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Export and Liberalization Policies in an International Duopoly
Composed of a Chinese State Firm and a Capitalistic Private Firm

by

Yasunori Ishii*

ABSTRACT

Establishing an international trade model of a Cournot duopoly that consists of a state-owned firm in China and a private firm in a capitalistic country, this paper examines the economic implications of the economic liberalization policy of China that releases a Chinese state-owned firm from the burden of output quota. It assumes that while the capitalistic country adopts an export subsidy policy, China promotes such a liberalization policy. It first analyzes the effects of China's economic liberalization on industry trade and then discusses its optimal level. The main findings are that China's liberalization policy also serves as a strategic trade policy, and that perfect economic liberalization is not always best for China.

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1. Introduction

Building a third-country trade model of international oligopoly, Brander and Spencer (1985) found that when firms engage in Cournot competition, (i) a rise in export subsidy increases the exports of the subsidy-giving country and decreases those of the rival country and (ii) the optimal export subsidy is positive. Their findings had a great impact on the traditional trade theory, and they have acquired many advocates since then.¹ However, their model considered an international oligopoly that consisted only of capitalistic private firms that can freely decide their outputs and exports. As is well known, the world economy has recently been changing its trade structure at remarkable speed since the People's Republic of China (henceforth, China) successfully put its economic reform, beginning in the late 1970s, into a stable orbit. Indeed, China has been growing as a major player in the wider world economy. Therefore, in a large number of industries, it is impossible to propose appropriate trade policies without considering China. In this paper we present a new international trade model that integrates China into the international trade system constituted by capitalistic countries, in order to appraise the traditional export subsidy policy and China's economic reform.

It is widely known today that the economic reform in China introduced markets at the margin, parallel to planning.² China adopted the dual-track pricing system that allowed Chinese state firms to sell their above-the-plan outputs at market prices after they had

fulfilled their planned output quotas at the official prices. Simultaneously, all the state firms were liberalized so as to supply above-the-plan outputs even to foreign markets and to retain a modest share of their profits. As a result, Chinese state firms have generally increased their outputs beyond the planned output quotas, and have begun to engage in international trade. Thus, they have an unprecedented role in the world economy as well as in the newly-reformed Chinese economy.

Of course, non-state firms also received permission to enter some industries and began to supply their products to free markets. However, they were strictly limited with respect to the number of workers they could employ, as well as to the sorts of goods they could produce. Even today, more than 80 % of the top hundred big Chinese firms are still composed of state (or state-owned) firms, and most of the central industries are still dominated by huge state firms controlled by government plans. In particular, international trade in China is mostly shared by big state firms (See JETRO (2004)). Therefore, it seems to be both plausible and necessary to consider such an economic situation of China when we construct a third-country trade model of a new international duopoly.

Over the last two decades, the number of big Chinese state firms that produce and export goods under a mitigating burden of mandatory output quotas has been increasing rapidly. However, their output and export choices seem to be still different from those of capitalistic private firms. Though the planned output has gradually become a smaller fraction of the total output, due to an economic liberalization policy that has reduced the planned output quota of Chinese state firms, the central planning apparatus has remained in place. Therefore, as Chinese state firms have made inroads into overseas markets, some international

industries have been transformed into a new type of mixed industry, in which big Chinese state firms and capitalistic private firms compete with each other under imperfect competition.

In this paper, we first establish a third-country trade model of an international duopoly that consists of a Chinese state firm that is growing as a result of an economic liberalization policy and a capitalistic private firm that is standing by an export subsidy policy. Then, using such a model, we examine the effects of changes in the export subsidy of the capitalistic country and in the economic liberalization of China on world trade, respectively. Finally, we discuss their optimal levels. We especially concentrate on the reexamination of the traditional export subsidy policy in the rise of a Chinese state firm and on the investigation of the economic implications of the China's economic liberalization policy in the new international trade system.

The rest of the paper is organized as follows. In Section 2, we present a third-country trade model of an international Cournot duopoly that consists of a state firm in China and a private firm in a capitalistic country. In Section 3, adopting such a model, we first analyze the effects of a change in the export subsidy of the capitalistic country and compare them with those in Brander and Spencer (1985), and then we investigate the effects of a change in the economic liberalization policy of China. In Section 4, we discuss the optimal levels of these policies. Finally, in Section 5, we present some concluding remarks.

