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State Trading Enterprises vs Trade Tax-Subsidy for Non-Economic Objectives

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State Trading Enterprises vs Trade Tax-Subsidy for Non-Economic Objectives

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Abstract

In this paper, we compare the welfare effects of State Trading Enterprises (STEs) with those of trade tax-subsidy policies in a small country, and analyze which is a more efficient trade management policy when the government tries to achieve non-economic objectives such as production support and consumption improvement. The main result which generates the argument by Alston and Gray (2000) is that trade management by STEs is welfare-superior to trade tax-subsidy policies if and only if the target levels are smaller than the autarky level.

JEL CODE: F13,Q17,Q18

Key Words: export subsidies, import tariffs, non-economic objectives, state trading enterprises,

Introduction

In many countries governments restrict agricultural trade to achieve non-economic objectives such as domestic production support or consumption improvement. To achieve these non-economic objectives, there are two representative ways among others. One is to use trade

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policies such as export subsidies or import tariffs. Another is to establish State Trading Enterprises (STEs), which play an important role in international agricultural trade. According to the World Trade Organization (WTO), STEs are defined as " Governmental and non-governmental enterprises, including marketing boards, which have been granted exclusive or special rights or privileges,..., in the exercise of which they influence through their purchases or sales the level or direction of imports or exports.[1]

These two forms of trade protection can achieve the same goal. However, the welfare effects derived from these policies are different because of their difference in the financial source. In the trade tax-subsidy policies, the government usually covers the finances by general taxes. On the other hand, STEs are basically required to be self-financing. They use price discrimination between domestic consumers and producers to become break-even, as in the price-pooling scheme employed by Canadian Wheat Board.

This paper analyzes the welfare effects of the trade protection by STEs. More specifically, we will focus the analysis on the STEs designed to achieve non-economic objectives, such as consumer-price or producer-price support, and then compare STEs with alternative trade protection policies like import tariffs and export subsidies, in terms of domestic economic welfare. The purpose of the paper is to clarify which is the second-best policy measure to achieve the non-economic objectives.

Both developed and developing countries establish STEs to attain domestic policy objectives. STEs are classified into import STEs and export STEs. Import STEs are engaged in control of imports and domestic marketing, while export STEs are in control of exports and domestic procurement (OECD 2001, p78).

In developed countries, STEs are mainly established to support the domestic producers, like New Zealand Dairy Board in New Zealand, which is an export STE, and Agriculture and Livestock Industries Corporation (ALIC) in Japan, which is an import STE. For example, ALIC protects the domestic producers in such a way that it imports sugar from the world market at the world price lower than the domestic producer price, and sells it to the domestic

consumers at a higher price.[2] This is like production subsidies financed by taxing the domestic consumers.

In developing countries, in contrast, STEs are typically established to stabilize the domestic producer and consumer prices of agricultural products as well as to assure reasonably-priced food supply, like the Grain Board in Tunisa and the Badan Urusan Logistik in Indonesia.[3]

There are some previous studies that analyzed the welfare effects of STEs.[4] Among them, Alston and Gray (2000) showed the basic mechanism of trade management by STEs in the case of producer protection, and examined the welfare effects when the country is a small-country exporter. More specifically, assuming that the aim of the government is to maintain the domestic producer price at a certain level between free trade and autarky, they compared the welfare effects of STEs with those of export subsidies when there is a taxpayer cost, and showed the condition for which STEs are a more efficient policy. According to their analysis, STEs are more efficient if the excess burden of taxation to finance export subsidies is sufficiently large, but STEs are always less efficient than export subsidies if there is no excess burden of taxation.

Our study is based on Alston and Gray (2000). But it differs from theirs at the following three points. We will consider, in addition to an export STE, (i) an import STE, (ii) non-economic objectives for consumers and producers protection, and (iii) the possibility of a trade pattern reversal.

Let us briefly explain the model and the main results of this paper.

First, we will focus not only on the case of a small-country exporter but also on the case of a small-country importer. We consider an import STE that achieves a target level of production, which placed smaller than the autarky one, and compare the welfare effects of the STE with those of an import tariff, provided that they secure the same return to the domestic producers. We will show that the STE is welfare-superior to the same kind of import tariffs if there is no excess burden. This result is in sharp contrast to the disadvantage of export STEs over export subsidies shown by Alston and Gray (2000).

