1

MONOPOLISTIC COMPETITION

Market in which firms can enter freely, each producing its own brand or version of a differentiated product.

Three characteristics

1. There is **free entry and exit**.
   - Relatively easy for new firms to enter the market with their own brands and for existing firms to exit if their products become unprofitable.
2. Firms compete by selling differentiated products that are **highly substitutable** for one another but not perfect substitutes.
   - Cross price elasticities are large, but not infinite.
3. The market is **fragmented**.
   - It consists of many buyers and sellers

Examples…
Toothpaste
Soap
Deodorant
Shaving cream
OTC pain relievers
Bicycles

2

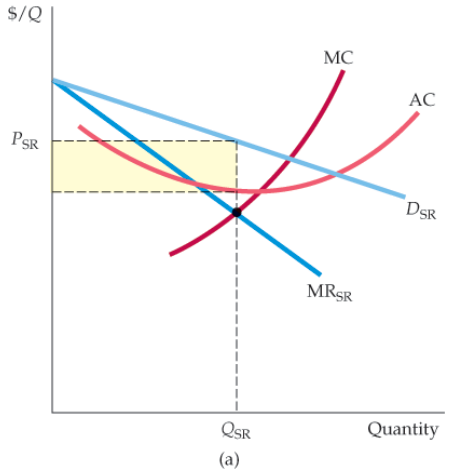
EQUILIBRIUM IN THE SHORT RUN

In the short run a monopolistically competitive firm behaves just like a monopolist.

1. Produce where $MR = MC$
2. Set price using the demand curve.

Primary difference: the firm only sells to a portion of the market demand.

- The firm's demand curve is **elastic** because of the presence of many substitutes.
- Their price mark up over marginal cost is less than a monopoly.



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EQUILIBRIUM IN THE LONG RUN

In the long run, free entry and exit will drive profits to zero.

If there are profits in the short run…

New firms enter market, taking some demand away from existing firms, prices and profits fall.

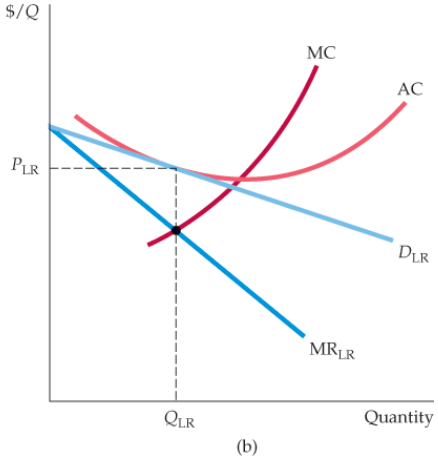
If there are losses in the short run…

Some firms exit the market, remaining firms enjoy higher demand and prices.

Equilibrium

Demand is tangent to AC

Profit = 0



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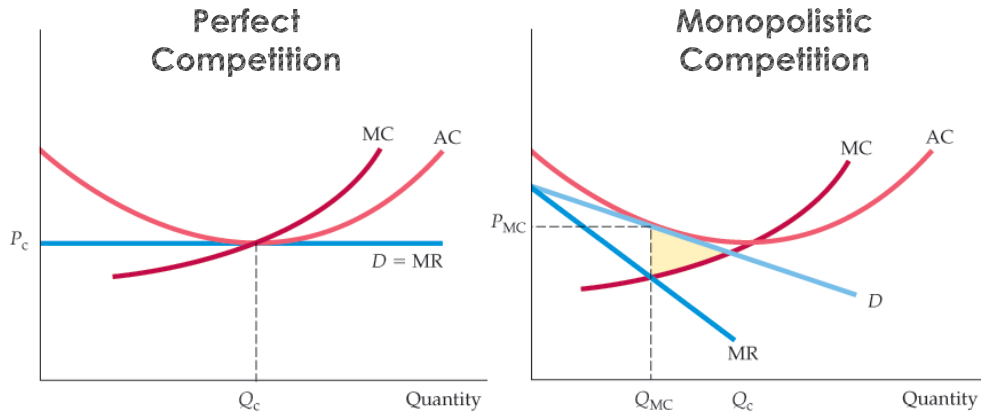
ECONOMIC EFFICIENCY

There are two sources of economic inefficiency in monopolistically competitive markets.

1. Price mark up over marginal cost
2. Excess capacity - Firms operate on the downward sloping part of AC



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REGULATING MONOPOLISTICALLY COMP. MARKETS

Are the efficiency concerns enough to warrant regulation?

Probably not…

In most monopolistically competitive markets, monopoly power is small.

