

Exclusive Rights, Policy Bias and Trade Distorting State Enterprises

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Abstract

State trading enterprises are an instrument through which the government manipulates market structure as a means of re-distributing income between producers, consumers and taxpayers. The specific way in which this occurs depends on the nature of exclusive rights bestowed on them. In an open economy, such enterprises have an impact on trade and they have come under increasing scrutiny in the World Trade Organization. We derive the trade distorting effect for state trading enterprises in an importing country and relate this effect to the bias of government policy. We estimate the distortion by calibrating the theoretical model to a state enterprise in Japan.

Keywords: State trading enterprises; exclusive rights; trade distortions; re-distribution

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Introduction

Recent research on the links between competition policy and trade have suggested that an anti-trust authority can influence domestic market structure and hence the nature of competition between domestic and foreign firms. This result has highlighted the conditions under which competition policy and trade policy are substitutes or complements as a means of giving advantage to domestic firms. For example, domestic merger policy and its link with trade issues has been explored by, *inter alia*, Dixit (1984), Barros and Cabral (1994), Horn and Levinsohn (2002), and Richardson (1999), while Hoekman and Saggi (2004) have explored the trade-off between competition policy enforcement and market access provisions in the context of trade liberalisation. More generally, Bagwell and Staiger (2002) have noted that the potential impact of competition policy on market access suggests a strong rationale for the inclusion of competition disciplines in the World Trade Organisation (WTO)¹.

However, this literature on the links between government-induced determinants of market structure and trade policy ignores the fact that, in many countries, governments have created monopoly and monopsony enterprises (state trading enterprises) with varying degrees of exclusive rights over the sale and procurement of domestic and traded commodities. These rights, which have been granted with the aim of meeting domestic objectives, have the potential to limit the extent of foreign competition. Specifically, across both developed and developing countries, state trading enterprises are used as instruments of government policy that directly determine market structure with the typical but not sole aim of welfare redistribution, the external effect of this being potentially to distort trade and market access with respect to competing foreign suppliers. This effect of state trading enterprises in importing

¹ More general discussion on the link between competition policies and trade and the potential for international cooperation on these issues in the context of the WTO, see Hoekman (1997) and Graham and Richardson (1997).

countries was acknowledged in the Harbinson text (see WTO 2003) as an item for negotiation in the Doha Round taking place in the World Trade Organization (WTO). However, the academic literature on state trading enterprises and trade distortions is fairly sparse.

This paper is concerned, therefore, with the government's manipulation of market structure via the use of state trading enterprises as a direct mechanism for limiting trade, the aim of which is re-distributing welfare between consumers and producers. Specifically, the focus is on state trading enterprises that are used in importing countries with particular reference to those which are used as part of the armoury of agricultural policy instruments, agriculture being the sector where the use of state trading is most pervasive. As noted above, this issue has been attracting attention in the on-going trade negotiations and many participating countries have called for explicit disciplines to be imposed on the activities of these enterprises. However, one of the main barriers to making progress is that the trade distorting and welfare effects of state trading are potentially difficult to measure. This paper addresses both of these issues.

It should be noted at the outset that state trading *per se* is not an issue directly related to state ownership. Rather, the issue relates to the fact that the government manipulates market structure by bestowing exclusive rights on an enterprise (or potentially more than one enterprise). These rights create a domestic market in which there is monopoly/monopsony power that consequentially impacts upon trade. The irrelevancy of ownership is readily seen from the WTO's definition of a state trading enterprise which is defined explicitly 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)

However, these exclusive rights can vary in their application. For example, a state enterprise may be given sole rights to procure imports from the world market and monopoly rights to sell the imported good domestically. Alternatively, the enterprise may be given exclusive

rights not only to procure and sell the imported good but also to procure and sell the domestically produced good. It may also be the case that the state enterprise, while still having monopoly/monopsony status over imports, has to compete with the private sector over domestic procurement and sales. By governments manipulating market structure in this way, the concern has been raised that state trading enterprises reduce market access and hence act in a manner similar to more explicit trade policy instruments such as tariffs or quotas.

Moreover, these enterprises with some degree of government created market power are unlikely to act in a manner similar to private firms and fully exploit their monopoly/monopsony status. This behaviour occurs because the objectives of these enterprises typically reflect the fact that they are instruments of government policy applied to a particular sector. So, for example, in the case of state trading enterprises that are used in the agricultural sector in developed countries, the aim of a typical enterprise will be to raise the welfare of producers which reflects the bias towards supporting farmers across many developed countries. In developing countries, the typical aim relates to the well-being of consumers, being consistent with the overall direction of agricultural policy where producers and exporters are often taxed². The key issue is the effect of these enterprises on trade and welfare. Yet these effects are not as easily discernable as those created by traditional policy instruments, although they have potentially similar effects in terms of restricting trade and re-distributing welfare.