Second, we will take account of non-economic objectives for consumer support, in addition

to producer support considered by Alston and Gray (2000). If a target level of consumption, instead of production, is placed below the autarky level in an export country, we will show that STEs are welfare-superior to export subsidies in contrast to Alson and Gray (2000).

Finally, we will take into account the possibility of a trade pattern reversal to happen owing to trade management. One of the examples is the sugar industry in the EU.[5] According to Kline (2005, p.32), thirty years ago, the EU was a net importer of sugar, supporting the economies of many of its former colonies with its purchases. Now, even though the cost of producing sugar is two to three times higher in Europe than in some developing countries, the EU has become the world's second-beggest exporter after Brazil of all forms of sugar and the biggest exporter of refined white sugar. We will show that the welfare advantages of STEs over trade tax-subsidy policies diminish when there occurs a trade pattern reversal.

The Basic Model

Let us first consider a STE in a small open economy which manages all the sales and purchases of a good in the domestic market as well as in the foreign trade given a world price p_w. Specifically, the STE purchases x_s units of the good from the domestic producers at a "producer price" p_s, while it sells x_c units to the domestic consumers at a "consumer price" p_d.

If we express with $p_d(x_d)$ the inverse domestic demand function, any domestic consumption x_c targeted by the STE must require the domestic consumer price $p_d = p_d(x_d)$. Similarly, if we express with $p_s(x_s)$ the inverse domestic supply function, any domestic production x_s that the STE wants to be realized must require the domestic producer price $p_s = p_s(x_s)$. When the targeted domestic consumption differs from the targeted domestic production, it makes up their difference with imports or exports at the given world price p_w. That is, $m = x_c - x_s$ is what the STE must import (or export) if $m < 0$ (or $m > 0$).

The profit of the STE is written by $V = p_d(x_d)x_d - p_s(x_s)x_s - p_w(x_d - x_s)$. Since $m = x_d - x_s$, we can express it as a function of the targeted domestic consumption and

production, x_d and x_s, and the world price p_w as follows.

$$V = \{p_d(x_d) - p_w\}\, x_d + \{p_w - p_s(x_s)\}\, x_s. \tag{1}$$

The first term shows the profit earned by selling the imported good. This is because the opportunity cost of the domestic sales for the STE is the foregone revenue earned by exporting the good. The second term shows the profit earned by selling the domestically produced good abroad.

Non-Economic Objectives and STE Trade Management

Let us consider the case in which the welfare-maximizing government pursues by means of the STE with a certain non-economic objective, e.g., promotion or restriction of domestic production and consumption, under the constraint that the STE's profit should be non-negative.

The budget constraint on the STE, i.e., $(p_d - p_w)x_d + (p_w - p_s)x_s \geq 0$, will limit feasible target levels of production or consumption. The STE can maximize purchase profits and sales profits, respectively. For example, when the STE is required to promote domestic production by raising the domestic producer price, the incurred loss from domestic production purchase $(p_s - p_w)x_s$ must be covered by the domestic sales profits $(p_c - p_w)x_c$. That is like production subsidies financed by taxing the domestic consumers. Let us find feasible policy targets for the STE facing a break-even constraint.

Feasible Targets by Taxing Domestic Consumers

Consider first the case in which the STE finances the costs for production subsidies by taxing the domestic consumers. In the following, we use Figures to explain. In all Figures, S and D represent supply and demand curves respectively. The maximum domestic sales profit which is realized at the monopolistic equilibrium C^M, is given by the rectangle $\square\, p_d^M p_w C^m C^M$. The

feasible domestic output x_s and the required producer price p_s should satisfy $(p_s - p_w)x_s = (p_d^M - p_w)x_d^M$ where p_d^M is monopolistic price and x_d^M is associated consumption. The domestic producer price and production pair (p_s, x_s) is then given by the rectangular hyperbola PPC with p_w as its origin in Figure 1, which we call the "Pooled Price Curve".

Feasible Targets by Taxing Domestic Producers

Next let consider the case in which the STE finances the cost for consumption subsidy by taxing the domestic producers. The maximum domestic purchase profit is realized at the monoposonistic equirlibrium S^M, which is given by the rectangle $\Box p_s^M p_w S^m S^M$. The feasible domestic sales price-volume pairs are shown by another rectangular hyperbola ppc in Figure 1.

