Price Competition

Intermediate Microeconomics

Main topics
- I will introduce the concept of pricing and market structure in a different way from the textbook, however, the material is effectively the same.
- Today we will discuss
  - Some basics of a good pricing strategy
  - Distinguish the demand curves for firms and markets
  - Introduce the formal analysis for pricing decisions aimed at profit maximization
  - Compare the results of profit maximization under different market structures
  - Ponder some examples ...

In the first lecture after the midterm, we will use these findings to discuss the welfare consequences of competition and market power.

Example: A Pharmaceutical Company
- Suppose you are the owner of a pharmaceutical company that has just invented a new lotion to treat poison ivy more effective than calamine lotion.
- You will want to grow your business, but what pricing strategy should you use?
- How will you price your new product?
  - Calamine lotion is now selling for $2.50 for an 8-oz. bottle.
  - Given that $2.50 price of calamine lotion, if you price your product below $2.50, you will capture the entire market.
  - If you price your product above $3.00, you will share the market with calamine lotion.
- But suppose you tried to price your product at $2.50?
  - Are their strategic issues yet unconsidered?
  - "Skimming" v. "penetration"
The Demand Curve of a Firm:
(Example: A Pharmaceutical Company)

Distinguish between the market demand curve and the firm’s demand curve.
- The demand curve accounts for prices you make in the market leaving prices of products of other firms unchanged.
- Suppose your long-run average costs are $1.00 per 8-oz bottle.
- Is the price at $2.50 price at which profits are at a maximum?
- A good pricing strategy must take into account the likely responses of competitors.

<table>
<thead>
<tr>
<th>Price</th>
<th>000 Jars sold per month</th>
<th>Profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3.50</td>
<td>1500</td>
<td>3750</td>
</tr>
<tr>
<td>3.00</td>
<td>3000</td>
<td>6000</td>
</tr>
<tr>
<td>2.50</td>
<td>4500</td>
<td>6750</td>
</tr>
<tr>
<td>2.00</td>
<td>6000</td>
<td>6000</td>
</tr>
<tr>
<td>1.50</td>
<td>8700</td>
<td>4350</td>
</tr>
<tr>
<td>1.00</td>
<td>9000</td>
<td>0</td>
</tr>
</tbody>
</table>

Three Examples:
- Eastman Kodak and Polaroid – the instant camera market – has a history of heavy price competition.
  - Eastman Kodak entered the market in 1976, and the two companies battled it out in an intense rivalry that lasted decades.
- The American steel industry – orchestrated pricing coordination.
  - Since the mid-1960s, the U.S. steel industry was dominated by seven companies that priced in a conciliatory (coordinated) fashion, and cooperated to lobby for protection against foreign competition.
- The American motorcycle market – wide price divergence and disparity.
  - In the 1960s, the U.S. motorcycle market was dominated by U.S. and British firms. The Japanese gained entrance and a large market share in the 1970s by aggressive pricing.

Aggressive v. Non-Aggressive Pricing Strategies
- The above three examples lead one to ask: When is one more likely to observe an aggressive pricing strategy?
  - When demand for one’s product is more price elastic.
  - When possible supply responses (either your own or your competitor’s) are relatively less elastic.
- Some other possible influences on pricing strategies:
  - availability of price information
  - size of your firm, relative to the size of other firms
  - size of your firm, relative to the size of the market
  - threat of attracting entry by new competitors
  - your costs relative to your competitors’
  - large excess capacity or large inventories
  - threat of retaliation.
Aggressive v. Non-Aggressive Pricing Strategies (2)

- The above three examples lead one to ask: When is one more likely to observe a price-cutting strategy?
  - When demand for one’s product is more price elastic.
  - When possible supply responses (either your own or your competitor’s) are relatively less elastic.
- To simplify the complexity of the real world, let’s focus on the price elasticity of demand and supply. What factors might make demand more (less) elastic?
  - Consumers’ ability to find substitutes.
  - Consumers’ willingness to forgo consumption of the item.

