Lecture 11:
Market Power and Monopoly

November 14, 2017

Overview

Course Administration

Sources of Market Power

Market Power and Marginal Revenue

Profit Maximization and Market Power

How a Firm With Market Power Reacts to Market Changes

Winners and Losers From Market Power

Governments and Market Power: Regulation, Antitrust and Innovation

Course Administration

1. Problem Set 7 answers posted
2. Problem Set 9 posted
3. Collect elasticity memos
   - memos should also be posted to google drive
   - will return comments by December 4
4. Last year's final exam is posted on the handouts page
5. Exam review December 3 – time and location on handouts page

Ripped from the Headlines

Next Week

Afternoon

Finder	Presenter
David Yarjah	Maya Pendleton

Evening

Finder	Presenter
Cheryl Barnes	Dara Duratinsky
Marissa Estheimer	J.J. Manser
Ben Darland	Kellen Moore

Sources of Market Power

Why Study Market Power?

- Most markets are imperfect to some degree
- Economists believe there is a role for government in easing market imperfections
- Today
  - How does limited competition impact consumption and production?
  - What is government's role in improving competition?

What is Market Power?

- Market power $\equiv$ when a firm has the ability to influence the market price
- Monopoly $\equiv$ market served only by one firm
- Monopolist $\equiv$ sole supplier and price setter of good on the market

Where Does Market Power Come From?

1. "Natural" monopolies
2. Switching costs
3. Product Differentiation
4. Absolute Cost Advantages
5. Government barriers to entry

1. Natural Monopolies

- An industry in which average total cost is always decreasing
  - Note that this also implies decreasing marginal cost
- This means that it is efficient for one firm to produce the entire industry output

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More on this at the end of class.

2. Switching Costs and Market Power

- Switching costs $\equiv$ cost to consumer in switching between products – examples?
- Network goods have particularly high switching costs
- Network good $\equiv$ good for which value to consumer increases with number of other consumers of the product

3. Product Differentiation and 4. Cost Advantage

Product differentiation

- Imperfect substitutability across varieties of a product
- Observable if you are willing to pay a little more for a particular variant

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Absolute Cost Advantage

- Firm owns something or has a technology that makes it have lower costs relative to competitors
- Examples?

5. Government Regulation as a Barrier to Entry

- We've already given examples that limit entry – reprise?

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- We've already given examples that limit entry – reprise?
- Remember, over the long run, high profits are a temptation to entry, perhaps in a slightly altered form
- Don't conclude that barriers to entry are always bad. They have a cost; does the cost justify the benefit?

Market Power and Marginal Revenue

Neither Perfect Competition Nor a Monopoly

- We say a firm has market power if it faces a downward sloping demand curve
  - Recollect – what did a demand curve look like to a perfectly competitive firm?

Neither Perfect Competition Nor a Monopoly

- We say a firm has market power if it faces a downward sloping demand curve
  - Recollect – what did a demand curve look like to a perfectly competitive firm?
- Firms in these types of markets face downward-sloping demand curves
  - Oligopoly $\equiv$ an industry with few firms – examples?
  - Monopolistic competition $\equiv$ many firms selling differentiated products
  - Monopoly

Marginal Revenue: Perfect Competition and Not

Perfect Competition

- What is marginal revenue?

Marginal Revenue: Perfect Competition and Not

Perfect Competition

- What is marginal revenue?
- If the firm perceives the demand curve as constant, then $MR = P$

Marginal Revenue: Perfect Competition and Not

Perfect Competition

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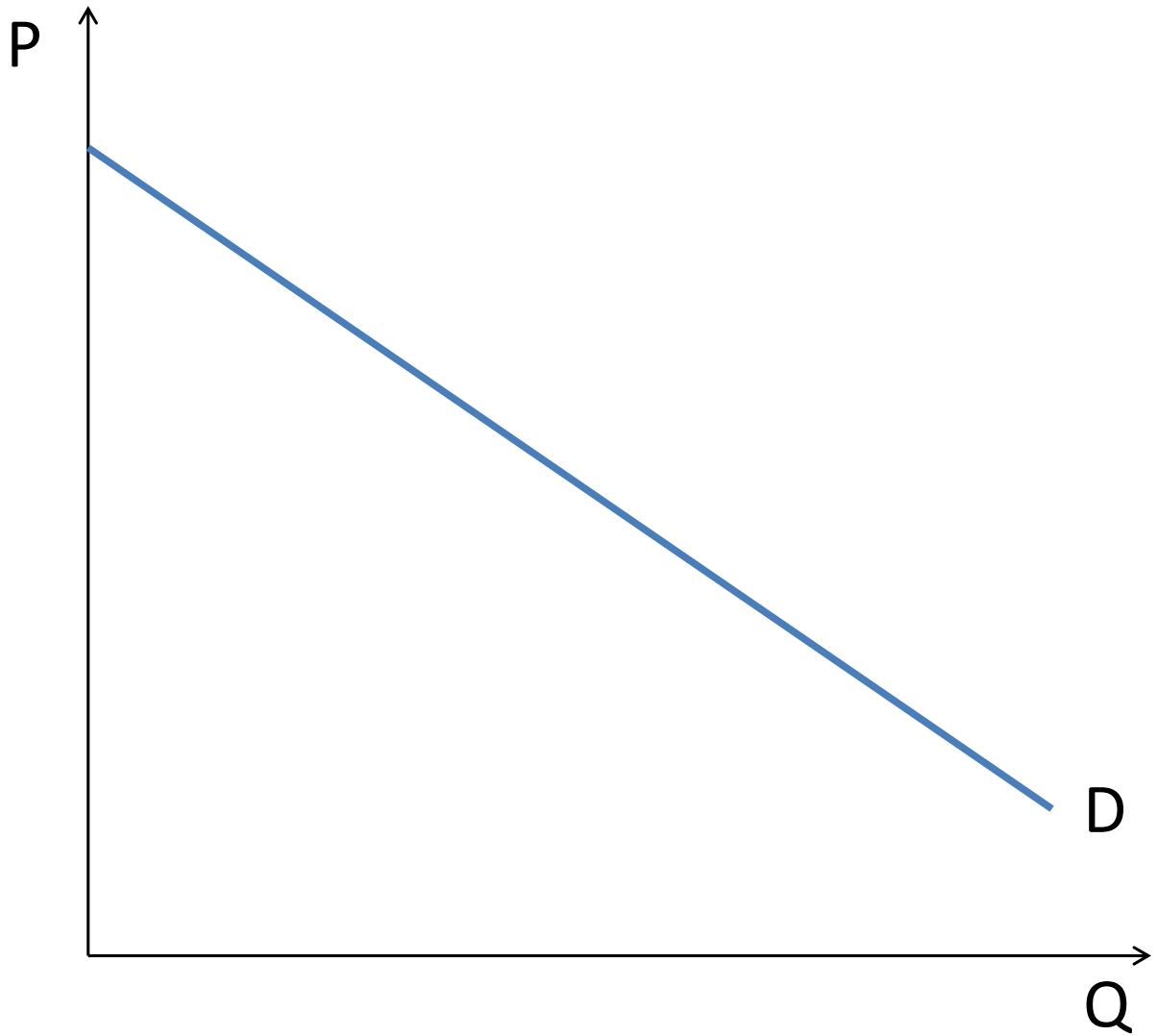
Market Power

- We assume that the firm has to charge the same price for all units of the good
- As before, marginal revenue is the additional revenue from an additional unit of output sold
- However, selling an additional unit of output now requires lowering the price on all units of output

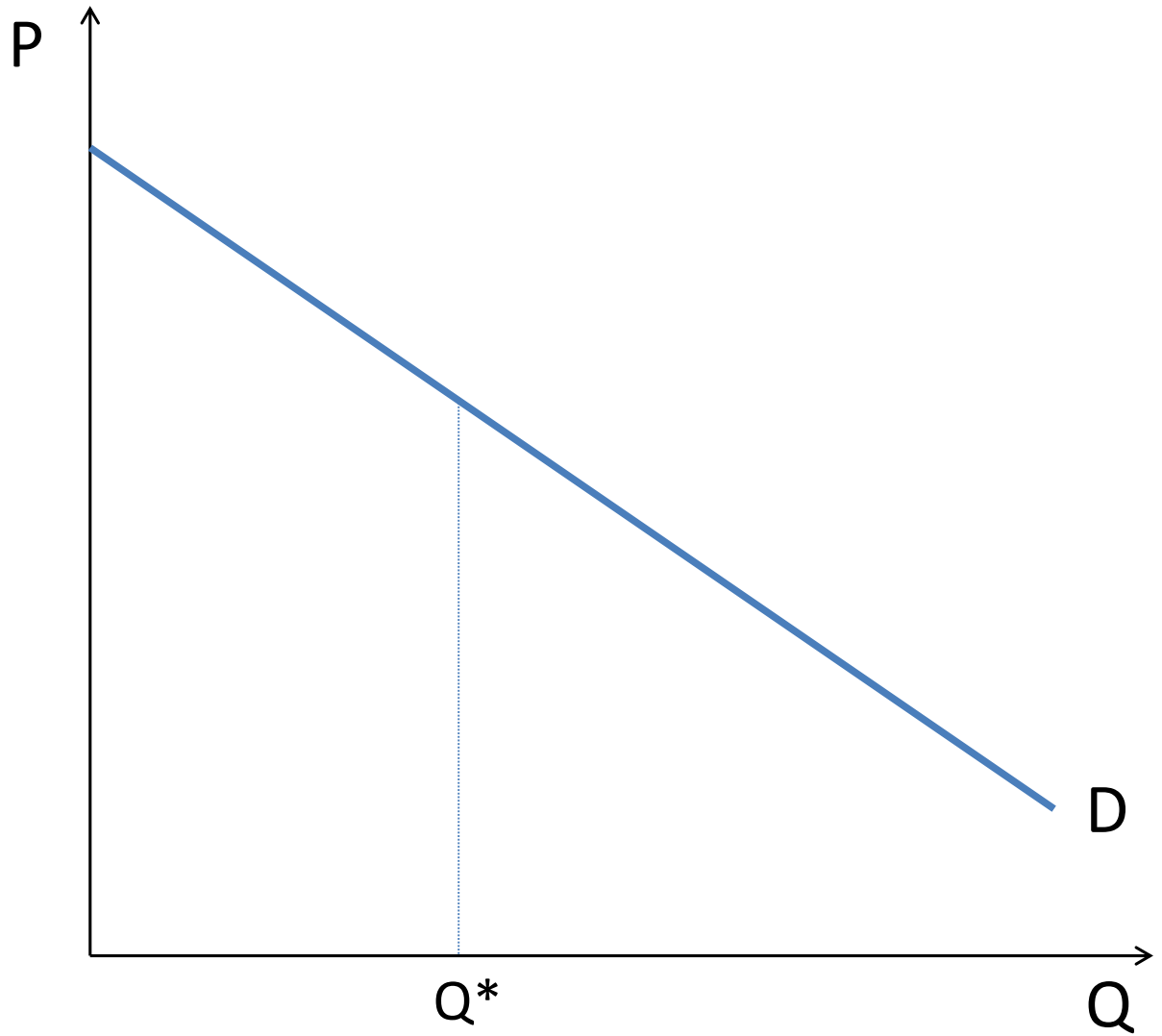
Market Power and Marginal Revenue in Pictures