2. A Basic Model and Assumptions

Consider an international duopoly that is composed of a state-owned firm in China and a

private firm in a capitalistic country, both of which export homogeneous goods to a third-country market where they engage in Cournot competition.³ While the capitalistic private firm can act freely in its output decision, the Chinese state firm must fulfill a mandatory output quota Q allotted by China's government in the first place, and its discretionary choice of output X is marginal. Therefore, in our new third-country trade model, while the capitalistic private firm exports all its output to the third country, the Chinese state firm exports just the above-the-plan output $(X - Q)$ to the third country. Furthermore, we suppose, for simplicity, that while the government of the capitalistic country gives an export subsidy to its capitalistic private firm, the government of China does not give an export subsidy to its state-owned firm⁴. The Chinese government adopts the economic liberalization policy that decreases the output quota allotted to its state-owned firm instead of the export subsidy policy.

Though the Chinese state firm has to deliver its mandatory output quota Q to its government at the official price p_Q , it can supply the above-the-plan output to the third country and retain a modest share of the profits. Usually, the total cost C for producing X is given by a cost function $C(X)$ with features $C'(X) > 0$ and $C''(X) > 0$. However, when we describe the cost function of the Chinese state firm it is necessary and important to consider explicitly the effort of its manager.

Before the economic reform, the manager of the Chinese state firm aimed only to achieve the mandatory output quotas and had no incentive to make efforts to produce more than the planned output quota. However, the reform brought about dramatic changes in such

the manager's attitude towards his efforts. As the liberalization policy (that reduces the mandatory output quota) has progressed, the manager has devoted much greater effort to business administration and has improved production efficiency remarkably. This exemplifies a Chinese characteristic feature, such that a decrease in the output quota Q of the Chinese state firm improves its production efficiency, and *vice versa*.⁵ Therefore, taking this feature into consideration, we suppose that the cost function of the Chinese state-owned firm is given by

$$C = C(X, Q), \quad C_X > 0, \quad C_{XX} > 0, \quad C_Q > 0, \quad C_{QQ} > 0, \quad C_{XQ} > 0, \quad (1)$$

where letters with a (two) subscript (s) denote once (twice) derivative of the function with respect to its variable(s), such as $C_X = \frac{\partial C(X, Q)}{\partial X}$, $C_{XX} = \frac{\partial^2 C(X, Q)}{\partial X^2}$, $C_{XQ} = \frac{\partial^2 C(X, Q)}{\partial Q \partial X}$ and so on. Moreover, judging from the manager's behavior, there is little doubt that profit has become the dominant objective of the Chinese state firm.

Adopting the cost function given by (1), profit π of the Chinese state firm is given by

$$\pi = p_Q Q + P(X - Q + X^*)(X - Q) - C(X, Q), \quad (2)$$

where $P(X - Q + X^*)$ is the inverse demand function of the third country with a feature $P'(X - Q + X^*) < 0$ (henceforth, letters with an asterisk * are the variables and functions for the capitalistic country that correspond to those for China). Since $Q = 0$ holds when complete liberalization is achieved, (2) is reduced to $\pi = P(X + X^*)X - C(X)$. The Chinese state firm chooses its output X so as to maximize its profit defined as (2), given all other variables.⁶

By contrast, since the capitalistic private firm freely exports all its products to the third

country, its profit is defined in a manner similar to that in Brander and Spencer (1985):

$$\pi^* = P(X - Q + X^*)X^* - C^*(X^*) + s^*X^* \quad (3)$$

where X^* is output (= export) of the capitalistic private firm, $C^*(X^*)$ is its cost function with features $C^{*'}(X^*) > 0$ and $C^{*''}(X^*) > 0$, and s^* is a specific export subsidy given by its capitalistic government. The capitalistic private firm decides its output X^* so as to maximize its profit defined as (3), given all other variables.

In existing third-country trade models, no firm ever sells its goods in its own country. However, in our third-country trade model, though the capitalistic private firm still never sells its products in its country, the Chinese state firm supplies indirectly a fraction of its output to the domestic market through its government, by way of its mandatory output quota. Hence, the economic welfare W and W^* of China and the capitalistic country are given respectively by

$$W = \int_0^Q p(q) dq - p_Q Q + \pi, \quad (4)$$

$$W^* = \pi^* - s^*X^*, \quad (5)$$

where $p(q)$ and $\int_0^Q p(q) dq - p_Q Q$ are the inverse demand function of the goods market and consumer surplus in China, respectively. While the capitalistic government sets its export subsidy s^* so as to maximize W^* , the Chinese government chooses its output quota Q so as to maximize W .

