Ch. 10  Perfect Competition, Monopoly, and Monopolistic Competition
Dear Economist,
A single Milky Way costs 20p in my local corner shop. A twin pack costs 47p. I've made a habit of checking the prices in other shops and a twin pack invariably costs more than two singles. What could be the cause of this apparent madness?
The madness in pricing, that is, not the madness of a twenty-something compulsively checking the price of children’s sweets.
Kendrick Curtis, via e-mail
Dear Kendrick,

I am composing this reply overseas, far from the British corner shops where I can check your story, but what you say rings true. In my own travels around shops with a clipboard – a sure way to make the staff twitchy – I have often discovered products with an unexpected mark-up. One example was the medium-sized pack of washing powder priced at rather more per 100g than the small or the large.

All shops want to offer competitive prices to customers who demand them, while charging more to customers who do not much care. Random mark-ups will do the trick: they are easily avoided by bargain hunters but will often snare the unwary.

You are right that it does feel mad for a twenty-something to check the price of children’s sweets; that is why the pricing you describe is clever. I am confident that many adults do not consider the price of confectionery, and that most children do. If I am right, the mark-up on a twin pack is likely to be aimed with pinpoint accuracy at greedy, careless grownups. The children will find the cheaper deal – if they want two Milky Ways, they can buy two singles. Adults, their wallets overstuffed and the days of saving for penny chews long forgotten, will grab for a twin pack and pay more. It seems to me like sweet justice.

Questions to economist@ft.com
Four broad categories of market types

- Perfect competition
- Monopoly
- Monopolistic competition
- Oligopoly
## Table 10.1 Characteristics of Market Types

<table>
<thead>
<tr>
<th>Market structure</th>
<th>Examples</th>
<th>Number of producers</th>
<th>Type of product</th>
<th>Power of firm over price</th>
<th>Barriers to entry</th>
<th>Non-price competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect competition</td>
<td>Parts of agriculture are reasonably close</td>
<td>Many</td>
<td>Standardized</td>
<td>None</td>
<td>Low</td>
<td>None</td>
</tr>
<tr>
<td>Monopolistic competition</td>
<td>Retail trade</td>
<td>Many</td>
<td>Differentiated</td>
<td>Some</td>
<td>Low</td>
<td>Advertising and product differentiation</td>
</tr>
<tr>
<td>Oligopoly</td>
<td>Computers, oil, steel</td>
<td>Few</td>
<td>Standardized or differentiated</td>
<td>Some</td>
<td>High</td>
<td>Advertising and product differentiation</td>
</tr>
<tr>
<td>Monopoly</td>
<td>Public utilities</td>
<td>One</td>
<td>Unique product</td>
<td>Considerable</td>
<td>Very high</td>
<td>Advertising</td>
</tr>
</tbody>
</table>
1. **Perfect competition**

- Many sellers, so many that firms are price takers
- Homogeneous product
- Easy entry and exit
- Perfect information about prices
Profit maximization in a perfectly competitive market

- (see book)
- \( P = MC \)
- Marginal cost curve left of shutdown level (min. variable cost) is supply curve
- \( P = MR = MC = AC \)
- Firm produces at minimum of average costs! (optimal outcome for industry)
- In a constant-cost industry increase in demand will lead in the long term to constant prices (i.e. horizontal supply curve)
**Frictions in cyberspace**

Nov 18th 1999
From The Economist print edition

_Retailing on the Internet, it is said, is almost perfectly competitive. Really?_

THE explosive growth of the Internet promises a new age of perfectly competitive markets. With perfect information about prices and products at their fingertips, consumers can quickly and easily find the best deals. In this brave new world, retailers’ profit margins will be competed away, as they are all forced to price at cost.

Or so we are led to believe. And yes, studies do show that online retailers tend to be cheaper than conventional rivals, and that they adjust prices more finely and more often. But they also find that price dispersion (the spread between the highest and lowest prices) is often as wide on the Internet as it is in the shopping mall—or even wider. Moreover, the retailers with the keenest prices rarely have the biggest sales.

Such price dispersion is usually a sign of market inefficiency. In an ideal competitive market, where products are identical, customers are perfectly informed, there is free market entry, a large number of buyers and sellers and no search costs, all sales are made by the retailer with the lowest price. So all prices are driven down to marginal cost. Search costs on the Internet might be expected to be lower and online consumers to be more easily informed about prices. So price dispersion online ought to be narrower than in conventional markets. But it does not seem to be.