In this paper we explore the links between the application of exclusive rights by state trading enterprises whose pay-off functions reflect the overall aim of government policy, how these enterprises distort trade and, in so doing, re-distribute welfare. The paper is organised as follows. In section 1, we provide some background to state trading enterprises which are used

² These aims can be found directly in the objectives set out for the state trading enterprise. There may also be other stated objectives that apply in specific cases. See OECD (2001) for an overview.

by importing countries around the world and then contrast that market structure with the literature on public firm/mixed oligopoly to which the issue of state trading relates. In section 2, we provide details of the underlying n -firm private benchmark that underpins the measurement of the trade and welfare effects contingent upon the absence (or de-regulation) of these state enterprises. We proceed to provide alternative characterisations of state trading enterprises defined by the nature of their exclusive rights. Three cases are covered that provide a generalisation of their use across most importing countries. In section 3, we identify the trade distorting effects and the factors that are likely to determine their size and explore the related distributional effects relative to the private sector benchmark. In section 4, we consider the case where the government would aim to meet its re-distributional objectives, not by manipulating market structure through state trading enterprises, but rather in the more traditional way of using a (optimal) tariff. The optimal tariff can then be compared with the tariff equivalents derived for the specific cases that characterise alternative roles for the state enterprises. Finally, in section 5, we calibrate the theoretical model to the case of the Japan Food Agency. This exercise is of interest since Japan has been one of the principal users of a state trading enterprise, where the bias of agricultural policy is strongly in favour of producers and it is an example of a country that has received criticism in the WTO for its reluctance to reform its agricultural support and trade policy which continue to limit international access to its domestic market. The results show that the trade distorting effect of the state enterprise in Japan is likely to be high, although this distortion has been reduced recently as the Japanese government has changed the nature of the exclusive rights that apply. In section 6, we summarise and conclude.

1. State Trading: Background and Related Literature

(a) Background

State trading enterprises are used in both the services and the goods sectors, they cover developed and developing countries and they apply to both exporters and importers³. In terms of trade in goods, most attention has been paid to the state trading enterprises that arise in agriculture. Many of the major countries involved in agricultural trade employ state enterprises including, *inter alia*, on the export side, Canada, Australia, India and China while, on the import side (where they are more numerous), Japan, Korea, India, China and Indonesia all employ state trading enterprises⁴. Many less significant exporters and importers also use state trading. As noted above, the principal characterisation of a state enterprise relates to its exclusive rights and these can apply to varying degrees in the domestic and import market across commodity sectors. For example, in Japan, the Japan Food Agency has typically accounted for all procurement and sales of imported rice but it competes with the private sector in the procurement and sale of domestically produced rice. With respect to wheat imports, however, the Japan Food Agency had exclusive rights over the procurement and sale of domestically produced *and* imported wheat. However, recent reforms have led to changes in the exclusive rights that apply to the Agency in the wheat market: they now apply to imports only and the Agency is no longer involved in the procurement and sale of domestically-produced wheat. Similar variation in the application of exclusive rights apply to other importers that employ state trading enterprises. In the model we outline below, we aim

³ In the context of the WTO, trade in goods is separated from trade in services. State trading arises in both sector but the rules relating to services are covered by the General Agreement on Trade in Services (GATS). In relation to trade in goods, the majority of state trading enterprises reported relate to trade in agricultural commodities. Mattoo (1998) gives a discussion on state trading issues as they arise in the services sector.

⁴ In recent years, Indonesia has de-regulated state enterprises that exist in several commodity sectors part of which followed from pressure from the IMF. However, the state trading enterprise still functions in the rice sector, the main staple food for Indonesians.

to capture this diversity and identify the tariff-equivalent effect contingent on the specific nature of these exclusive rights.

In passing, it is worth noting the topicality of the state trading issue in the current WTO negotiations. There is a range of restrictions imposed by the WTO in an effort to limit the trade distorting impact of state trading enterprises, it being understood from the inception of the General Agreement on Tariffs and Trade (GATT) in 1947 that state trading enterprises will exist and have the potential to harm a country's trading partners. Efforts to limit the externality of state trading on competitors are captured by Article XVII:1(a) through which state trading enterprises are required to act in a manner consistent with the GATT principle of non-discrimination and most-favoured nation treatment; and by Article XVII:1(b) through which they must act on the basis of commercial considerations (WTO, *op cit.*, p. 509-510). In importing countries, state enterprises should not have mark-ups in excess of bound tariffs (Article XVII:4(b)) and should be notified to the WTO. However, dissatisfaction with the restrictions on state trading enterprises has led several countries to include state trading as part of the current trade negotiating agenda for agriculture (see WTO (2004) for a review). However, with respect to the principal importing countries that use state trading (namely Japan and Korea), they have claimed that the trade distorting impact arises with respect to those state enterprises involved in exporting only while importing state trading enterprises have no effect on market access. As we show below, however, this negotiating stance is questionable as state trading importers will also distort trade.

(b) Related Literature

The model presented below relates in part to the literature on the public firm that competes with the private sector in a mixed oligopoly. The key issue typically addressed in this literature is whether the involvement by a social-welfare maximising public firm competing with (or replacing) profit maximising firms can improve overall welfare. Notable papers in this area include Cremer *et al.* (1989) and de Fraja and Delbono (1989), with de Fraja and

Delbono (1990) providing an overview. Recent papers on privatisation also consider the role of (partial) state ownership co-existing with private firms (see the papers by Matsumura (1998) and Bennett and Maw (2000, 2003)).