Demand as Perceived by the Firm



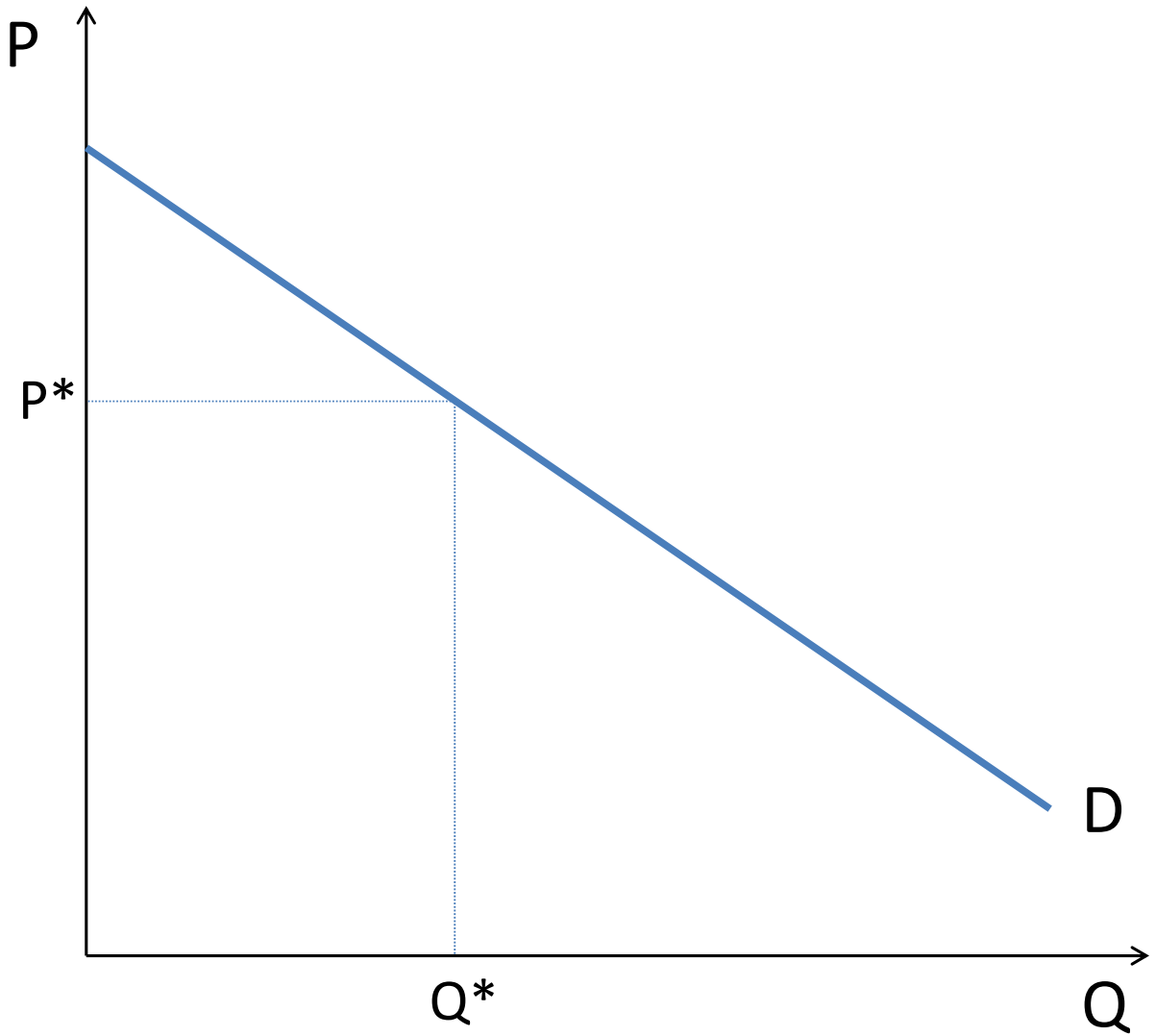
Market Power and Marginal Revenue in Pictures

Can Think of Firm Choosing Either P or Q



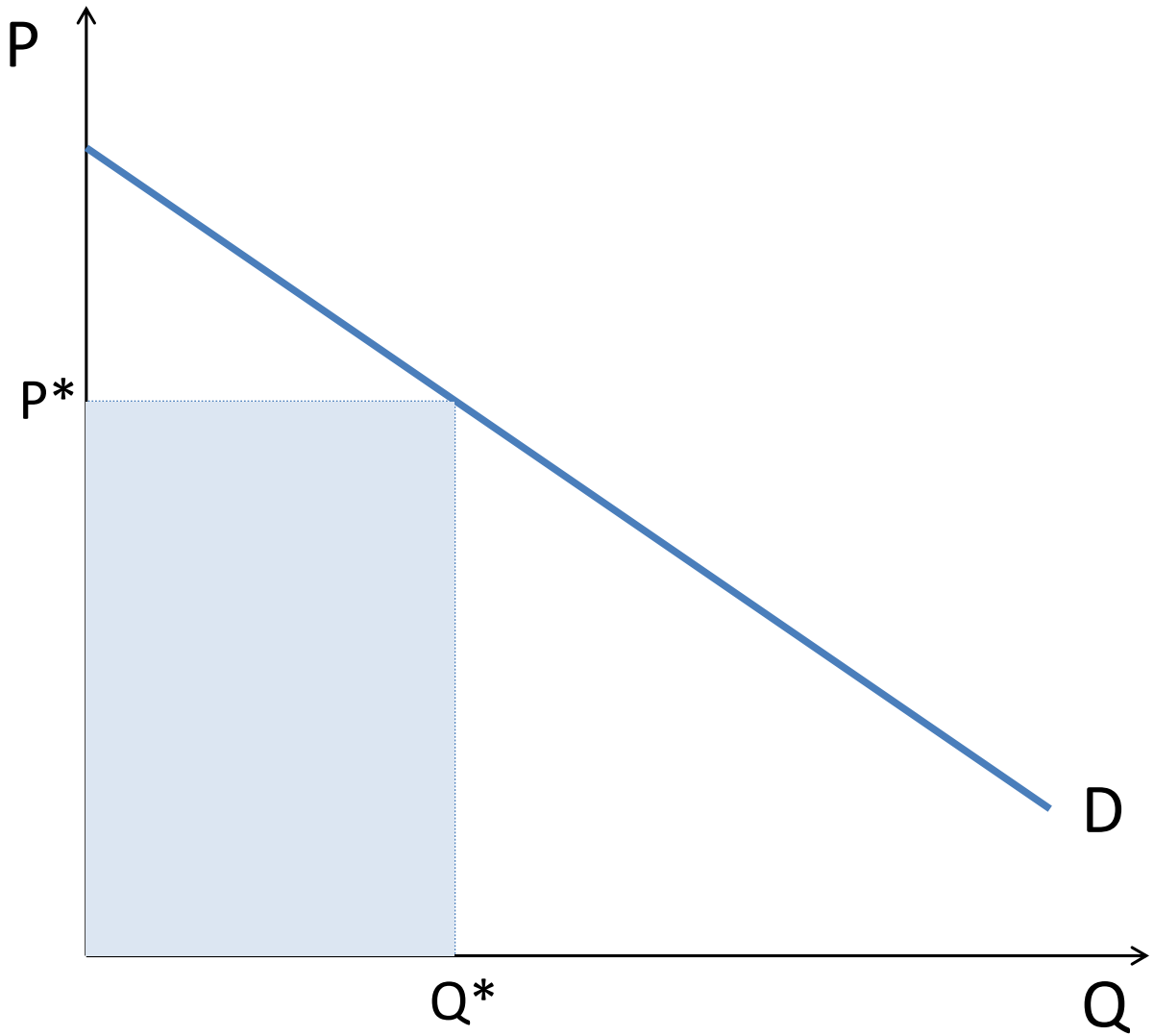
Market Power and Marginal Revenue in Pictures

What is Revenue?