- Firms face elastic demand
- Price is close to marginal cost
- Deadweight loss is small

The small inefficiencies are balanced against a very important benefit of monopolistic competition…

Product diversity

Consumers value the ability to choose!

This benefit may even outweigh the inefficiency costs.

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OLIGOPOLY

Market in which only a few firms compete with one another, and entry by new firms is impeded.

The products that the firms produce may or may not be differentiated.

Profits can be high, if firms are able to cooperate.

Profits can be low, if firms compete aggressively.

The most interesting detail is that firms behave strategically…

They must consider how their competitors will react and how those reactions impact their own profits.

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EQUILIBRIUM IN AN OLIGOPOLY MARKET

Basic idea behind any market equilibrium

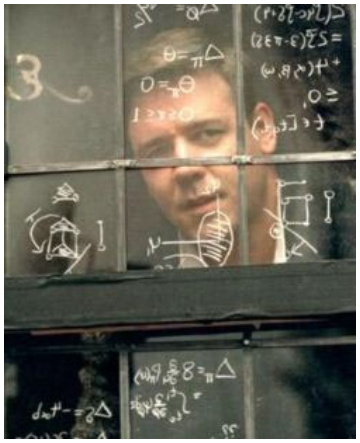
Firms are doing the best they can and have no reason to change their price or output.

In an oligopoly market we need to take it a bit further…

Each firm is doing the best they can given what its competitors are doing.

↓

Nash Equilibrium



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COURNOT MODEL OF DUOPOLY (two firms)

Model Assumptions:

1. Firms sell **identical** products
2. Firms compete by choosing a **quantity** to produce
3. Firms choose quantities **simultaneously**
4. All goods sell for the **same price**
   - Price is determined by the inverse demand and the total quantity produced in the market.

Real World Examples...
Oil, coal, and natural gas markets

COURNOT MODEL OF DUOPOLY (two firms)

How do we solve this model?

Step 1: Form each firm's total revenue function, this will depend on their output and the output of their competitor.

This is where the strategic interaction appears!

Step 2: Using the profit maximization process ($MR = MC$), calculate the reaction curves of each firm.

- A reaction curve shows how a firm's profit maximizing output depends on their competitor's output.

Step 3: Where these two reaction curves intersect reveals the Cournot equilibrium quantities for each firm.

Step 4: Use inverse demand to determine the equilibrium price.

A COURNOT EXAMPLE

OilPro and GreaseTech are the only two firms that provide oil changes in a local market in a Cournot duopoly.

Both have a marginal cost of **$20** per oil change and no fixed costs.

The inverse demand curve for oil changes is $\boldsymbol{P = 200 - 3Q}$, where P is in dollars and $\boldsymbol{Q = q_O + q_G}$ is the number of oil changes (in thousands) produced by the two firms.

Goal: Determine each firm's Cournot equilibrium quantity and the price.

Step 1: Form each firm's total revenue function

A COURNOT EXAMPLE

Step 2: Using the profit maximization process we calculate the reaction curves of each firm.

$$MC_O = MC_G = \$20$$

$$TR_O = 200q_O - 3q_O^2 - 3q_Oq_G,$$
$$TR_G = 200q_G - 3q_G^2 - 3q_Oq_G$$

OilPro

GreaseTech

A COURNOT EXAMPLE

Step 3: Where these two reaction curves intersect reveals the Cournot equilibrium quantities for each firm.

$$q_O^*(q_G) = 30 - \frac{1}{2}q_G$$

$$q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

A COURNOT EXAMPLE

Solution: $q_O = 20,\ q_G = 20$

Why is this the Nash (Cournot) equilibrium???

Reaction Curves

$$q_O^*(q_G) = 30 - \frac{1}{2}q_G$$

$$q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

Equilibrium Concept

a Nash equilibrium occurs when each firm chooses its optimal output level, given the output levels of its competitors, and no firm can increase its profit by unilaterally changing its own output.

Verification

When $q_O = 20$, GreaseTech's profit maximizing reaction is:

$$q_G = 30 - 0.5(20) = 20$$

When $q_G = 20$, OilPro's profit maximizing reaction is:

$$q_O = 30 - 0.5(20) = 20$$

Conclusion

This is the equilibrium because both firms are choosing their optimal output level given the output level of their competitor.

A COURNOT EXAMPLE

Step 4: Use inverse demand to determine the equilibrium price.

$$P = 200 - 3Q$$

$$q_O^* = 20, \qquad q_G^* = 20, \qquad Q = 40$$

$P = 200 - 3(40) = \$80$

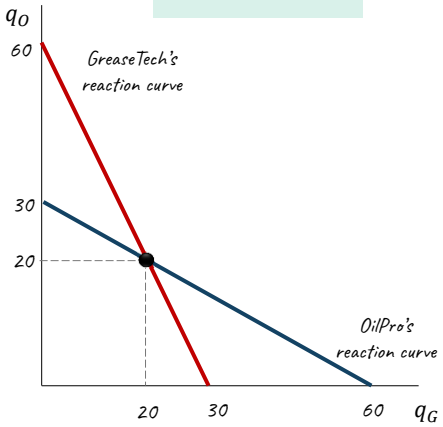
How much profit do they earn?