There are, however, important differences in the approach taken here. First, most of this literature typically assumes a closed economy such that the effect of the public firm on foreign competitors is ignored. The only exceptions are the papers by Fjell and White (1996) and Pal and White (1998), although the latter is addressed to whether the existence of the welfare maximising public firm competing with foreign importers affects the case for an optimal tariff. In the case explored here, we are directly interested in the externality caused by the state trading enterprise on market access. Specifically, we aim to measure the trade distorting effect in the form of a tariff-equivalent measure that relates to the specific characterisation of the exclusive rights. Nevertheless, we also compare the tariff-equivalent effect with the optimal tariff that would apply in the absence of the state trading enterprise.

A second important difference is the nature of the state trading enterprise's pay-off function. Typically, the characterisation of the public firm's pay-off function is that it maximises social welfare. However, this is unlikely to be realistic in the case of state trading enterprises involved in agricultural trade, given the bias in agricultural policy that is observed around the world either in favour of producers (as in developed countries) or in favour of consumers/taxpayers (as in developing countries). For example, in the case of Japan referred to above, Japan is noted as a country that uses the highest level of trade barriers to restrict agricultural trade and gives enormous levels of support to domestic producers at the expense largely of consumers. Recent data from the OECD show that for period 2000-2002, 86 per cent of the transfers to wheat farmers came from consumers in the form of higher market prices (OECD, 2005). Prices for agricultural products in Japan are, on average, 150 per cent higher than world market prices, while the average for OECD countries is a price differential of around 45 per cent (OECD, 2004). These distortions are caused mainly by border

protection. The bias in the welfare function towards producers, interacting with the nature of exclusive rights, will serve to determine the trade distorting effect of the state trading enterprise.

The literature directly related to state trading, in contrast with the literature on the public firm in a closed economy, is relatively thin. Meade (1955) highlighted the potential for a state trading enterprise to act in a manner similar to more explicit trade policy instruments. The issue received further attention from Lloyd (1982). Hamilton and Stiegert (2002) empirically tested whether the existence of a state enterprise could act as a vehicle for rent-shifting between countries. McCorriston and MacLaren (2005a) explore the export subsidy equivalent effects of alternative state trading enterprises. These papers however apply to state trading involved in export markets; state trading enterprises in importing countries have received considerably less coverage, the exception being McCorriston and MacLaren (2005b).

2. Theoretical Framework

(a) Benchmark

In order to identify the potential trade distorting and welfare effects associated with a state trading enterprise with varying exclusive rights, we must first create a benchmark from which to define and measure the distortion. To do this, we characterise an n -firm private sector oligopoly in which each private firm can procure from both the import and domestic markets and sell to domestic consumers. The principal justification for this benchmark is that it reflects one of the motivations for the existence of state trading enterprises in agriculturally-related markets. There are two (potentially off-setting) aspects to this structure. First, the manipulation of market structure through the use of state trading enterprises reflects governments' concerns about the effect which the market power exerted by the private sector has on domestic producers and consumers. Indeed, part of the debate concerning the nature of de-regulation of state enterprises relates to the market structure that will replace the state enterprise. For example, there is concern that privatising a state trading enterprise will lead

only to the replacement of a public monopoly with a private profit maximising one which will have a detrimental effect on consumers and upstream producers (see OECD, 2001). Second, if the private sector is ‘too competitive’, it may not be able to exert bargaining power to exploit terms of trade effects when purchasing imports from the world market. In order to capture both of these effects, we create an n -firm benchmark from which the tariff-equivalent can be measured for alternative characterisations of the market structure that may exist in the absence of the state trading enterprise.

To measure the trade distorting effect of the state trading enterprise, we identify the implicit tariff that would bring about equality between the level of imports generated by the state trading enterprise and the private sector benchmark i.e. $Q^p(t^e) = Q^{STE}$, where superscript p (STE) represents the private (state trading) outcome. Intuitively, the tariff equivalent measures the tariff that would have to be imposed on the n private 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 imports are lower with the STE than in the benchmark; or negative, if they are higher. The sign will depend on the specific characterisation of the exclusive rights bestowed on the state trading enterprise.

Given that we aim to derive explicit measures of the trade distortion, we assume a specific functional form. Assume utility is given by:

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

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

$$u(Q_1, Q_2) = a_1Q_1 + a_2Q_2 - \frac{1}{2}(b_1Q_1^2 + b_2Q_2^2 + 2\gamma Q_1Q_2)$$

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

$$p_1 = a_1 - b_1Q_1 - \gamma Q_2 \quad (2)$$

$$p_2 = a_2 - b_2Q_2 - \gamma Q_1 \quad (3)$$

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; $Q_1 = nq_1$ and $Q_2 = nq_2$ 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, we assume upward-sloping, inverse supply functions. For the domestically-procured commodity, this function is given by:

$$p_A = f + kQ_1 \quad (4)$$

and for the imported good the function is:

$$p_w = F + KQ_2 \quad (5)$$

If $K = 0$, we have the small country case and there is no potential for terms of trade effects in the purchase of imports.

