Imperfect Competition

Introduction (1/2)

Markets rarely fit all of the assumptions of perfect competition or monopoly.

In this chapter, we explore market structures that are collectively referred to as **imperfect competition**.

- Market structures with characteristics between those of perfect competition and monopoly

Chapter Outline

11.1 What Does Equilibrium Mean in an Oligopoly?
11.2 Oligopoly with Identical Goods: Collusion and Cartels
11.3 Oligopoly with Identical Goods: Bertrand Competition
11.4 Oligopoly with Identical Goods: Cournot Competition
11.5 Oligopoly with Identical Goods but with a First-Mover: Stackelberg Competition
11.6 Oligopoly with Differentiated Goods: Bertrand Competition
11.7 Monopolistic Competition
11.8 Conclusion

Introduction (2/2)

- We relax a number of assumptions to examine markets in a more realistic manner:
  - Allow for varying degrees of competition
  - Allow for differentiated products
  - Allow for strategic behavior

What Does Equilibrium Mean in an Oligopoly? (1/2)

11.1

- The first market structure we consider is **oligopoly**.
- Competition between a small number of firms

- It is important to examine what equilibrium means in an oligopoly.
- Under perfect competition or monopoly, short-run equilibrium refers to a price–quantity combination that results in a market clearing.
- More complicated under **oligopoly**
  - In an oligopolistic industry, each company's actions influences what the other companies want to do.
  - To determine an outcome when no firm wants to change its decision, we must determine more than just a price and quantity for the industry as a whole.
  - An equilibrium in which each firm is doing its best, conditional on the actions taken by other firms, is called a **Nash equilibrium**.

What Does Equilibrium Mean in an Oligopoly? (2/2): Question 1

11.1

What is the Nash Equilibrium for these two firms?

		DISNEY	
		Advertise	**Don't Advertise**
WARNER BROTHERS	**Advertise**	250, 250	550, −80
	Don't Advertise	−80, 550	320, 320

A. Warner Brothers will advertise, Disney will not
B. Disney will advertise, Warner Brothers will not
C. Neither will advertise
D. Both will advertise

What Does Equilibrium Mean in an Oligopoly? (2/2): Question 1 – Correct Answer

11.1

What is the Nash Equilibrium for these two firms?

		DISNEY	
		Advertise	**Don't Advertise**
WARNER BROTHERS	**Advertise**	250, 250	550, −80
	Don't Advertise	−80, 550	320, 320

A. Warner Brothers will advertise, Disney will not
B. Disney will advertise, Warner Brothers will not
C. Neither will advertise
D. Both will advertise (correct answer)

Oligopoly with Identical Goods: Collusion and Cartels (1/6)

11.2

- There is an incentive for firms in oligopolistic markets to engage in **collusion** or to form a **cartel**.
- **Collusion**: Economic behavior in which all the firms in an oligopoly coordinate their production and pricing decisions to collectively act as a monopoly to gain monopoly profits to be split among themselves

- **Model Assumptions: Collusion and Cartels**

1. Firms make identical products.
2. Industry firms agree to coordinate their quantity and pricing decisions.
3. No firm deviates from the agreement, even if breaking it is in the firm's best interest.

Oligopoly with Identical Goods: Collusion and Cartels (2/6)

11.2

The Instability of Collusion and Cartels

The problem with maintaining collusion is that each firm has an incentive to cheat.

Consider two firms, A and B, producing an identical product.

- Inverse demand is $P = 20 - Q$, and marginal cost is $MC = \$4$.

If the firms collude, they will produce the monopoly output.

- Equate marginal revenue and marginal cost:

$$MR = 20 - 2Q = MC \rightarrow 20 - 2Q = 4 \rightarrow Q = 8$$

- The monopoly price will be \$12, and total profits will be \$64.

Assuming firms split production, each will produce 4 units, and each firm will earn \$32 in profit.

Oligopoly with Identical Goods: Collusion and Cartels (3/6)

11.2

The Instability of Collusion and Cartels

The problem is that each firm has an incentive to cheat.

- What happens if Firm A decides to produce 5 units instead of 4?
  - Total production is 9 units instead of 8, and total industry profit will fall.
- Given inverse demand $P = 20 - Q$, the new price will be \$11, and total profits will be \$63.
- However, Firm A has increased individual profit:

$$\text{Profit}_A = (P - c) \times Q_A \Rightarrow \qquad \text{Profit}_A = (11 - 4)5 = \$35$$

- And Firm B has reduced profit:

