

<NOTE>A Note on Law and Economics : A Case of Lawsuit for Price Level

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A Note on Law and Economics*
— A Case of Lawsuit for Price Level —

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1 Introduction

Law and economics has been examined in various papers, [see for example, Coase(1960),Demsetz(1967),Cheung,S.N.S.(1968),Posner(1975),Diamond(1974), Becker,G.S. and Landes, W.(1974),Weitzman(1974)].

A purpose of this note is to examine issue of cartel, which is closely related to law. In a model developed by Stephen(1987),raising penalty rate of cartel or raising probability of detection with respect to cartel will have no effect on output level of the cartel, unless the probability of detection is extremely sensitive to the price charged. In the next section of this note, however, it will be shown that raising the penalty rate or the probability of detection will have effect on the output level of the cartel under a condition that the probability of detection is insensitive to a change in price charged, then needless to say, the probability is not extremely sensitive as supposed by Stephen(1987),taking reputation of the cartel into consideration. In section 3 the difference between the probability of the lawsuit and that of being found guilty will be examined. In the last section concluding remarks will be given.

2 Reputation and Lawsuit for Price Level

In Stephen(1987), buyers' incentive to get damaged is taken into consideration under a (for example, treble)damage regime. However, in Japan it would not be plausible to suppose that the buyers have the incentives to get

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damaged. In this note the reputation of the cartel will be taken into consideration instead of such incentives.

If the cartel is detected with the probability q , the profit is denoted by

$$p(x(p) - R) - c(x(p) - R) - F(p - c)(x(p) - R) \quad (1)$$

where p is the price level, $F (> 1)$ is the penalty rate of cartel.

On the other hand if the cartel is not detected with probability $1-q$, the profit is denoted by

$$px(p) - cx(p). \quad (2)$$

Hence, the expected profit $E\pi$ is denoted by

$$E\pi = (1 - q)(px(p) - cx(p)) + q \{ p(x(p) - R) - c(x(p) - R) - F(p - c)(x(p) - R) \}, \quad (3)$$

where R is the amount of demand which is reduced by bad reputation due to the detection of the cartel and $x(p)$ is specified such that $x(p) = a/b - p/b$, in the following.

Differentiating $E\pi$ with respect to p yields

$$\begin{aligned} \frac{dE\pi}{dp} &= (1 - qF) \left[\frac{a}{b} - \frac{1}{b} p \right] - q(1 - F)R \\ &+ (p - c)(1 - qF) \left[-\frac{1}{b} \right] \\ &= 0. \end{aligned} \quad (4)$$

Second order condition is satisfied;

$$\frac{d^2 E\pi}{dp^2} = \frac{-2}{b}(1 - qF) < 0, \quad (5)$$

where $1 > qF$ is assumed.

From (5) p^* is obtained in the following manner;

$$p^* = \frac{1}{2} \left\{ a + c + \frac{q(F-1)bR}{1-qF} \right\}, \quad (6)$$

where $F > 1$ and $1 > qF$ are assumed as above.

Hence, differentiating p^* with respect to c , q , F or R will yield the following results ;

$$\frac{\partial p^*}{\partial c} = \frac{1}{2} > 0, \text{ then } \frac{\partial x^*}{\partial c} < 0, \quad (7)$$

$$\frac{\partial p^*}{\partial R} = \frac{1}{2} \frac{q(F-1)b}{1-qF} > 0, \text{ then } \frac{\partial x^*}{\partial R} < 0, \quad (8)$$

$$\frac{\partial p^*}{\partial q} = \frac{1}{2} \frac{(F-1)bR}{(1-qF)^2} > 0, \text{ then } \frac{\partial x^*}{\partial q} < 0, \quad (9)$$

$$\frac{\partial p^*}{\partial F} = \frac{1}{2} \frac{(1-q)qbR}{(1-qF)^2} > 0, \text{ then } \frac{\partial x^*}{\partial F} < 0. \quad (10)$$

Hence, following main results have been derived ; raising the penalty rate F or the probability of being detected q will decrease the output level of cartel, though in Stephen(1987) raising the penalty rate or the probability will have no effect on the output level. In addition to the above results, it has been derived that if the amount of demand reduced by bad reputation is raised the price of the cartel is raised and the output level is decreased.

