

Economics 431 Vertical Relations

Last time we have considered a model of the relationship between the manufacturer (upstream firm) and retailer (downstream firm). Our next step is to understand what shapes the relationships between manufacturers and retailers and why retail markets are so different for different goods

- Does it surprise you that a gas station carries just one brand of gasoline, but a supermarket carries many brands of cereals?
- In general, why do manufacturers restrict the distribution of their products?

Based on our discussion of double marginalization, we know that the manufacturer has a profit incentive to control the downstream firm. Why did double marginalization arise? Each unit of good sold gives profit to two firms: manufacturer and retailer.

- Any decision made by the retailer that increases demand for the good generates an incremental profit for the manufacturer.
- Because retailer makes decisions based on his own profit, not joint profits, the demand for intermediate good is too low.

Manufacturing and retailing are complementary activities, and both firms gain if they are coordinated.

One of the simplest solutions to the double marginalization problem is two-part tariff - here called franchise fee.. The manufacturing monopoly provides the good at a flat fee T plus a price equal to marginal cost $r = c$.

Retailer's decision:

$$p = \frac{A + r}{2} = \frac{A + c}{2} = p_M$$

$$\pi_D = \pi_M - T = \frac{(A - c)^2}{4B} - T$$

$$\pi_U = T$$

$$\frac{\pi_M}{2} < T < \pi_M$$

Any franchise fee is optimal. It divides extra profit between the manufacturer and retailer. Manufacturer must get at least $\frac{\pi_M}{2}$, otherwise he will not be interested in a franchise agreement. They probably bargain over it.

Manufacturer gets his profit up-front, and sets price equal to marginal cost, thereby avoiding double marginalization.

The drawback of franchise fees is that they don't work so well in other environments. If demand for product may either be high or low, and the manufacturer does not know it, he may be in the situation faced by a monopolist with 2nd degree price discrimination.

There should be separate franchise contracts (T_H, T_L) for low-demand and high-demand retailer. The manufacturer cannot appropriate all the profit from such franchise contract. Offer the menu of franchise agreements based on quantity.

$$T_L = \pi_M^L, Q_M^L$$

$$T_H = \pi^H(Q_M^L)$$

Profit royalty: manufacturer sells for c and then gets fraction α of profits.

Another agreement: draw a contract directly on price or quantity

$$\begin{aligned} p &\leq p_M \\ Q &\geq Q_M \end{aligned}$$

(price ceiling or quantity floor). The first is called resale price maintenance and the second one is called quantity forcing (also do not work very well with uncertainty)

So, we have shown simple ways to resolve the double marginalization problem. we have not said anything about why the manufacturers have an incentive to restrict the distribution of their products.

So far we have assumed that the role of the retailer is only in buying the product from the manufacturer and putting it on the shelf.

Actually, retailers perform other services that consumers are willing to pay for: display, advertisement, product demonstration, short checkout lines etc. The level of this promotional services, s affects demand. The more services the retailer performs, the greater is the demand for the good.

$$Q(p, s) = (A - p) s$$

if the good is sold at the same price, higher level of promotion services increases quantity demanded.

Suppose that there are two retailers who are Cournot competitors. The aggregate demand depends on the aggregate level of promotion services:

$$Q = (A - p) S$$

Inverse demand:

$$p = A - \frac{Q}{S}$$

If either retailer mounts an ad campaign, then $S = 2$. If none, then slope equals $S = 1$. Retailer's marginal costs: r for the good and φ for one unit of promotion

$$\max_{Q_1} \left(A - \frac{Q_1 + Q_2}{S} \right) Q_1 - rQ_1$$

$$A - \frac{Q_2}{S} - \frac{2Q_1}{S} = r$$

Marginal revenue equals marginal cost

$$p - r = \frac{Q_1}{S} = \frac{Q}{2S}$$

$$\frac{Q_1}{s} = \frac{Q_2}{s} = \frac{A - r}{3}$$

$$Q_1 = Q_2 = S \frac{A - r}{3}$$

Promotion effort:

$$p - r = \frac{A - r}{3}$$

$$\pi_D = \frac{(A - r)^2}{9} S - \varphi < \frac{(A - r)^2}{9}$$

$$A = 18, c = 6, \varphi = 17.$$

$$\pi_M = 36 \text{ (when } S = 1)$$

$$\pi_M = 72 \text{ (when } S = 2)$$

$$\pi_C = 16 \text{ (when } S = 1)$$

$$\pi_M = 32 \text{ (when } S = 2)$$

Mounting the ad campaign and paying for it alone is not worth it:

$$\pi = \frac{(A - r)^2}{9} S - \varphi = 32 - 17 = 15 < 16 = \frac{(A - r)^2}{9}$$

Each retailer wants the other one to pay for the ad campaign. There is a free-rider problem. As a result, nobody pays for the ad campaign. Both retailers are low service outlets. If the manufacturer deals with two retailers, the most profit he can extract from the franchise agreement is the sum of the retailer's profits

$$\frac{2(A - c)^2}{9}$$

If there is an exclusive dealing agreement, the retailer is the monopolist: spending φ on the ad campaign pays

$$\frac{(A-c)^2}{4}S - \varphi = 55 > 36 = \frac{(A-c)^2}{4}$$

Profit to be extracted:

$$\frac{(A-c)^2}{4}S - \varphi > \frac{(A-c)^2}{4} > \frac{2(A-c)^2}{9}$$

Manufacturer can extract more profit from an exclusive dealer. Do the consumers benefit? Two retailers, no exclusive dealing, no ads

$$Q = \frac{2}{3}(A-c) = 8$$

One exclusive dealer, ads

$$\frac{A-c}{2}S = 12$$

If $S > \frac{3}{2}$.

- We will see exclusive dealing where the effects from promotional services is strong (likely to happen when consumer does not know much about the good)

If having one dealer restricts the distribution, the same effect can be reached by resale price maintenance. Sometimes, if there is no exclusive dealing, the resale price maintenance helps.

$$\begin{aligned} \frac{(A-c)^2}{9}S - \varphi &< \frac{(A-c)^2}{9} \\ 32 - 17 &< 16 \\ \frac{(A-c)^2}{8}S - \varphi &> \frac{(A-c)^2}{8} \\ 36 - 17 &> 16 \end{aligned}$$

Works for φ in the interval

$$\begin{aligned} \frac{(A-c)^2}{9}(S-1) < \varphi < \frac{(A-c)^2}{8}(S-1) \\ 16 < \varphi < 18 \end{aligned}$$

RPM agreement

$$p \geq p_M$$

By forcing a price floor, the manufacturer prevents the emergence of low-service discount stores.

But then, how about gasoline? The properties of the product are pretty much known. Why doesn't every station carry many brands of gasoline? It is not likely that purchase decision is influenced by promotional effort.

We have to realize that distribution network creates barriers to entry. If a gas station sells only one brand, then the oil company who sells another brand will have to build its own station.

Cereal is another category of product: each manufacturer has market power, because each brand is different. And promotional effort is not done by the retailer

Good	Promotion important	Promotion done by retailer	Brands are different	Distribution
Electronics	yes	yes	yes	exclusive (free-riding)
Cereal, automobiles	yes	no	yes	non-excl (mkt penetr.)
Gas	no	no	no	exclusive (entry)

Notice how we considered monopolistic manufacturing. And this is OK as long as competing brands are somehow different. A particular manufacturer has a monopoly over his brand, and there is no perfect substitute for it. However close is GMC Jimmy to Oldsmobile Bravada, consumers still perceive them as different trucks.