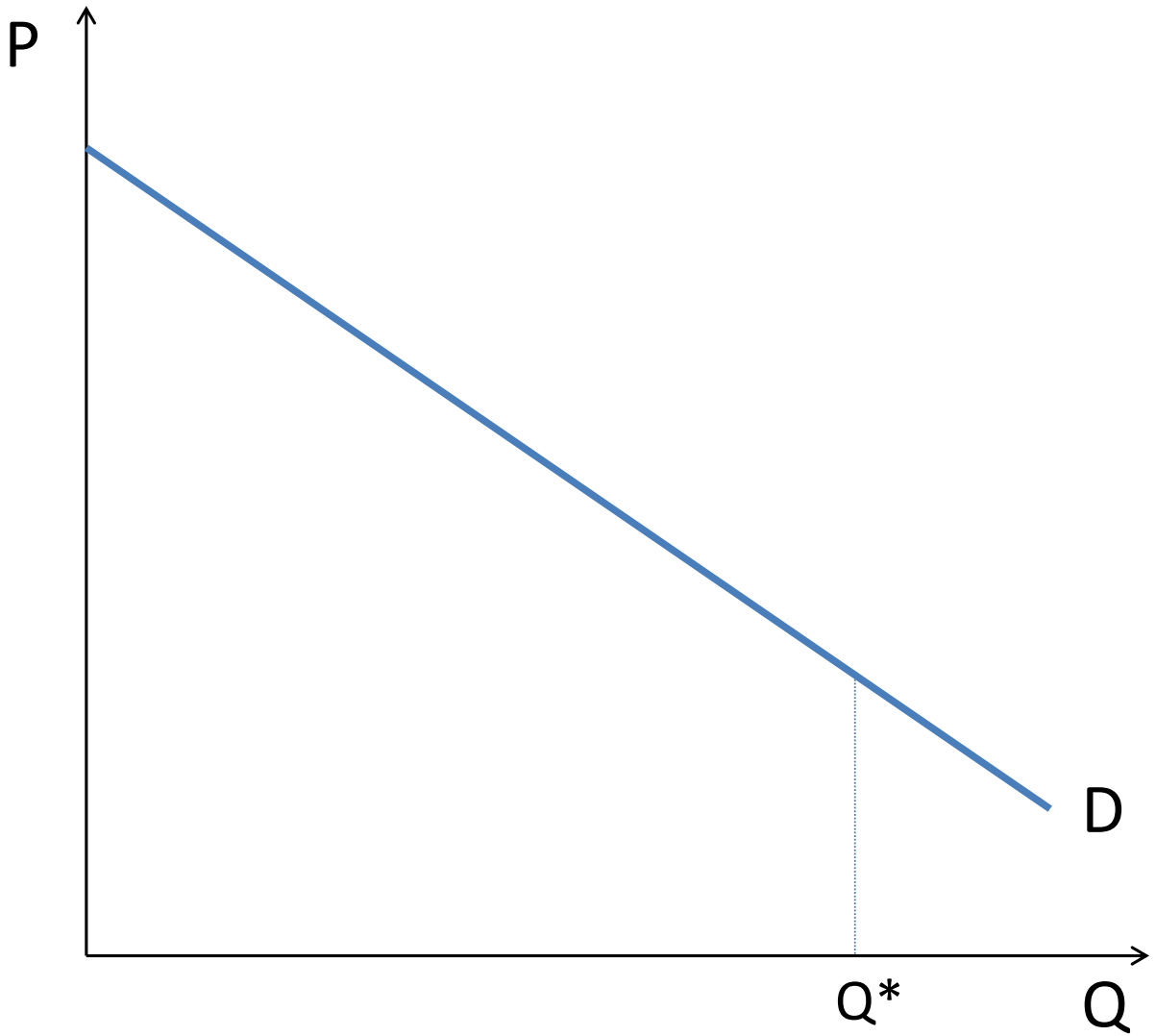
Market Power and Marginal Revenue in Pictures

Revenue



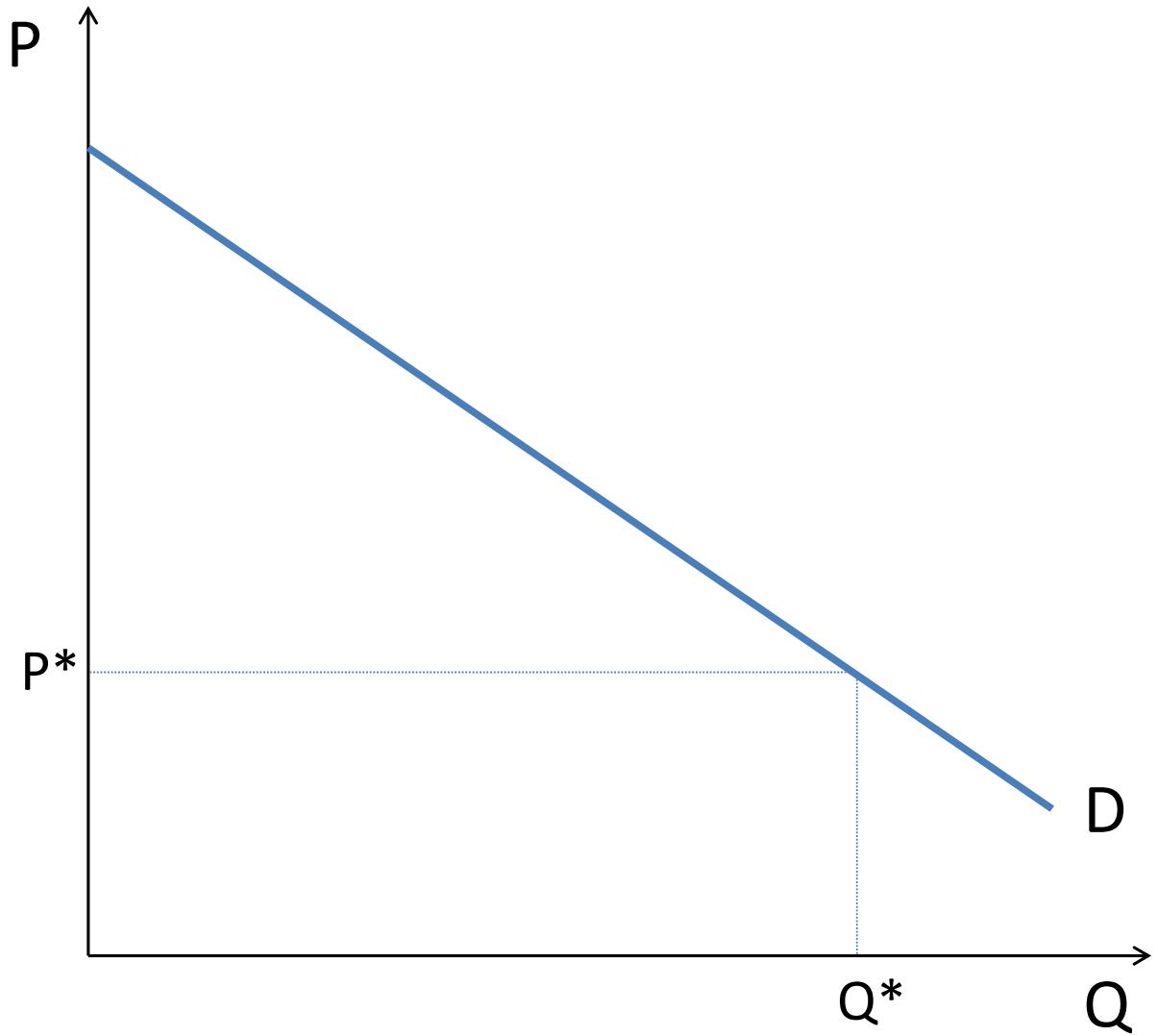
Market Power and Marginal Revenue in Pictures

