Conduct: Integration and Merger Activity

- **Vertical Integration**
  - Where various stages in the production of a single product are carried out by one firm.

- **Horizontal Integration**
  - The merging of the production of similar products into a single firm.

- **Conglomerate Mergers**
  - The integration of different product lines into a single firm.

DOJ/FTC Horizontal Merger Guidelines

- Recall $\text{HHI} = 10,000 \sum w_i^2$, where $w_i = S_i / S_T$.
- A proposed horizontal merger may be challenged if either
  - HHI exceeds 1800, or would be after merger, and
  - Merger increases the HHI by more than 100.
- But revised guidelines recognize efficiencies:
  - “The primary benefit of mergers to the economy is their efficiency potential...which can result in lower prices to consumers...In the majority of cases the Guidelines will allow firms to achieve efficiencies through mergers without interference....”

Perfect Competition: Structure

- Many buyers and sellers.
- Homogeneous (identical) product.
- Perfect information on both sides of market.
- No transaction costs.
- Free entry and exit.
- What really counts: each buyer and seller has insignificant influence on price.

Key Implications

- Firms are “price takers” ($P = MR$).
- In the short-run, firms may earn profits or losses.
- Long-run economic profits are zero.
Unrealistic? Why Learn?
• Many small businesses are “price-takers,” and decision rules for such firms are similar to those of perfectly competitive firms.
• It is a useful benchmark.
• Explains why governments oppose monopolies.
• Illuminates the “danger” to managers of competitive environments.
  ■ Importance of product differentiation.
  ■ Sustainable advantage.

Managing a Perfectly Competitive Firm (or Price-Taking Business)

Setting Price

Profit-Maximizing Output Decision
• MR = MC.
• Since, MR = P,
• Set P = MC to maximize profits.

Graphically: Representative Firm’s Output Decision

A Numerical Example
• Given
  ■ P=$10
  ■ C(Q) = 5 + Q^2
• Optimal Price?
  ■ P=$10
• Optimal Output?
  ■ MR = P = $10 and MC = 2Q
  ■ 10 = 2Q
  ■ Q = 5 units
• Maximum Profits?
  ■ PQ - C(Q) = (10)(5) - (5 + 25) = $20
Should this Firm Sustain Short Run Losses or Shut Down?

\[ \text{Profit} = (P - \text{ATC}) \times Q < 0 \]

\[ P^e = D' = MR \]

\[ Q_f^* \]

\[ \text{ATC} \]

\[ \text{MC} \]

\[ \text{AVC} \]

\[ \text{Profit} = (P_e - \text{ATC}) \times Q_f^* < 0 \]

Shutdown Decision Rule

- A profit-maximizing firm should continue to operate (sustain short-run losses) if its operating loss is less than its fixed costs.
- Operating results in a smaller loss than ceasing operations.
- More carefully, if \( OL < \text{sunk FC} \).
- Decision rule:
  - A firm should shut down when \( P < \text{min AVC} \).
  - Continue operating as long as \( P \geq \text{min AVC} \).

Firm’s Short-Run Supply Curve: MC Above Min AVC

\[ P_{\text{min MVC}} \]

\[ Q_f^* \]

\[ \text{Market} \]

\[ D_f \]

\[ S^* \]

\[ S^\text{market} \]

\[ 10 \]

\[ 15 \]

\[ 20 \]

\[ 25 \]

\[ 30 \]

\[ 40 \]

\[ Q \]

\[ P \]

\[ 5 \]

\[ 10 \]

\[ 18 \]

\[ 30 \]

\[ 43 \]

Short-Run Market Supply Curve

- The market supply curve is the summation of each individual firm’s supply at each price.

Long Run Adjustments?

- If firms are price takers but there are barriers to entry, profits will persist.
- If the industry is perfectly competitive, firms are not only price takers but there is free entry.
  - Other “greedy capitalists” enter the market.

Effect of Entry on Price?

\[ \text{Market} \]

\[ \text{Firm} \]

\[ Q_{0d} \]

\[ Q_f^* \]

\[ D_f^e \]

\[ D_f^r \]
Effect of Entry on the Firm’s Output and Profits?

Summary of Logic

• Short run profits leads to entry.
• Entry increases market supply, drives down market price, increases market quantity.
• Demand for individual firm’s product shifts down.
• Firm reduces output to maximize profit.
• Similarly, if SR profits are negative: exit lowers supply, drives up price, …
• Long run profits are zero.

Features of Long Run Competitive Equilibrium

• \( P = MC \)
  • Socially efficient output, in SR as well as in LR.
• \( P = \text{minimum AC} \)
  • Efficient plant size.
  • Zero profits
    • Firms are earning just enough to offset their opportunity cost.

Summary: Managing a competitive firm

Conduct:

• Take prevailing price \( P \) as given
• Chose quantity to equate \( MC \) to \( P \).
• Look for ways to lower cost

Performance:

• zero economic profit (\( PS = FC \)), but—if it’s any consolation—maximal \( SV = PS + CS \).
Comment: firms may also try to blunt competition and escape the “commodity” trap

Monopoly: Structure

• Single firm serves the “relevant market.”
• Most monopolies are “local” monopolies.
• The demand for the firm’s product is the market demand curve.
• Firm has control over price.
  • Of course, the price charged affects the quantity demanded of the monopolist’s product.