The above discussion demonstrates that the trade management by the STE is to choose a pair of the domestic production and consumption targets (x_s, x_d) such that (i) $x_s \in [x_s^M, \bar{x_s}^T]$, (ii) $x_d \in [x_d^M, \bar{x_c}^T]$ and (iii) the zero-profit constraint, $(p_d(x_d) - p_w)x_d + (p_w - p_s(x_s))x_s = 0$.

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Figure 1 around here.

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Welfar-maximizing STE

We will now analyze the welfare consequences when government requires that the STE facing a break-even constraint sets the targets different from the free-trade equilibrium. We will consider the domestic production and consumption targets for an import and an export countries, respectively.

Import Country's STE with Domestic Production Targets

We start with an import country achieves a certain domestic production target given by point S^* in Figure 2. In what follows, we will attach '$*$' to the points or variables that are associated with the target level. We should note that achieving this target entails subsidizing domestic production by the amount of $p_s^* - p_w$ per unit of output, so that the economy incurs at least the cost of the prodcution distortion equal to the area $\triangle S^* F H$.

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Figure 2 around here.

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We can find out where the domestic consumption shoud be located to achieve this production target by drawing the PPC passing throgh the target point $S^*$and discovering its intersection with the demand curve, C^*. The PPC can possibly have several intersections with the demand curve, but the welfare-maximizing STE must choose the gratest domestic consumption so as to minimize the distortions.

Now compare the above results with the welfare loss associated with the alternative trade policy, i.e., an import tariff. The same domestic production target is achieved by imposing a specific import tariff of $p_s^* - p_w$. In effect, this tariff policy subsidizes domestic production at the same rate as the STE trade management does, but it taxes domestic consumption at a higher rate than the STE trade management. As a result, the import tariff gives rise to greater welfare loss, which comes from the increased consumption distortions measured by the are $CLMC^*$.

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Figure 3 around here.

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The same argument holds, as shown in Figure 3, even when the domestic production target entails domestic output smaller than the free trade level. Now the domestic production target

is indicated by point S^*, and the required domestic consumption is point C^* on the PPC. If this target is achieved by an import subsidy, the consumption distortion increases as much as the area $\square MC^*NL$ relative to that of the STE trade management.

However, this welfare-superiority of the STE over the trade taxes and subsidies is lost once the government sets the target level which is greater than the autarky-equilibrium one.

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Figure 4 around here.

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Such target level of domestic production S^* gives rise to a trade-pattern reversal that causes the production distortion FMS^* and the consumption distortion KHC^* in Figure 4. If we replace the STE trade management with the export subsidies keeping the same domestic production target, the consumption tax rate is lower so as to improve the welfare by the area C^*HGC.

Proposition 1. *For a small import country, the self-financing trade management by the STE is welfare-superior to trade subsideis (or taxes) in achieving a given domestic production target if and only if the target level of output is smaller than the autarkey level.*[6]

Import Country's STE with Domestic Consumption Targets

We will next consider the case where the import coutnry's government pursues a certain targeted domestic consumption by establishing an STE. We will use again Figure 2-4 to address this case. Figures 2 and 3 illustrate the case in which the STE trade management does not cause a trade reversal. The domestic consumption target is given by point C^* in Figure 2 and Figrue 3. The government can achieve this target with an import tariff of $p_d^* - p_w$ in Figure 2 and with an import subsidy of $p_w - p_d^*$ in Figure 3. It can be seen that the STE trade management incurs larger production distortions.

However, if the level of target consumption is set sufficiently small, like point C^* in Figure 4, then a trade pattern reversal will occur and the country will export the product. In this case, if we want the same consumption level to be realized by an export subsidy, the larger cost of production distortions equal to the area of S^*MLS will be incurred.

Proposition 2. *For a small importing country, the self-financing trade management by the STE is welfare-inferior to trade subsideis (or taxes) in achieving a given domestic consumption target if and only if the target level of consumption is larger than the autarkey level.*

Export country's STE Trade Management

We can apply the argument in the preceding sections to the case of the export country by using Figure 5. Let us first discuss the case of domestic production targets.

