연세경제연구 제 X 권 제 I 호
Yonsei Economic Studies, Vol. X, No. I (March 2003)

# Optimal Competition Policy for Export Marketing Boards

Jae Hyeong Kang* · Sanghack Lee** · Sanghoon Lee***

This note derives optimal competition policy for export marketing boards dealing with many products. The optimal number of export marketing boards is shown to be one plus the ratio of weighted sum of the slopes of export supply curves relative to weighted sum of the slopes of import demand curves. Utilizing graphic methods, this note also discusses the effects of fixed costs on the optimal number of export marketing boards.

## I. Introduction

Many agricultural products are traded through marketing boards. The marketing boards are in charge of international trade for a variety of products such as cocoa, coffee, rice, tea, wheat, etc.. As an evidence of their important role in international trade, Krishna and Thursby [4] have noted that Ghanan and Nigerian boards together accounted for approximately 40 percent of world cocoa exports in the 1960s and 1970s. They have also noted that sales of the

* School of Economics. Kookmin University, Seoul 136-702, Korea.
** School of Economics, Kookmin University, Seoul 136-702, Korea.
*** Kyonggi Development Institute.

Asian tea boards account for two-thirds of USA tea imports. National governments are likely to encourage their trading corporations to perform the roles of marketing boards for such products. Sogo-shosas of Japan and general trading companies of Korea, respectively, are examples related to such government policies.[1)]

Since marketing boards affect international trade flow, government policies toward them can be considered as trade policies as well.[2)] Then, it is natural to compare the government policies with other trade policies such as export taxes and import tariffs. Another important point pertaining to marketing boards is the possibility that there exist several marketing boards for a single product. Implicit assumption of the received literature is that there exists a single board for each product.[3)] However, several marketing boards can engage in marketing or international trade of the same product. For instance, Lee and Lee [5] have noted that Korea imports feed grain through four agencies similar to marketing boards. Export of agricultural products of Korea is also conducted largely by a few trading corporations. Lee and Lee [5] have derived the optimal competition policy for marketing boards dealing with a single product.

Extending the analysis of Lee and Lee [5], this paper derives the optimal competition policy for export marketing boards dealing with many products. By competition policy we mean allocation of "license to export" without quantity restriction. This competition policy is different from export quotas in

1) Cho [1] offers a detailed explanation for the fole of trading corporations. In general, trading corporations treat a vast variety of products, while marketing boards account for specialized items, respectively.

2) Schmitz, *et al.* [8] recognize marketing boards as one of several forms of cartel institutions.

3) If the objective of a board is to maximize national welfare, there exists an incentive-compatibility issue, since the board is likely to maximize its own profit rather than nation welfare. Managerial efficiency of marketing boards may also be evaluated by measurable profits of the boards rather than by national welfare which is hard to observe.

that quantity restriction is not levied on license holders.

The remainder of this note is organized as follows. Section Ⅱ considers the case in which each marketing board deals with several products. Section Ⅲ examines the effect of fixed costs on the optimal number of marketing boards. The final section provides conclusions.

## Ⅱ. Optimal Competition Policy with Many Products

We examine the case in which each marketing board deals with several products. There are $n$ marketing boards. Each marketing board is assumed to be a profit-maximizing Cournot-Nash competitor. The home country exports $g$ kinds of products. Marketing board $j$ exports $q_{ij}$ amount of product $i$. Let $Q^i$ denote the aggregate export volume of the product $i$. Thus, $Q^i = \sum_j q_{ij}$, for $i = 1, \cdots, g$. The price of the product $i$ is denoted by $P^i(Q^i)$. The supply of product $i$ is given by $S^i(Q^i)$. For simplicity, per-unit processing costs and fixed costs are assumed to be zero. Then, the aggregate profit of marketing board $j$ is given by

$$\Pi^j = \sum_i (P^i(Q^i)q_{ij} - S^i(Q^i)q_{ij}) \tag{1}$$

note that marketing board $j$ pays $S^i(Q^i)$ per-unit price to domestic suppliers and receives $P^i(Q^i)$ per-unit price from consumers abroad. The first-order conditions for profit maximization are given by

$$\partial\Pi^j/\partial q_{ij} = (P^i(Q^i))'q_{ij} + P^i(Q^i) - (S^i(Q^i))'q_{ij} - S^i(Q^i) = 0 \tag{2}$$
$$\text{for } i = 1, \cdots, g$$

summing equation (2) over $j=1,\cdots,n$, i.e., for each product, we obtain

$$(P^i(Q^i))'Q^i + nP^i(Q^i) - (S^i(Q^i))'Q^i - nS^i(Q^i) = 0 \qquad (3)$$
$$\text{for } i = 1,\cdots,g$$

national welfare of the home country is given by

$$W = \sum_i (P^i(Q)Q^i - \int_0^Q S^i(q)dq) \qquad (4)$$

without processing costs, $W$ is the sum of producer surplus of each product. The home government can maximize $W$ by suitably choosing the number of marketing boards $n$. The optimal number is obtained by solving the first-oder condition of welfare maximization:

$$dW/dn = \sum_i [(P^i(Q^i))'Q^i + P^i(Q^i) - S^i(Q^i)](dQ^i/dn) = 0 \qquad (5)$$

the physical units of the products can be suitably chosen so that $(dQ^i/dn)$ $= \cdots = (dQ^g/dn)$. Then the following proposition holds.