Before the economic reform the official good price p_Q and the mandatory output quota Q in China were set artificially by the government without considering actual demand-supply relations in the domestic market. However, following the economic reform,

even the Chinese government cannot always compel the artificial price and it attempts to adopt a market-clearing price. Therefore, we regard that the official output price p_Q as being set by $p_Q = p(Q)$ by using the domestic inverse demand function $p(q)$. Therefore, the economic welfare W of China is rewritten as

$$W = \int_0^Q p(q) dq - p_Q(Q)Q + \pi. \quad (4)'$$

As in many other papers, we suppose that the firms' output choices and the governments' political decisions are made at two stages. At the first stage, the governments of China and of the capitalistic country set independently their political variables so as to maximize their own welfare, respectively. At the second stage, the Chinese state firm and the capitalistic private firm determine uncooperatively their outputs so as to maximize their profits, respectively. Then, we solve these optimization problems by backward induction.

3. Effects of Export Subsidy and Liberalization Policies

The Cournot-Nash equilibrium in the second stage is a pair of X and X^* that simultaneously satisfies

$$\pi_X = P(D) + P'(D)(X - Q) - C_X(X, Q) = 0, \quad (6)$$

$$\pi_{X^*} = P(D) + P'(D)X^* - C^{*'}(X^*) + s^* = 0, \quad (7)$$

where D represents $(X - Q + X^*)$. Apparently, (6) and (7) are respectively the first-order conditions (reaction functions) of the Chinese state firm and the capitalistic private firm. It is assumed that the industry equilibrium is locally stable and that the firms' reaction curves are

both downward sloping (that is, products of the two firms are strategically substitutive for each other). Hence, we have, as many papers have shown,⁷

$$\begin{aligned} \pi_{XX} < 0, \pi_{XX^*} < 0, \pi_{X^*X}^* < 0, \pi_{X^*X^*}^* < 0, \pi_{XX} \pi_{X^*X^*}^* - \pi_{XX^*} \pi_{X^*X}^* > 0, \\ \pi_{XX} < \pi_{XX^*} < 0, \pi_{X^*X}^* < \pi_{X^*X^*}^* < 0. \end{aligned} \quad (8)$$

Under the conditions of $\pi_{XX} < 0$ and $\pi_{X^*X^*}^* < 0$ in (8), the second-order conditions for (4) and (5) hold, respectively.

Obviously, since the official price of goods p_Q determined by the Chinese government is not included in either of (6) and (7), the Cournot-Nash equilibrium in the second stage does not depend on the China's official price of goods, and thus the firms' output-export decisions are also independent of it. However, these decisions depend on the export subsidy s^* of the capitalistic country and the mandatory output quota Q of China because (6) and (7) include both of them. In what follows, using (6), (7) and (8), we investigate the effects of changes in s^* and Q on output-export decisions of the Chinese state-owned firm and the capitalistic private firm, in order to clarify the features of the export subsidy policy of the capitalistic country and the liberalization policy of China in a new international trade system that consists of China and the capitalistic country.

First, to investigate the effects of a change in the export subsidy of the capitalistic country on industry equilibrium, we derive, from (6) and (7),

$$\begin{bmatrix} \pi_{XX} & \pi_{XX^*} \\ \pi_{X^*X}^* & \pi_{X^*X^*}^* \end{bmatrix} \begin{bmatrix} \frac{\partial X}{\partial s^*} \\ \frac{\partial X^*}{\partial s^*} \end{bmatrix} = \begin{bmatrix} 0 \\ -1 \end{bmatrix}. \quad (9)$$

