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<td>Author(s)</td>
<td>三田原 謙平</td>
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<tr>
<td>Citation</td>
<td>兵庫大学経済学部、経済、商産、法律論集 1996，40，p.25-31</td>
<td>未定</td>
</tr>
<tr>
<td>Issue Date</td>
<td>1996-03-31</td>
<td></td>
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Dual-Track System in Transitional Economies

Katsuhiro Miyamoto

1. Introduction

In December 1991, the former Soviet Union collapsed and many socialist countries began to shift from centralized planning economies to market economies. There are many kinds of transitional processes from centralized planning economies to market economies. The former Soviet Union and East European countries adopted the “Shock Therapy” stabilization process. On the other hand, China and other Asian countries employed the gradual stabilization procedure. It seems that the economic performance of the Asian countries' transition is better than that of Russia and East European countries' transition. "The Dual-Track System" that is the double price system is one of the most important characters of the "gradualism." The dual-track system is connected with the mandatory quota system. The government orders the mandatory quota to state enterprises. The state enterprises have two kinds of prices: goods subject to quota are allocated at the official prices and above-quota products are sold at market prices.

The purpose of this paper is to show from the welfare point of view, the dual-track system is an intermediate economic system between the centralized economic system and the market economic system.

2. Koo and Obst's Analysis

Anthony Y.C. Koo and Norman P. Obst analyzed the dual-track economic system in China's price reform. They assumed that the marginal cost was constant and the state monopolistic firm sold the residual output after the mandatory quota in the monopolistic market. Then, they came to a very interesting conclusion about three economic systems, perfect competition, state monopoly and dual-track system.

They found the following relations about prices,
perfect competitive price < dual-track price < state monopolistic price.

The inequality about output in their model is,

state monopolistic output < dual-track output < perfect competitive output.

The relation to consumer surplus is,

state monopolistic system < dual-track system < perfect competitive system.

Therefore, they concluded that the dual-track system was a transitional economic system from the state monopolistic system to the perfect competitive system.

3. Economic Model

Many countries in transition, for example, China, Vietnam, Lao PDR, Myanmar, Mongolia and so on, employed the dual-track system and the mandatory quota system, on the consumer goods and the energy resources. On this paper, we employed the demand function and the cost function of Koo and Obst's model.

It is assumed that the demand function is as follows.

\[ P = \frac{A}{B} \cdot \frac{Z}{D} . \]  

(1)

\( P \) is price, \( Z \) is demand, \( A \) and \( B \) are positive parameters. The cost function is as follows.

\[ C(Z) = mZ + \frac{n}{2}Z^2 + K . \]  

(2)

\( C \) is total cost, \( K \) is constant cost, and \( m, n \) are positive parameters.

The marginal cost \((MC)\) is,

\[ MC(Z) = m + nZ . \]  

(3)
The marginal revenue (MR) is,

\[ MR(Z) = \frac{B}{A} - 2 \frac{Z}{B} . \] (4)

This paper analyzes three economic systems: perfect competitive system, state monopolistic system and dual-track system.

(1) perfect competitive system

In the perfect competitive system, the equilibrium point is a point of intersection of the demand function and the supply function. The equilibrium price and the equilibrium output of the perfect competitive system are,

\[ P_1 = \frac{m + nA}{1 + nB} , \] (5)

\[ Z_1 = \frac{A - mB}{1 + nB} . \] (6)

(2) state monopolistic system

The state monopolistic firm maximizes its profit, then the equilibrium condition is \( MR = MC \). The equilibrium price and output are,

\[ P_2 = \frac{A + B(m + nA)}{B(2 + nB)} , \] (7)

\[ Z_2 = \frac{A - mB}{2 + nB} . \] (8)

(3) dual-track system

Many transitional economies employ the dual-track system and the mandatory quota system. It is assumed that the mandatory quota (\( \bar{Z} \)) is decided by the government. Then \( \bar{Z} \) is a parameter.