Choose a Different Q



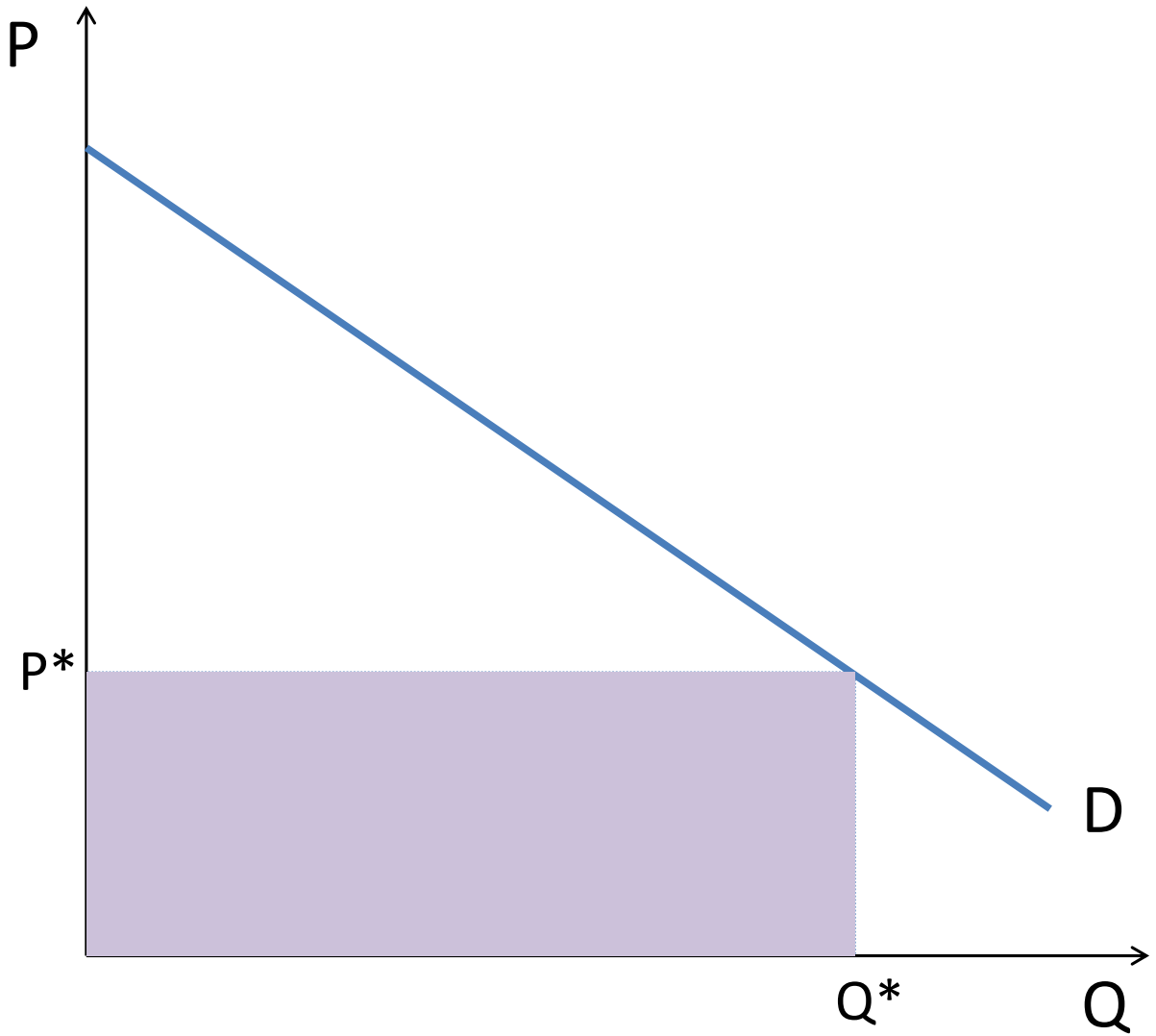
Market Power and Marginal Revenue in Pictures

Yields a Different P



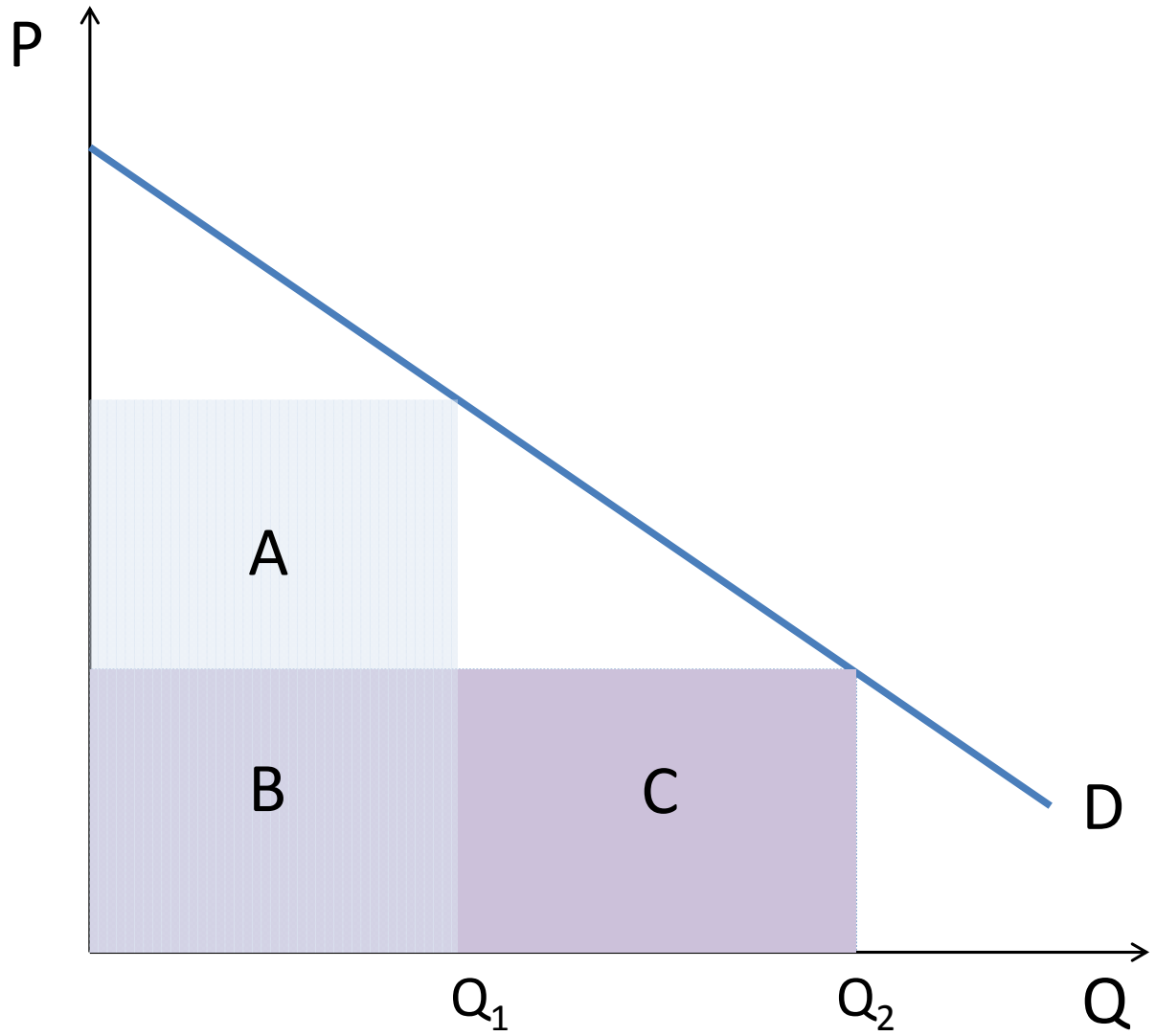
Market Power and Marginal Revenue in Pictures

Different Revenue



Market Power and Marginal Revenue in Pictures

Compare Gains and Losses From Change in Production



Market Power and Marginal Revenue in Algebra

Define

$$MR = P + \frac{\Delta P}{\Delta Q} Q = \left(\frac{\partial TR}{\partial Q} \right)$$

- We know that $\frac{\Delta P}{\Delta Q}$ is the slope of the demand curve, and that's negative
- Thus, MR decreases as Q increases

Market Power and Marginal Revenue in Algebra

For a linear demand curve,

- Consider an inverse demand curve of form $P = a + bQ$ (note similarity to $y = b + mx$)
- We can rewrite MR as

$$\begin{aligned} MR &= P + \frac{\Delta P}{\Delta Q} Q \\ &= (a + bQ) + bQ \\ &= a + 2bQ \end{aligned}$$

Market Power and Marginal Revenue in Algebra

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$$\begin{aligned} MR &= P + \frac{\Delta P}{\Delta Q} Q \\ &= (a + bQ) + bQ \\ &= a + 2bQ \end{aligned}$$

- Note that the intercept is the same as the inverse demand curve, but the slope is twice as steep
- This is another formula you should memorize

Note: This is slightly different notation with signs than in the textbook; I find it clearer. Remember that b is negative, so the MR slope will always be negative.

Profit Maximization and Market Power

Profit Maximization

What does a competitive firm set equal for profit maximization?

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Profit Maximization

What does a competitive firm set equal for profit maximization?