Figure 5 indicates the domestic production target S^* with the associated PPC. If an STE is established to achieve the production target, then the domestic production is subsidized at the rate of $p_s^* - p_w$ per unit and to balance the budget, consumption is taxed at a higher rate of $p_d^* - p_w$. Accordingly, as compared to an export subsidy of $p_s^* - p_w$ per unit that succeeds in achieving the same target, the STE trade management lowers economic welfare by increasing the cost of consumption distortions.

But if the domestic production is set s^*, a trade pattern reversal will occur. If an STE is realized to this production target, then the domestic production is taxed at the rate of $p_w - p_s^t$ and the consumption is subsidized at a lower rate of $p_w - p_d^t$. As compared to an export tariff of $p_w - p_s^t$ per unit in achieving the same target, the STE trade management is making to higher economic welfare.

Proposition 3. *For a small exporting country, the self-financing trade management by an STE is welfare-inferior to trade subsidies (or taxes) in achieving a given domestic production target if and only if the target level of output is larger than the autarky level.*

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Figure 5 around here.

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Finally, consider the case where the government sets a domestic consumption target. Given a target depicted by point C^* in Figure 5, if an STE is established to achieve this target, then the domestic consumption is subsidized at the rate of $p_w - p_d^t$ and the production is taxed at a higher rate of $p_w - p_s^t$. As compared to an export tariff of $p_w - p_d^t$ per unit in achieving the same target, the STE trade management lowers economic welfare by increasing the cost of production distortion.

Proposition 4. *For a small exporting country, the self-financing trade management by the STE is welfare-inferior to trade tax (or subsidy) in achieving a given domestic consumption target if and only if the target level of consumption is larger than the autarky level.*

Concluding Remarks

In this paper, we compared the welfare effects of STEs with those of trade tax-subsidy policies in a small country and analyzed which are more efficient trade management policies when the government achieves non-economic objectives such as production support and consumption improvement. The main result is that trade management by STEs is welfare-superior to trade tax-subsidy policies if and only if the target levels of production or consumption are placed smaller than the autarky level. The following questions are left for future study.

Our analysis is confined to the comparison between the STE trade management and trade tax-subsidy policies. According to the targeting principle introduced by Bhagwati, to achieve a production target it is the best for the government to use only a domestic production subsidy, since it does not cause welfare distortions in domestic consumption. However, in terms of their finances, a production subsidy needs more tax revenue than an export subsidy, which may give an welfare advantage to the latter.

In the context of this paper, tax distortions will also affect our argument. For example, consider an import country. When there is no excess burden of taxation, a production subsidy is welfare-superior to an STE trade management, and an STE trade management is welfare-superior to an import tariff. However, if there is an excess burden of taxation, this order will change because the government can reduce the welfare cost of tax distortions by using the tariff revenues. More specifically, with the excess burden being large, there arise a case in which, a STE trade management is welfare-superior to an import tariff and an import tariff is to a production subsidy, or an import tariff is welfare-superior to a STE trade management and a STE trade management is welfare-superior to a production subsidy.

Notes

[1]See WTO understanding on the Interpretation of Article XVII.

[2]For more information about ALIC, see http://alic.lin.go.jp/

[3]For more information about STEs in developing countries, see FAO 2002.

[4]Alston and Gray (2000) is based on Gardner (1983). Carter and Smith (2001) and Fulton et al. (1999) studied on export STEs. Alston and Hurd (1990) examined welfare effects of export and import STEs respectively.

[5] EU actually do not use STEs but it heavily regulates the pricing and marketing of sugar (Ackerman and Dixit (1999)).

The European Commission proposed changes to the sugar restructuring scheme aimed at making it more effective and thus reducing EU sugar production in 2006. It decided to renounce the export subsidy from 2008/09 year. See more detail at EU Press releases RAPID "Sugar reform: Commission proposes to improve sugar restructuring scheme" http://ec.europa.eu/agriculture/capreform/sugar/

[6]All the proofs of propositions are collected in the appendix.