A recent paper*, by Michael Smith and Erik Brynjolfsson of the Massachusetts Institute of Technology’s Sloan School of Management and Joseph Bailey of the University of Maryland, looks at the main research on this topic. One study it cites, by Mr. Bailey, finds that price dispersion for books, CDs and software is no smaller online than it is in conventional markets. Another, by Messrs Brynjolfsson and Smith, finds that prices for identical books and CDs at different online retailers differ by as much as 50%, and on average by 33% for books and 25% for CDs. A third, by Eric Clemons, Il-Horn Hann and Lorin Hitt of the University of Pennsylvania’s Wharton School, finds that prices for airline tickets from online travel agents differ by an average of 28%.
Monopoly

- One producer
- Considerable power over price
- Unique product
- Very high barriers to entry
### Table 11.1 Cost, Revenue, and Profit of a Monopolist

<table>
<thead>
<tr>
<th>Output</th>
<th>Price (dollars)</th>
<th>Total revenue (dollars)</th>
<th>Variable cost (dollars)</th>
<th>Total cost (dollars)</th>
<th>Total profit (dollars)</th>
<th>Variable cost profit (dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>−1</td>
<td>0</td>
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<tr>
<td>1</td>
<td>9</td>
<td>9</td>
<td>1.5</td>
<td>2.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>16</td>
<td>4</td>
<td>5</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>21</td>
<td>7.5</td>
<td>8.5</td>
<td>12.5</td>
<td>13.5</td>
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<tr>
<td>4</td>
<td>6</td>
<td>24</td>
<td>12</td>
<td>13</td>
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<td>12</td>
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<tr>
<td>4.5</td>
<td>5.5</td>
<td>24.75</td>
<td>14.625</td>
<td>15.625</td>
<td>9.125</td>
<td>10.125</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>25</td>
<td>17.5</td>
<td>18.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>24</td>
<td>24</td>
<td>25</td>
<td>−1</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>21</td>
<td>31.5</td>
<td>32.5</td>
<td>−11.5</td>
<td>−10.5</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>16</td>
<td>40</td>
<td>41</td>
<td>−25</td>
<td>−24</td>
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<tr>
<td>9</td>
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<td>0</td>
<td>0</td>
<td>60</td>
<td>61</td>
<td>−61</td>
<td>−60</td>
</tr>
</tbody>
</table>
Monopoly graph

**Figure 11.4 Output and Price Decisions of a Monopolist**

*Managerial Economics, 6th Edition*  
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Monopolists produce less, price higher than firms in competitive equilibrium

\[
MR = P(1 + 1/\eta)
\]

- Situation is inefficient, insofar as the sum of consumer and producer surplus is concerned
  - What is producer and consumer surplus?
- Monopolist has to take demand conditions explicitly into account
- Why is no other firm entering the market???
Other aspects of monopoly

- “Natural monopoly” if minimum of average cost occurs only at very high output level (minimum efficient scale) ==> there is only place for one firm in the market!
- Measure of monopoly power (markup of price over cost):

\[
\text{markup} = \frac{P - MC}{MC}
\]
Sources of monopoly power

- Natural monopoly (public utilities best example, railway tracks), economies of scale,
- Capital requirements on production or big sunk costs on entry
- Patents (17 years), trade secrets (Coke)
- Exclusive or unique assets (minerals, talent)
- Locational advantage (popcorn shop in cinema – but in general you pay rent for these advantages)
- Regulation (TV, taxi, telephone in the past)
- Collusion by competitors
What can a monopolist do?