$\Pi_O = q_O(P - MC) = 20(80 - 20) = \$1{,}200$

$\Pi_G = q_G(P - MC) = 20(80 - 20) = \$1{,}200$

$$q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

$$q_O^*(q_G) = 30 - \frac{1}{2}q_G$$



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SYMMETRY IN THE COURNOT MODEL

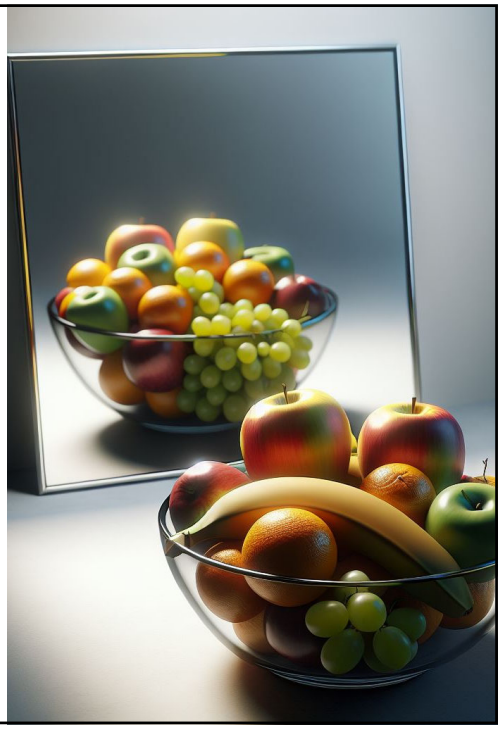
The fact that the two firms have equal marginal costs is what causes the equilibrium quantities and profits to be equal across firms.

This is also why we see symmetrical reaction curves for the two firms.

If the firms had different marginal costs, then their outputs and profits would no longer be equal in equilibrium.

↓

You can see an example of this in question 4 of the chapter 13 practice problems.



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HOW DOES THIS COMPARE?

$$MC = \$20, \qquad P = 200 - 3Q$$

Competitive

$P = MC \rightarrow 200 - 3Q = 20$

$Q = 60,\ P = 20$

$\pi = \$0$

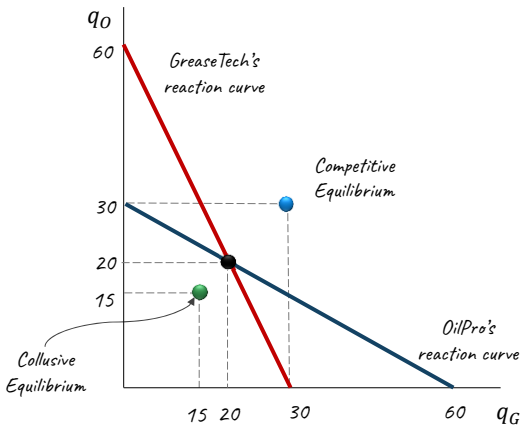
Collusion

Firms agree to maximize total profit and split it equally

$MR_T = MC \rightarrow 200 - 6Q = 20$

$Q = 30,\ \ P = \$110$

$\pi = 15 \times (110 - 20) = \$1{,}350\ each$



WHY ISN'T COLLUSION AN EQUILIBRIUM?

Under collusion

- Each produces $q = 15$
- Sell at a price of $p = \$110$

These choices are not on the two firm's reaction curves…

So, they cannot be part of an equilibrium!

Conclusion, neither firm will want to follow through with the collusive output of 15.

They each prefer to increase production.

Let's investigate

Suppose that the two firms have agreed to the collusive output.

Oilpro's best response is to produce

$$q_O = 30 - \frac{1}{2} \times 15 = 22.5$$

$$P = 200 - 3(22.5 + 15) = 87.5$$

$$\Pi_O = 22.5(87.5 - 20) = \$1{,}518.75$$

This is more profit than from following through with the collusion!

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THE STACKELBERG MODEL

Model Assumptions

1. Firms sell **identical** products
2. Firms compete by choosing a **quantity** to produce
3. Firms choose quantities **sequentially**.
   - the leader chooses first
   - the follower observes this choice and then makes their own choice.
4. All goods sell for the **same price**
   - Price is determined by the inverse demand and the total quantity produced in the market.

