer welfare equally with that of the other constituents, and leads to an effect equivalent to that of an import subsidy. However, when the pay-off function reflects a bias towards producers, the state trading enterprise restricts imports, the level of this restriction being greater if the benchmark is more competitive and hence the corresponding trade distorting effect of the state enterprise is all the greater.

State Trading Enterprises: Welfare Effects

As noted in the discussion above, agricultural policy intervention in developed countries is typically targeted by governments towards re-distribution for the benefit of producers. State

trading enterprises can be used as a mechanism to attain this objective. The welfare distribution in each of these four cases of exclusive rights is summarised in Figure 3. When the pay-off function is biased towards producers (Cases 1-3), in all three cases total welfare is reduced relative to the benchmark (where $n = 10$). However, the most significant effects come through re-distribution. As is evident from the Figure, when the state trading enterprise



has both monopsony power over domestic procurement and imports and monopoly power in sales (Case 1), it is most successful in raising producer welfare relative to the benchmark value. Case 2 also meets this objective of re-distribution, although to a lesser degree. The most marginal change in producer welfare arises in Case 3, the case in which the exclusive rights are weakest. Note, however, that in the welfare maximising case (Case 4), consistent with the implicit import subsidy shown in Figure 1, the state enterprise leads to an overall increase in welfare, relative to the benchmark, which arises principally from the increase in consumer surplus that it generates through implicitly subsidising imports. The state trading enterprise helps to correct the market failure which is caused by imperfect competition in the

domestic and import markets. Only in Case 4 does the state trading enterprise increase market access and raise welfare in the exporting countries.

2. Example: State Trading in Japan

Over the last four decades, the Japan Food Agency has been the principal means of managing Japan's trade in specific commodities such as wheat. Until recently it has had exclusive rights to procure both domestically produced and imported wheat and, therefore, it has had monopsony and monopoly status over both domestically produced wheat and imports. This characterisation of its exclusive rights in the wheat sector would clearly fit with Case 1 as defined above. Despite the manipulation of market structure in this manner and the results derived above (Figure 1, Case 1), the position taken by Japan in the current round of trade negotiations is to argue that such state trading enterprises are not trade distorting and that any discussion about state trading enterprises in the trade negotiations should be limited to those in exporting countries.⁴

As of 2002-2003, the Japanese government reformed the way in which the Japan Food Agency operates in the wheat sector by changing the nature of its exclusive rights.⁵ Specifically, the Agency (now re-named the Food Department) has sole responsibility only for imports and it has no role in the domestic procurement market. Private-sector firms now participate in the domestic market and compete in the sale of the commodity with imports procured by the Food Department. However, the bias of policy towards wheat producers is unlikely to have changed. While, prior to reform, the Japan Food Agency could directly influence the returns to domestic producers through its domestic purchases, the re-distribution towards them can now only come indirectly through the volume of imports purchased by the Food Department. Specifically, the profits on imports made by the Food Department on the

⁴ See Japan's submission to the WTO on this issue, WTO (2000).

sale of imports are now transferred into an Income Stabilisation Fund which directly supplements producers' incomes. Given this recent reform, Case 3 would now appear to an appropriate characterisation of the role of the state enterprise in the Japanese wheat market.

Data on prices and quantities were collected for the Japanese wheat sector for a specific year (2000) in which the Japanese Food Agency had sole rights in the domestic and import markets. These data were then used to calibrate the inverse demand functions as given in equations (2) and (3) and the supply functions as given in equations (4) and (5). The calibration procedure followed Dixit (1988). To measure the policy bias of Japanese policy, estimates from Lee and Kennedy (2002) were used which gave values of $\alpha_p = 1.25$ and $\alpha_c = 0.75$. Although these values apply to the rice sector, it was assumed that the same policy bias exists for the wheat sector. The data and the calibrated parameters are presented in Table 1.

Table 1: Calibration Data and Parameters

Parameter	Value	Calibrated Parameter	Value
Demand elasticity	0.25	b_1	0.001415626
Elasticity of substitution	5	b_2	0.000711467
Domestic retail price	\$903/tonne	γ	0.000490279
Retail price of imported wheat	\$1023/tonne	a_1	4515
Sales of domestically produced wheat	735000 tonnes	a_2	5115
Sales of imported wheat	5245000 tonnes	k	0.002864304
Export supply elasticity	5	f	-1305.26316
Domestic supply elasticity	0.38	K	2.27264E-05
Domestic producer price	\$800/tonne	F	476.8
Import price	\$596/tonne		

⁵ Fukuda *et al.* (2004) give a recent overview of Japanese government policy in relation to the wheat sector.