**Proposition** Suppose that the physical units of the products are suitably chosen so that $(dQ^1/dn) = \cdots = (dQ^g/dn)$ at $n^*$. Then, the optimal number of export marketing boards is given by one plus the ratio of the quantity-weighted sum of the slopes of the export supply curves relative to the quantity-weighted sum of the absolute slopes of the import demand curves. That is,

$$n^* = 1 - [\sum_i (S^i(Q_*^i))'Q_*^i]/[\sum_i (P^i(Q_*^i))'Q_*^i]$$

< proof >

Since $(dQ^1/dn) = \cdots = (dQ^g/dn) > 0$, from equation (5) it follows that

$$\sum_i (P^i(Q^i))' Q^i + \sum_i P^i(Q^i) - \sum_i S^i(Q^i) = 0 \qquad (5)'$$

summation of equation (3) over $i$ and arrangement gives

$$n = [-\sum_i (P^i(Q^i))' Q^i + \sum_i (S^i(Q^i))' Q^i] / [\sum_i (P^i(Q^i)) - \sum_i (S^i(Q^i))]$$

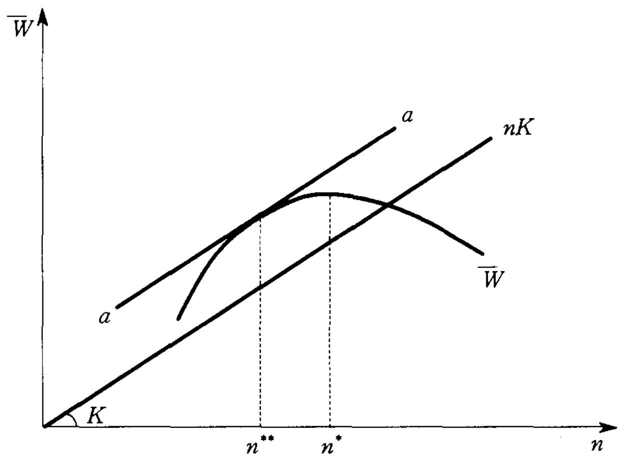
then, utilizing equation $(5)'$, $n^*$ is obtained. Q.E.D.

The method developed by Lee and Lee [5] is shown to be applicable to the case with multiple products as well. Slopes of export supply and import demand curves with large trade volumes have greater effects on the optimal number of export marketing boards.

## Ⅲ. Optimal Competition Policy with Fixed Costs

In this section we discuss the effect of fixed costs on the optimal number of export marketing boards. If the fixed cost is relatively small compared to market size, the analysis in section Ⅱ may not be significantly affected. The optimal number of marketing boards derived in section Ⅱ may also be considered as the upper limit to the optimal number. Another plausible case in which the fixed cost can be assumed zero is the one where the home government purports to streamline the export industry consisting of too manyfirms. In such a case, fixed cost can be considered as a sunk cost which

〈Figure 1〉




does not affect the optimal competition policy.

In this section we derive the optimal competition policy via graphical method. National welfare inclusive of fixed costs, $W^*$, can be written as:

$$W^* = W - nK \tag{6}$$

where $K$ denotes a fixed cost of each board. The optimal number of marketing boards can be obtained by solving the first order condition for welfare maximization, given by:

$$dW^*/dn = dW/dn - K = 0 \tag{7}$$

in 〈Figure 1〉, the slope of the line aa is equal to that of the ray $nK$ from the origin. The larger $K$ is, the steeper the ray $nK$. The vertical difference between $W$ and $nK$ represents national welfare $W^*$, which is maximized at $n^{**}$. Note that the optimal number derived in section Ⅱ corresponds to $n^*$ in

〈Figure 1〉. An increase in $K$ rotates the ray $nK$ counter-clockwise. Then the line $aa$, whose slope is equal to that of the ray $nK$, slides to the left on the $W$ curve. Thus, $n^{**}$ decreases. Conversely, a decrease in $K$ rotates the ray $nK$ clock-wise and tends to increase $n^{**}$, the upper limit of which is given by $n^{*}$.

## IV. Concluding Remarks

Relatively little attention has been paid to the optimal policy pertaining to exports produced by perfectly competitive industries. Given the substantial amounts of such products at present and their potential in the future, this neglect is difficult to justify. When export marketing boards deal with several products, the optimal number of export marketing boards is given by one plus the ratio of the quantity-weighted sum of the slopes of the export supply curves relative to the quantity-weighted sum of the absolute slopes of the import demand curves. A graphic method to derive the optimal competition policy with fixed costs is also presented.

There are several ways to extend the present analysis. One of them is to apply the method developed in this paper to actual situations to derive the optimal number of marketing boards for a particular product through econometric work. With data on export supply curve, import demand curve and fixed costs, this might be done without much difficulty. Another significant extension is to derive the optimal competition policy for import marketing boards. With suitable revision, the analysis in this paper can be applied to examine the optimal import policy as well.

## ▣ *References* ▣

1. Cho, D. S., *The General Trading Company*, Lexington Books, 1987.
2. Dixit, A., "International Trade Policies for Oligopolistic Industries," *The Economic Journal* 94, Supp. 1984, pp. 1～16.
3. Helpman, E. and P. Krugman, *Trade Policy and Market Structure*, MIT Press, 1989.
4. Krishna, K. and M. Thursby, "Optimal Policies and Marketing Board Objectives," *Journal of Development Economics* 38, 1992, pp. 1～15.
5. Lee, S. and S. Lee, "Optimal Competition Policy for Marketing Boards," *Yonsei Economic Studies*, Vol. 4, No. 1, 1997, pp. 11～23.
6. Lee, S. and Y. C. Kim, "Optimal Competition Policy for an Oligopolistic Export Industry," *Seoul Journal of Economics* 7, 1994, pp. 337～353.
7. Markusen, J. R., "The Welfare and Allocative Effects of Export Taxes versus Marketing Boards," *Journal of Development Economics* 14, 1984, pp. 19～36.
8. Schmitz, A., McCalla, A. F., Mitchell D. O. and C. Carter, *Grain Export Cartels*, Ballinger Publishing Company, 1981.