Four Classes of Market Structure

- We often identify expected pricing strategies of firms by classifying market by their “market structure.”

<table>
<thead>
<tr>
<th>(Perfectly) competitive market</th>
<th>Unconcentrated, undifferentiated</th>
<th>Many sellers, homogeneous product</th>
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<td>Monopolistically competitive market</td>
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Pricing Decisions – Formal Analysis

- Objective: Suppose firms aim to maximize short-run profits.
  - Profits: \( \pi = R(y) - C(y) \)
  - Revenues: \( R = R(y) = py \)
  - Costs: \( TC = C(y) \)
- Concepts we will need:
  - Marginal revenue (MR) is the slope of the revenue function
  - Marginal cost (MC) is the slope of the cost function
  - Profits are at a maximum when they peak. i.e. they are at a maximum when the profit function has a slope of zero.
- That is when:
  \[ \frac{d\pi}{dy} = 0 \]
Finding the Maximum Profits:

- Find the point where profits level off, i.e. where they peak:
  \[ \frac{d\pi}{dy} = \frac{dR}{dy} - \frac{dC}{dy} = 0 \]
- That is the point where \( MR = MC \):
  \[ \frac{dR}{dy} = \frac{dC}{dy} \]
- This is the fundamental necessary condition for profit maximization for all market structures – marginal revenue must equal marginal cost.

Finding the Maximum Profits:

(Special Case 1: The firm has a downwardly sloping linear demand function)

- The linear demand function and the implied revenue function:
  \[ p = a - by \]
  \[ R(y) = py = y(a - by) = ay - by^2 \]
  \[ \frac{dR}{dy} = a - 2by \]
- In words, if demand is linear, then marginal revenues are also linear with the same intercept (i.e. where \( y = 0 \)) and a slope that is twice as steep.
- It is easy in this case to draw the profit-maximizing output target.
  - It is the level of output that satisfies the necessary condition that \( MR = MC \).

Profit maximization when the firm’s demand curve is downward sloping
Profit maximization when the firm’s demand curve is downward sloping

Finding the Maximum Profits:
(Special Case 2: The firm has a perfectly elastic demand function)

- The linear demand function and the implied revenue function:
  \[ p = p^* \text{ (a constant)} \]
  \[ R(y) = p^*y \]
  \[ \frac{dR}{dy} = p^* \]

- This case is even easier to draw:
  - the level of output that satisfies the necessary condition that MC = MR is when MC equals the current market price.

Profit maximization when demand is perfectly elastic
Do these two special cases have relevance? Yes, absolutely!

- When would a firm’s demand function be perfectly elastic?
  - When consumers consider their products perfect substitutes.
  - When consumers are always willing to make a one-for-one trade between Firm A’s product and its competitors’ products, it faces a perfectly elastic demand curve.
- Under these conditions, they are said:
  - to be **price takers**
  - to have no market power.
- Example: bottled drinking water

Do these two special cases have relevance? Yes, absolutely!

- When would a firm’s demand function be downward sloping?
  - All other cases ...
  - When consumers differentiate between the qualities of like products (i.e. products made by different firms in the same market).
  - When there is a single firm, or when firms cooperate to set their prices.
- Under these conditions, they are said:
  - to have **market power**.
  - Market power is defined as the ability of the firm to affect the price of its product by altering its level of production.
### Four Classes of Market Structure (once again)

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<th>Differentiation</th>
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### Some Examples to Ponder

- **Commodities markets** – goods such as wheat, corn, hogs, coffee – traded on commodities exchanges
- **Gold jewelry** (i.e. jewelry district 47th Street b/w 5th and 6th Ave.)
- **Air travel**
- **Refuse collection**

- **Two main factors/dimensions of market structure:**
  - Degree of concentration
  - Differentiability