Real World Examples...
Automobile industry, telecommunications, pharmaceuticals

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THE STACKELBERG MODEL

The Stackelberg leader has ***first mover advantage*** – they can predict what the follower will do and incorporate that response into their decision making.

How do we solve this model?

Step 1: Determine the reaction curve of the Stackelberg follower.

Step 2: Considering the reaction curve of the follower, find the profit maximizing output for the leader.

This is how the model differs from Cournot...
We update the demand to reflect how the follower will respond, then follow "standard" profit maximizing process.
Find TR and MR, then set MR=MC to find q_L.

Step 3: Revisit the follower's reaction curve to determine their output.

Step 4: Use inverse demand to determine the equilibrium price.

A STACKELBERG EXAMPLE

OilPro and GreaseTech are the only two firms that provide oil changes in a local market in a Cournot duopoly.

Both have a marginal cost of **$20** per oil change and no fixed costs.

The inverse demand curve for oil changes is $\boldsymbol{P = 200 - 3Q}$, where P isin dollars and $\boldsymbol{Q = q_O + q_G}$ is the number of oil changes (in thousands) produced by the two firms.

OilPro is the Stackelberg leader.

Goal: Determine each firm's Stackelberg equilibrium quantity and the price.

Step 1: Determine the reaction function of the Stackelberg follower.

Same process as the Cournot model…

Form revenue function:

$$TR_G = q_G(200 - 3(q_O + q_G))$$

$$TR_G = 200q_G - 3q_G^2 - 3q_O q_G$$

Find marginal revenue:

$$MR_G = \frac{\partial TR_G}{\partial q_G} = 200 - 6q_G - 3q_O$$

Set $MR_G = MC$ and solve for q_G:

$$200 - 6q_G - 3q_O = 20$$

$$\boldsymbol{q_G^*(q_O) = 30 - \frac{1}{2}q_O}$$

A STACKELBERG EXAMPLE

$$MC_O = MC_G = \$20, \qquad P = 200 - 3(q_O + q_G), \qquad q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

Step 2: Considering the reaction function of the follower, find the profit maximizing output for the leader.

Find (inverse) Residual Demand

$P = 200 - 3(q_O + q_G)$

Find OilPro's Total Revenue

A STACKELBERG EXAMPLE

$$MC_O = MC_G = \$20, \qquad P = 200 - 3(q_O + q_G), \qquad q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

Step 2: Considering the reaction function of the follower, find the profit maximizing output for the leader.

(Inverse) Residual Demand

$$P = 110 - \frac{3}{2}q_O$$

OilPro's Total Revenue

$$TR_O = 110q_O - \frac{3}{2}q_O^2$$

Find OilPro's Marginal Revenue

Set $MR_O = MC$ and solve for q_O

A STACKELBERG EXAMPLE

$$MC_O = MC_G = \$20, \qquad P = 200 - 3(q_O + q_G), \qquad q_G^*(q_O) = 30 - \frac{1}{2}q_O$$

Step 3: Revisit the follower's reaction function to determine their output.

Step 4: Use inverse demand to determine the equilibrium price.

DOES THE LEADER HAVE AN ADVANTAGE?

$$MC_O = MC_G = \$20, \qquad P = 65, \qquad q_O = 30, \qquad q_G = 15$$

OilPro's Profit…

$\Pi_O = q_O(P - MC)$

$= 30(65 - 20)$

$= \$1{,}350$

GreaseTech's Profit…

$\Pi_G = q_G(P - MC)$

$= 15(65 - 20)$

$= \$675$

Why does going first create a strategic advantage?

Committing to an output level before the follower allows the leader to…

1. **shape the market environment**, forcing the follower to adapt to the leader's decision.
2. **predict how the follower will respond** to its output level, allowing the leader to choose an output that maximizes its own profit.
3. **capture a larger share of the market** and potentially earn higher profits than the follower, who must react rather than act independently.

COURNOT VS. STACKELBERG

Cournot Oligopoly

Simultaneous Quantity Setting

Firms do not have the opportunity to influence each other's decisions directly.

1. **Determine Reaction Curves:** Find the reaction curves for both firms through profit maximization.
2. **Find Equilibrium:** Solve for the intersection of these reaction curves to determine each firm's output choice.

Stackelberg Oligopoly

Sequential Quantity Setting

The leader can strategically influence the follower's decision.

1. **Determine Follower's Reaction Curve:** Find the reaction curve of the follower through profit maximization.
2. **Compute Residual Demand and Marginal Revenue:** Use the follower's reaction curve to compute the residual demand and marginal revenue for the leader.
3. **Maximize Leader's Profit:** Solve for the output that maximizes the leader's profit.
4. **Determine Follower's Output:** Use the reaction curve to determine the follower's optimal output choice.

