

Industrial Organization 05

Advertising

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Outline

- 1 Definition of informative and persuasive advertising
- 2 Examples of advertising intensity by sector
- 3 Advertising expenditure by a monopoly
- 4 Effects of advertising on competition

Typology of goods based on consumer information

We can distinguish **two types of goods** (Nelson, 1970 and 1974):

- Search goods
- Experience goods

Search goods

Goods whose quality can be observed by consumers before purchase

Experience goods

Goods whose quality characteristics cannot be observed by consumers before purchase (or it would be too costly)

Experience goods and the role of information

According to Nelson, the nature of an "experience good" depends on the **cost for a consumer to search for information** about the quality of the product

Two types of information:

- *Hard information*: the existence of the product, its price, the retailers that sell it, its characteristics (direct information)
- *Soft information*: indirect information

Informative and persuasive advertising

The distinction between **search goods** and **experience goods** leads to a distinction between **two types of advertising**:

- Informative advertising
- Persuasive advertising

Informative advertising

Provides information about product characteristics to reveal an objective differentiation

Persuasive advertising

Attempts to change consumer preferences to create a subjective differentiation

Informative and persuasive advertising

What is the most common type of advertising?

→ according to Nelson (1976), the ratio of advertising to sales is **3 times higher** for experience goods than for search goods

What is the difference between **informative advertising** and **persuasive advertising** in terms of social welfare?

- Informative advertising: some value a priori
- Persuasive advertising: value less clear

The example of Yoplait 150

Study of the the impact of advertising on "Yoplait 150", introduced in the US in 1987

The data (sales, advertising) showed that

- Probability of buying Yoplait 150 = $1,85 \times \text{advertising exposure} - 0,24 \times \text{advertising exposure} \times \text{number of previous purchases} + (\text{other control variables})$
- Advertising exposure = number of 30-second ads the consumer saw in a week

→ Consistent with the idea of informative advertising

The example of generic drugs

In 1984, the American Congress created an accelerated approval process for generic drugs

→ between 1984 and 1998, their market share increased from 18% to 42%

And yet, the prices of brand-name drugs did not go down; on the contrary, they went up!

This is mainly explained by the intensive advertising campaigns of the pharmaceutical companies selling these branded drugs

→ Consistent with the idea of pervasive advertising

Advertising as a signal

For experience goods, it can be difficult to make informative advertising

Nevertheless, advertising can act as a signal sent to consumers to indicate that the quality is high

Let's assume that there are low quality (experience) goods and high quality goods, and that the purchases are repeated

High-quality sellers may have incentives to spend a lot of money on advertising in order to signal themselves as sellers of high-quality goods

Advertising as a signal

Idea: It is only rational to spend a lot if the firm offers a high-quality product

Conditions for this strategy to be credible?

→ A high-quality firm should have a greater incentive to get consumers to try its product than a low-quality firm

Is this kind of advertising a waste?

→ Not necessarily; the equilibrium with advertising could be more efficient than the equilibrium without it

Advertising intensity

The **ratio of advertising to sales** (or turnover) varies between industries:

- Salt: 0 to 0.5%
- Software: 2.9%
- Breakfast cereals: 8 to 13%

A simple formula (the **Dorfman-Steiner formula**) provides an explanation:

$$\frac{a}{R} = \frac{p - C'}{p} \eta = \frac{\eta}{\epsilon}$$

where

- η denotes the elasticity of demand to advertising
- ϵ denotes the price elasticity of demand
- a the advertising investment
- R the revenue

Advertising expenses by a monopoly

Let's consider a monopoly firm

The demand function $q = D(p, a)$ depends on price p and ad level a

The monopoly maximizes its profit

$$pD(p, a) - C(D(p, a)) - a$$

with respect to p and a

The first order conditions with respect to p and a are:

$$D(p, a) + pD_p(p, a) = C'(D(p, a))D_p(p, a)$$

and

$$pD_a(p, a) = C'(D(p, a))D_a(p, a) + 1$$

Advertising expenses by a monopoly

The first-order condition with respect to the **price** p is

$$D(p, a) + pD_p(p, a) = C'(D(p, a))D_p(p, a)$$

We introduce the price elasticity of demand

$$\varepsilon = -\frac{pD_p(p, a)}{D(p, a)}$$

We then obtain **the inverse price elasticity rule**:

$$\frac{p - C'}{p} = \frac{1}{\varepsilon}$$

Advertising expenses by a monopoly

The second first-order condition with respect to the **ad level** a is

$$pD_a(p, a) = C'(D(p, a))D_a(p, a) + 1$$

so we have

$$(p - C')D_a = 1$$

We define the elasticity of demand to advertising:

$$\eta = \frac{aD_a(p, a)}{D(p, a)}$$

which gives

$$(p - C')\eta D(p, a) = a$$

Advertising expenses by a monopoly

We have

$$(p - C') \eta D(p, a) = a$$

therefore

$$\frac{(p - C')}{p} \eta = \frac{a}{pD(p, a)} = \frac{a}{R} = \frac{\eta}{\epsilon}$$