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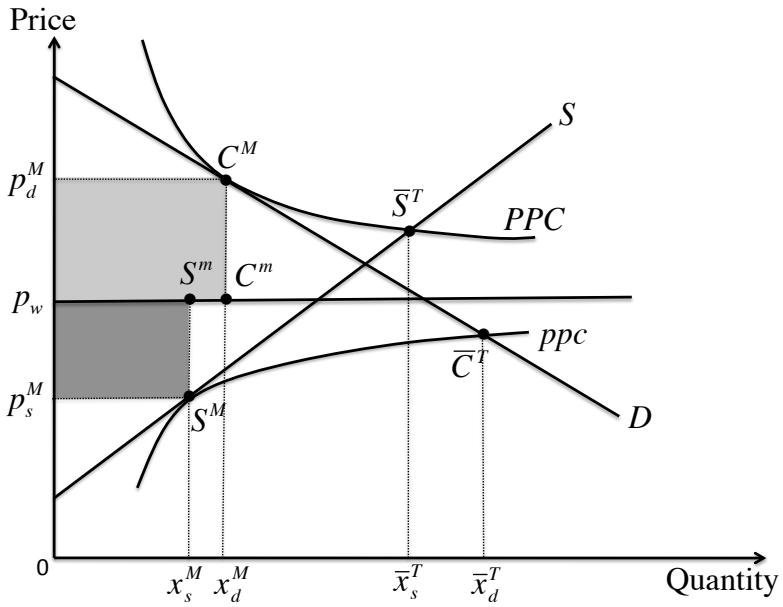