“Natural” Sources of Monopoly Power

• Economies of scale
• Economies of scope
• Learning curve
"Created" Sources of Monopoly Power

- Patents and other legal barriers (like licenses)
- Lock-in effects, e.g., networks
- Tying contracts
- Exclusive contracts
- Collusion

Legal Ostacles to Monopoly Power

- Section 3 of the Clayton Act (1914)
  - Prohibits exclusive dealing and tying arrangements where the effect may be to "substantially lessen competition"
- Sections 1 and 2 of the Sherman Act (1890)
  - Prohibits price-fixing, market sharing, and other collusive practices designed to "monopolize, or attempt to monopolize" a market

Managing a Monopoly

- Market power permits you to price above MC
- Is the sky the limit?
- No. How much you sell depends on the price you set!

A Monopolist’s Marginal Revenue

Monopoly Profit Maximization

Produce where MR = MC. Charge the price on the demand curve that corresponds to that quantity.

Useful Formulae

- What’s the MR if a firm faces a linear demand curve for its product? $P = a + bQ$
  
  $MR = a + 2bQ,$ where $b < 0.$
- More generally, MR is the derivative of $R=QP(Q)$
- In terms of own-price elasticity $E,$

$$MR = P \frac{1 + E}{E}$$
\[ \frac{dR}{dQ} = \frac{d(QP)}{dQ} = P + Q \frac{dP}{dQ} = P[1 + \frac{Q}{P} \frac{dP}{dQ}] \]

because (own price) elasticity (of demand) is
\[ \epsilon = \frac{dQ}{dP} \frac{P}{Q} \]

### A Linear Example

- **Given estimates of**
  - \( P = 10 - Q \)
  - \( C(Q) = 6 + 2Q \)
- **Optimal output?**
  - \( MR = 10 - 2Q \)
  - \( MC = 2 \)
  - \( 10 - 2Q = 2 \)
  - \( Q = 4 \) units
- **Optimal price?**
  - \( P = 10 - (4) = 6 \)
- **Maximum profits?**
  - \( PQ - C(Q) = (6)(4) - (6 + 8) = 10 \)

### How Elasticity Determines Markup and Price

- In previous example, \( P = 3.0 \) MC...why 3?
- \( MC = MR = P[1+1/\epsilon] \) so
- Monopolist’s profit maximizing markup is
- \( P = m MC \), where the gross markup factor is
  \[ m = \frac{1}{1 + \frac{1}{\epsilon}} = \frac{\epsilon}{\epsilon + 1} \]

### Example

- \( MC = $10 \) and \( \epsilon = -3 \). Then
- \( m = -3/(-3+1) = 3/2 = 1.5 \), and
- \( P = m MC = (1.5)$10 = $15 \).
- So the monopolist maximizes profits by charging 150% of MC when elasticity is -3.

### Optimal Markup

- \( MC = MR = P[1+1/\epsilon] \) so
- Monopolist’s profit maximizing markup is
- \( P = m MC \), where the gross markup factor is
  \[ m = \frac{1}{1 + \frac{1}{\epsilon}} = \frac{\epsilon}{\epsilon + 1} \]

### Monopoly Multi-Plant Decisions

- Consider a monopoly that produces identical output at two production facilities. Eg., PG&E at Moss Landing and over the hill.
  - Let \( C_1(Q_1) \) be the production cost at facility 1.
  - Let \( C_2(Q_2) \) be the production cost at facility 2.
  - Decision Rule: Produce output where
    \( MR(Q) = MC_1(Q_1) \) and \( MR(Q) = MC_2(Q_2) \)
  - Set price equal to \( P(Q) \), where \( Q = Q_1 + Q_2 \).
The math
- \( Q = Q_1 + Q_2 \) is total output, so total cost is
- \( C(Q) = C_1(Q_1) + C_2(Q_2) \) and
- Profit is \( \pi = R(Q_1 + Q_2) - C_1(Q_1) + C_2(Q_2) \)
- The first order conditions are
  - \( 0 = \frac{\partial \pi}{\partial Q_1} = MR(Q_1 + Q_2) - MC_1(Q_1) \), and
  - \( 0 = \frac{\partial \pi}{\partial Q_2} = MR(Q_1 + Q_2) - MC_2(Q_2) \), so…
- Cookbook: solve simultaneous equations
  - \( MR(Q_1 + Q_2) = MC_1(Q_1) \)
  - \( MR(Q_1 + Q_2) = MC_2(Q_2) \)
  - check whether more profitable to shut down a plant

Long Run Adjustments?
- None, unless the source of monopoly power is eliminated.

Why Government Dislikes Monopoly?
- \( P > MC \)
  - Too little output, at too high a price.
  - Deadweight loss of monopoly.
  - Another problem is that monopolies tend to stifle innovation.
    - More on that in a few weeks.