3 Probability of Lawsuit and That of Being Found Guilty

In this section the difference between the probability of lawsuit (q) and that (r) of being found guilty will be taken into consideration. If the lawsuit is brought the reputation will not be good. Further, if the cartel is found guilty the reputation will get worse. In the following it is assumed that the demand for the goods produced by the cartel which is found guilty will be decreased even more.

If the cartel is found guilty profit is denoted by

$$p(x(p) - mR) - c(x(p) - mR) - F(p - c)(x(p) - mR), \quad (11)$$

where $m > 1$ is assumed.

On the other hand, if the cartel is not found guilty even if the lawsuit is brought, the profit is denoted by

$$p(x(p) - R) - c(x(p) - R). \quad (12)$$

If the lawsuit is not brought at all, then the profit is denoted by

$$px(p) - cx(p). \quad (13)$$

Hence from (11), (12) and (13) expected profit of the cartel is denoted by

$$E\pi = (1 - q)(px(p) - cx(p)) + q(1 - r) \{p(x(p) - R) - c(x(p) - R)\} \\ + qr \{p(x(p) - mR) - c(x(p) - mR) - F(p - c)(x(p) - mR)\}. \quad (14)$$

First order condition is obtained;

$$\frac{dE\pi}{dp} = (1 - qrF) \left[\frac{-1}{b} \right] p + (1 - qrF) \frac{c}{b} + (1 - qrF) \frac{a}{b} - (1 - qrF) \frac{p}{b} \\ - qr \{1 - r(1 - m + Fm)\} \\ = 0, \quad (15)$$

where $p = a - bx$ is assumed.

Second order condition is satisfied;

$$\frac{d^2E\pi}{dp^2} = \frac{-2(1 - qrF)}{b} < 0, \quad (16)$$

where $1 > qrF$ is assumed.

From first order condition

$$p^* = \frac{a+c}{2} + \frac{bqR \{r(1-m+Fm)-1\}}{2(1-qrF)}, \quad (17)$$

where a or c is assumed to be sufficiently large for $p > 0$.

From (17) following results can be obtained straightforwardly;

the sign of $\frac{\partial p^*}{\partial R}$ or $\frac{\partial p^*}{\partial q}$

is negative, zero or positive

and the sign of $\frac{\partial x^*}{\partial R}$ or $\frac{\partial x^*}{\partial q}$

is positive, zero or negative

according to

$$\frac{1-r}{r}$$

is larger than, equal to or less than

$$m(F-1).$$

Further, following results have been derived ;

$$\frac{\partial p^*}{\partial F} = \frac{bqrR(1-qr) \left\{ m - \frac{q(1-r)}{1-qr} \right\}}{2(1-qrF)^2} > 0, \quad (18)$$

since $m > \frac{q(1-r)}{1-qr}$ as $m > 1$ and $\frac{q(1-r)}{1-qr} < 1$.

$$\text{Hence, } \frac{\partial x^*}{\partial F} < 0. \quad (19)$$

In addition to the above results

$$\frac{\partial p^*}{\partial r} > 0 \quad \text{and} \quad \frac{\partial x^*}{\partial r} < 0, \quad (20)$$

since

$$1 - m + Fm - qF > 0 \quad \text{as} \quad \frac{m-1}{m-q} < 1 < F.$$

Therefore, raising the penalty rate F or the probability (r) of being found guilty will increase the price level but decrease the output of the cartel. On the other hand, the effect of the reputation or the probability (q) of being suited can not be determined in general. The effect depends on the levels of parameters r , m and F , though the effects have been determined in the case of section 2, where the difference between the probability (q) of lawsuit and the probability (r) of being found guilty has not been taken into consideration.

4 Concluding Remarks

In this note the reputation is taken into consideration to examine the issue of cartel. Following results have been derived; if the difference between the probability (q) of lawsuit and the probability (r) of being found guilty has not been taken into consideration, raising the penalty rate F or the probability of being detected q will decrease the output level of cartel, though in Stephen(1987) raising the penalty rate or the probability will have no effect on the output level. Further it has been derived that if the amount of demand reduced by bad reputation is raised the price of the cartel is raised and the output level is decreased. On the other hand, if the difference between the probability (q) of lawsuit and the probability (r) of being found guilty is taken into consideration, the effect of the reputation or the probability (q) of being suited can not be determined in general. However, even in this case raising the penalty rate F or the probability (r) of being found guilty will increase the price level but decrease the output of the cartel.

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