The demand function is,

\[ P = \frac{A}{B} - \frac{Z}{B} - \frac{\bar{Z}}{B} . \] (9)

The marginal revenue (MR3) is as follows.
The marginal cost ($MC_3$) of this system is,

$$MC_3(Z) = m + n(Z + \bar{Z}).$$ (11)

After the mandatory quota $\bar{Z}$, the state enterprise wants to sell the residuary output in a free market. Therefore, after the mandatory quota $\bar{Z}$, the new equilibrium price and output are,

$$P_3 = \frac{m + nA}{1 + nB},$$ (12)

$$Z_3 = \frac{A - mB}{1 + nB} - \bar{Z}.$$ (13)

It is assumed that the mandatory quota is sold in the state shop at the state price ($\bar{P}$) which is equal to the minimum marginal cost ($m$).
\[ P = m . \]  \hspace{1cm} (14)

Therefore, in this case, the residual output price \( P_3 \) is coincidence with the equilibrium price in perfect competition \( P_1 \),

\[ P_3 = P_1 , \]  \hspace{1cm} (15)

and the total output in this case is equal to the equilibrium output in perfect competition,

\[ Z_3 = Z_1 . \]  \hspace{1cm} (16)

Next, we compare the three systems from the welfare point of view. In figure 1, \( AB \) is the demand function \( P = \frac{A}{B} - \frac{Z}{B} \), \( E_1 G \) is the marginal cost function \( (MC_1(Z) = m + nZ) \), \( AQ \) is the marginal revenue function, \( A'C = OM \) is the mandatory quota \( (Z) \) and \( E_2 F \) is the marginal function after the mandatory quota \( (MC_3(Z) = m + n(Z + Z)) \).

4. Conclusion

In this section, we compare the three economic systems. 

(i) perfect competitive system

The equilibrium price is \( E_1 H_1 \), the equilibrium output is \( O H_1 \), the consumer surplus is \( \Delta AE_1 D \) and the producer surplus is \( \Delta DE_1 G \).

(ii) state monopolistic system

The equilibrium price is \( E_2 H_2 \), the equilibrium output is \( O H_2 \), the consumer surplus is \( \Delta AE_2 N \) and the producer surplus is \( \Delta NE_2 QG \).

(iii) dual-track system

The state price of mandatory quota is \( OG \), the equilibrium price of residual output is \( E_3 H_3 \), the equilibrium output after the mandatory quota is \( O H_3 \), the consumer surplus is \( \Delta AE_1 LTG \) and the producer surplus is \( \Delta LKE_1 - \Delta GJK \).

These comparisons are shown in table 1. About the free market price, the following inequality is held.

perfect competitive price = dual-track price < state monopolistic price.
### Table 1

<table>
<thead>
<tr>
<th>System</th>
<th>Price</th>
<th>Output</th>
<th>Consumer Surplus</th>
<th>Producer Surplus</th>
<th>Total Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Free</td>
<td>MQ</td>
<td>Free</td>
<td>MQ</td>
<td>Total</td>
</tr>
<tr>
<td>Perfect Competitive System</td>
<td>E₁H₁</td>
<td>OH₁</td>
<td>OH₁</td>
<td>ΔAE₁D</td>
<td>ΔDE₁G</td>
</tr>
<tr>
<td>State Monopolistic System</td>
<td>E₂H₂</td>
<td>OH₂</td>
<td>OH₂</td>
<td>ΔAE₂N</td>
<td>□NE₂QG</td>
</tr>
<tr>
<td>Dual-Track System</td>
<td>E₃H₃ = E₁H₁</td>
<td>OG</td>
<td>OH₃</td>
<td>OM</td>
<td>OH₁</td>
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</tbody>
</table>

MQ...Mandatory Quota

The inequality about the output is,

perfect competitive output > dual-track output > state monopolistic output.

The inequality about the consumer surplus is,

dual-track system > perfect competitive system > state monopolistic system.

The inequality about the producer surplus is,

perfect competitive system > dual-track system.

The inequality about the total surplus is,

perfect competitive system = dual-track system > state monopolistic system.

From the welfare point of view, the total surplus of perfect competitive system is equal to the total surplus of dual-track system. Only the distribution of total surplus is different between the perfect competitive system and the dual-track system. The state monopolistic system is not better than the perfect competitive system or the dual-track system. Therefore, the dual-
track system in transitional economies is the intermediate economic system between the perfect competitive system and the state monopolistic system.

References