Figure 1: **Pooled Price Curve**

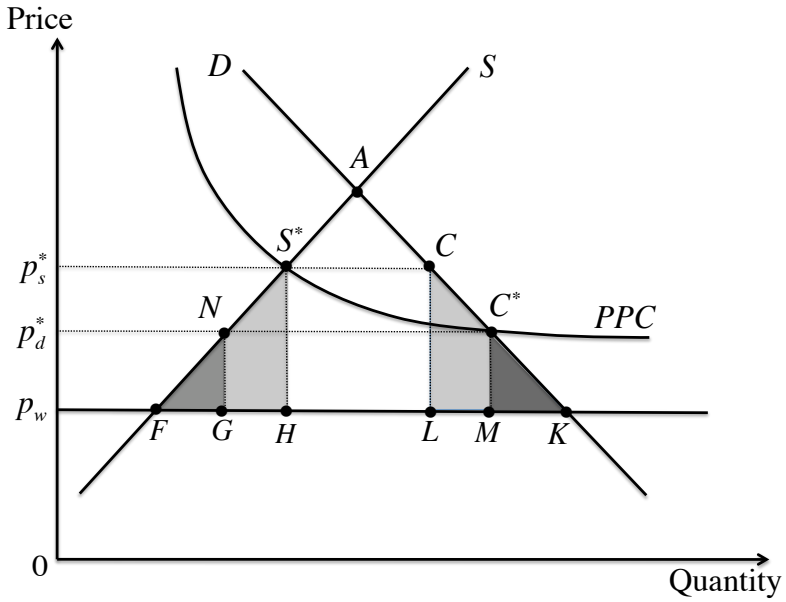

Figure 2: **STE vs Import tariff**

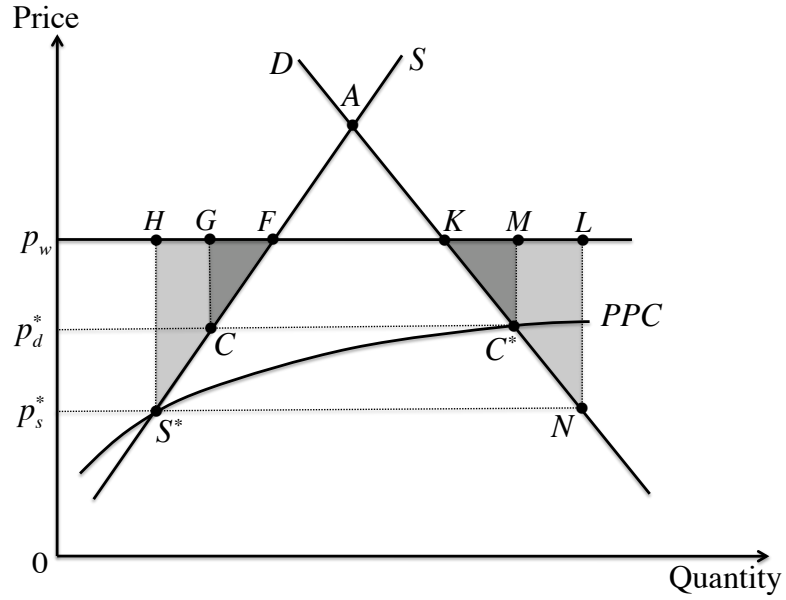

Figure 3: **STE vs Import subsidy**

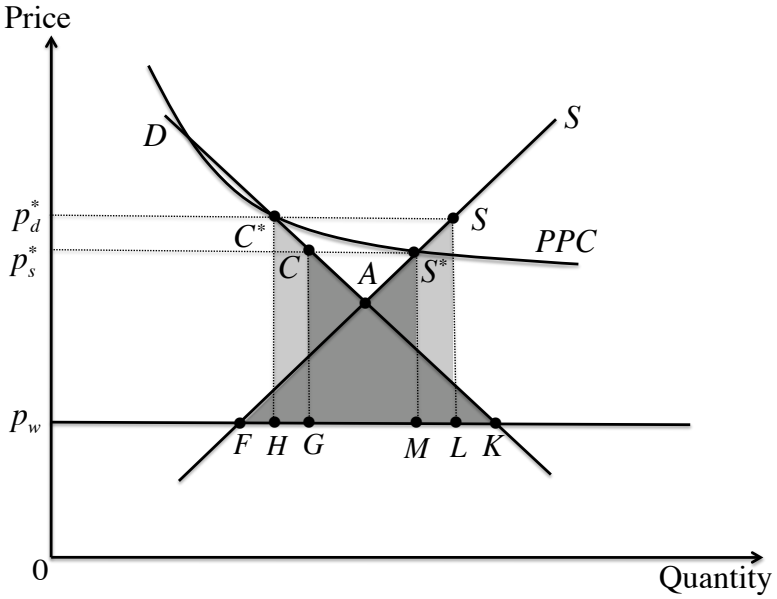

Figure 4: **STE vs Export subsidy**

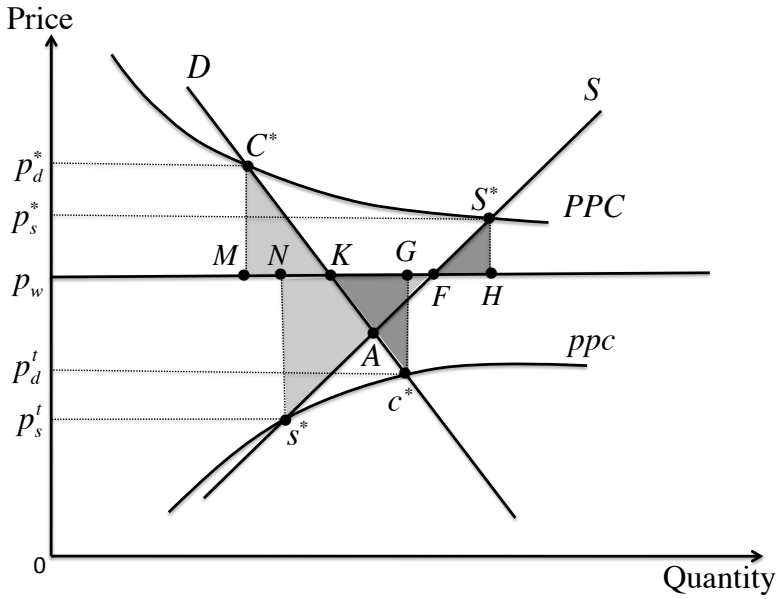

Figure 5: **STE in small-country exporter**

Appendix

The appendix contains the proofs of the propositions.