Erect strategic entry barriers

- Excessive patenting and copyright
- Limit pricing (set price below monopoly price)
- Extensive advertising to create brand name to raise cost of entry
- Create intentionally excess capacity as a warning for a price war
Franchising „McFood“

- A Franchiser (mother company) gets a fixed percentage of sales,
- The franchisee is the residual claimant

- What are the incentives for the two partners?
- Other problems like number of shops in a region…
- Other examples??
Amd 11.1 Franchiser versus Franchisee?
Cost-plus pricing

- When you ask managers, how they set prices, they always say “related to costs”, but not demand

Two steps:

- The firm estimates the cost per unit of output of the product … usually average cost
- The firm adds a markup to the estimated average cost

Markup = \frac{(Price - Cost)}{Cost}
Does mark-up pricing maximize profit?

\[ TR = QP(Q) \]

\[ MR = \frac{\partial TR}{\partial Q} = P + Q \frac{\partial P}{\partial Q} = P(1 + \frac{1}{\eta}) \]

\[ MC = MR = \ldots \implies P = MC \frac{1}{1 + \frac{1}{\eta}} \]

\[
\implies \text{markup can be calculated:}
\]

A markup system will maximize profit if:

- Price elasticity of demand is known
- Marginal costs are known (in general only average costs are used)
### Table 13.1: Relationship between Markup and Price Elasticity

<table>
<thead>
<tr>
<th>Price Elasticity of Demand</th>
<th>Optimal % Markup of Marginal Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1.2</td>
<td>500</td>
</tr>
<tr>
<td>-1.4</td>
<td>250</td>
</tr>
<tr>
<td>-1.8</td>
<td>125</td>
</tr>
<tr>
<td>-2.5</td>
<td>66.67</td>
</tr>
<tr>
<td>-5.0</td>
<td>25</td>
</tr>
<tr>
<td>-11.0</td>
<td>10</td>
</tr>
<tr>
<td>-21.0</td>
<td>5</td>
</tr>
<tr>
<td>-51.0</td>
<td>2</td>
</tr>
</tbody>
</table>
The Multi-product firm

Demand inter-relationships

\[ TR = TR_X + TR_Y \]

\[ MR_X = \frac{dTR}{dQ_X} = \frac{dTR_X}{dQ_X} + \frac{dTR_Y}{dQ_X} \]

\[ MR_Y = \frac{dTR}{dQ_Y} = \frac{dTR_X}{dQ_Y} + \frac{dTR_Y}{dQ_Y} \]

- Products can be complements or substitutes for consumers.
Demand interrelationship

- What effect does it have on prices?

- Example: Why do you get peanuts for free in Pubs, but you have to pay for Tub Water?

- What about water in wine bars or coffee shops?
Production inter-relationships

- Products are produced jointly for technical reasons
- Example: by-products (Abfallprodukte) in plastic production, oil industry...
- Costs of separate production cannot be separated properly. 2 possibilities:
  - A) products always produced in same proportions
  - B) substitution in production possible
Optimal pricing for joint products: fixed proportions

Figure 13.1 Optimal Pricing for Joint Products Produced in Fixed Proportions (Case 1)
Optimal pricing for joint products: fixed proportions II
Joint products: variable proportions

- Output A can be substituted for output B
- Iso-revenue curve: combination of output levels A and B with same revenue
- Iso-cost curve: combination of output levels A and B with same costs

- Tangency condition
Optimal pricing for joint products: variable proportions

![Diagram showing optimal outputs for joint products produced in variable proportions.](https://via.placeholder.com/150)
3. Monopolistic Competition

- Many firms
- Differentiated products (is in general a strategic marketing goal) – products are close substitutes to each other; we talk about a product group if similar products

- Demand curve not completely flat
- Firms do not react to each other’s actions (because there are so many)

- Easy entry and exit
  - Examples: shirts, candy bars, restaurants, …
  - Not tomatoes at Südbahnhof market, or petrol or cars
Behavior of monopolistically competitive firms

- Firms in an „industry group“ are similar (symmetric in extreme), i.e. they have the same incentives
- What happens if firm changes price alone? (dd)
- Same incentive for other firms to change price (DD)
- ----> demand is steeper in this case
  - In the extreme: a very small firm – changing the price alone – has a very flat demand curve!