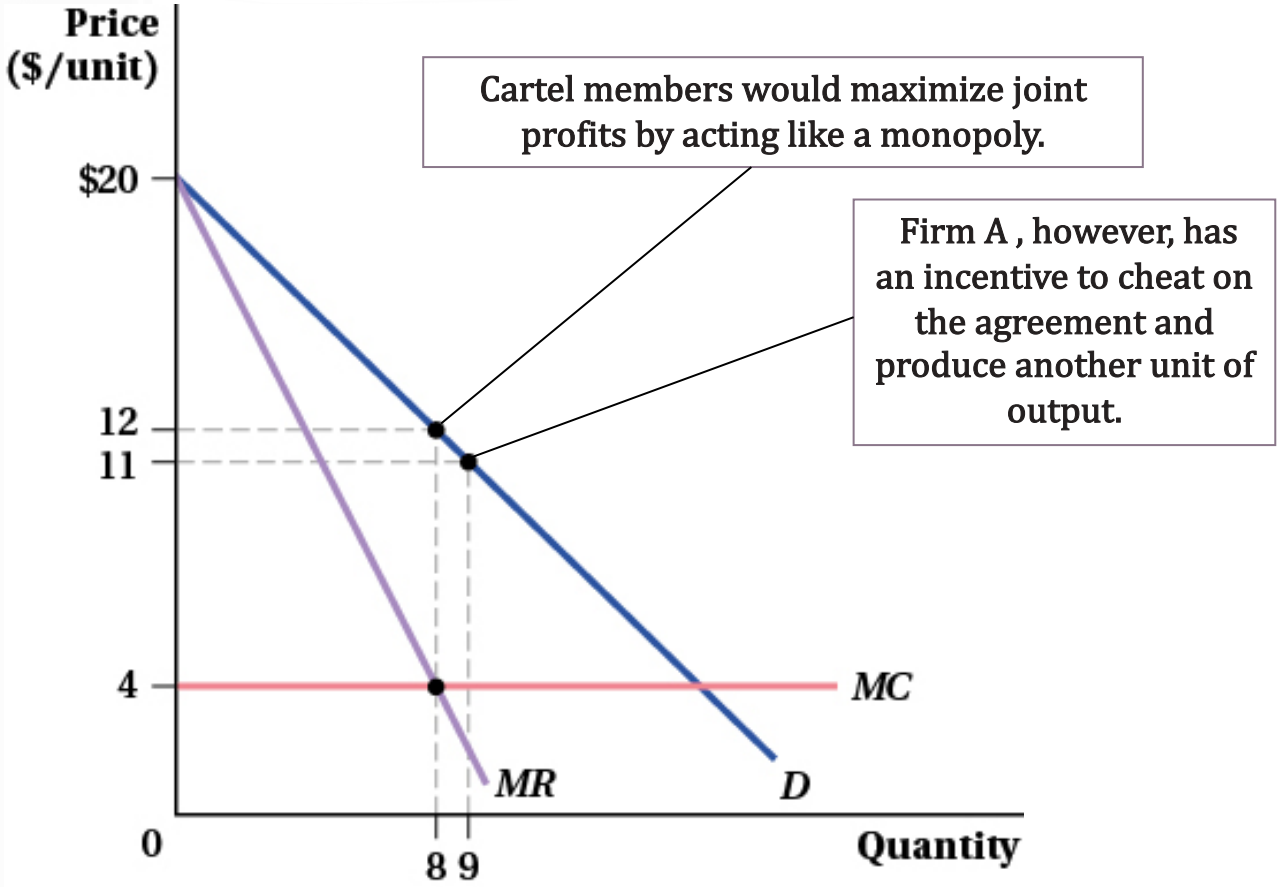
$$\text{Profit}_B = (P - c) \times Q_B \Rightarrow \qquad \text{Profit}_B = (11 - 4)4 = \$28$$

This incentive to cheat makes it difficult to maintain collusive agreements.

Oligopoly with Identical Goods: Collusion and Cartels (4/6)

11.2

Figure 11.1 Cartel Instability



Oligopoly with Identical Goods: Collusion and Cartels (5/6)

11.2

The Instability of Collusion and Cartels

- Increasing the number of firms in the cartel also makes holding to the agreed production level more difficult.
- Having more firms in a cartel reduces the damages suffered by any one firm that continues to abide by the agreement because profit losses caused by cheating are spread out across more firms.
- Every firm in the cartel has an incentive to cheat, making it difficult to persuade any one firm to collude in the first place.

Oligopoly with Identical Goods: Collusion and Cartels (6/6)

11.2

What Makes Collusion Easier?

A number of things can make it easier to sustain collusive agreements:

1. Making it easy to detect and punish cheaters

2. Little variation in marginal costs across producers; since the goal is to produce at lowest cost, it is difficult to share profits if production costs vary greatly across cartel members.

3. Long time horizon makes defection more costly, as future monopoly profits are given more weight.

Oligopoly with Identical Goods: Bertrand Competition (1/3)

11.3

With the collusion model, firms are focused on their output decision.

- In reality, firms often focus on their *price* decision instead.
- The **Bertrand competition** model describes an oligopoly in which each firm chooses the price of its product.
- Strategic interaction ensues, with each firm responding to its rivals' price decision.

Model Assumptions: Bertrand Competition with Identical Goods

1. Firms make identical products.
2. Firms compete by choosing the price at which they sell their products.
3. Firms set their prices simultaneously.

Oligopoly with Identical Goods: Bertrand Competition (2/3)

11.3

Setting Up the Bertrand Model

Suppose two firms, Target and Walmart, are selling Sony Playstations.

- Products are identical; assume marginal cost is identical.
- Total quantity purchased is Q. Price at Walmart is P_W; price at Target is P_T.

Demand for Playstations at Walmart

$$\begin{cases} Q, & \text{if } P_W < P_T \\ \frac{Q}{2}, & \text{if } P_W = P_T \\ 0, & \text{if } P_W > P_T \end{cases}$$

Demand for Playstations at Target

$$\begin{cases} Q, & \text{if } P_T < P_W \\ \frac{Q}{2}, & \text{if } P_T = P_W \\ 0, & \text{if } P_T > P_W \end{cases}$$

The only way to sell Playstations is to match or beat your competitor.

Oligopoly with Identical Goods: Bertrand Competition (3/3)

11.3

Nash Equilibrium of a Bertrand Oligopoly

What should Target do if Walmart lowers the price of the Nintendo Switch to less than Target's?

- Target is left with two options if it still wants to sell the Nintento Switch.
  - It can match Walmart, so that the market is shared equally.
  - it can undercut Walmart, so that all consumers purchase from Target.

What is the Nash equilibrium in this structure?

- Equilibrium occurs when each firm charges the marginal cost of production.
- With identical firms and products, if one firm is charging more than its marginal cost, the other firm *always* has an incentive to undercut.
- Even though competition is imperfect, in Bertrand competition, market equilibrium is identical to perfect competition and price equals marginal cost.

Oligopoly with Identical Goods: Cournot Competition (1/14)

11.4

If, instead, firms focus on the quantity decision:

- Oligopolists in a local market may compete on price, but producers in larger markets (e.g., commodities) may have to set production, because capacity constraints may keep each firm from losing all of its customers.

This type of structure is called **Cournot competition**.