Therefore, (8) and (9) combine to give

$$\frac{\partial X}{\partial s^*} = \frac{\pi_{xx^*}}{\Delta} < 0, \quad \frac{\partial X^*}{\partial s^*} = -\frac{\pi_{xx}}{\Delta} > 0, \quad \left| \frac{\partial X}{\partial s^*} \right| < \frac{\partial X^*}{\partial s^*}, \quad (10)$$

where $\Delta = \pi_{xx} \pi_{x^*x^*}^* - \pi_{xx^*} \pi_{x^*x}^* > 0$. Furthermore, taking into consideration that the export of the Chinese state firm and the total export of the two firms to the third country are given respectively by $E_x = X - Q$ and $D = E_x + X^*$, (10) presents

$$\frac{\partial E_x}{\partial s^*} = \frac{\partial(X - Q)}{\partial s^*} = \frac{\partial X}{\partial s^*} < 0, \quad \frac{\partial D}{\partial s^*} = \frac{\partial X}{\partial s^*} + \frac{\partial X^*}{\partial s^*} > 0. \quad (11)$$

Hence, (10) and (11) is paraphrased as

PROPOSITION 1. *An increase in the export subsidy of the capitalistic country (i) increases the output (= export) of the capitalistic country, (ii) decreases the output and export of China, and (iii) raises total export to the third country, and vice versa.*

While both the capitalistic firms in the third-country trade model established by Brander and Spencer (1985) export all their products to the third country, the Chinese state firm in our third-country trade model does not supply all its products to the third country and its export is less than its output, due to the mandatory output quota. In spite of such a difference, signs of the effects of a change in an export subsidy of the capitalistic country on firms' outputs and total supply to the third country are identical to each other in both models. This shows that participation of the Chinese state firm in the third-country trade does not disturb political order due to a change in the export subsidy as long as the Chinese state firm also

maximizes its profit even if it bears an official output quota. However, the economic impact generated by the participation of the Chinese state-owned firm in third-country trade will become clearer when the effects of a change in its output quota on the two firms are analyzed.

In order to examine the effects of a change in the mandatory output quota Q of China on the outputs and exports of the Chinese state firm and the capitalistic private firm, we solve

$$\begin{bmatrix} \pi_{XX} & \pi_{XX^*} \\ \pi_{X^*X}^* & \pi_{X^*X^*}^* \end{bmatrix} \begin{bmatrix} \frac{\partial X}{\partial Q} \\ \frac{\partial X^*}{\partial Q} \end{bmatrix} = \begin{bmatrix} 2P'(D) + P''(D)(X - Q) + C_{XQ}(X, Q) \\ P'(D) + P''(D)X^* \end{bmatrix}. \quad (12)$$

Then, the effect of a change in Q on output X of the Chinese state-owned firm is given by

$$\frac{\partial X}{\partial Q} = \frac{(C_{XX} + C_{XQ})\pi_{X^*X^*}^* + \Delta}{\Delta} = \frac{(C_{XX} + C_{XQ})\pi_{X^*X^*}^*}{\Delta} + 1. \quad (13)$$

This equation demonstrates that the effect of a change in the output quota on the output of the Chinese state firm is composed of two effects. The first term is the effect that depends on changes in its cost efficiency that result from a change in output quota, and the second term is the effect that is induced literally by a change in output quota. So, let us call the first effect **the quota-oriented efficient effect** and the second effect **the quota-oriented output effect**. Therefore, it is restated that the effect of a change in the output quota on the output of the Chinese state firm is equal to the sum of the quota-oriented efficient effect and the quota-oriented output effect.⁸

Taking into consideration (1) and (8), while the quota-oriented efficient effect is negative,

the quota-oriented output effect is positive. Therefore, the effect of a change in the output quota on the output of the Chinese state firm is ambiguous when judging from (13). However, it is well known that the quota-oriented efficient effect has been dominant over the quota-oriented output effect during the period of economic reform in China. Therefore, in such a situation we can get

$$\frac{\partial X}{\partial Q} < 0, \quad (13)'$$

which means, in turn, that a promotion of economic liberalization (a decrease in Q) in China increases the output of the Chinese state firm. We can now present

PROPOSITION 2. *An extension of output liberalization (a reduction in the mandatory output quota) in China increases the output of the Chinese state firm during the economic reform period when the quota-oriented efficiency-improving effect is dominant over the quota-oriented output expansion effect.*

In practice, since a reduction in the output quota (output liberalization) increases the discretionary range in output-export choice of the manager in the Chinese state-owned firm and thus improves its production-management efficiency, the output of the Chinese state-owned increases definitively as a result. Such economic reasoning coincides with the actual economic fact that China was able to experience its economic growth through executing the output liberalization of Chinese state-owned firms.