Conclusion:

For the monopoly firm, the optimal ratio of advertising expenditures to sales is equal to the ratio of the elasticities of demand with respect to advertising and price

Some empirical evidence

Some examples (according to Metwally, 1975):

- Instant coffee: $\eta/\epsilon = 0.019$ and $a/R = 0.020$
- Beer: $\eta/\epsilon = 0.008$ and $a/R = 0.011$
- Cigarettes: $\eta/\epsilon = 0.019$ and $a/R = 0.046$
- Soap: $\eta/\epsilon = 0.013$ and $a/R = 0.012$
- Washing powder: $\eta/\epsilon = 0.019$ and $a/R = 0.030$
- Toothpaste: $\eta/\epsilon = 0.024$ and $a/R = 0.059$
- Motor oil: $\eta/\epsilon = 0.017$ and $a/R = 0.016$

Advertising intensity and market structure

Dorfman-Steiner formula:

$$\frac{a}{R} = \frac{\eta}{\epsilon}$$

We can use the Dorfman-Steiner formula to get an intuition about the **effect of market structure on advertising spending**

How does the firm's price elasticity vary with the number of competitors?

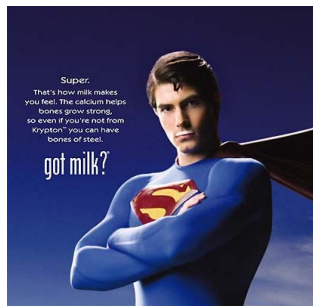
→ It tends to increase

→ And so the advertising intensity tends to decrease

Advertising intensity and market structure

How does an increase in the number of firms affect the elasticity η ?

If advertising is a public good? \rightarrow advertising increases the demand of each firm'



\rightarrow In this case, the elasticity of demand to advertising (and so the intensity of advertising) decreases with the number of firms

Advertising intensity and market structure

If, on the contrary, the only effect of advertising is to make consumers switch from one firm to another?

→ The elasticity of advertising (and so the intensity of advertising) tends to increase with the number of firms (as the incentives to capture competitors' markets increase with the number of competitors)

Advertising intensity and market structure

This analysis suggests an **ambiguous relationship between advertising intensity and the number of firms**

Empirical studies suggest that:

- Starting with a small number of firms, increasing the number of firms increases advertising intensity
- Starting with a large number of firms, increasing the number of firms decreases advertising intensity

Competing through advertising

General intuition

Advertising is an instrument of competition, like prices

For example, what would happen if the only effect of advertising was to shift market share?

→ We would have a mechanism "à la Bertrand": increase of advertising spending until the profits reach zero

But advertising is different from pricing in some ways:

- Interactions are less frequent
- Advertising is an investment and may have long-term effects

Advertising can soften price competition

- Let's assume a competitive framework à la Hotelling (linear differentiation)
- Two firms are located at the two extremes of the linear city
- The consumers are uniformly distributed along the linear city
- But we assume that they ignore the differences between the goods of the two firms
- What happens? → we have a competition "à la Bertrand" and therefore the firms obtain zero profits
- If firms can make informative advertising, what happens? → We have a competition "à la Hotelling" and therefore firms make strictly positive profits

Conclusion: Informative advertising can increase the differentiation between firms and reduce the intensity of price competition

Advertising can strengthen price competition

- Two firms sell homogeneous (identical) goods
- Consumers are willing to pay v for their good
- But they **ignore the existence and the prices of the firms** → they have to search
- Let's suppose they can only search once
- **What is the equilibrium price?** → the equilibrium price is $p^* = v$
- **If firms can make informative advertising, what happens?** → the equilibrium price is now $p^* = c$

Conclusion: Informative advertising can increase the intensity of price competition.

Advertising as an entry barrier

Theory of John Sutton (1991)

In markets where it is possible to differentiate oneself in the eyes of consumers, we observe high levels of advertising expenditure and a high degree of concentration

→ Advertising as an **endogenous entry barrier**

Advertising as an entry barrier

RealLemon example (1978), lemon juice brand:

- The brand RealLemon of Borden dominated the US markets for several years
- Entry of a competitor Golden Crown, with an identical product
- But intensive advertising campaigns by RealLemon → Golden Crown had to set a price 15 to 25% lower
- This led to a price war
- Complaint against Borden to the FTC, which found that Borden abused its dominant position from Borden (complaint withdrawn on appeal)

Take aways

- There are two types of advertising: informative advertising (providing information about product characteristics) and persuasive advertising (seeking to create subjective differentiation)
- The monopoly invests in advertising so that the ratio of its advertising expenditures to its sales is equal to the ratio of the elasticity of demand to advertising to the price elasticity of demand
- Advertising on product characteristics tends to weaken competition because it increases the ability of firms to differentiate
- Advertising on prices tends to increase price competition