

Economics of Sugarcane and Sugar Production in Thailand

**Assoc. Prof. Dr. Sompong Orapin*

***Professor Dr. Seiichi Fukui*

Introduction

The GATT agreement on world agricultural trade system in 1994 are supposed to influence agricultural and food trade policies in the future.

Meanwhile, there have been debates on the effectiveness of the manufactural support policies including food industry support policy since 1970's¹

In Japan, especially since 1980's such policies have been viewed as effective to industrial development.² But in our opinion, we need further investigation because the effectiveness of the policies is controversial according to the more recent views on the state role of development.

First, we need to examine the viewpoint concerning the effectiveness of "Strategic Trade

Policies" on the miracle economic growth in East Asian countries. As widely known, the East Asian countries have achieved the economic growth during a decade by their export-oriented development policies. We should make clear the consistency of these development policies with "Strategic Trade Policies".

Secondly, there was a debate between World Bank and Japanese Government on which was more appropriate development policy, the selective intervention policy introduced by Japan and South Korea or the allied market by Southeast Asian countries, for instance, Indonesia, Malaysia and Thailand.³ The latter is defined as the development policy which makes the best use of market

*คณบดีบัณฑิตวิทยาลัย มหาวิทยาลัยธุรกิจบัณฑิต : Ph.D. (Agricultural Policy), Faculty of Agriculture, Kyoto University, Kyoto, Japan.

**Professor, Faculty of Economics, Osaka Gaku-in University, Osaka, Japan.

¹See Kaizuka [1973]

²See Ito, Kiyono, Okuno and Suzumura [1984] and The World Bank [1993]

³See World Bank, op. cit.

mechanism and admits only a minimum government intervention. The World Bank supports this type of policy as suitability of the present developing countries while Japanese government asserts some industrial support policies are indispensable, though the World Bank also admitted that the developing countries should compensate the losses caused by market failures, such as coordination failure within the private sectors, information – relating externality and credit rationing with the least government intervention. We need to reexamine the validity of each viewpoint.

Thirdly, the effective government intervention premises not only the capable bureaucrats and appropriate political systems but also the condition that the political activities of interest groups and/or pressure groups do not interrupt the government intervention. During the heyday of development economics, it is assumed that the government has played a focal role for the successful practices of development. The modern political economy, however, asserts that government cannot play such a role. But, even if the bureaucratic and political systems are not suitable for development, the appropriate political activities by private sectors which aim at industrial development can amend the government failure. We need to investigate the role of political activities by private sectors for development under the situation of serious government failure.

The objectives of this research are (i) to elucidate the way and to what extent Thai sugarcane growers, sugar millers and exporters have influenced the government policies through their political

activities, (ii) to test the hypotheses on increasing return in sugar production, and on effectiveness for production growth of sugar policies and (iii) to investigate the future direction of Thai sugarcane and sugar industry policies under the World Trade Organization.

An Quantitative Analysis of Thai Sugar Policy

1) Market Equilibrium of sugar under sharing system: Firstly, we predetermined a hypothetical model to compare the economic welfare under sharing system with the other.

Figure 1 shows the model in which we assume that Thailand is a small country in the world sugar market and that transportation cost is zero.

The average selling price of sugar is equal to the weighted average of P_d and P_w

$$P = [P_d \cdot Q_d + P_w (Q^* - Q_d)] / Q^*$$

Next, we compare the consumer's and producer's surplus in the price discrimination model with those in the competitive model.

In the competitive model, the consumer's surplus is given by ack and producer's surplus is given by ego. In the price discrimination model under sharing system, the consumer's surplus is measured by area aph which is less than ack because of the higher domestic price while the producer's surplus is measured by cknf which is calculated by deducing the production cost goQ*n from the total gross revenue of sugar $P \cdot Q^*$. The consumer's surplus decreased by area P_d hkc and the producer's surplus increased by area ckme. If the

welfare weight of consumer is equal to the producer's, in other words, if the welfare weights are the same, the reduction of consumer's surplus offsets the increase of producer's surplus by area fgn. Therefore, the price discrimination under sharing system causes social welfare loss fgn.

Figure 1 : Market Equilibrium in the Short-run under Sugar Control Policy ($P_d > P_w^*$)

2) Modelling the Estimation of Welfare Weights :

$$\text{Consumer's Surplus} = \int_0^{Q_d} P_d \cdot dQ_d - P_d \cdot Q_d \quad \dots\dots\dots (1)$$

$$\text{LN}(Q_d) = \alpha_0 + \alpha_1 \cdot \text{LN}(P_d) + \alpha_2 \cdot Z_d \quad \dots\dots\dots (2)$$

$$\text{Producer's Surplus} = \int_0^{Q^*d} P_x \text{MC} \cdot dQ \quad \dots\dots\dots (3)$$

$$\text{LN}(Q) = \beta_0 + \beta_1 \cdot \text{LN}(\text{MC}) + \beta_2 Z \quad \dots\dots\dots (4)$$

$$W = \text{CS} + \theta \cdot \text{PS} \quad \dots\dots\dots (5)$$

Figure 1 : Short-run Market Equilibrium of Sugar under Sugar Control Policy

3) Estimation of Demand and Supply Functions

$$\text{LN}(C_t) = -4.53 - 0.216\text{LN}(P_t) + 0.542\text{LN}(Y_t) + 0.406(C_{t-1})$$

(-1.09) (2.93) (2.07)

The popular supply function with finite polynomial lags is Almon type follows:-

$$\text{LN}(S_t) = \alpha_0 + \sum_{i=1}^n \alpha_i \text{LN}(P_{t-i}) + \sum_{j=1}^M \beta_j \cdot \ln(S_{t-j}) + \gamma \cdot T + \delta \cdot Z$$