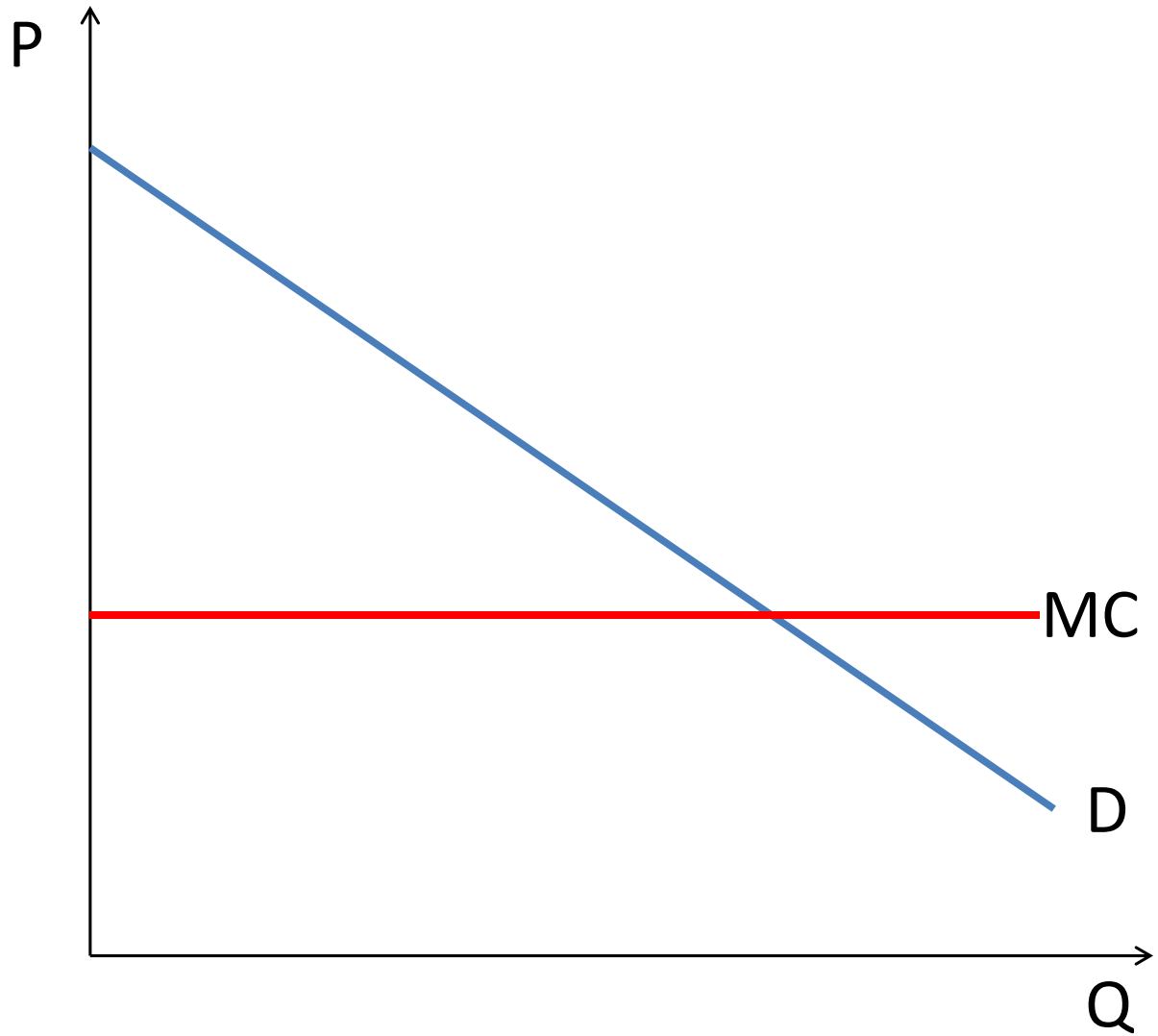
- $MR = MC$, and we know that $MR = P$

What does a firm with market power set equal for profit maximization?

- $MR = MC$
- But MR is more complicated
- And $MR \neq P$ (in general)

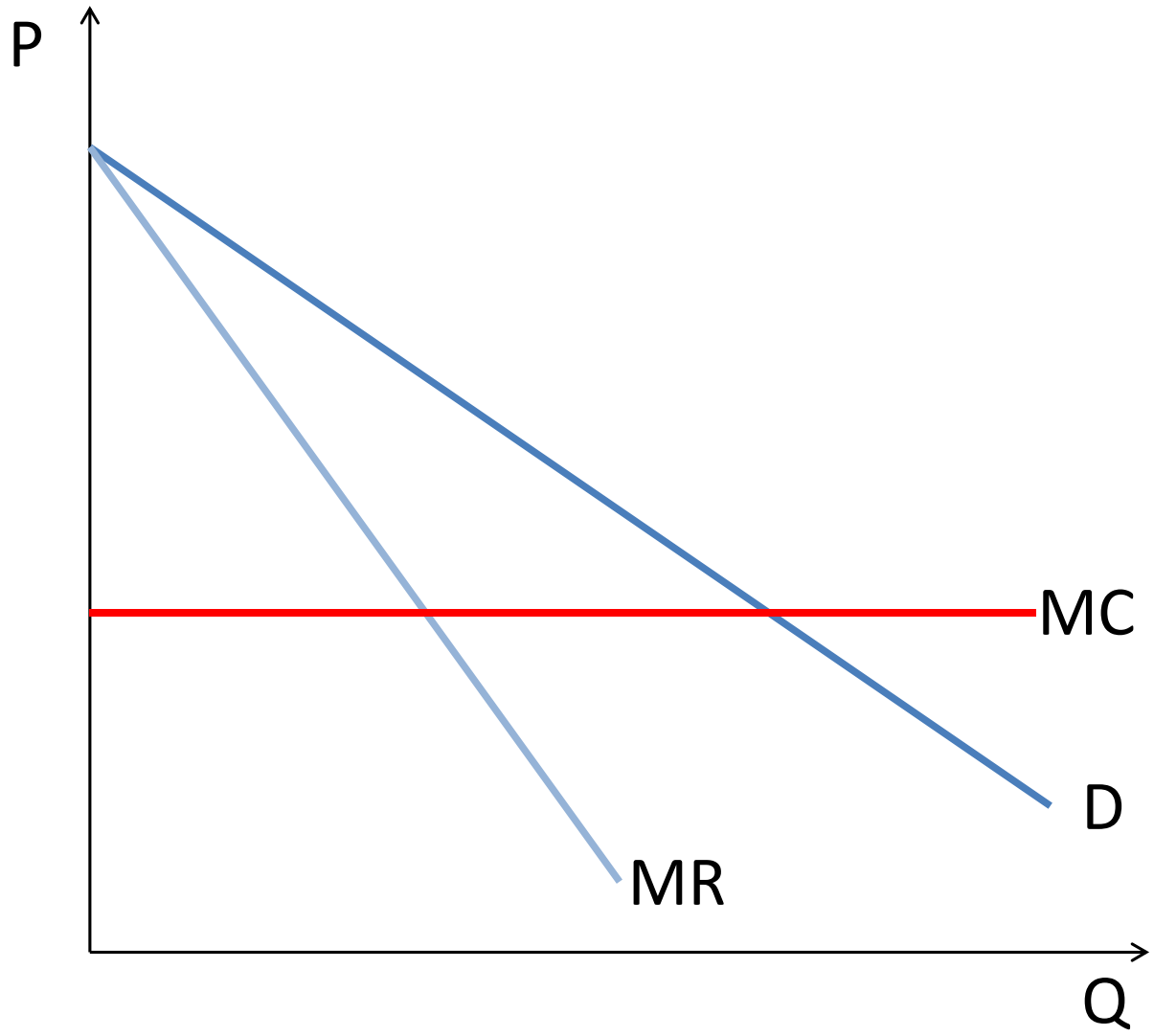
Maximizing π with Market Power: Constant *MC*

Where is *MR*?



Maximizing π with Market Power: Constant *MC*

What is Profit Maximizing *Q*?