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. 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, first-order conditions for profit maximisation give:

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

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

(b) Alternative Characterisations of the State Trading Enterprise

As noted above, there are essentially two aspects to the state trading enterprise issue. The first is that state trading enterprises are an instrument of government policy and, as such, they will reflect the overall bias of policy towards certain groups. Therefore, we employ a weighted social welfare pay-off function for the state trading enterprise where the arguments represent producer welfare (PS), consumer welfare (CS) and profits from domestic and import sales ($\pi_1 + \pi_2$ assumed to be exchequer revenue) and where the α 's are a measure of the weights given by government to each of these arguments. Specifically:

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

Normalising on α_3 , the pay-off function can be re-written as:

$$W = \alpha_p PS + \alpha_c CS + \pi_1 + \pi_2 \tag{8}$$

where $\alpha_p = \alpha_1 / \alpha_3$ and $\alpha_c = \alpha_2 / \alpha_3$. As is well-known, in developed countries, governments typically bias agricultural policy in favour of producers and against consumers ($\alpha_p > 1 > \alpha_c$), while in developing countries, the bias is often against producers ($\alpha_p < 1 < \alpha_c$).

The second key feature associated with state trading enterprises is the nature of exclusive rights. These may apply to domestic procurement and sales and/or procurement and sales of imports and there may or may not be competition from the private sector, most obviously in domestic procurement. Therefore, we consider three cases of exclusive rights that typically prevail across agricultural importers. In Case 1, we characterise the state trading enterprise as

having sole rights in both the domestic *and* import markets, i.e., it has monopsony rights over imports and the domestically-procured good and monopoly rights over the sale of both. In Case 2, we consider the example where the state trading enterprise has exclusive rights over the procurement and sale of imports only but it competes with the private sector in the procurement and sale of the domestically-produced commodity. To distinguish the private firms that compete directly with the state trading enterprise in this case, we denote them by m as distinct from the n firms in the benchmark⁵. Finally, in Case 3, the state trading enterprise has exclusive rights with respect to imports only and it is excluded from domestic procurement. The m private firms procure and sell the domestically-produced good and compete with the state trading enterprise only in the sale of these goods which are substitutes for the imported good sold exclusively by the state trading enterprise.⁶

Maximising welfare as given by (8) and contingent upon the characterisation of 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

⁵ This captures the possibility that the number of private firms that may compete with the state trading enterprise may not necessarily be equal to n , the number of firms that would exist in the absence of the state enterprise.

⁶ There is a fourth possibility, namely, that the state trading enterprise and private firms compete in both the domestic and import markets. This case is not analysed here because, empirically, it does not seem to be important and, moreover, it is not clear that the state trading enterprise would still satisfy the definition used by the WTO.

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

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

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

3. Trade Distorting Effect of State Trading Enterprises

From a trade policy perspective, the concern with state trading enterprises is that the manipulation of the domestic market structure leads to restrictions on international market access in a manner similar to that of more explicit trade policy instruments. To derive the tariff equivalent of each of these three cases, we calculate the level of imports for each using equations (9)-(11), set each volume of imports equal to the level of imports generated by the private sector benchmark (equation (7)) and solve for t^e , the tariff that implicitly would be imposed on the private firms to give the same outcome as in each of the state trading cases. Expressions for the tariff equivalents for these three cases are:

Case 1:

$$t_1^e = \frac{1}{\Delta_3 n \phi_1} \{ (a_2 - F)(\Delta_3 n \phi_1 - \phi_3 \Delta_1) - (a_1 - f) \gamma [\Delta_3 n(n+1) - \phi_3(2-\alpha_c)] \}$$

where

$$\begin{aligned} \phi_1 &= (b_1 + k)(n+1) \\ \phi_2 &= (b_2 + K)(n+1) \\ \phi_3 &= \phi_1 \phi_2 - \gamma^2 (n+1)^2 \\ \Delta_1 &= b_1(2-\alpha_c) + k(2-\alpha_p) \\ \Delta_2 &= b_2(2-\alpha_c) + 2K \\ \Delta_3 &= \Delta_1 \Delta_2 - \gamma^2 (2-\alpha_c)^2 \end{aligned} \quad (12)$$

Case 2:

$$t_2^e = \frac{1}{\Delta_9 n \phi_1} \{ (a_2 - F)(\Delta_9 n \phi_1 - \phi_3 \Delta_4 \Delta_5) - (a_1 - f)(\Delta_9 \gamma m(n+1) - \phi_3 \Delta_8) \}$$

where

$$\begin{aligned} \phi_4 &= m\gamma(1 - \alpha_c) \\ \phi_5 &= m[b_1(1 - \alpha_c) + k(1 - \alpha_p)] \\ \Delta_4 &= (b_1 + k)(m + 1) \\ \Delta_5 &= \Delta_1 \Delta_4 - \phi_5(b_1 + k) \\ \Delta_6 &= \Delta_2 \Delta_4 - \gamma \phi_4 \\ \Delta_7 &= \gamma \Delta_4(2 - \alpha_c) - \phi_4(b_1 + k) \\ \Delta_8 &= \phi_4 \Delta_5 + \Delta_7(\Delta_4 - \phi_5) \\ \Delta_9 &= \Delta_5 \Delta_6 - \Delta_7 \gamma(\Delta_4(2 - \alpha_c) - \phi_5) \end{aligned} \tag{13}$$

and where ϕ_1 and ϕ_3 are defined as above.

Case 3:

$$t_3^e = \frac{1}{\Delta_{10} n \phi_1} \{ (a_2 - F)(\Delta_{10} n \phi_1 - \Delta_4 \phi_3) - (a_1 - f)(\Delta_{10} n \phi_1 - \Delta_4 \phi_3) \}$$

where

$$\Delta_{10} = \Delta_2 \Delta_4 - \phi_4 \gamma \tag{14}$$

and all other variables are defined as above.