- Oligopoly model in which each firm chooses its production quantity rather than price

Model Assumptions: Cournot Competition with Identical Goods

1. Firms make identical products.
2. Firms compete by choosing a quantity to produce.
3. All goods sell for the market price, which is determined by the sum of quantities produced by all firms in the market.
4. Firms choose quantities simultaneously.

Oligopoly with Identical Goods: Cournot Competition (2/14)

11.4

Setting Up the Cournot Model

Assume there are two firms in a Cournot oligopoly.

- Each firm has a constant marginal cost ***c.***
- Firms 1 and 2 *simultaneously* choose production quantities q_1 and q_2.

Inverse demand is given by:

$$P = a - bQ \; ; \; Q = q_1 + q_2$$

Firm 1's profit is:

$$\pi_1 = q_1(P - c)$$

substituting in for P: $\pi_1 = q_1 \times [(a - b(q_1 + q_2)) - c]$

And Firm 2's profit is: $\pi_2 = q_2 \times [(a - b(q_1 + q_2)) - c]$

Each firm's profit depends on actions of the other firm.

Oligopoly with Identical Goods: Cournot Competition (3/14)

11.4

Equilibrium in a Cournot Oligopoly

Assume only two countries, Saudi Arabia and Iran, supply oil to the world.

- Each has a constant marginal cost of $20 per barrel.

Inverse demand is given by: $P = 200 - 3Q$; $Q = q_{SA} + q_I$

Solving for the equilibrium in this model is similar to the monopoly case, except Q is the sum of quantities. Rewriting the inverse demand curve,

$$P = 200 - 3Q = 200 - 3(q_{SA} + q_I)$$
$$P = 200 - 3q_{SA} - 3q_I$$

Oligopoly with Identical Goods: Cournot Competition (4/14)

11.4

Equilibrium in a Cournot Oligopoly

The slope of the marginal revenue curve is twice the slope of the inverse demand curve.

For Saudi Arabia: $MR_{SA} = 200 - 6q_{SA} - 3q_I$

Solving for Saudi Arabia's profit-maximizing output:

$$MR_{SA} = MC$$
$$200 - 6q_{SA} - 3q_I = 20$$
$$q_{SA} = 30 - 0.5q_I$$

Similarly, Iran's profit-maximizing output is:

$$q_I = 30 - 0.5q_{SA}$$

Oligopoly with Identical Goods: Cournot Competition (5/14)

11.4

Equilibrium in a Cournot Oligopoly

This differs from the monopoly outcome in that the profit-maximizing output for each country depends on the choices of the other.

For instance, if the Saudis expect Iran to produce 10 million barrels per day, they face the inverse demand curve:

$$P = 200 - 3q_{SA} - 3q_I = 200 - 3q_{SA} - 3(10) = 170 - 3q_{SA}$$

This leftover demand is the **residual demand curve**.

- In Cournot competition, the demand remaining for a firm's output given competitor firms' production quantities

Similarly, a **residual marginal revenue curve** is a marginal revenue curve corresponding to a residual demand curve.

Oligopoly with Identical Goods: Cournot Competition (6/14)

11.4

Cournot Equilibrium: A Graphical Approach

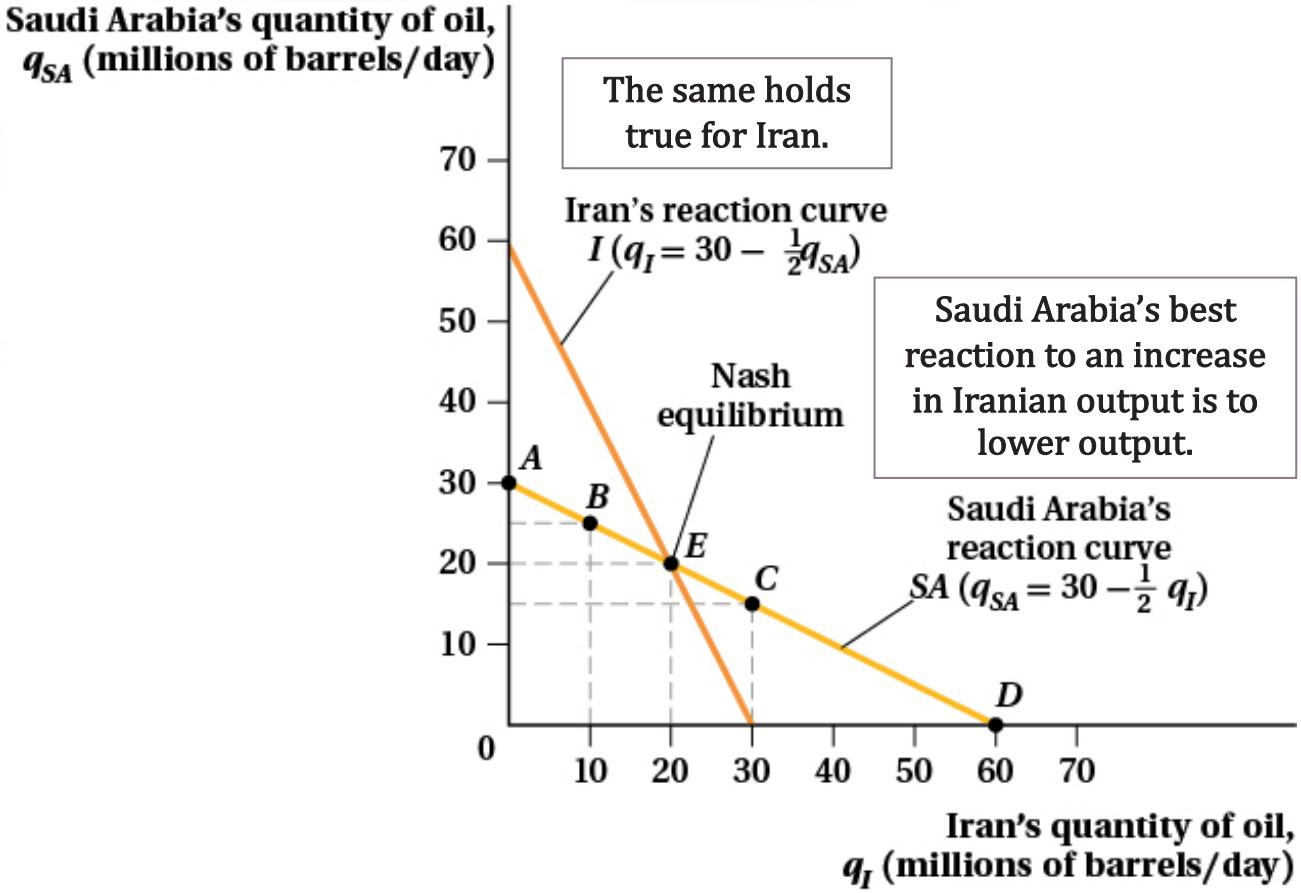
The relationship between two firms' output decisions in a Cournot oligopoly can be seen graphically through the use of **reaction curves**.