Since the export of the Chinese state-owned firm is $E_x = (X - Q)$, the effect of a

change in Q on the export of the Chinese state-owned firm is under the conditions of (1) and (8) given by

$$\frac{\partial E_x}{\partial Q} = \frac{\partial(X-Q)}{\partial Q} = \frac{\partial X}{\partial Q} - 1 = \frac{(C_{xx} + C_{xQ})\pi_{x^*x^*}^*}{\Delta} < 0. \quad (14)$$

Furthermore, because (14) shows $\frac{\partial E_x}{\partial Q} - \frac{\partial X}{\partial Q} = -1 < 0$, this immediately presents

$$\frac{\partial E_x}{\partial Q} < \frac{\partial X}{\partial Q} \quad (15)$$

Therefore, (14) and (15) combine to demonstrate

PROPOSITION 3. *An extension of output liberalization in China expands the export of China. Furthermore, the rise in China's export induced by such economic liberalization is larger than that of her output.*

On the other hand, taking account of (1) and (8), the effect of a change in Q on output X^* of the capitalistic private firm is immediately given by

$$\frac{\partial X^*}{\partial Q} = -\frac{(C_{xx} + C_{xQ})\pi_{x^*x^*}^*}{\Delta} > 0. \quad (16)$$

It is obvious from (16) that the promotion of China's economic liberalization reduces the exports of the capitalistic private firm to the third country. Consequently, (15) and (16) combine to illustrate that while the extension of China's economic liberalization expands the international market share of the Chinese state firm, it reduces the international market share of the capitalistic private firm. The extension of China's economic liberalization results in strengthening the international competitive power of the Chinese state-owned firm.

However, (15) and (16) do not demonstrate that the promotion of China's economic liberalization reduces total export D to the third country (= consumption of the goods in the third country) that is the sum of E and X^* . Therefore, considering (1), (8), (14) and (16), the effect of a change in Q on the total export D to the third country is given by

$$\frac{\partial D}{\partial Q} = \frac{\partial E_x}{\partial Q} + \frac{\partial X^*}{\partial Q} = \frac{\{P'(D) - C^{**}(X^*)\}(C_{xx} + C_{xQ})}{\Delta} < 0. \quad (17)$$

That is, the extension of China's economic liberalization increases the total export to the third country by the two firms. Furthermore, considering the demand function defined above, (17) implies simultaneously that the extension of China's economic liberalization results in a decline in the price of the goods in the third country. Therefore, we get

PROPOSITION 4. *While an extension of economic liberalization in China reduces the exports of the capitalistic private firm, it raises the total exports of the good to the third country and lowers its price in the third country.*

Apparently, since an extension of economic liberalization in China has positive effects on the third country, the third country should welcome the policy. Indeed, the economic liberalization in China was supported by many third-party countries. Therefore, such a phenomenon can be regarded as one of the reasons why China was able to strongly promote its economic reforms. Moreover, Proposition 4 shows, together with Proposition 3, that the economic liberalization of the Chinese state-owned firm works effectively as a trade policy for China. China can control its international market share as well as its export of goods by

varying the degree of its economic liberalization.

4. Optimal Export Subsidy and Liberalization Policies

In this section, we concentrate on the optimal output liberalization policy in China in the first stage. As was described in Section 2, while the Chinese government sets its mandatory output quota Q so as to maximize its economic welfare defined as (4):

$$W = \int_0^Q p(q) dq - p_Q Q + \pi, \quad (4)$$

the government in the capitalistic country determines its export subsidy so as to maximize its economic welfare given by (5):

$$W^* = \pi^* - s^* X^*. \quad (5)$$

The industry equilibrium in the first stage is given as a pair of Q and s^* that simultaneously satisfies

$$\frac{\partial W}{\partial Q} = p(Q) - P'(D)(X - Q) - P(D) - C_Q(X, Q) + P'(D)(X - Q) \frac{\partial X^*}{\partial Q} = 0, \quad (18)$$

$$\frac{\partial W^*}{\partial s^*} = \frac{\partial \pi^*}{\partial X} \frac{\partial X}{\partial s^*} - s^* \frac{\partial X^*}{\partial s^*} = 0. \quad (19)$$

Of course, (18) and (19) are the first-order conditions for maximizing W and W^* , respectively. It is assumed that the second-order conditions of W and W^* maximization and the stability conditions of industry equilibrium are all satisfied.