Deadweight Loss of Monopoly
- The beneficial effects of economies of scale, economies of scope, and cost complementarities on price and output may outweigh the negative effects of market power.
- The prospect of acquiring monopoly power encourages innovation.
- The industry might not be viable otherwise.
- Regulation might reduce DW loss but create worse problems…

Monopolistic Competition: Structure and Conduct
- Numerous buyers and sellers
- Differentiated products
  - Implication: Since products differ, each firm faces a downward sloping demand curve.
  - Consumers view the products as fairly close substitutes.
- Free entry and exit
  - Implication: Firms will earn zero profits in the long run.
Managing a Monopolistically Competitive Firm

- Like a monopoly, monopolistically competitive firms have market power that permits pricing above marginal cost.
- Level of sales depends on the price it sets.
- **But ...**
  - The presence of other brands in the market makes the demand for your brand more elastic than if you were a monopolist.
  - Free entry and exit impacts profitability.
- Therefore, monopolistically competitive firms have limited market power.

### Marginal Revenue Like a Monopolist

<table>
<thead>
<tr>
<th>Price</th>
<th>TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>20</td>
<td>200</td>
</tr>
<tr>
<td>30</td>
<td>300</td>
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<tr>
<td>40</td>
<td>400</td>
</tr>
<tr>
<td>50</td>
<td>500</td>
</tr>
</tbody>
</table>

### Monopolistic Competition: Profit Maximization

- Maximize profits like a monopolist
  - Produce output where MR = MC.
  - Charge the price on the demand curve that corresponds to that quantity.

### Short-Run Monopolistic Competition

<table>
<thead>
<tr>
<th>Price</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>MC</td>
</tr>
<tr>
<td>AFC</td>
<td>MC</td>
</tr>
<tr>
<td>Q*</td>
<td>MR</td>
</tr>
</tbody>
</table>

### Long Run Adjustments?

- If the industry is truly monopolistically competitive, there is free entry.
  - In this case other “greedy capitalists” enter, and their new brands steal market share.
  - This reduces the demand for your product until profits are ultimately zero.
Monopolistic Competition

The Good (To Consumers)
- Product Variety

The Bad (To Society)
- \( P > MC \)
- Excess capacity

The Ugly (To Managers)
- \( P = ATC > \text{minimum of average costs} \)
- Zero Profits (in the long run)!

Optimal Advertising Decisions
- Advertising is one way for firms with market power to differentiate their products.
- But, how much should a firm spend on advertising?
  - Advertise to the point where the marginal revenue generated from advertising equals the marginal cost of advertising.
  - Equivalently, the profit-maximizing level of advertising occurs where the advertising-to-sales ratio equals the ratio of the advertising elasticity of demand to the own-price elasticity of demand. This is the Dorfman-Steiner condition:

\[
\frac{A}{R} = \frac{E_{a,s}}{E_{Q,P}}
\]

Maximizing Profits: A Synthesizing Example

- \( C(Q) = 125 + 4Q^2 \)
- Determine the profit-maximizing output and price, and discuss its implications, if:
  - You are a price taker and other firms charge $40 per unit;
  - You are a monopolist and the inverse demand for your product is \( P = 100 - Q \);
  - You are a monopolistically competitive firm and the inverse demand for your brand is \( P = 100 - Q \).

Price Taker
- \( \text{MR} = \text{MC} = 8Q \)
- \( \text{MR} = \text{P} = 40 \)
- Set MR = MC.
- Optimal output: \( Q = 5 \) units.
- Cost of producing 5 units.
  - \( C(Q) = 125 + 4Q^2 = 125 + 100 = 225 \)
- Revenues:
  - \( PQ = (40)(5) = 200 \)
- Maximum profits of $25.
- Implications: Expect exit in the long-run.

Marginal Cost

- \( C(Q) = 125 + 4Q^2 \)
- So \( MC = 8Q \).
- This is independent of market structure.

Monopoly/Monopolistic Competition
- \( \text{MR} = 100 - 2Q \) (since \( P = 100 - Q \)).
- Set \( \text{MR} = \text{MC}, \text{or} 100 - 2Q = 8Q \).
  - Optimal output: \( Q = 10 \).
  - Optimal price: \( P = 100 - (10) = 90 \).
  - Maximal profits:
    - \( PQ - C(Q) = (90)(10) - (125 + 4(100)) = 375 \).
- Implications:
  - Monopolist will not face entry (unless patent or other entry barriers are eliminated).
  - Monopolistically competitive firm should expect other firms to clone, so profits will decline over time.
Conclusion

• Firms operating in a perfectly competitive market take the market price as given.
  ■ Produce output where \( P = MC \).
  ■ Firms may earn profits or losses in the short run.
  ■ ... but, in the long run, entry or exit forces profits to zero.
• A monopoly firm, in contrast, can earn persistent profits provided that source of monopoly power is not eliminated.
• A monopolistically competitive firm can earn profits in the short run, but entry by competing brands will erode these profits over time.