In this chapter, look for the answers to these questions:

- What is a perfectly competitive market?
- What is marginal revenue? How is it related to total and average revenue?
- How does a competitive firm determine the quantity that maximizes profits?
- When might a competitive firm shut down in the short run? Exit the market in the long run?
- What does the market supply curve look like in the short run? In the long run?

Introduction: A Scenario

- Three years after graduating, you run your own business.
- You must decide how much to produce, what price to charge, how many workers to hire, etc.
- What factors should affect these decisions?
  - Your costs (studied in preceding chapter)
  -
- We begin by studying the behavior of firms in perfectly competitive markets.
Characteristics of Perfect Competition
1. 
2. 
3. 
Because of 1 & 2, each buyer and seller is a

The Revenue of a Competitive Firm
1. Total revenue (TR)
2. Average revenue (AR)
3. Marginal Revenue (MR):

Exercise
Fill in the empty spaces of the table.

<table>
<thead>
<tr>
<th>Q</th>
<th>P</th>
<th>TR</th>
<th>AR</th>
<th>MR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$10</td>
<td>n.a.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$10</td>
<td></td>
<td>$10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$10</td>
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<tr>
<td>3</td>
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</tr>
<tr>
<td>4</td>
<td>$10</td>
<td>$40</td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>$10</td>
<td>$50</td>
<td>$10</td>
<td></td>
</tr>
</tbody>
</table>
MR = P for a Competitive Firm

- A competitive firm can keep increasing its output without affecting the market price.
- So, each one-unit increase in $Q$ causes revenue to rise by $P$.

Profit Maximization

- What $Q$ maximizes the firm’s profit?
- To find the answer, “Think at the margin.”
  - If increase $Q$ by one unit,
    - If $MR > MC$, then
    - If $MR < MC$, then

(continued from earlier exercise)

<table>
<thead>
<tr>
<th>$Q$</th>
<th>TR</th>
<th>TC</th>
<th>Profit</th>
<th>$MR$</th>
<th>$MC$</th>
<th>$\Delta$Profit = $MR - MC$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>$6$</td>
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<tr>
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<td>11</td>
<td>9</td>
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<td>0</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>33</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>-2</td>
</tr>
</tbody>
</table>

At any $Q$ with

At any $Q$ with
MC and the Firm’s Supply Decision

At $Q_a$, 

At $Q_b$, 

At $Q_c$, 

Costs

$P_1$

$Q$

$P_1$

$Q_1$

$Q$

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11

If price rises to $P_2$, then the profit-maximizing quantity rises to $Q_2$.

The $MC$ curve determines the firm’s $Q$ at any price.

Hence,

Shutdown vs. Exit

$\text{Shutdown}$:

$\text{Exit}$:

A key difference:
A Firm’s Short-run Decision to Shut Down

- Cost of shutting down:

- Benefit of shutting down:

So, shut down if

\[ \text{Divide both sides by } Q. \]

So, firm’s decision rule is:

Shut down if

A Competitive Firm’s SR Supply Curve

If \( P > AVC \), then firm produces \( Q \) where \( P = MC \).

If \( P < AVC \), then firm shuts down (produces \( Q = 0 \)).

The Irrelevance of Sunk Costs

- Sunk cost:

Sunk costs should be irrelevant to decisions; you must pay them regardless of your choice.

\( FC \) is a sunk cost: The firm must pay its fixed costs whether it produces or shuts down.

So,
A Firm's Long-Run Decision to Exit

- Cost of exiting the market:
- Benefit of exiting the market:

\[ \text{So, firm exits if} \]
\[ \text{Divide both sides by} \ Q \ \text{to write the firm's decision rule as:} \]
\[ \text{Exit if} \]

A New Firm's Decision to Enter Market

\[ \text{In the long run, a new firm will enter the market if it is profitable to do so: if} \]
\[ \text{Divide both sides by} \ Q \ \text{to express the firm's entry decision as:} \]
\[ \text{Enter if} \]

The Competitive Firm's Supply Curve

The firm's LR supply curve is

\[ MC \]
\[ LRATC \]
\[ Q \]
**ACTIVE LEARNING 2a:**
Identifying a firm's profit

Determine this firm's total profit.
Identify the area on the graph that represents the firm's profit.

**ACTIVE LEARNING 2b:**
Identifying a firm's loss

Determine this firm's total loss, assuming $AVC < $3.
Identify the area on the graph that represents the firm's loss.

---

**Market Supply: Assumptions**

1) All existing firms and potential entrants

2) Each firm's costs

3) The number of firms in the market is
   
   • ___________ in the short run due to ___________
   
   • ___________ in the long run due to ___________
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The SR Market Supply Curve

- As long as \( P \geq AVC \), each firm will produce its profit-maximizing quantity.
- Recall from Chapter 4: At each price, the market quantity supplied is the sum of quantities supplied by all firms.

Example: 1000 identical firms. At each \( P \), market \( Q = 1000 \times \text{(one firm's } Q) \)

Entry & Exit in the Long Run

- In the LR, the number of firms can change due to entry & exit.
- If existing firms earn positive economic profit,
- If existing firms incur losses,
The Zero-Profit Condition

- **Long-run equilibrium:**
  - The process of
  - Zero economic profit occurs when
  - Since firms produce where the zero-profit condition is
  - Recall that $MC$ intersects $ATC$ at minimum $ATC$. Hence, in the long run,

Why Do Firms Stay in Business if Profit = 0?

- Recall, economic profit is revenue minus all costs – including
- In the zero-profit equilibrium,

The LR Market Supply Curve

- In the long run, the typical firm earns zero profit.
SR & LR Effects of an Increase in Demand

Why the LR Supply Curve Might Slope Upward

1) Firms Have Different Costs

1. As $P$ rises, firms with lower costs enter the market before those with higher costs.

2. Further increases in $P$

   1. Hence, LR market supply curve slopes upward.
   2. At any $P$:
      - For the marginal firm,
      - For lower-cost firms,
2) Costs Rise as Firms Enter the Market

- In some industries,

- The entry of new firms

- Hence, an increase in $P$ is required to increase the market quantity supplied, so the supply curve is upward-sloping.

CONCLUSION: The Efficiency of a Competitive Market

- Profit-maximization:

- Perfect competition:

- So, in the competitive eq’m:

- Recall, $MC$ is cost of producing the marginal unit. $P$ is value to buyers of the marginal unit.

- So,

- In the next chapter, monopoly: pricing & production decisions, deadweight loss, regulation.