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Excess Information and Tragedy of the Commons: A Summary*

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Abstract

Information pollution is a serious problem for modern society. Many people consider that increase of information often makes them confuse. However, economists usually treats information as what always improves utility. The problem of disutility of information is still mostly unlooked.

This paper focuses on the problem of information pollution, especially excess information provided by supplier. We name information provided by supplier a *catalog*. We consider a market with catalog sales, and assume that thicker catalog must bore the consumer. If supplier makes his catalog thicker, then he can sell more products, instead of discouraging consumer to search and buy so that other supplier can sell less products. This situation is very similar to the case of "tragedy of the commons", where the grass of the commons is consumer's motivation to buy in this context.

We analyze this situation in the framework of oligopoly model. Consider a two-stage game. In first stage, N suppliers determine quantity $q_n \geq 0$, thickness of catalog $k_n \in [0, q_n]$ and price $p_n : [0, q_n] \to \mathbb{R}_+$. In second stage, one consumer chooses his action from "search independent of catalog and buy(type 1)", "search by catalog and buy(type 2)" or "not buy(type 3)" for each commodity. For $i \in \{1, 2.3\}$, H_i^n denotes the set of the commodity produced by supplier n for which consumer chooses "type i". $u > 0$ denotes consumer's payoff when he gets a commodity, $C > 0$ the cost to search a commodity independent of catalog and $c_0(k) = a_0 + b_0 k$ the cost to search a

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commodity for catalog. So consumer's total payoff is

$$\sum_n \left[\int_{H_1^n} (u - p_n - C) d\lambda + \int_{H_2^n} (u - p_n - c_0(\sum_n k_n)) d\lambda \right],$$

where λ denotes Lebesgue measure. Supplier's payoff is

$$\int_{H_1^n \cup H_2^n} p_n d\lambda - c_1(k_n) - c_2(q_n),$$

where $c_1(k_n) = b_1 k_n$ denotes the cost of catalog and $c_2(q_n) = b_2 q_n$ denotes the cost of production.

We assume $b_0, b_1, b_2 > 0$, $u > a_0 + b_1 + b_2$ and $C > u - b_2$ and show that under these assumptions, the result of this two-stage game comes from subgame-parfect Nash equilibrium is uniquely determined, $k_n = q_n = \frac{u - a_0 - b_1 - b_2}{(N+1)b_0}$ and $p_n(x) = \frac{1}{N+1}(u - a_0) + \frac{N}{N+1}(b_1 + b_2)$ for all n and almost all $x \in [0, k_n]$. Every supplier gains $\frac{(u - a_0 - b_1 - b_2)^2}{(N+1)^2 b_0}$ and consumer gains 0. Since $u - a_0 > b_1 + b_2$, p_n decreases as N increases, as usual. However, total surplus $\frac{N}{(N+1)^2} \frac{(u - a_0 - b_1 - b_2)^2}{b_0}$ also decreases as N increases.

This "counterfeit competition" may happen when the cost consumers search a commodity is not negligible. So we should take notice that this situation. Even if new entry of supplier induces markdown, it may be inefficient in fact.