- Marketing is important: firms want to make their product „unique“, in other words:
  - Demand for their product should get more inelastic (steep)
  - Use advertising!
Demand curve if the firm (dd) or the industry (DD) changes price
Figure 11.8 Short-Run Equilibrium in Monopolistic Competition
Short-run equilibrium

- Like a monopolist: set price where
  - marginal revenue = marginal cost
- Profits arise
- --- > market entry of similar products (firms)
- Each firm competes for a percentage of total demand, new entry means demand for the individual firm must be lower (shifts left/down)
- Shift must be so far, that profits disappear
- I.e. Demand curve must finally be tangential to long-run average cost curve
Long-run equilibrium

- Due to market entry demand shifted to the left for the firm

- Zero profit condition met (Revenue=Costs)

- Profit-maximization condition met (MC=MR)

- Problem: production is not cost-efficient
  - Long-run average costs not at minimum
  - „cost“ of product variety
Perfect Competition (PC) versus Monopolistic Competition (MonC)

- PC: price equal to long-run marginal cost, in MonC price is always higher as marginal cost:
  - there are people out there who value the good more than the marginal cost to produce it.
  - ==> in principle production should rise
- PC produces at minimum of long-run average cost, MonC not at the minimum
- Trade-Off between efficiency (cost) and variety
- Long-run profit situation is alike, because of entry, but how short is the short-run??
Monopolistic Competition: summing up

- Very common market form
- No interaction between firms
- Firm could reduce average cost by producing more
- Firms try to bind their costumers to the firm:
  - Marketing, advertising plays a role (not in perfect competition)
  - Make the product different from the crowd
Optimal advertising rule

- For small variations in output (and/or) if the firm is only a small part of the market, we can assume that Price does not change following small changes in advertising.
- To determine optimal advertising, cost of advertising and cost of production must be considered.
- Simple rule:
  - Marginal revenue from an extra dollar of advertising = $\eta$ (elasticity of demand)
Optimal advertising expenditure:

advertising meant to increase brand consciousness of clients

- With little advertising, elasticity will be high, because product will be considered as easily substitutable to others,
- Increase advertising and elasticity will fall
Advertising

- Advertising can have two effects:
- High-price strategy: increase brand consciousness, don’t talk about price:
  - Price elasticity of demand should decrease
    (demand curve should get steeper)
- Low-price strategy „promotions“, i.e. increase sales:
  - Advertise price cuts which should increase price consciousness of customers, i.e. price elasticity should increase
## Price elasticity and advertising

<table>
<thead>
<tr>
<th>Brand</th>
<th>Advertised price change</th>
<th>Unadvertised price change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chock Full o´nuts</td>
<td>8.9</td>
<td>6.5</td>
</tr>
<tr>
<td>Maxwell House</td>
<td>6.0</td>
<td>*</td>
</tr>
<tr>
<td>Folgers</td>
<td>15.1</td>
<td>10.6</td>
</tr>
<tr>
<td>Hill Brothers</td>
<td>6.3</td>
<td>4.2</td>
</tr>
</tbody>
</table>

*Not significantly different from zero.

Source: Katz and Shapiro, “Consumer Shopping Behavior in the Retail Coffee Market.”
Problem - Pawnshops

During recessions, many people – particularly those who have difficulty getting bank loans – turn to pawnshops to raise cash. But even during boom years, pawnshops can be very profitable. Because the collateral that customers put up (such as jewelry or guns) is generally worth at least double what is lent, it generally can be sold at a profit. And because the usury laws allow higher interest ceilings for pawnshops than for other lending institutions, pawnshops often charge spectacularly high rates of interest. For example, Florida’s pawnshops charge interest rates of 20% or more per month. According to Steven Kent, an analyst at Goldman, Sachs, pawnshops make 20% gross profit on defaulted loans and 205% interest on loans repaid.

a) In late 1991, there were about 8,000 pawnshops in the United States, according to American Business Information. This was much higher than in 1986, when the number was about 5,000. Indeed, in late 1991, the number jumped by about 1,000. Why did the number increase?

b) In a particular small city, do the pawnshops constitute a perfectly competitive industry? If not, what is the market structure of the industry?

c) Are there considerable barriers to enter in the pawnshop industry? (Note: A pawnshop can be opened for less than $125,000, but a number of states have tightened licensing requirements for pawnshops.)
a) The pawnshop business appears to be highly profitable on the basis of the question. We should expect that entry into this industry would follow such high profits unless there were barriers to entry. If the current entry in the industry where not enough to eliminate all the supernormal profits being earned, we should expect continued entry until profits were eliminated.

b) The market for pawnshop services is likely to be quite local, as local perhaps as neighborhoods. In this case, even though there might be 100 pawnshops in a large city, the market for any individual shop is likely to be oligopolistic or monopolistic.

c) Barriers to entry appear low in this industry. Pawnshops do not appear to be any more difficult to start than restaurants or hardware stores.