PRICE COMPETITION WITH HOMOGENOUS GOODS

The Bertrand Model with Identical Goods

Model assumptions:

1. Firms sell **identical products**
2. The firms compete by choosing the **price** at which they sell their products.
3. The firms set their price **simultaneously**.

A QUICK DEMONSTRATION

Walmart and Target both sell PlayStations.

Each firm's marginal cost is **$150 per console**.

Customers don't prefer *one store over the other*, they have the following simple demand rule:

1. Buy a PlayStation from the store with the lowest price.
2. If prices are identical, then flip a coin to see which store to shop at.

Suppose total demand in the market is:

$\boldsymbol{Q = 300 - P_L}$, where P_L is the lowest price offered.

Nash Equilibrium?

Each has incentive to undercut their competitors' prices

Until…

$$P = MC$$

For this scenario

P = $150

Q = 300 - 150 = 150

75 PlayStations are sold by each superstore.

A QUICK DEMONSTRATION

Suppose instead that Walmart's marginal cost is **$100** and Target's is still **$150**.

What do you think the Nash equilibrium is now?

P_T = $150
P_W = $149.99
All PlayStations are sold by Walmart.

Conclusions

Nash equilibrium of any Bertrand model with identical goods and identical costs…

- both firms charge their marginal cost

Nash equilibrium of any Bertrand model with identical goods and different costs…

- the high-cost firm charges their marginal cost
- the low-cost firm charges just below the high-cost firm's marginal cost.

PRODUCT DIFFERENTIATION

Vertical Differentiation is about inferiority or superiority

- Occurs when consumers consider one product better or worse than another.

Horizontal Differentiation is about substitutability

- Occurs when some consumers view one good as a poor substitute for the other.
- They will buy the good they prefer even if its price higher.

PRICE COMPETITION (BERTRAND) WITH HORIZONTALLY DIFFERENTIATED GOODS

Model Assumptions

1. Firms do not sell identical products
   - their **goods are substitutes**, but not perfect substitutes.
2. Each firm chooses the **price** at which it sells its product.
3. Firms set prices **simultaneously**.

More realistic than the basic Bertrand model…
Oligopolist markets often have some degree of product differentiation.

Real World Example…
Food producers

A BERTRAND WITH DIFFERENTIATION EXAMPLE

Suppose there are two main manufacturers of snowboards, Burton and K2.

Individuals view their products as similar but not identical.

If one firm cuts their prices it will gain market share from the other, but not steal all the customers.

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of $150, and no fixed costs.

A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of \$150, and no fixed costs.

Goal: Determine each firms' Bertrand equilibrium price and quantity.

Step 1: Form the profit function for each firm.

Since the firm's compete by setting price, the profit functions should depend on prices.
(not quantities as we typically see)

Start with Burton…

$\Pi_B(p_B, p_K) = q_B(p_B - MC)$

Plug in what we know about q_B and MC

$\Pi_B(p_B, p_K) = (900 - 2p_B + p_K)(p_B - 150)$

Expand the parentheticals

$\Pi_B(p_B, p_K) = 1200p_B - 2p_B^2 + p_Bp_K - 135{,}000 - 150p_K$

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A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of \$150, and no fixed costs.

Goal: Determine each firms' Bertrand equilibrium price and quantity.

Step 1: Form the profit function for each firm.

Since the firm's compete by setting price, the profit functions should depend on prices.
(not quantities as we typically see)

Do the same for K2…

$\Pi_K(p_K, p_B) = q_K(p_K - MC)$

Plug in what we know about q_K and MC

$\Pi_K(p_K, p_B) = (900 - 2p_K + p_B)(p_K - 150)$

Expand the parentheticals

$\Pi_K(p_K, p_B) = 1200p_K - 2p_K^2 + p_Bp_K - 135{,}000 - 150p_B$

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A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of \$150, and no fixed costs.

Step 2: Calculate the reaction curves

Burton

$\Pi_B(p_B, p_K) = 1200p_B - 2p_B^2 + p_Bp_K - 135{,}000 - 150p_K$

A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

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K2

$\Pi_K(p_K, p_B) = 1200p_K - 2p_K^2 + p_Bp_K - 135{,}000 - 150p_B$

A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of $150, and no fixed costs.

Reaction Functions…

$$p_B = 300 + \frac{p_K}{4}$$

$$p_K = 300 + \frac{p_B}{4}$$

Step 3: Find the intersection between the two reaction curves

A BERTRAND WITH DIFFERENTIATION EXAMPLE

Product differentiation means that each firm faces its own demand curve.