Maximizing π with Market Power: Constant *MC*

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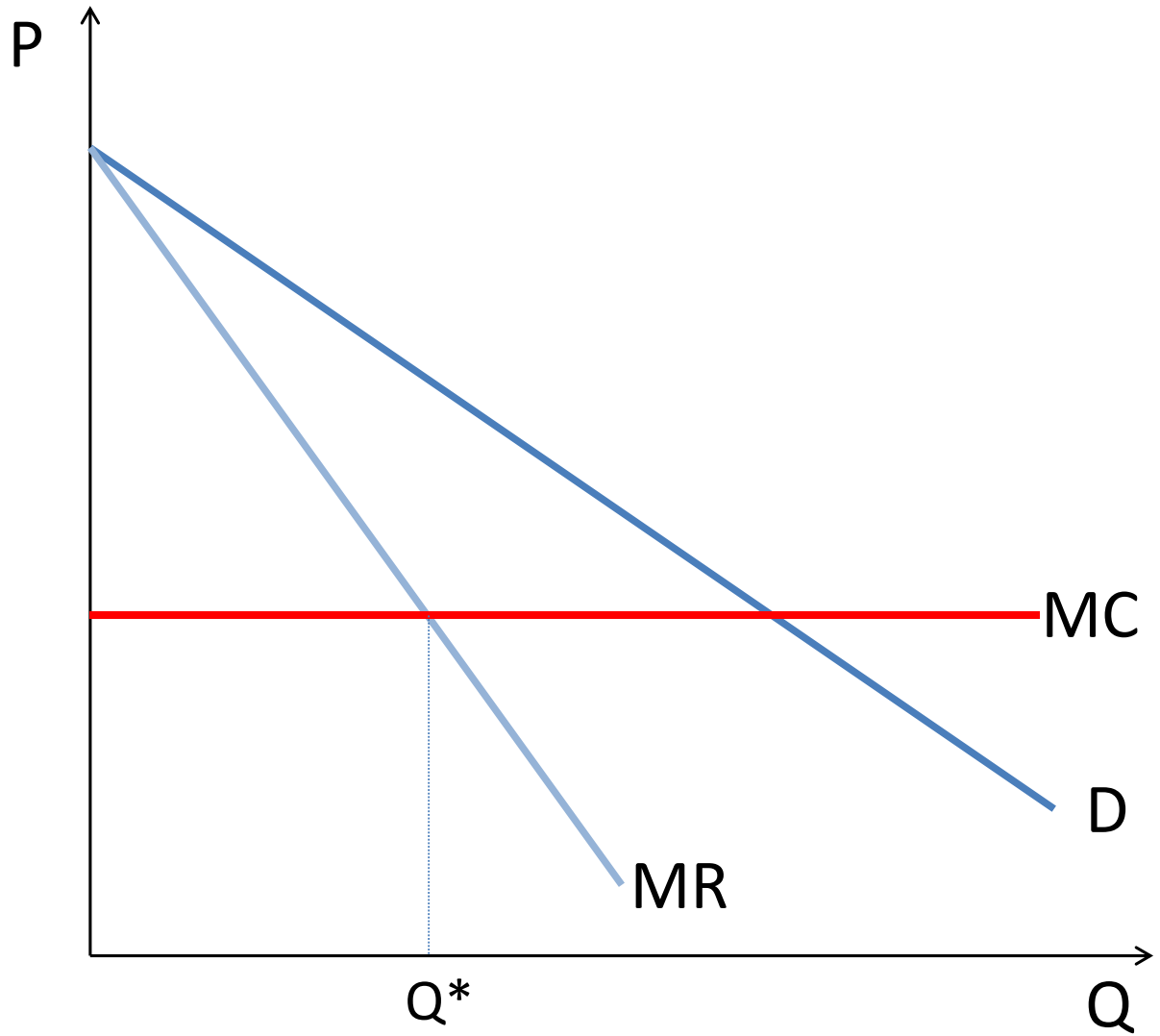
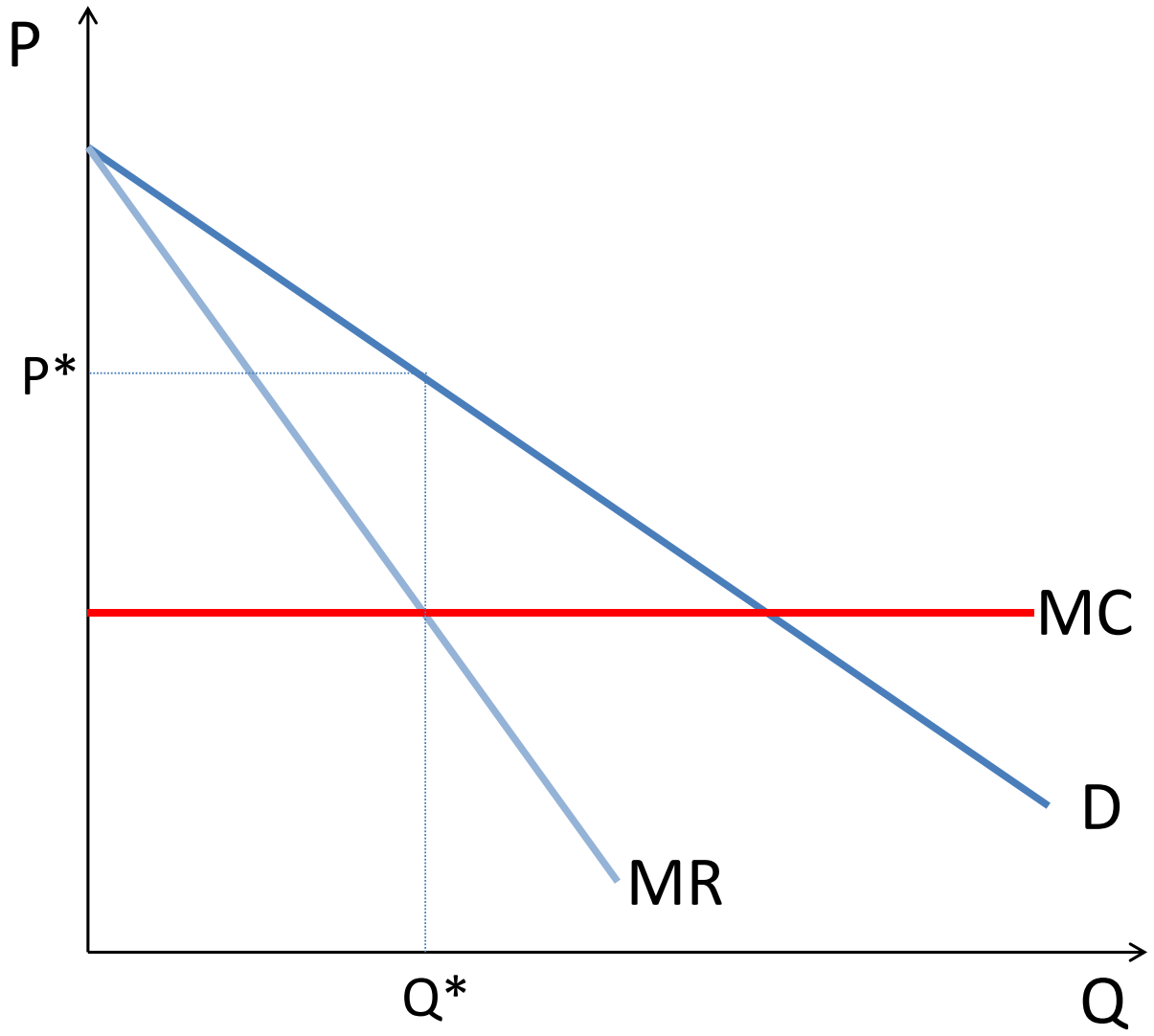


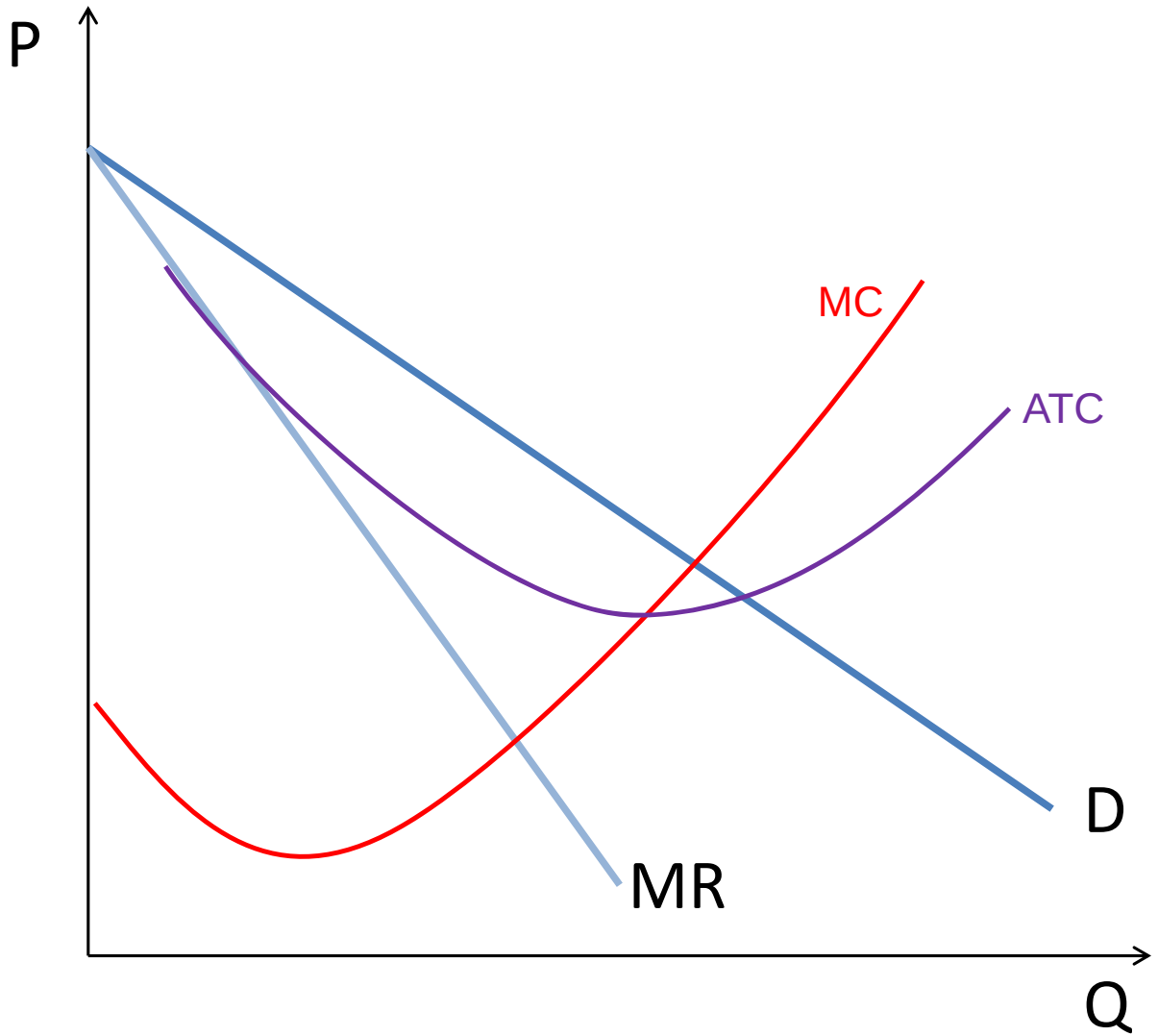
Maximizing π with Market Power: Constant *MC*

Can See Revenues, but Not Costs



Maximizing π with Market Power: Increasing *MC*

Where is Profit Maximizing *Q*?