To explore the determinants of the tariff equivalents for each of these three cases, it is easiest to take some representative parameter values and explore how values of each of the tariff equivalents varies⁷. We assume a value for m such that inclusive of the STE in the relevant cases, $m + STE = n$. There are three aspects to this exercise: first, we explore how the alternative characterisations lead to different levels of trade distortion; second, we consider the extent to which the policy bias in the state enterprise's pay-off function matters; and third, we assess how each of these cases depends on the underlying degree of competitiveness, as a captured by the private sector benchmark. These effects are summarised in Figure 1.

⁷ We assumed the following values to calibrate the demand and supply equations: 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 $Q_2 = 1200000$.

There are several important features. First, the characterisation of the nature of exclusive rights does matter in determining the trade distorting effect. Setting aside Case 1 with an unbiased pay-off function for the present (i.e., $\alpha_p = \alpha_c = 1$), consider each of the three cases where the bias in the pay-off function is towards producers. Case 1 (biased) gives the greatest trade distorting effect and Case 3 the lowest⁸. This ranking is not surprising. In Case 1, the state trading enterprise has monopsony and monopoly power over imports and the domestically-produced commodity. In this case, where the state trading enterprise has the most extensive coverage of exclusive rights, restricting the level of imports allows it to maximise sales of the domestically-produced commodity and increase producer welfare given the bias in the pay-off function. However, in Case 3, it has control over imports only and it competes with a relatively large number of private firms (as captured by $m = n - 1$) and, accordingly, the state trading enterprise gives a smaller level of trade distortion. Case 2 lies between these two cases, with the trade distorting effect correspondingly lying between the values for Cases 1 and 3⁹. For the 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, i.e., when there is the state trading enterprise and no private sector competition. In sum, the more extensive the exclusive rights (i.e., whether the monopoly/monopsony power of the state enterprise extends across domestic procurement and

⁸ The parameter values for the weights in the biased welfare function case are $\alpha_p = 1.5$ and $\alpha_c = 0.5$, respectively.

⁹ The ranking between Cases 1 and 3 is robust for any values of the underlying parameters. However, the tariff equivalent for Case 2 may exceed Case 1 where the domestic elasticity of supply is greater than the demand elasticity. Since there is less scope for private firms exerting monopsony power in the benchmark, the effect of the state enterprise replacing the private firms in the domestic market is dissipated, resulting in a lower level of imports in the benchmark and hence a lower tariff equivalent.

imports), the greater the likely level of trade distortion for any given bias in the pay-off function.

[FIGURE 1 ABOUT HERE]

Also shown in Figure 1 is the influence of the policy bias on the trade distorting effect. To highlight this influence, focus on Case 1 and compare the result for the unbiased welfare function with that for the politically-biased welfare function. When the government weights the welfare of the constituents equally ($\alpha_p = \alpha_c = 1$), the state enterprise imports more than the firms in the private sector benchmark because it is concerned with the impact of market power on both producers and consumers equally. In this case, the tariff equivalent is an implicit import subsidy. However, when the policy bias is in favour of domestic producers ($\alpha_p > 1$), the state enterprise increases procurement of the domestically produced commodity at the expense of imports and the tariff equivalent is an import tax. Alternatively, if the policy bias was in favour of consumers ($\alpha_c > 1$), an implicit import subsidy would arise (not shown) which decreases as the number of private firms in the benchmark increases.

Finally, each of these outcomes is sensitive to the underlying characterisation of the private firm benchmark. Consider first of all Case 1 with an unbiased pay-off function for the state enterprise. In this case, if the underlying benchmark is competitive, a social welfare maximising state enterprise has little effect on trade as the market is already competitive. But if the underlying benchmark were less competitive, the welfare maximising state 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 enterprise restricts trade, the level of this restriction being higher if the benchmark is relatively competitive. In other words, to replicate the level of imports in the state trading case, the level of the tariff would need to be relatively high and hence the corresponding trade distorting effect of the state enterprise is greater.

As noted in the discussion above, agricultural policy in developed countries is typically targeted by governments towards re-distribution. State trading enterprises can be used as a mechanism to attain this objective. The outcome for welfare distribution for each of these three cases of exclusive rights is summarised in Figure 2. When the pay-off function is biased towards producers, all three characterisations of exclusive rights lower welfare 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 biased), it is most successful in raising producer welfare relative to the benchmark value. Case 2 also meets this objective though 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 1 unbiased), 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 through the implicit import subsidy that would arise in this case.

[FIGURE 2 ABOUT HERE]

4. Optimal Tariff in the Absence of State Trading Enterprises

The analysis so far has been confined to the government manipulating market structure in order to effect re-distribution as given by the weighted social welfare function. This manipulation has been shown to affect the volume of imports. However, the alternative mechanism could be the more traditional one of a tariff which would achieve the same end¹⁰.