Burton: $q_B = 900 - 2p_B + p_K$

K2: $q_K = 900 - 2p_K + p_B$

Each firm has a marginal cost of $150, and no fixed costs.

Reaction Functions…

$$p_B = 300 + \frac{p_K}{4}$$

$$p_K = 300 + \frac{p_B}{4}$$

Step 3: Find the intersection between the two reaction curves

$$P_B = 400, \qquad P_K = 400$$

How much do they each sell??

$q_B = 900 - 2(400) + 400 = 500$

$q_K = 900 - 2(400) + 400 = 500$

A BERTRAND WITH DIFFERENTIATION EXAMPLE

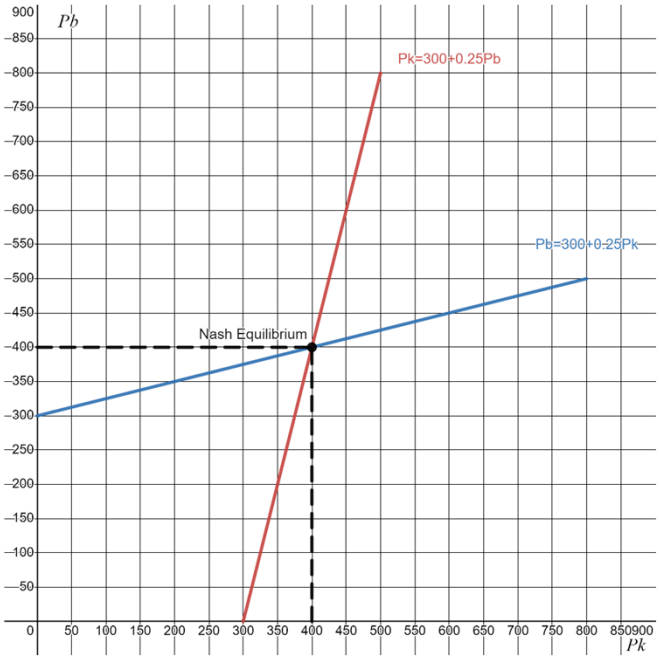
Bertrand Equilibrium…

$p_B = \$400, \quad q_B = 500$

$p_K = \$400, \quad q_K = 500$

$$p_B = 300 + \frac{p_K}{4}$$

$$p_K = 300 + \frac{p_B}{4}$$



A BERTRAND WITH DIFFERENTIATION EXAMPLE

Bertrand Equilibrium…

$p_B = \$400, \quad q_B = 500$

$p_K = \$400, \quad q_K = 500$

$$p_B = 300 + \frac{p_K}{4}$$

$$p_K = 300 + \frac{p_B}{4}$$

Why is this the Nash (Bertrand) equilibrium?

Equilibrium Concept

a Nash equilibrium occurs when each firm chooses its optimal price, given the prices of its competitors, and no firm can increase its profit by unilaterally changing its own price.

Verification

When $P_B = 400$, K2's profit maximizing reaction is:

$$P_K = 300 + \frac{400}{4} = \$400$$

When $P_K = 400$, Burtons's profit maximizing reaction is:

$$P_B = 300 + \frac{400}{4} = \$400$$

Conclusion

This is the equilibrium because both firms are choosing their optimal price given the price of their competitor.

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THE DOMINANT FIRM MODEL

A **Dominant Firm** has a large share of total sales, and sets price to maximize their own profits

Model Properties…

1. one large firm (dominant firm) has a major share of sales, and
2. a group of smaller firms (competitive fringe) supplies the remainder of the market.
   - The dominant firm sets the price.
   - The competitive fringe **"picks up the slack"** – supplying as much as they can afford to at the price set by the dominant firm.

Example:

In 2012 Heinz had about 60% of the U.S. ketchup market.

The next largest competitor, ConAgra, had just 16%, while Del Monte was third with 7%.

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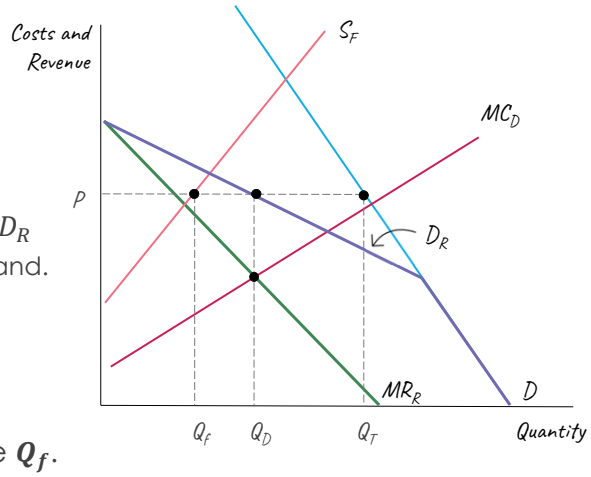
EQUILIBRIUM IN A DOMINANT FIRM MARKET

We are given…

- market demand **(D)**
- Supply (or MC) of the fringe (S_F)
- MC of the dominant firm (MC_D)

How do we solve this model?