- A function that relates a firm's best response to its competitor's possible actions
- In Cournot competition, this is the firm's best production response to its competitor's possible quantity choices.

Oligopoly with Identical Goods: Cournot Competition (7/14)

11.4

Figure 11.3 Reaction Curves and Cournot Equilibrium



Oligopoly with Identical Goods: Cournot Competition (8/14)

11.4

Cournot Equilibrium: A Mathematical Approach

We can also solve for a Cournot equilibrium mathematically.

- Substitute one firm's reaction curve into the other.
- In the oil production example:

$$q_{SA} = 30 - 0.5q_I \text{ , } q_I = 30 - 0.5q_{SA}$$
$$q_{SA} = 30 - 0.5(30 - 0.5q_{SA}) = 30 - 15 + 0.25\, q_{SA}$$
$$q_{SA} = 20 \text{ million}$$

Saudi Arabia's equilibrium output is 20 million barrels per day.

Since Iran and Saudi Arabia have identical production costs, Iran will also produce 20 million barrels per day, and the market price will be:

$$P = 200 - 3q_{SA} - 3q_I = 200 - 3(20) - 3(20) = \$80 \text{ per barrel}$$

Oligopoly with Identical Goods: Cournot Competition (9/14)

Cournot Equilibrium: A Mathematical Approach

Finally, we can compute the profit earned by Saudi Arabia:

$$\pi_{SA} = q_{SA} \times (P - \$20) = 20 \text{ million} \times (\$80 - \$20) = \$1.2 \text{ billion}$$

and Iran:

$$\pi_{I} = q_{I} \times (P - \$20) = 20 \text{ million} \times (\$80 - \$20) = \$1.2 \text{ billion}$$

Total output is 40 million barrels of oil per day, and total profit is $2.4 billion.

Oligopoly with Identical Goods: Cournot Competition (10/14)

11.4

Comparing Cournot to Collusion and to Bertrand Oligopoly

Under collusion, Saudi Arabia and Iran will act as a single monopolist, splitting production evenly because production costs are the same.

- Following the normal procedure, that marginal revenue equals marginal cost, total output is 30 million barrels per day (BPD), with associated market price:

$$P = 200 - 3(30) = \$110$$

- Total profit is:

$$\pi_{SA} + \pi_I = (P - \$20) \times Q = (\$110 - \$20) \times 30 \text{ million} = \$2.7 \text{ billion}$$

- Under collusion, production is *less* than that observed in the Cournot equilibrium (40 million BPD), and profits are higher by $300 million per day.

Oligopoly with Identical Goods: Cournot Competition (11/14)

11.4

Comparing Cournot to Collusion and to Bertrand Oligopoly

With Bertrand competition, firms compete on price.

- Price will equal marginal cost; using the inverse demand curve:

$$P = MC$$

$$200 - 3Q = \$20$$

$$Q = 60 \text{ million}$$

- The two countries would split this demand equally, selling 30 million barrels each.

How much profit do Saudi Arabia and Iran earn?

  - Because both firms sell at a price equal to *MC*, each earns zero economic profit.

At the Bertrand equilibrium, output quantity is higher than at the Cournot equilibrium, price is lower, and there is no profit.

Oligopoly with Identical Goods: Cournot Competition (12/14)

11.4

Comparing Cournot to Collusion and to Bertrand Oligopoly

Table 11.2 Comparing Equilibria across Oligopolies

Oligopoly Structure	Total Output (million bpd)	Price ($ per barrel)	Industry Profit (per day)
Collusion	30	$110	$2.7 billion
Bertrand (identical products)	60	20	0
Cournot	40	80	2.4 billion

Oligopoly with Identical Goods: Cournot Competition (13/14)

11.4

Comparing Cournot to Collusion and to Bertrand Oligopoly

In summary

- *Output* under the three industry structures:

$$Q_m < Q_c < Q_b$$

  - Monopoly results in the lowest quantity produced, while Bertrand results in the most.

- Market price under the three industry structures:

$$P_b < P_c < P_m$$

  - Bertrand yields the lowest price, while monopoly yields the highest.

- Profit under the three industry structures:

$$\pi_b = 0 < \pi_c < \pi_m$$

  - Bertrand yields the lowest profit (0), while monopoly yields the highest.

Oligopoly with Identical Goods: Cournot Competition (14/14)

11.4

What Happens If There Are More than Two Firms in a Cournot Oligopoly?

The approach presented in previous slides extends to the case of multiple firms.

- In general, as the number of firms increases, market outcomes still fall between the monopoly and perfectly competitive cases, *but*
  - outcomes will approach the perfectly competitive case.
  - more competitors mean higher industry output, lower market price, and lower industry profit.

Oligopoly with Identical Goods: Stackelberg Competition (1/7)

11.5

So far, we have considered only the case in which competitors with market power choose output or price simultaneously.