¹⁰ It should be noted that the set-up for deriving the optimal tariff in this case differs from the more obvious case most commonly associated with Brander and Spencer (1984) and amended for the case with a state firm in Pal and White (1998). In those cases, the home private firms or state owned enterprise compete with foreign firms. In the set-up here, there are only private firms but these private

Therefore, in this section we maintain the welfare function as given by (8) amended to take account of the revenue from the tariff (where the tariff revenue is assumed to have the same weight as profits since they all accrue to the Treasury) and derive the optimal tariff that could be chosen by the government with an n -private firm benchmark. The welfare function is given by:

$$W = \alpha_p PS + \alpha_c CS + \pi_1 + \pi_2 + tQ_2 \quad (8')$$

To obtain an expression for the optimal tariff, we first derive the equilibrium level of domestic procurement and imports for the n private firms inclusive of this tariff. These expressions are obtained from the amended first-order conditions for the private firms as given in (7) with t replacing t^e . Specifically, equilibrium quantities of domestic sales and imports are given by:

$$Q_1 = n \left\{ \frac{\phi_2(a_1 - f) - \gamma(n+1)(a_2 - F - t)}{\phi_3} \right\} \quad (15)$$

and

$$Q_2 = n \left\{ \frac{\phi_1(a_2 - F - t) - \gamma(n+1)(a_1 - f)}{\phi_3} \right\} \quad (16)$$

where ϕ_1 , ϕ_2 and ϕ_3 are given as above.

These equilibrium quantities are then substituted into (8') with the government then choosing t^{opt} , the optimal tariff, to maximise its weighted social welfare function. The first-order condition is:

$$\frac{\partial W}{\partial t} = \Lambda_1 + \Lambda_2 Q_1 + \Lambda_3 Q_2 + t\theta_2 = 0 \quad (17)$$

firms have two sources of profits: (i) from procurement of the domestically-produced good and (ii) from procurement of the imported good which they subsequently sell on to domestic consumers. The tariff in this case raises the cost of imports by affecting the terms of trade but it does not cause 'rent shifting' from foreign competitors that compete directly in the domestic market because there are none.

$$\Lambda_1 = (a_1 - f)\theta_1 + (a_2 - F)\theta_2$$

with $\Lambda_2 = \alpha_p k\theta_1 + \alpha_c(b_1\theta_1 + \gamma\theta_2) - 2\theta_1(b_1 + k) - 2\gamma\theta_2$

$$\Lambda_3 = \alpha_c(b_2\theta_2 + \gamma\theta_1) - 2\theta_2(b_2 + K) - 2\gamma\theta_1 + 1$$

and where $\theta_1 = \frac{n\gamma(n+1)}{\phi_3}$ and $\theta_2 = -\frac{n\phi_1}{\phi_3}$.

Substituting in Q_1 from equation (15) and Q_2 from equation (16), and letting Q_1' and Q_2' be the equilibrium quantities when there is no tariff intervention (i.e., the domestic and import volumes at free trade) gives:

$$\frac{\partial W}{\partial t} = \Lambda_1 + \Lambda_2 Q_1' + \Lambda_3 Q_2' + t\theta_2 + \Lambda_2\theta_1 t + \Lambda_3\theta_2 t = 0$$

The optimal tariff is then given by:

$$t^{opt} = \frac{\Lambda_1 + \Lambda_2 Q_1' + \Lambda_3 Q_2'}{-\theta_2 - \Lambda_2\theta_1 - \Lambda_3\theta_2} \quad (18)$$

We can now compare the tariff equivalent that arises in each of the state trading cases with the more traditional outcome, i.e., where the government could have chosen a tariff (albeit optimally) to restrict imports and to re-distribute welfare. Note that in equation (18) the optimal tariff is a function not only of the parameters of the demand and supply functions but also of the policy weights chosen by the government.

5. Example: State Trading in Japan

As measured by any available yardstick, Japan gives high levels of support to agricultural producers at the expense of food consumers. The government uses a wide array of mechanisms to achieve its overall aims of enhancing self-sufficiency in agricultural commodities and in supporting farmers' incomes. A key feature of that intervention is the control and limitation of imports¹¹. Over the last four decades, the Japan Food Agency has

¹¹ By any measure available, the level of government support to farmers in Japan is high. Prices are generally well in excess of world market prices (see section 1), and general measures of support to

been the principal means of managing trade, the enterprise being directly involved in the rice and wheat commodity sectors. With respect to wheat, the Japanese government proffered exclusive rights to this enterprise to procure domestically produced wheat and to have sole responsibility for imports of wheat into Japan¹². Therefore, the Japan Food Agency has had monopsony and monopoly status over both domestically produced wheat and imports. This characterisation of the role of the Agency in the wheat sector would clearly fit with Case 1 (biased) as defined above. Despite the manipulation of market structure in this manner, 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 on those in export countries only¹³.

As of 2002-2003, however, the Japanese government reformed the way in which the Japan Food Agency operates by changing the nature of the exclusive rights that apply in the wheat sector. Specifically, the Japan Food Agency (now re-named as the Food Department) has sole responsibility for imports only and 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 state enterprise. However, the bias of policy 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 can now only come indirectly through the volume of imports purchased. Specifically, the profits on imports made by the Food Department on the sale of imports are now transferred into an Income

farmers such as the Producer and Consumer Support Estimates (PSE and CSE) show high levels of transfers to producers from consumers. For example, the PSE for the wheat sector in Japan in 2003 to be 87 per cent i.e. 87 per cent of Japanese wheat farmers' revenue comes through government policies. See OECD (2004).

¹² Fukuda *et al.* (2004) give a recent overview of Japanese government policy in relation to the wheat sector.