1. Find the dominant firm's **residual demand**, D_R
   - Subtract the fringe supply from the market demand.
2. Invert D_R and find the MR_R
3. Set $MR_R = MC_D$ to find Q_D
4. Plug Q_D into the inverse D_R to find price.
5. The fringe are price takers, so they produce Q_f.



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DOMINANT FIRM EXAMPLE

The market demand curve in a global mining industry is $Q^d = 110 - 10P$

- Q^d is measured in millions of units of product mined per year.
- P is measured in dollars per unit.

The industry is dominated by a large firm with a **marginal cost of $5 per unit**.

There also exists a competitive fringe of **200 firms**, each of whom has a marginal cost of $MC = 5 + 100q$.

- q is the output of a typical fringe firm.

1. What is the equation of the supply curve for the competitive fringe?

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DOMINANT FIRM EXAMPLE

The market demand curve in a global mining industry is $\boldsymbol{Q^d = 110 - 10P}$

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There also exists a competitive fringe of **200 firms**, each of whom has a marginal cost of $\boldsymbol{MC = 5 + 100q}$.

- q is the output of a typical fringe firm.

$$Q_f^s = 2P - 10$$

2. What is the equation of the dominant firm's residual demand curve?

DOMINANT FIRM EXAMPLE

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The industry is dominated by a large firm with a **marginal cost of $5 per unit**.

There also exists a competitive fringe of **200 firms**, each of whom has a marginal cost of $\boldsymbol{MC = 5 + 100q}$.

- q is the output of a typical fringe firm.

$$Q^r = 120 - 12P$$

3. What is the profit-maximizing quantity of the dominant firm?

DOMINANT FIRM EXAMPLE

The market demand curve in a global mining industry is $\boldsymbol{Q^d = 110 - 10P}$

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- P is measured in dollars per unit.

The industry is dominated by a large firm with a **marginal cost of $5 per unit**.

There also exists a competitive fringe of **200 firms**, each of whom has a marginal cost of $\boldsymbol{MC = 5 + 100q}$.

- q is the output of a typical fringe firm.

$$P = 10 - \frac{Q}{12}, \qquad Q = 30\ mil$$

4. What is the resulting market price?

5. At $P = \$7.50$, how much does the competitive fringe produce?

$Q_f^S = 2P - 10$

DOMINANT FIRM EXAMPLE

The market demand curve in a global mining industry is $\boldsymbol{Q^d = 110 - 10P}$

- Q^d is measured in millions of units of product mined per year.
- P is measured in dollars per unit.

The industry is dominated by a large firm with a **marginal cost of $5 per unit**.

There also exists a competitive fringe of **200 firms**, each of whom has a marginal cost of $\boldsymbol{MC = 5 + 100q}$.

- q is the output of a typical fringe firm.

5. At $P = \$7.50$, what is the fringe's market share? what is the dominant firm's market share?

$Q_f^S = 5\ mil$

$Q_D^S = 30\ mil$

} Industry output $= 35\ mil$

LIMIT PRICING

As the competitive fringe grows…

1. Residual demand shrinks.
2. The dominant firm's price and quantity fall.
3. The dominant firm's market share falls.
4. The dominant firm's profits fall.

(you can see a demonstration of this in the textbook)

The dominant firm can slow this process with **Limit Pricing**!

↓

A strategy in which the dominant firm keeps its price below the level that maximizes its current profit to reduce the rate of expansion by the fringe.

Attractive plan if…

(1) Competitive fringe is expanding rapidly.
(2) Dominant firm is forward looking.
(3) Dominant firm has a cost advantage over the fringe.

WHAT IS A CARTEL?

Producers in a cartel **explicitly** agree to cooperate in setting prices and output levels.