The general Nerlovian supply function is formulated by:-

$$\text{LN}(S_t) = \alpha_0 + \sum_{i=1}^n \alpha_i \cdot \text{LN}(P_{t-i}) + \sum_{j=1}^m \beta_j \cdot \text{LN}(S_{t-j}) + \gamma \cdot T + \delta \cdot Z$$

We specify the model as follows:-

$$\text{LN}(Q_t) = \alpha_0 + \alpha_1 \cdot \text{LN}(Q_{t-1}) + \alpha_2 \cdot \text{LN}(P_{t-1}) + \alpha_3 \cdot \text{LN}(P_{t-2}) + \beta_1 \cdot Z_1 + \beta_2 \cdot Z_2 + \beta_3 \cdot Z_3$$

The Estimation Results

Table 2 shows the welfare weights of sugar industry which are calculated from the estimation results in Table 1. According to it, θ 's are higher than one except for 1973-76, the period after oil crisis. This indicated that the government had made a protection policies for sugar industry except for the booming period after oil crisis. Especially the average value of θ after sharing system was introduced, is 1.13 which is higher than 1.085 the average value before sharing system except for 1973-76. This fact suggests that the

government reinforced the protection policy after introducing sharing system. But because even the maximum value of θ is 1.18, the degree of protection given to sugar industry is not so high as expected.⁴

For the supply function of sugar, the price elasticities of supply are 0.8 for shortrun and -18.0 for long-run. This finding indicates that the supply responses of sugar producers to price changes have been very elastic and Thai sugar industry has been expanding their production capacity to comply with the declining long-term trend of real price in

⁴We did not take into consideration of direct subsidy to sugar industry because we could not get the data.

contrast with the Philippines sugar industry which have restricted their production in response to the depression in the world sugar market.⁵

From the short and long-run supply behaviors, we can hypothesize that in the short-run, sugar industry maximized their profits by equalizing the marginal cost to price while it continuously cut the production cost by technical change in the long run.

If this is the case, the long run marginal cost function and also average cost function can be regarded as a downward sloping envelope function of short run functions. So it is highly probable that "increasing return" characterizes Thai sugar industry.

In addition, the parameters of two policy implication dummy variables are positive but insignificant. Therefore, we can not conclude that the sugar policies had positive effects on the sugar production.

Summary and Conclusion

A competitive market of the products characteristics of increasing return can not continue to exist because the private rate of return is not equal to social rate of return there.

In an oligopolistically or monopolistically competitive market, the agents must collect the information about their competitors and the others

besides price information. Such information costs are unignorable expensive.

Traditionally there existed the rationale for government intervention to correct market failures caused by externalities or imperfect information.⁶ More recently, government behavior has been viewed as a political-economic process driven by Recardian rent-seeking pressure exerted by interest group.⁷ What do we consider the case of Thai sugar policies?

As shown in the previous sections, "increasing return" and oligopolistic markets which are characteristics of Thai sugar industry, cause market failure. Following the traditional view, the government intervention can contribute to increase of social welfare or production efficiency by correcting the failure while the intervention driven by the rentseeking political activities of interest groups is liable to arouse social welfare loss, according to the more recent view. In the case of Thai sugar industry, however, we could not find any evidence that the government intervention has a significant effect on social welfare or production efficiency. And although the owners of Thai sugar industry has sometimes pressed the government to make industrial protection policies by political activities, it was limited to the period when they faced the difficulties cause by heavy decline in the world market price.

⁵For the Philippines case, see Washio, op. cit., and Sugar Industry Association [1995 a].

⁶See Ito, et.al., op. cit.

⁷See Sugar Industry Association [1995b].

Therefore, we can conclude that Thai sugar industry has not grown rapidly by industrial support policy but by enterprise spirit such as making best use of “increasing return” and comparative advantage in production cost. □

Table 1: Estimation Results of Sugar Supply Function

Dependent Variable	LN(Qt)		
	Model I	Model II	Model III
Constant	-1.43	4.67	2.51
LN(Q _{t-1})	1.01 (13.18)*		
LN(P _{t-1})	0.8 (2.98)*	0.67 (2.22)**	0.79 (2.47)**
LN(P _{t-2})	-0.62 (-3.37)*	0.31 (1.35)	0.17 (0.64)
LN(P _{t-3})			0.29 (1.11)
LN(Z ₁)	0.18 (1.45)	0.086 (0.62)	0.14 (0.95)
LN(Z ₂)	0.09 (0.43)	-0.27 (-1.1)	-0.27 (-1.1)
LN(Z ₃)	-0.29 (-2.11)**	-0.22 (-1.41)	-0.26 (-1.62)
T		0.15 (11.64)*	0.16 (10.22)*
Adj. R ²	0.95	0.93	0.93

Note: The values in parenthesis are statistics. *Indicates 1% of significance level;

**5% of significance level.

Table 2: Table 2: Welfare Weights given to Sugar Industry

Year	Welfare weights	Year	Welfare weights
1966	1.11	1980	1.08
1967	1.09	1981	1.18
1968	1.12	1982	1.11
1969	1.08	1983	1.16
1970	1.10	1984	1.15
1971	1.09	1985	1.17
1972	1.05	1986	1.17
1973	0.99	1987	1.15
1974	0.83	1988	1.13
1975	0.77	1989	1.10
1976	0.97	1990	1.08
1977	1.00	1991	1.12
1978	1.05	1992	1.13
1979	1.06		