Tirole ch. 2

Nov 28, 2006

Lagwell-Riordan (1986) Search

..., 1986 working paper (p. 107)

A monopolist can set quality high or low. Consumers are of two types. Informed consumers observe quality before buying, and they are fraction α of the population. Uninformed consumers only observe quality <u>after</u> buying. Both types value Low quality at 0 and High quality at θ. High quality has $MC = c_1$, low quality $MC = c_0$.

In equilibrium, at least some Uninformeds must buy (if none did, then the monopolist would choose High quality and all would be willing to buy).

Suppose the uninformeds all buy, ~~if~~ and the seller charges p.

$$\Pi_{\text{Low quality}} = (1-\alpha)(p-c_0)$$

$$\Pi_{\text{high quality}} = (1)\ (p-c_1)$$

High quality is chosen if $p-c_1 > (1-\alpha)(p-c_0)$

so if $\alpha p \geq c_1 - (1-\alpha) c_0$.

Can p be this high? We need $p \leq \theta$. So ~~this~~ a high quality equilibrium needs

$$\alpha \theta \geq c_1 - (1-\alpha) c_0.$$

Eq1: High quality, $p = \theta$, all consumers buy

Otherwise; **Eq2:** Mixing between High and Low, $p < \theta$, Low consumers mix between buying and not).

~~The eq. [illegible]~~ Having informed consumers can thus increase product quality for everyone. It helps the seller! He gets the entire social surplus in this model, in Eq. 1.

Also, if some Low consumers don't know α, they can look at P. If $p = \theta$, they deduce that quality is high.

The Dorfman-Steiner (1954) Condition (p102)

Let demand increase with advertising, s (advertising measured in dollars)

$$\pi = p \cdot D(p,s) - C(D(p,s)) - s$$

$$p: \quad D + p D_p - C' D_p = 0 \rightarrow (p - C') D_p = -D$$

$$s: \quad p D_s - C' D_s - 1 = 0 \rightarrow (p - C') D_s = 1$$

$$\rightarrow \frac{-D}{D_p} = \frac{1}{D_s} \longrightarrow \frac{D_s}{D_p} = \frac{-1}{D}$$

Let's turn that into elasticities.

$$\rightarrow \frac{D_s \cdot \frac{1}{D}}{D_p \cdot \frac{1}{D}} = -\frac{1}{D} \rightarrow \frac{D_s \frac{s}{D}}{D_p \frac{p}{D}} = -\frac{s}{pD} \rightarrow \boxed{\frac{\varepsilon_{Ds}}{\varepsilon_{Dp}} = \frac{s}{pD}}$$

Thus, the optimal ad to sales revenue ratio equals the ~~optimal~~ ratio of their elasticities. If ~~ad~~ ~~cost~~ demand is more ad-elastic, spend more on ads.

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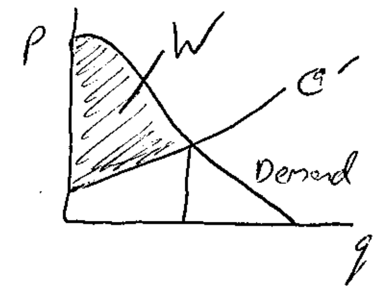
Monopoly Quality

s = quality

q = quantity

$P(q,s)$ and $C(q,s)$ are inverse demand and total cost.



$$\text{Welfare} = \int_0^q P(x,s)\,dx - C(q,s)$$

First-best

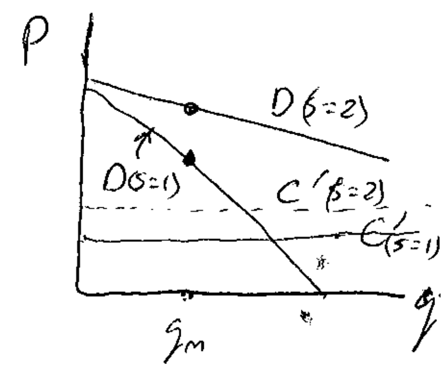
FOC: q: $$P(q,s) - \frac{dC}{dq} = 0 \quad (2.1)$$

FOC: s: $$\int_0^q \frac{dP}{ds}\,dx - \frac{dC}{ds} = 0 \quad (2.2)$$

The social planner equates the total marginal benefit from more quality to the marginal cost of more quality. Another way to say that: he equates Average $MB_s \cdot q = MC_s$

$$\frac{\left(\int_0^q \frac{dP}{ds}\,dx\right)}{q} \cdot q = \frac{dC}{ds}$$

The monopolist maximizes



$$\text{Profit} = q\,P(q,s) - C(q,s)$$

FOC q: $$P + q\frac{dP}{dq} - \frac{dC}{dq} = 0 \quad (2.3)$$

s: $$q\frac{dP}{ds} - \frac{dC}{ds} = 0 \quad (2.4)$$

The monopolist equates (q)(the marginal consumer's MB_s) to MC_s. This is the same as the first-best quality only if the marginal consumer's MB$_s$ equals the average consumer's.

In my figure, the monopolist chooses $s=2$ for $q=q_m$, but the social planner choses $s=1$ for $q=q_m$.