¹³ See Japan's submission to the WTO on this issue, WTO (2000).

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.

We collected data on prices and quantities relating to the Japanese wheat sector for a specific year (2000) in which the Japanese Food Agency had sole rights in the domestic and import markets and calibrated the inverse demand functions as given in equations (2) and (3). The calibration procedure follows Dixit (1988). To measure the policy bias of Japanese policy (i.e. $\alpha_p > 1 > \alpha_c$), we used estimates from Lee and Kennedy (2002) which gave values of $\alpha_p = 1.25$ and $\alpha_c = 0.75$. Although these values apply to the rice sector, we assumed the same policy bias for the wheat sector¹⁴. The data and the calibrated parameters are presented in Table 1.

[TABLE 1 ABOUT HERE]

Using these data, we derive the tariff equivalent estimate for Case 1 using equation (12) which characterises the Japan Food Agency as having sole rights in the domestic and import market. With the same data, and using equation (14), we also consider the change in the trade distorting effect of the recent reforms which restricted the state enterprise to having sole rights over imports only (Case 3). We assume in each case, that the underlying benchmark is relatively competitive with $n = 10$ and, with respect to Case 3, the number of private sector firms m that compete with the state trading enterprise is set equal to 9.

¹⁴ As in the wheat sector, the Japanese government intervenes in the rice sector with the aim of increasing income for rice farmers with the corresponding price distortions and PSE levels being very high. For example, the PSE for rice farmers in Japan in 2003 was 83 per cent which is close to that reported for the wheat sector for the same period (see footnote 10).

The trade distorting and welfare effects of the state trading enterprise in Japan are shown in Table 2. With the data used, Case 1 would imply a tariff equivalent measure of \$657 per tonne. This is more than twice the level of the price at which the Japan Food Agency imported wheat from the world market in that year and it implies considerable trade distortion caused by the existence of the state enterprise¹⁵. 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. We also present the results for the trade distorting effect associated with the recent reforms which weakened the exclusive rights (equivalent to Case 3 above). As expected, the trade distorting effect associated with this case is lower, the tariff equivalent being \$341 per tonne, almost half of the level in the Case 1 outcome. 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 and consumer surplus decreasing by around 12 per cent. Overall, the effect of Case 3 is to reduce net welfare by 1 per cent.

[TABLE 2 ABOUT HERE]

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 values does not change the overall picture. Assume, for example, the following values: a domestic demand elasticity equal to 1; a domestic supply elasticity equal to 1; an elasticity of substitution equal to 3 (implying domestic and imported wheat are more differentiated); and an export supply elasticity equal to 100, implying that there are no terms of trade effects and Japan as a price taker in the world wheat market. For these data, the tariff equivalent for Case 1 is equal to

¹⁵ 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. See section 1.

\$200 per tonne and for Case 3, \$141 per tonne. Clearly the state enterprise (configured as in Case 1 or Case 3) still leads to significant trade distortions and the ranking between the two cases still holds. The re-distribution effects still exist (producer surplus increases by around 52 per cent in Case 1 and by 31 per cent in Case 3) with reductions in net welfare being 3 per cent in Case 1 and 2 per cent in Case 3. Despite the specific choice of parameter values, the 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. This example also shows that importing state trading enterprises have the potential to distort trade significantly by restricting market access for foreign competitors.

The corresponding optimal tariff derived from equation (18) is also reported in Table 2. If the government had aimed to meet its domestic re-distributive objective towards producers through only a tariff, the value of this tariff, when set optimally, would be \$1502/tonne. Note that this value reflects the weights in the government's pay-off function. Therefore, there is a clear discrepancy between the tariff equivalent that arises when the government uses state trading to meet its re-distributional aims and the tariff that would arise if the government would maintain the private firm benchmark and set the tariff optimally even when aimed at the same re-distributional objectives. If the government were neutral regarding re-distribution, then the value of the optimal tariff would be \$1269/tonne. This decline in the optimal tariff between the biased and the unbiased cases is to be expected since differentiating (18) with respect to α_p and α_c confirms that reducing (increasing) the weight on producer (consumer) welfare should decrease the size of the optimal tariff.

It should be noted that there is no expectation that the optimal tariff should necessarily equal the tariff equivalent in the state trading outcome. Specifically, the state trading enterprise, unless it is excluded from domestic procurement, deals with a domestic distortion and a terms of trade distortion, while the optimal tariff can only deal directly with the latter. In principle,

therefore, the optimal tariff derived from the data should only be directly compared with the outcome in Case 3, the scenario where the state trading enterprise can influence imports only. In this case, the tariff plays the same role, i.e., it serves to exploit terms of trade effects and to increase producer welfare by reducing imports only. However, in Case 1, the state enterprise can also influence the degree of competition in the domestic market for which the tariff cannot substitute. Thus even although the trade distorting effect in Case 1 is closer numerically to the optimal tariff outcome, there is the important difference between what the alternative instruments of government policy are doing in each of these two cases¹⁶.

6. Summary and Conclusions

This paper has focused on the trade distorting effect of state trading enterprises and how that distortion is linked with the nature of their exclusive rights and with the bias of government policy. Unlike much of the extant literature on the (welfare maximising) public firm, the emphasis here has been on the externality on foreign competitors which is caused by the existence of the state trading enterprise. The key issue in relation to state trading, as identified by the World Trade Organization, is not the question of the ownership of a firm *per se* but the nature of exclusive rights bestowed on the state enterprise. These rights are used as a means of manipulating market structure to meet the objective of government policy which typically relates to re-distribution between consumers and producers.