- In reality, firms may make decisions before or after observing a competitor's choice.

This type of structure is called **Stackelberg competition.**

- Oligopoly model in which firms make production decisions sequentially

Model Assumptions: Stackelberg Competition with Identical Goods

1. Firms make identical products.
2. Firms compete by choosing a quantity to produce.
3. All goods sell for the market price, which is determined by the sum of quantities produced by all firms in the market.
4. Firms choose quantities simultaneously.

Oligopoly with Identical Goods: Stackelberg Competition (2/7)

11.5

Consider the outcomes of the Cournot competition model.

- Each firm chooses its optimal quantity based on what the firm believes its competitor(s) might do.

What happens if one firm observes the other producing more than the Cournot output?

  - Could punish competitor by changing its own production

Reaction curves are downward-sloping; the best response is to *reduce* output from the Cournot equilibrium level.

The ability of a first mover to manipulate its competitor's output in Stackelberg competition means that there is a **first-mover advantage**.

- In Stackelberg competition, the advantage is gained by the initial firm in setting its production quantity.

Oligopoly with Identical Goods: Stackelberg Competition (3/7)

11.5

Let's return to Saudi Arabia and Iran in Cournot competition.

Inverse demand is given by (quantity measured in millions of barrels):

$$P = 200 - 3Q \; ; Q = \; q_{SA} + q_I$$

Each country has a constant marginal cost of production of $20 per barrel.

The two countries will produce where marginal revenue equals marginal cost, yielding the following reaction functions:

Saudi Arabia

$$MR_{SA} = 200 - 6q_{SA} - 3q_I = 20$$

$$q_{SA} = 30 - 0.5q_I$$

Iran

$$MR_I = 200 - 6q_I - 3q_{SA} = 20$$

$$q_I = 30 - 0.5q_{SA}$$

Oligopoly with Identical Goods: Stackelberg Competition (4/7)

11.5

Stackelberg Competition and the First-Mover Advantage

Now suppose Saudi Arabia is a Stackelberg leader. This means it chooses its optimal quantity of output *before* Iran does.

- Iran's incentives remain the same; for any quantity Saudi Arabia chooses to produce, Iran's reaction function describes the optimal response.
- Importantly, *Saudi Arabia realizes Iran will do this before it makes its first move*.
  - However, Saudi Arabia's reaction curve is different; specifically, we must substitute Iran's reaction curve into the inverse demand curve.

Oligopoly with Identical Goods: Stackelberg Competition (5/7)

11.5

Stackelberg Competition and the First-Mover Advantage

- Substitute Iran's reaction curve into the inverse demand curve and solve for the optimal output for Saudi Arabia.

$$P = 200 - 3q_{SA} - 3q_I$$
$$P = 200 - 3q_{SA} - 3(30 - 0.5q_{SA})$$
$$P = 110 - 1.5q_{SA}$$
$$MR_{SA} = 100 - 3q_{SA} = 20$$
$$q_{SA} = 30$$

- Plug this in to Iran's reaction function:

$$q_I = 30 - 0.5(30) = 15$$

Oligopoly with Identical Goods: Stackelberg Competition (6/7)

Let's compare Saudi Arabia's decisions under a Stackelberg *competition* structure to the Cournot outcome.

In the Cournot equilibrium, each country produces 20 million barrels per day; now Saudi Arabia produces 30 million barrels per day and Iran, 15 million.

Cournot

$$P = 200 - 4q_{SA} - 3q_I$$

$$MR_{SA} = 200 - 6q_{SA} - 3q_I = 20$$

$$q_{SA} = 30 - 0.5q_I$$

$$q_{SA} = 3q_I = 20$$

$$4p_B = 900 + p_K$$

Stackelberg

$$P = 200 - 3q_{SA} - 3q_I$$

$$P = 200 - 3q_{SA} - 3(30 - 0.5q_{SA})$$

$$P = 110 - 1.5q_{SA}$$

$$MR_{SA} = 100 - 3q_{SA} = 20$$

$$q_{SA} = 30$$

$$q_I = 30 - 0.5(30) = 15$$

Oligopoly with Identical Goods: Stackelberg Competition (7/7)

11.5

Market price is $P = 200 - 3(45) = \$65$ per barrel, and profit for each country is:

Saudi Arabia

$$\pi_{SA} = q_{SA}(P - 20) = 30(65 - 20)$$

$$\pi_{SA} = \$1{,}350{,}000{,}000 / day$$

Iran

$$\pi_I = q_I(P - 20) = 15(65 - 20)$$

$$\pi_I = \$675{,}000{,}000 / day$$

Saudi Arabia makes slightly more (by $150 million) than the Cournot equilibrium of $1.2 billion per day as a result of holding first-mover advantage, whereas Iran does much worse.

Oligopoly with Differentiated Goods: Bertrand Competition (1/6)

11.6

Every model we have considered so far has shared a common assumption: that all firms in a particular market sell an *identical product*.

- A more realistic situation—particularly with consumer goods—is that products in a specific market are differentiated in important ways
- A **differentiated product market** is a market with multiple varieties of a common product.
- We start by examining Bertrand competition with differentiated products.

Model Assumptions: Bertrand Competition with Differentiated Goods

1. Firms do *not* sell identical products. They sell differentiated products, meaning consumers do not view them as perfect substitutes.
2. Each firm chooses the price at which it sells its product.
3. Firms set prices simultaneously.

Oligopoly with Differentiated Goods: Bertrand Competition (2/6)

11.6

Equilibrium in a Differentiated-Products Bertrand Market

Suppose there are two snowboard manufacturers, Burton and K2.

- Products are substitutes but not *perfect* substitutes.
- Differentiation means each firm faces a unique demand curve.

- Consider the following demand curves for the two companies' snowboards, where price is measured in dollars:

Burton

$$p_B = 900 - 2p_B + p_K$$

K2

$$q_K = 900 - 2p_K + p_B$$

As the price of Burton snowboards increases, Burton is in less demand but K2 is in greater demand, and vice versa.