Proof of Proposition 1

Suppose that this country is an importer. The social surplus under an STE is defined by

$$W^{STE} = \int_0^{x_d^*} [p_d(x) - p_d(x_d^*)]dx + \int_0^{x_s^*} [p_s(x_s^*) - p_s(x)]dx + V, \tag{A.1}$$

where $V = 0$. The one under an import tariff is defined by

$$W^{IT} = \int_0^{x_d^{IT}} [p_d(x) - p_d(x_d^{IT})]dx + \int_0^{x_s^*} [p_s(x_s^*) - p_s(x)]dx + [p_d(x_d^{IT}) - p_w](x_d^{IT} - x_s^*). \tag{A.2}$$

We can use (A.1), (A.2) and the zero-profit constraint of STE, (1), to derive the change in social surplus resulting from the introduction of the STE as follows:

$$\begin{aligned}
\triangle W &= W^{STE} - W^{IT} \\
&= \int_{x_d^{IT}}^{x_d^*} p_d(x)dx - [p_d(x_d^*)x_d^* - p_d(x_d^{IT})x_d^{IT}] - [p_d(x_d^{IT}) - p_w](x_d^{IT} - x_s^*) \\
&= \int_{x_d^{IT}}^{x_d^*} p_d(x)dx - [p_d(x_d^*)x_d^* - p_d(x_d^{IT})x_d^{IT}] - [p_d(x_d^{IT}) - p_w](x_d^{IT}) + [p_d(x_d^*) - p_w]x_d^* \\
&= \int_{x_d^{IT}}^{x_d^*} [p_d(x) - p_w]dx.
\end{aligned} \tag{A.3}$$

Assume that this country imposes an import tariff, so that $p_d(x_d^{IT}) > p_w$. Suppose further that there is no trade pattern reversal, i.e., $x_d^* > x_s^*$. From the zero-profit constraint of STE, (1), we have

$$[p_d(x_d^*) - p_w]x_d^* = [p_d(x_d^{IT}) - p_w]x_s^*. \tag{A.4}$$

Then, we get $x_d^* \geqq x_d^{IT}$ because $p_d'(\cdot) < 0$. From (A.3), we obtain $\triangle W \geqq 0$ because $p_d(x_d^*) > p_w$. Conversely, assume that there is a trade pattern reversal, i.e., $x_d^* < x_s^*$. Then, from (A.4), we get $x_d^* < x_d^{IT}$. Then, we obtain $\triangle W < 0$ because $p_d(x_d^*) > p_w$. □

Proof of Proposition 2

Suppose that this country is an importer. The social surplus under an STE is defined by (A.1). The one under an import subsidy is defined by

$$W^{IS} = \int_0^{x_d^*} [p_d(x) - p_d(x_d^*)]dx + \int_0^{x_s^{IS}} [p_s(x_s^{IS}) - p_s(x)]dx - [p_w - p_d^{IS}](x_d^* - x_s^{IS}) \quad \text{(A.5)}$$

We can use (A.1), (A.5) and the zero-profit constraint of STE, (1), to derive the change in social surplus resulting from the introduction of the STE as follows:

$$\begin{aligned}
\triangle W &= W^{STE} - W^{IS} \\
&= \int_{x_s^*}^{x_s^{IS}} p_s(x)dx - (x_d^* - x_s^{IS})[p_w - p_s(x_s^{IS})] + p_s(x_s^*)x_s^* - p_s(x_s^{IS})x_s^{IS} \\
&= \int_{x_s^*}^{x_s^{IS}} p_s(x)dx - (p_w - p_s^*)x_s^* - (p_w - p_s^{IS})x_s^{IS} + p_s(x_s^*)x_s^* - p_s(x_s^{IS})x_s^{IS} \\
&= \int_{x_s^*}^{x_s^{IS}} [p_s(x) - p_w]dx. \qquad \text{(A.6)}
\end{aligned}$$

Assume that this country gives an import subsidy, so that $p_s(x) < p_w$. Suppose further that there is no trade pattern reversal, i.e., $x_s^* < x_d^*$. From the zero-profit constraint of STE, (1),

$$[p_w - p_s^*(x_s^*)]x_s^* = [p_w - p_s(x_s^{IS})]x_d^* \qquad \text{(A.7)}$$

Then, we get $x_d^{IS} \geqq x_s^*$ because $p_d'(\cdot) < 0$. From (A.6) we obtain $\triangle W \leqq 0$ because $p_s(x) < p_w$. Conversely, we assume that there is trade pattern reversal, i.e., $x_s^* > x_d^*$. Then, (A.7), we get $x_d^{IS} < x_s^*$. Then we obtain $\triangle W > 0$ because $p_d(x_d^*) > p_w$. □

Proof of Proposition 3 and 4

The proofs of Proposition 3 and 4 are the same as those of Proposition 1 and 2, respectively.