Although (18) and (19) are mutually dependent on each other, the optimal economic liberalization of China and the optimal export subsidy of the capitalistic country are respectively examined by using (18) and (19) separately. Then, substituting $s^* = 0$ into the

right-hand side of (19) and considering $\frac{\partial \pi^*}{\partial X} < 0$ and $\frac{\partial X}{\partial s^*} < 0$, we find that $\frac{\partial W^*}{\partial s^*} > 0$

holds at $s^* = 0$. Therefore, we can present

PROPOSITION 5. *The optimal export subsidy of the capitalistic country is still positive in a new international trade structure that includes China.*

This proposition demonstrates that the optimal export subsidy of the capitalistic country in our model is also positive, as is similar to that of the capitalistic country in the international trade system consisting of only capitalistic countries that was assumed by Brander and Spencer (1985). Therefore, Proposition 1 and Proposition 5 combine to show that the export subsidy of the capitalistic country proposed by them does not vary its essential features even by the rise of China which has a different type of firm.

On the other hand, substituting $Q = 0$ into the right-hand side of (18), we have

$$\frac{\partial W}{\partial Q} = p(Q) - P'(D)X - P(D) - C_Q(X, Q) + P'(D)X \frac{\partial X^*}{\partial Q} \quad (18)'$$

at $Q = 0$. Apparently, the optimal output quota is positive when the right-hand side of (18)' is positive, and thus imperfect economic liberalization is best for China. By contrast, the optimal output quota becomes zero if the right-hand side of (18)' is non-positive, and perfect economic liberalization becomes optimal for China. However, the right-hand side of (18)' would not be decided in general, because the former two terms and the latter three terms in the right hand side of (18)' have different signs, respectively. Though the probability that the right-hand side of (18)' is negative is large, we can not exclude the possibility that it is

positive under certain reasonable conditions. For example, it becomes positive in the case where the absolute value of $P'(D)$ is big enough while $C_Q(X, Q)$ and $\frac{\partial X^*}{\partial Q}$ are both small enough. Hence, the above arguments for China's optimal economic liberalization policy are summarized as

PROPOSITION 6. *Though China's economic liberalization increases the output and export of China, perfect economic liberalization is not always best for China. There is the possibility that imperfect economic liberalization is optimal for China under certain conditions.*

Though it has been often said that the perfect economic liberalization of the Chinese state-owned firm is the best for China and should be achieved at once, this proposition indicates that such an assertion is not always true. From a theoretical point of view, the perfect economic liberalization of the Chinese state-owned firm does not maximize China's economic welfare in certain cases. In addition, from a practical point of view, it implies for China to lose the effective means to manage its international trade. Unlike Russia, which carried out a big-bang type of economic reform that aimed to achieve perfect economic liberalization at a stroke, China adopted a gradual economic reform and thus was doubted of its successful achievement. However, Proposition 6 suggests that the gradual economic reform chosen by China can be seen as appropriate for China in searching for its optimal level of economic liberalization, as well as in controlling its economic confusion that might

ensue from the economic reform.

5. Conclusions

Recently, China has attracted widespread attention because of her remarkable expansion of output and international trade caused by her economic liberalization policy. Some capitalistic countries, however, have misgivings about the final state of such economic reform by China because her economic system is quite different from those of the capitalistic countries. This is because no papers have examined the effects of the economic liberalization policy of China on the world economy and the optimal level of China's economic liberalization.

In this paper we have analyzed the export subsidy policy of a capitalistic country and the economic liberalization policy of China in a new international Cournot duopoly consisting of a capitalistic private firm and a Chinese state-owned firm. It is supposed that, while the capitalistic government gives an export subsidy to its private firm, the Chinese government allot an output quota to its state-owned firm. Furthermore, it is assumed that, while the firms choose uncooperatively their output-export levels so as to maximize their profits, the governments set independently their political variables so as to maximize their own economic welfare. To achieve this purpose, we have extended the third-country trade model of international oligopoly established by Brander and Spencer (1985). Thus, we have derived several interesting results, which are summarized as propositions.