Maximizing π with Market Power: Increasing *MC*

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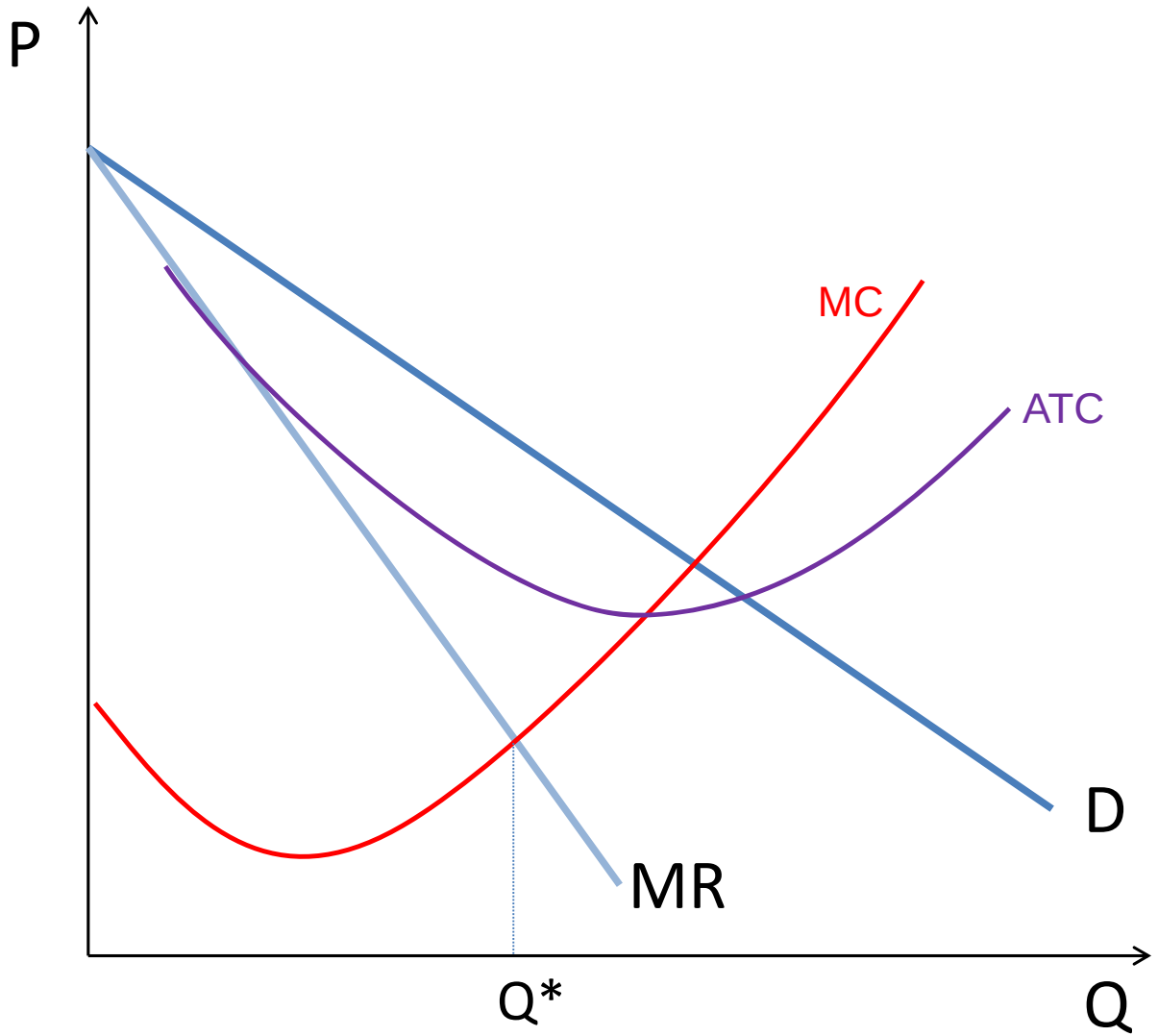
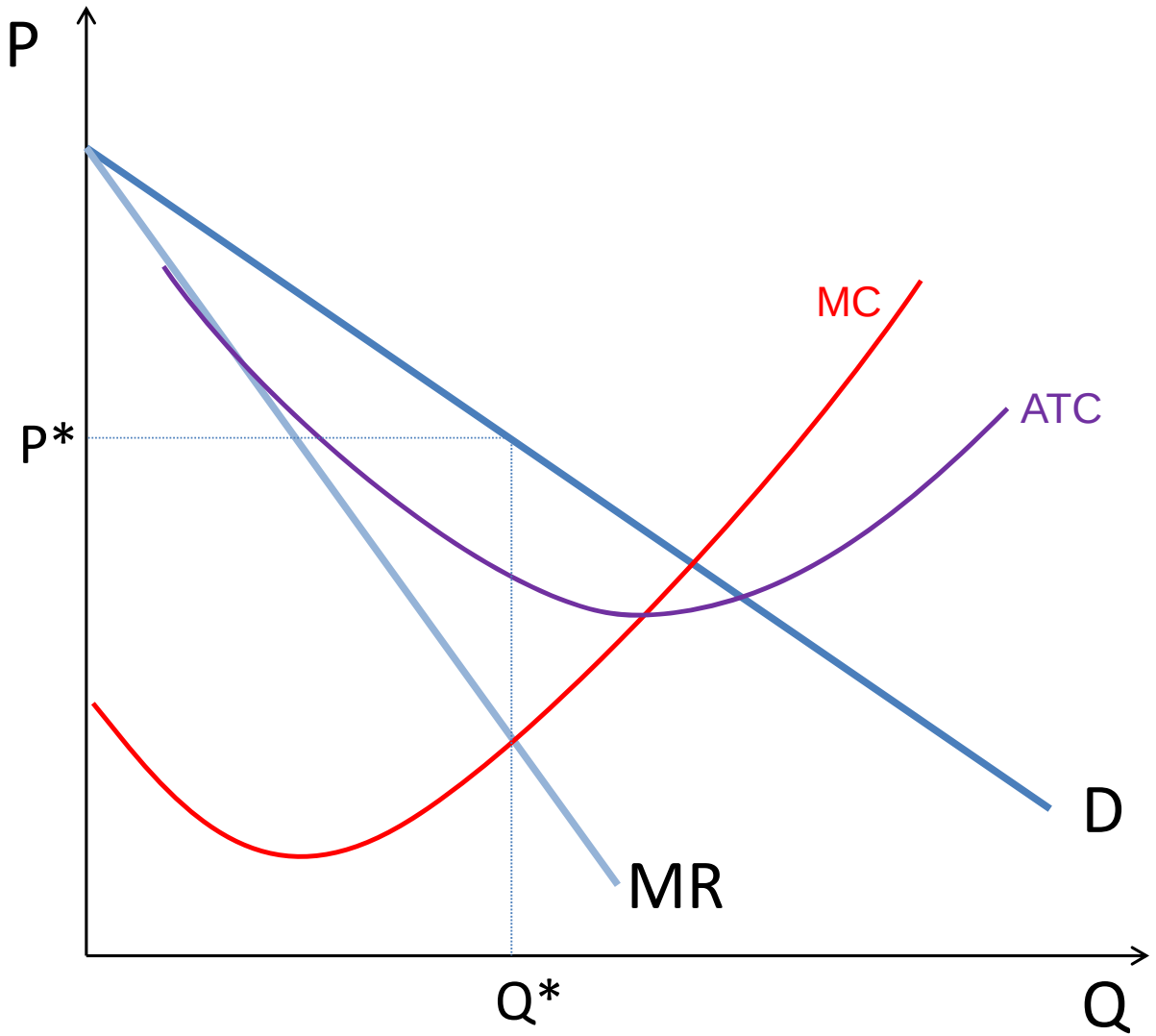


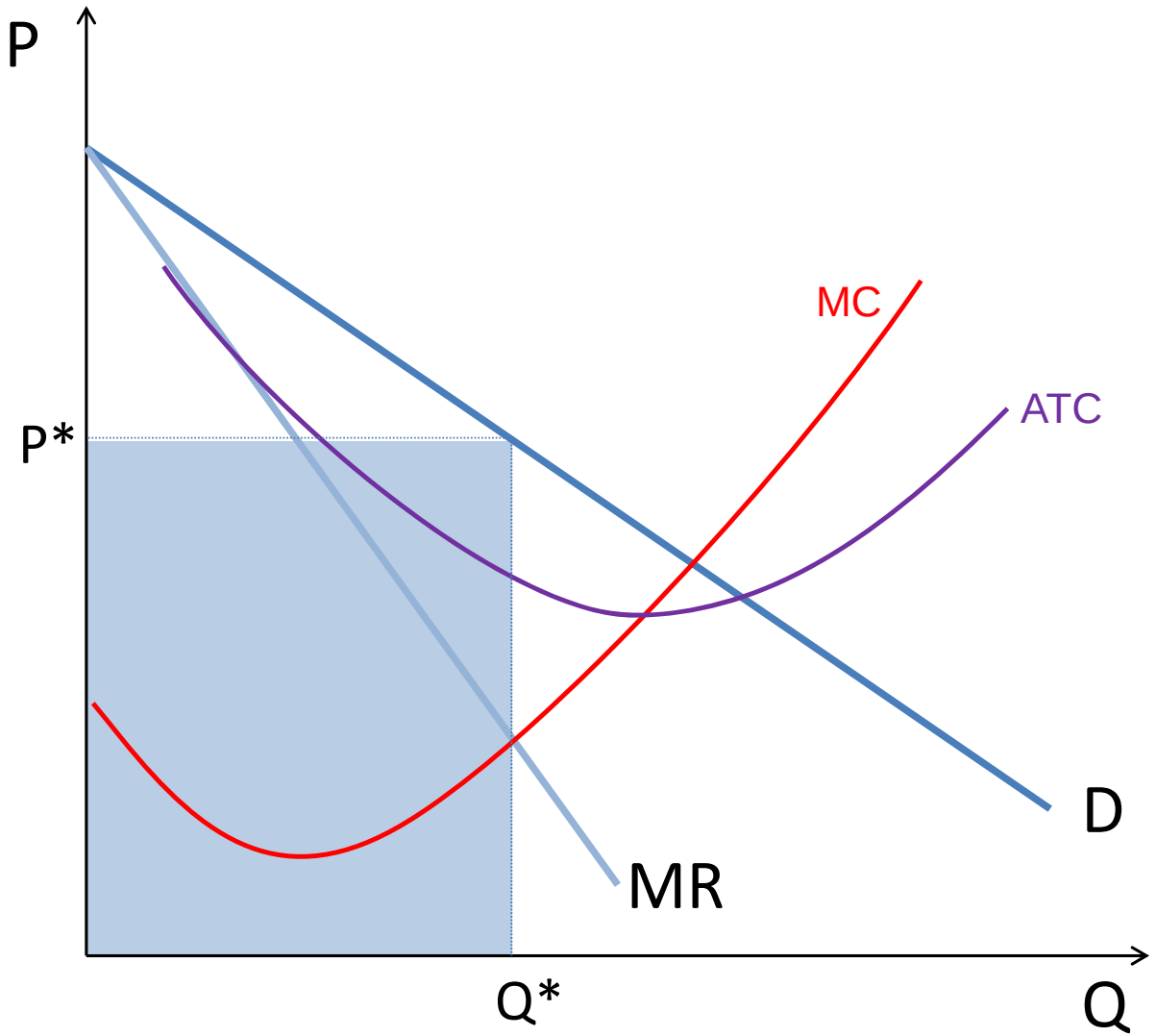
Maximizing π with Market Power: Increasing *MC*

What is Total Revenue?