Using these data, the tariff equivalent for Case 1 was calculated, this case characterising the Japan Food Agency prior to the reform of its exclusive rights. With the same data, the trade distorting effect of the Food Department was also calculated using Case 3. In each case it was assumed that the underlying benchmark was relatively competitive with $n = 10$ and, with respect to the case of the Food Department, the number of private sector firms m that compete with the state trading enterprise was set equal to 9.

The trade distorting and welfare effects of the Japan Food Agency and the Food Department are shown in Table 2. With the data used, the Food Agency would imply a tariff equivalent of \$657 per tonne and therefore implies a considerable trade distortion caused by the existence of the state enterprise.⁶ Overall, as with traditional trade policy instruments, this instrument reduces welfare. Relative to the private sector benchmark, there is approximately a 3 per cent reduction in net welfare. However, the policy is successful at re-distribution. It increases producer surplus by 59 per cent while reducing consumer surplus by 23 per cent.

The results for the trade distorting effect associated with the recent reforms which weakened the exclusive rights that applied, i.e., the trade distortion created by the Food Department in the Japanese wheat market, are also shown in Table 2. As expected, the trade distorting effect is now smaller, the tariff equivalent being \$341 per tonne, almost half of the level for the Food Agency. Again re-distribution occurs but not so strongly as in the previous case, with producer surplus increasing by around 33 per cent relative to the private sector benchmark

⁶ Although this implicit tariff measure seems high, recall that prices of imported agricultural goods in Japan are around 150 per cent higher than world prices, a level caused by traditional trade policy instruments.

and consumer surplus decreasing by around 12 per cent. Overall, net welfare decreases by 1 per cent as compared with the benchmark.⁷

This example of the Japanese wheat sector serves to show that state trading enterprises are a useful instrument of government intervention when directed at re-distribution, despite the overall loss of welfare. However, this example also shows that importing state trading enterprises which have a policy bias towards producers have the potential to distort trade significantly by restricting market access for foreign competitors and in so doing, they reduce welfare in exporting countries.

Table 2: Tariff Equivalent and Welfare Effects of State Trading Enterprises in the Japanese Wheat Market¹

Case 1: The Japan Food Agency

Tariff equivalent	\$657.4/tonne
Change in producer surplus	59%
Change in consumer surplus	-23%
Change in net welfare	-3%

Case 3: The Japan Food Department

Tariff equivalent	\$341.4/tonne
Change in producer surplus	33%
Change in consumer surplus	-12%
Change in net welfare	-1%

Note: 1. Welfare changes are measured relative to the private firm benchmark where $n=10$ and $m=9$.

3. Conclusions

State trading enterprises in the agricultural sector are an instrument through which government manipulates market structure as a means of re-distributing income between producers, consumers and taxpayers. In an open economy, such enterprises have an effect on

⁷ For given price and quantity data, the results are obviously sensitive to the underlying parameters that are used to calibrate the model. Yet, choosing more extreme parameter values did not change the overall picture.

trade and they have come increasing scrutiny in the World Trade Organization, despite their legality under Article XVII of the GATT. In the current negotiations in the Doha Round, the activities of state trading enterprises which export are being negotiated as part of export competition. Those enterprises which import have so far avoided scrutiny, largely on the grounds that they are claimed not to be trade distorting. It has been shown in this paper that, under very general conditions, such a conclusion is false.

Overall, the paper provides several important insights for the current trade negotiations. First, market access and welfare can be affected by the way in which government influences market structure through the nature of the exclusive rights that it grants a state trading enterprise and the associated definition of its pay-off function. When the state trading enterprise has as its objective the transfer of income to producers, it not only impedes imports but it also reduces the country's welfare relative to that in the benchmark. However, if the policy weights are equal, then it raises domestic welfare relative to that in the benchmark. Second, a framework is provided which is based on solid theoretical foundations. Third, the trading distorting effect and the welfare effects were quantified through calibrating the model to data from Japan. The reduction in the extent of the exclusive rights from those which used to be held by the Japan Food Agency to those now held by the Food Department have diminished the size of the trade distortion but nevertheless it remains substantial. Fourth, the results illustrate the importance of state trading enterprises in importing countries and the additional potential gains from reforms under the pillar of market access that could be achieved. Therefore, because state trading enterprises, which have as their objective the maximisation of the returns to producers, impede imports when measured against a realistic benchmark, they ought to part of the negotiations on market access.

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