We identified three broad characterisations of how these exclusive rights may apply and derived an implicit tariff equivalent measure for an n -firm private sector benchmark to identify the trade distorting effect. In general, the trade distorting effect is likely to be highest

¹⁶ There are of course other ways in which the government could deal with domestic distortions, for example through competition policy or agricultural price support policy. However, given that we are principally concerned with state trading enterprises as a trade distorting issue, we confine the optimal policy discussion to a comparison with the optimal tariff.

when the exclusive rights mean that the state trading enterprise has monopoly and monopsony rights in both the domestic and import markets. We calibrated the theoretical model to the case of the Japan Food Agency that has, until recently, been given monopsony and monopoly rights over imports and domestic procurement of wheat and took into account the nature of the policy bias in Japanese agricultural policy. The results indicate that the trade distorting and associated welfare effects are likely to be significant and that these effects continue to hold true, although to a lesser degree, following recent changes to the nature of exclusive rights that now apply to the state enterprise in this sector. Taken together, the analysis presented here suggests that state trading enterprises are potentially an effective means of meeting a government's policy objective. However, these enterprises cause significant trade distortions. As such, they ought to be the subject of negotiation in the on-going Doha Round of trade negotiations in the WTO.

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Figure 1: Tariff Equivalent for Cases 1-3

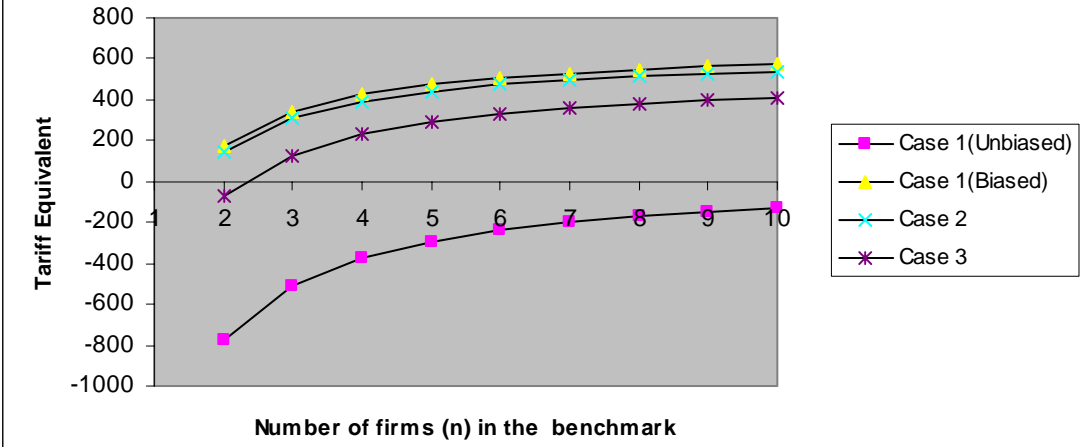


Figure 2: Welfare Effects of STEs with Different Exclusive Rights

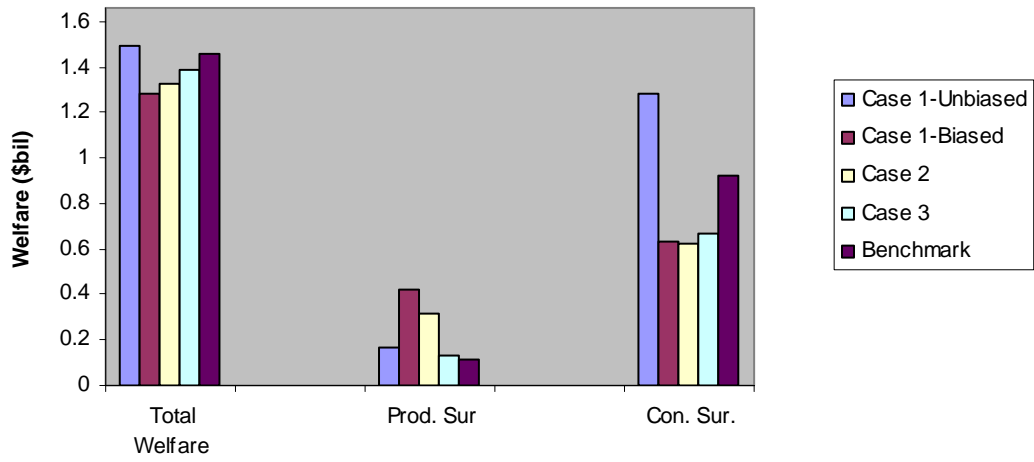


Table 1: Calibration Data and Parameters

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 good	\$1023/tonne	a_1	4515
Sales of domestically produced good	735000 tonnes	a_2	5115
Sales of imported good	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		

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

Case 1	
Tariff equivalent	\$657.4/tonne
Change in producer surplus	59%
Change in consumer surplus	-23%
Change in net welfare	-3%
Case 3:	
Tariff equivalent	\$341.4/tonne
Change in producer surplus	33%
Change in consumer surplus	-12%
Change in net welfare	-1%
Optimal Tariff	\$1502/tonne

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