It is shown, as one of the main findings, that the propositions about the export subsidy of the capitalistic country presented by Brander and Spencer (1985), who considered a

traditional trade system consisting of only capitalistic private firms, are also true in a new trade system composed of the capitalistic private firm and the Chinese state-owned firm without any essential modification. Furthermore, it is demonstrated, as another main finding, that China's economic liberalization of a state-owned firm is effective as a trade policy and that the perfect economic liberalization of the Chinese state-owned firm is not always best for China. Then, it would be inferred from these findings that in a case where China adopts the export subsidy policy in addition to the economic liberalization policy though, we did not suppose such a case explicitly in this paper, even if China discards the export subsidy policy as a condition of FTA (Free Trade Agreement) with capitalistic countries, she can still retain the economic liberalization policy as a powerful trade policy.

It might be thought that if China were to achieve the perfect economic liberalization of the Chinese state-owned firm, our model would be reduced to the model established by Brander and Spencer (1985), and that this paper would therefore lose its significance. However, such reasoning is invalid. As long as the present government continues to exist, China will not become a perfectly capitalistic country even if she achieves perfect economic liberalization. Therefore, even if China were to adopt the perfect economic liberalization of the Chinese state-owned firm in certain economic cases, she will recover the imperfect economic liberalization of the Chinese state-owned firm during other economic situations. This paper examines the conditions under which China should adopt the perfect or imperfect economic liberalization of the Chinese state-owned firm. Moreover, even if China were to become a completely capitalistic country, this paper would retain its value, because it clarifies some important features of China's economic liberalization policy during its

economic reforms. The government of China would do well to pay some more attentions when adopting its optimal economic liberalization policy.

In this paper, we have investigated the export subsidy policy of a capitalistic country and the economic liberalization policy of China in a third-country trade model. The model can be extended in some different directions. It would be interesting and useful, for example, to examine these policies by building a reciprocal trade model. One can extend the model so as to reexamine the policies through constructing a Stackelberg duopoly model or in a Bertrand duopoly. Some propositions presented in this paper could then be reassessed from a new theoretical point of view.

Footnotes

1. Among many papers, see Eaton and Grossman (1986) and Janeba (1998), for example. Eaton and Grossman (1986) have shown, among others, that when firms export goods under Bertrand competition, a rise in export subsidy raises all the firms' prices and the optimal export subsidy is negative. However, Janeba (1998) has demonstrated that when the firms have willingness to exploit tax or subsidy differentials by relocating production, laissez-faire is the only equilibrium.
2. See Dong and Putterman (2002 and 2003), Gordon and Li (1991), Jefferson (1994), Jefferson and Rawski (1994), Li (1997 and 1999), and Lin, Cai and Li (1998), for example.
3. Li (1999) has assumed that Chinese markets are all perfectly competitive, but the assumption of imperfectly competitive markets seems to be more plausible in such industries as are dominated by big state firms. The recent surge of exports from China's state industries includes large sales to the United States and Japan. Thus, large Chinese state-owned firms have begun vigorous oligopolistic competition with big private firms in the United States and/or Japan in several overseas markets.
4. This assumption is to crystallize contrasts between the export subsidy policy of the capitalistic country and the economic liberalization policy of China, but it is not difficult to introduce the export subsidy policy of China into the model.
5. As regards the firms' production efficiency in communist countries, see Bergson (1987 and 1992), Danilin, Materov, Rosefielde and Lovell (1985), Murphy, Shleifer and Vishy (1992), Dong and Putterman (2003) and Li (1999), for illustration. Though, working

with panel data, Hay and Liu (1992) found that standard neoclassical cost functions can model the behavior of state enterprises successfully, I suppose that it is more plausible to introduce explicitly a factor that represents manager's effort or production efficiency into the cost function of the Chinese state-owned firm.

6. If the Chinese state-owned firm is completely liberalized ($Q = 0$), then (2) is reduced to

$\pi = P(X + X^*)X - C(X) + sX$. Thus, in such a case, our third-country trade model would coincide with that of Brander and Spencer (1985).

7. As regards the stability conditions for a Cournot industry, see Okuguchi (1976) and Kolstad and Mathiesen (1987), for example.

8. It is supposed that the quota-oriented efficient effect works only during the period

when the output liberalization policy is adopted in the range that $(X - Q) > 0$ holds

and that it reduces to zero when $(X - Q) = 0$ holds. Therefore, in such a case where

$(X - Q) = 0$ holds, $\frac{\partial X}{\partial Q} = 1$ holds, and the Chinese state-owned firm produces just

the mandatory output as its obligation.

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