Oligopoly with Differentiated Goods: Bertrand Competition (3/6)

11.6

Equilibrium in a Differentiated-Products Bertrand Market

Each company sets its price to maximize profits.

- For simplicity, assume the marginal cost of producing snowboards is zero.
- Burton and K2 set their price so that marginal revenue is equal to zero.

These are the reaction curves for Burton and K2; as the competitor's price rises, their own price rises.

– This is the opposite of quantity reaction in Cournot competition. Why does this occur?

Burton

$$MRB = 900 - 4p_B + p_K = 0$$

$$4p_B = 900 + p_K$$

$$p_B = 225 + 0.25p_K$$

K2

$$MRK = 900 - 4p_K + p_B = 0$$

$$4p_K = 900 + p_B$$

$$p_K = 225 + 0.25p_B$$

Oligopoly with Differentiated Goods: Bertrand Competition (4/6)

Equilibrium in a Differentiated-Products Bertrand Market

To find the equilibrium prices, plug one company's reaction curve in to the other's:

$$p_B = 225 + 0.25p_K$$
$$p_B = 225 + 0.25p_K\,(225 + 0.25p_B)$$
$$0.9375p_B = 281.25$$
$$p_B = \$300$$

Plugging this price in to K2's reaction curve yields K2's equilibrium price.

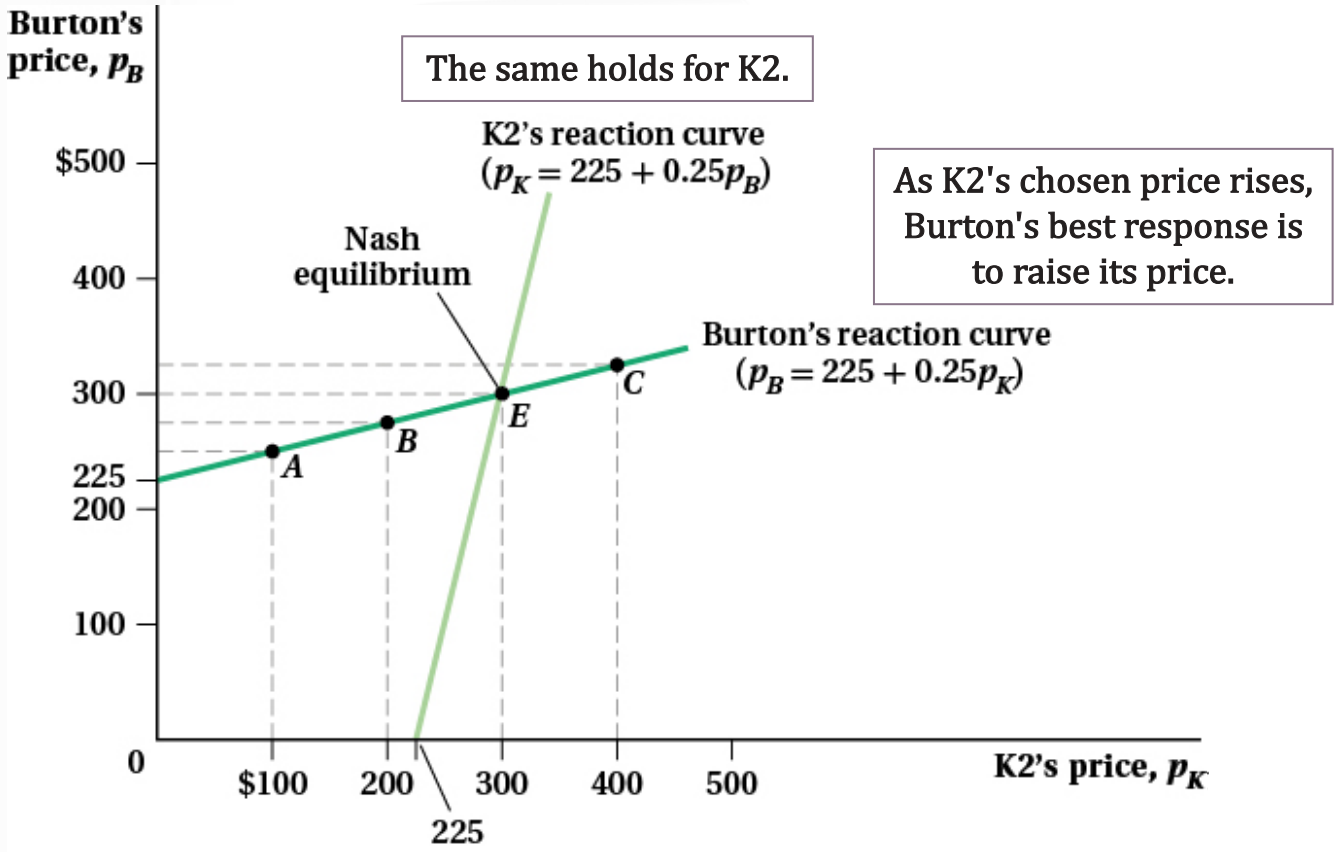
$$P_K = 225 + 0.25(300) = \$300$$

We can also find the equilibrium graphically.

Oligopoly with Differentiated Goods: Bertrand Competition (5/6)

11.6

Figure 11.4 Nash Equilibrium in a Bertrand Market



Oligopoly with Differentiated Goods: Bertrand Competition (6/6): Discussion Question

11.6

How do firms with identical products differentiate themselves in the market?

Monopolistic Competition (1/7)

11.7

So far, we have focused exclusively on markets whose number of firms is fixed.

- If, instead, there are no barriers to entry in a differentiated product market, we have ***monopolistic competition***.
  - A market structure characterized by many firms selling a differentiated product and with no barriers to entry

Model Assumptions: Monopolistic Competition

1. Industry firms sell differentiated products that consumers do not view as perfect substitutes.
2. Other firms' choices affect a firm's residual demand curve, but the firm ignores any strategic interactions between its own quantity or price choice and that of its competitors.
3. The market allows free entry and exit.