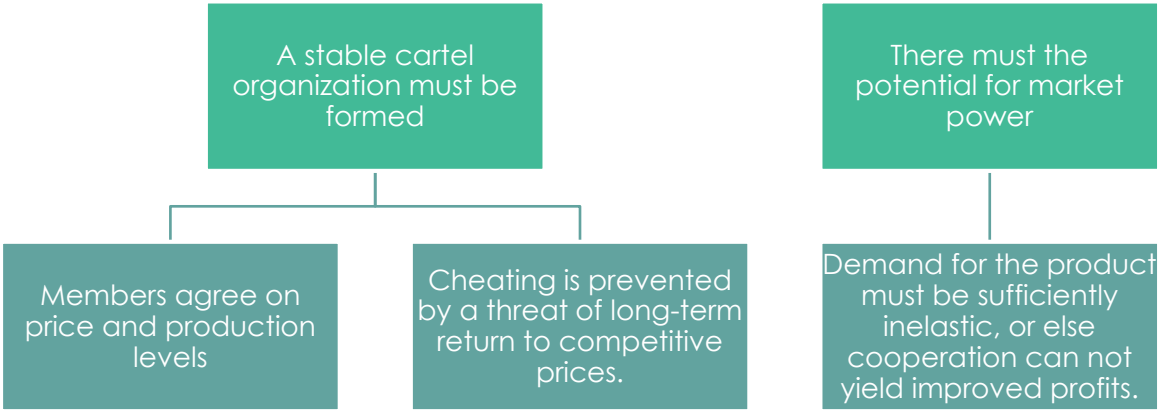
If enough producers follow the "rules" and demand is sufficiently inelastic, then prices can be well above competitive levels.

Cartels are prohibited under U.S. antitrust laws, so they are often international.

Countries can also form cartels

- E.g. OPEC – the organization of petroleum exporting countries.

CONDITIONS FOR CARTEL SUCCESS...



HOW DO WE MODEL A CARTEL?

As a multiplant monopolist

If we want to understand how cartel members divide the total output.

Each member is like one plant

Output is divided such that

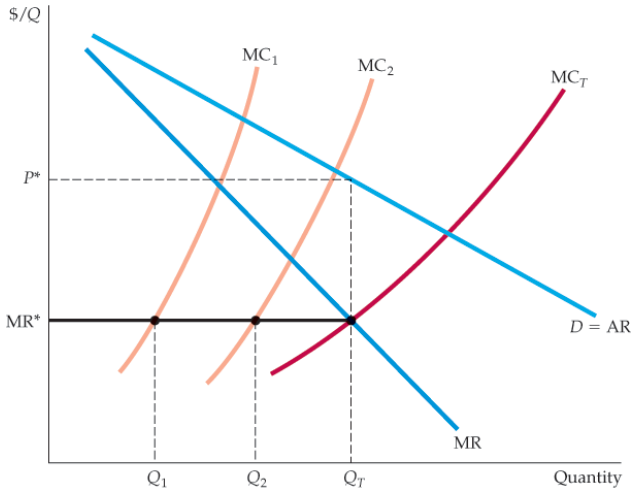
$$MC_1 = MC_2 = \cdots MC_n = MR$$

As a dominant firm with a competitive fringe

If we want to understand how the cartel behavior impacts the prices in the market

The cartel is the dominant firm

The competitive fringe is any non-cartel member producers.



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ANALYSIS OF CARTEL PRICING

Dominant firm market revisited…

The cartel is only a portion of the total production, with the rest of the producers behaving competitively.

CIPEC is a copper cartel (Chile, Peru, Zambia, and Congo).

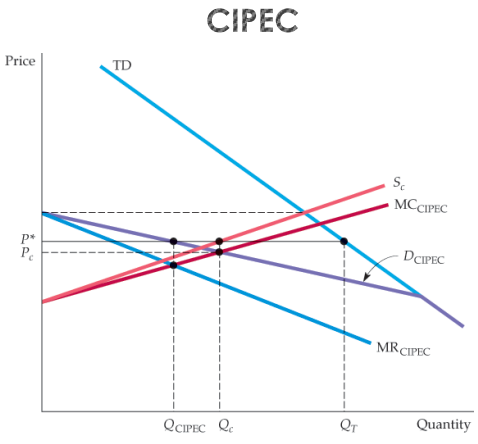
Accounts for less than ½ the worlds copper production.

These countries have only a slight cost advantage over other producers.

Both total demand and the competitive supply are relatively elastic

Demand faced by CIPEC demand is elastic.

- they have very little market power
- set price at P*, only slightly above marginal cost



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ANALYSIS OF CARTEL PRICING

Dominant firm market revisited…

The cartel is only a portion of the total production, with the rest of the producers behaving competitively.

OPEC is an oil cartel (Iran, Iraq, Kuwait, Saudi Arabia and Venezuela)

Accounts for about 40% the worlds crude oil production.

These countries have a large cost advantage over other producers.

Both total demand and the competitive supply are relatively inelastic

Demand faced by OPEC demand is inelastic.

- they have a lot market power
- set price at P*, way above marginal cost