Advertising

Industrial Organization

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ISEG, 2025/26

Outline

Typology of goods based on consumer information

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

Search goods

Goods whose quality characteristics can be assessed by consumers before purchase (e.g., USB-C charger).

Experience goods

Goods whose quality characteristics cannot be observed by consumers before purchase (or it would be too costly; e.g., consulting services, restaurants).

Typology of information

Two types of information:

- **Hard information**: the existence of the product, its price, the retailers that sell it, its characteristics (direct information) $\rightarrow$ *mainly used to evaluate search goods*
- **Soft information**: indirect information $\rightarrow$ *crucial for experience goods*

Informative and persuasive advertising

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

Informative advertising:

Provides information about product characteristics to reveal an objective differentiation.
$\rightarrow$ *conveys mostly hard information*

Persuasive advertising:

Attempts to change consumer preferences to create a subjective differentiation.
$\rightarrow$ *conveys mostly soft information*

Informative and persuasive advertising

What is the most common type of advertising?

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

What is the difference between informative and persuasive advertising regarding social welfare?

- Informative advertising: improves market transparency → pro-competitive
- Persuasive advertising: ambiguous as we will see...

The example of Yoplait 150

Study of advertising impact on *Yoplait 150*, cheap French yoghurt introduced to US in 1987.

The data (sales, advertising) showed that

- Probability of buying Yoplait 150 = 1.85 × advertising exposure − 0.24 × advertising exposure × number of previous purchases + control variables
- Advertising exposure = number of 30-second ads the consumer saw in a week

→ Consistent with the idea of which type of advertising? informative

→ How would the signs of the coefficients change in the case of persuasive advertising?

The example of generic drugs

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

$\rightarrow$ between 1984 and 1998, their market share increased from 18% to 42%

What happened to the prices of brand-name drugs? They went up! **Why?**

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

$\rightarrow$ Consistent with the idea of which type of advertising? persuasive

Advertising as a signal

For experience goods, informative advertising can prove difficult.

$\Rightarrow$ yet, advertising can act as a signal for high quality!

When is it rational that high-quality firms spend more on ads in order to signal high quality than low-quality firms?

$\rightarrow$ given repeated purchases ($T > 1$), 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?

$\rightarrow$ Not necessarily. The EQ with advertising could be more efficient than the EQ without it.

Advertising intensity

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

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

The Dorfman-Steiner formula provides an explanation:

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

where

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

Advertising expenses by a monopoly

- Let's consider a monopoly firm
- The demand function $q = D(p, a)$ depends on price p and ad intensity level a
- The monopoly maximizes its profit with respect to p and a

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

Advertising expenses by a monopoly

- The FOC 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

$$\epsilon = -\frac{pD'_p(p,a)}{D(p,a)}$$

- We then obtain the inverse price elasticity rule:

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

Advertising expenses by a monopoly

- The second FOC 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.

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

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

This formula provides intuition about the effect of market structure on advertising spending.

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

$\rightarrow$ tends to increase

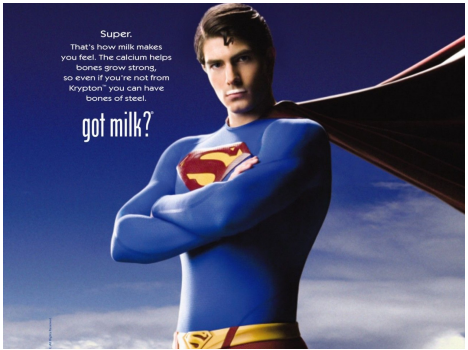
So what happens to the advertising intensity?

$\rightarrow$ 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

What if the only effect of advertising is to make consumers switch from one firm to another?

$\rightarrow$ elasticity of advertising (and so the intensity of advertising) tends to increase with the number of firms (as incentives to capture competitors' shares increase with their number)

$\rightarrow$ increase of advertising spending until the profits reach zero "à la Bertrand"

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

Empirical studies suggest:

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

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 they ignore the differences between the goods of the two firms
- What happens? $\rightarrow$ we have a competition 'à la Bertrand" and firms obtain zero profits
- If firms can make informative advertising, what happens?

  $\rightarrow$ we have a competition 'à la Hotelling" and firms make 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 are unaware of the existence and the prices of the firms $\rightarrow$ they have to search
- Let's suppose they can search only once
- What is the equilibrium price?

  $\rightarrow p^* = v$
- If firms can make informative advertising, what happens?

  $\rightarrow p^* = c$

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

Advertising as an entry barrier

Theory of John Sutton (1991)

In markets where it's possible to differentiate oneself in the eyes of consumers, we observe high levels of advertising expenditure and a high degree of concentration (few competitors).

$\rightarrow$ Advertising as an endogenous entry barrier

Advertising as an entry barrier: an example

ReaLemon (1978), lemon juice brand:

- The brand ReaLemon of Borden dominated US market for years
- Entry of a competitor Golden Crown, with an identical product
- ReaLemon reacted with intensive advertising campaings
  $\rightarrow$ Golden Crown had to set a price 15-25% lower
- This led to a price war
- Complaint against Borden to the FTC, which found that Borden abused its dominant position (complaint withdrawn on appeal)

Take-aways

- 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 equals the ratio of advertising elasticity of demand to 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.

Course materials are based on the Industrial Organization course by Michele Fabi and Marc Bourreau, whom I gratefully acknowledge for generously sharing their materials.