Monopolistic Competition (2/7)

Equilibrium in Monopolistically Competitive Markets

To understand how equilibrium is reached in a monopolistically competitive market, first examine how free entry affects noncompetitive market outcomes.

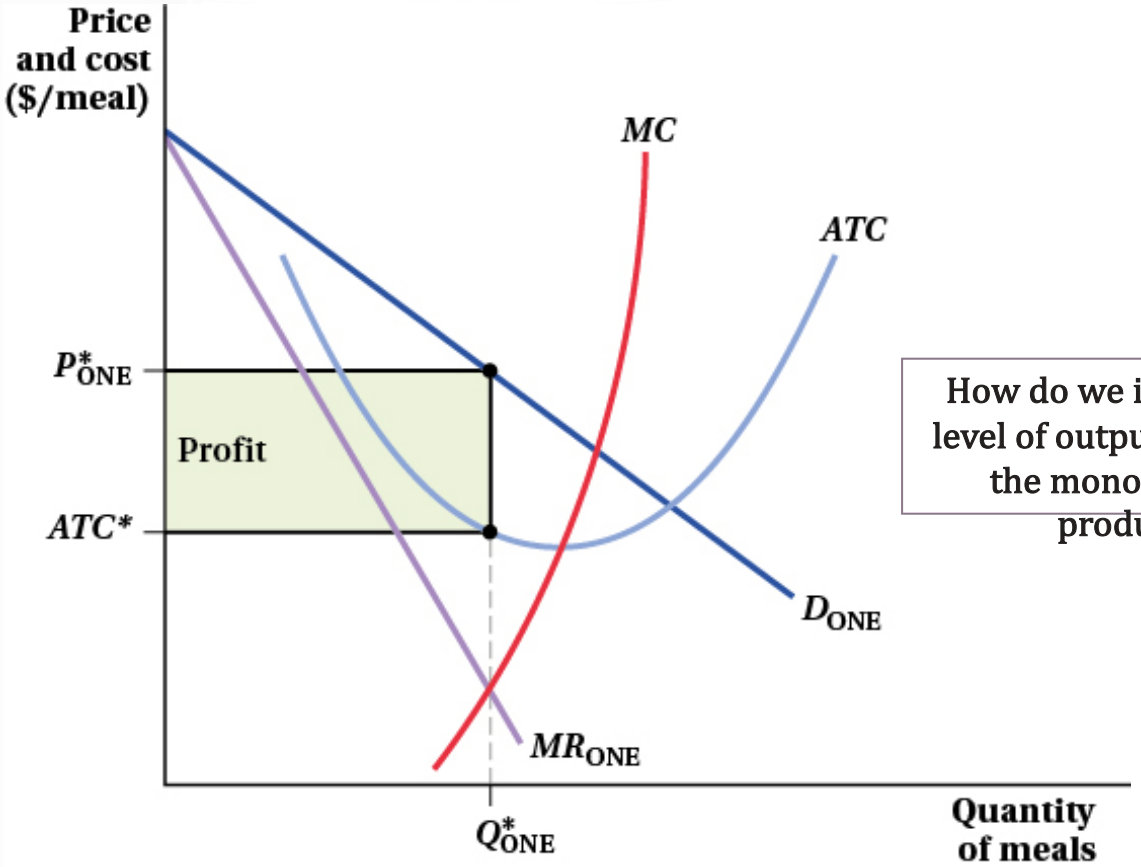
Consider a small town with a single fast-food burger restaurant.

- The restaurant is effectively a monopolist.
- The demand curve is D_{one}, indicating a single firm.
- The firm will choose a level of production that equates marginal revenue with marginal cost.

Monopolistic Competition (3/7)

11.7

Figure 11.5 Demand and Cost Curves for a Monopoly



Monopolistic Competition (4/7)

Equilibrium in Monopolistically Competitive Markets

The result is a monopoly outcome.

Now, suppose a second firm notices the profitability of operating a fast-food restaurant in this town.

- With no barriers to entry, the second firm opens a restaurant.

Two things happen to the demand curve, D_{ONE}, when another firm enters.

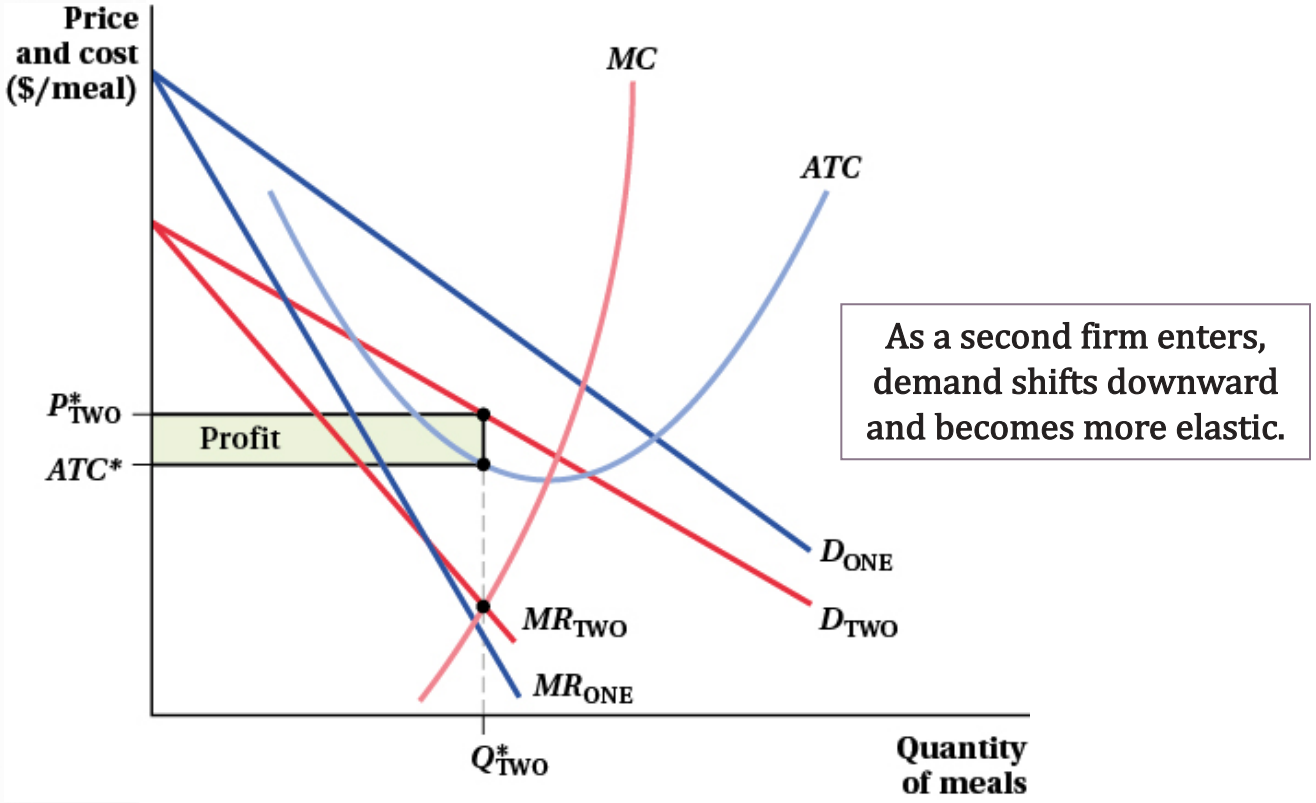
1. First, because the second firm offers an (imperfect) substitute product, the demand curve for the first firm's food becomes flatter (more elastic).
2. Second, because demand is now split across two firms, D_{ONE} shifts in as well.

Unlike in previous oligopoly models, each firm takes the other's actions as given, and there is no strategic response to the behavior of rivals.

Monopolistic Competition (5/7)

11.7

Figure 11.6 The Effect of Firm's Entry on Demand for a Monopolistically Competitive Firm



Monopolistic Competition (6/7)

11.7

Equilibrium in Monopolistically Competitive Markets

Just as with perfect competition, entry will continue to occur until economic profit is equal to zero.

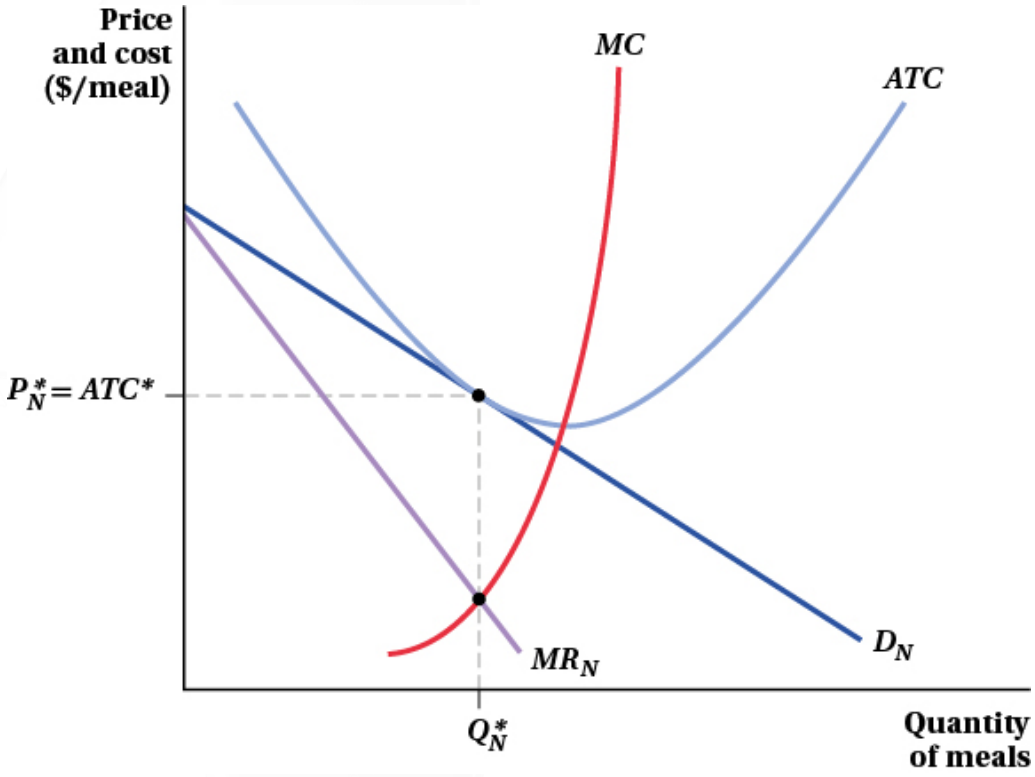
However, unlike with perfect competition, this does *not* mean that price is equal to marginal cost.

- The firms always face a downward-sloping demand curve.
- Entry will occur until demand is tangent with the average total cost curve.
- This is the point at which economic profits are exhausted.

Monopolistic Competition (7/7)

11.7

Figure 11.7 Long-Run Equilibrium for a Monopolistically Competitive Market



Because there is free entry, in the long run firms in monopolistic competition cannot sustain economic profit.

However, since each firm faces a downward-sloping demand curve, in the long run average total costs are not minimized in monopolistic competition.

Conclusion (1/1)

11.8

In this chapter, we examined a number of models of imperfect competition.

- Bertrand, Cournot, and Stackelberg competition with identical goods
- Collusion
- Bertrand competition with differentiated goods
- Monopolistic competition

Choosing which model is a good fit for a particular market requires judgment on the part of the economist.

In the next chapter, we look more closely at the concept of strategic interaction, which underlies some of the models from this chapter.