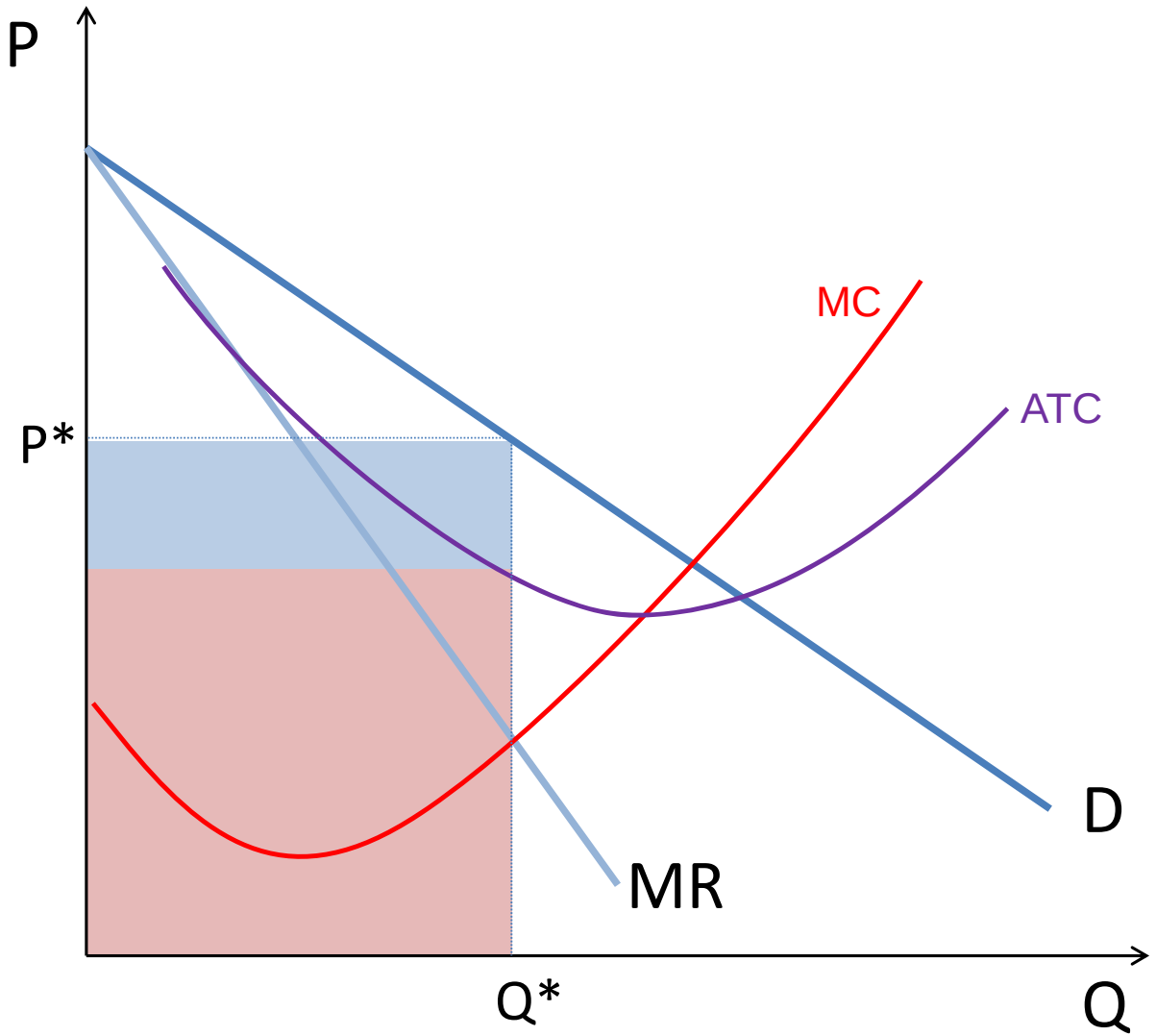
Maximizing π with Market Power: Increasing *MC*

What are Total Costs?



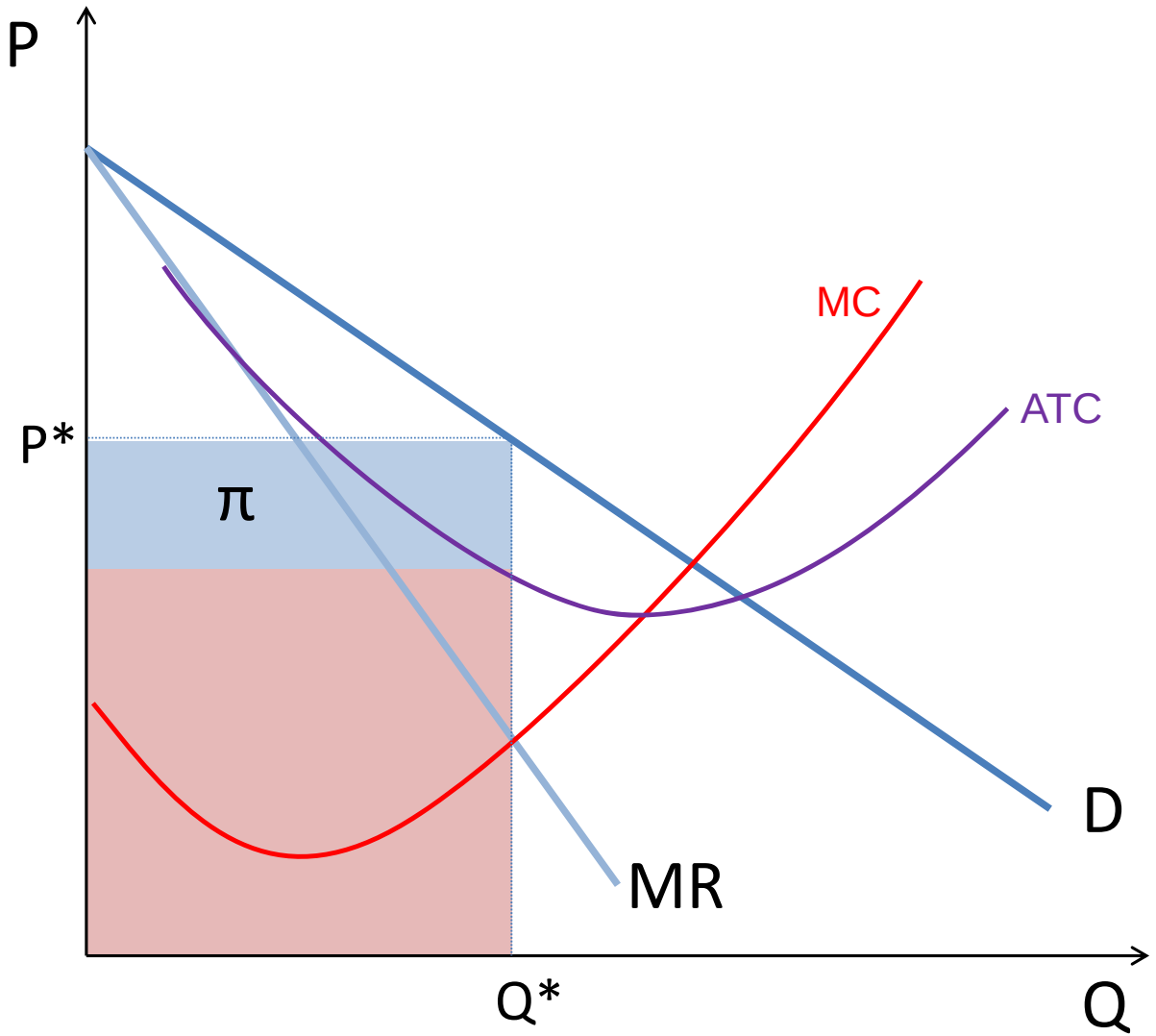
Maximizing π with Market Power: Increasing *MC*

What is Profit?



Maximizing π with Market Power: Increasing *MC*

Market Power Yields Profits!



Profit Maximization with Market Power in Math

Profits are maximized at Q^* such that $MR = MC$. What are Q^* and P^*?

Use these three steps:

1. Find MR
   - If you have a linear demand curve, you can find $MR = a + 2bQ$
   - where b is the slope of the **inverse** demand curve
   - a is the y-intercept
   - Remember that the inverse demand curve is $P = f(Q)$
2. Set $MR = MC$
3. Find price from demand curve

Profit Maximization with Market Power in Math

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Return to picture for three steps.

Do not confuse MC curve with true supply curve, which is independent of demand.

How a Firm with Market Power Reacts to Market Changes

Three Changes

1. Change in marginal cost
2. Outward shift in demand
3. Rotation of demand curve

Competitive Market and an Increase in *MC*

What happens to the equilibrium price and quantity?

Competitive Market and an Increase in *MC*

What happens to the equilibrium price and quantity?

- Supply curve shifts inward
- If supply is elastic, curve just shifts up
- Price increases
- Equilibrium Q declines

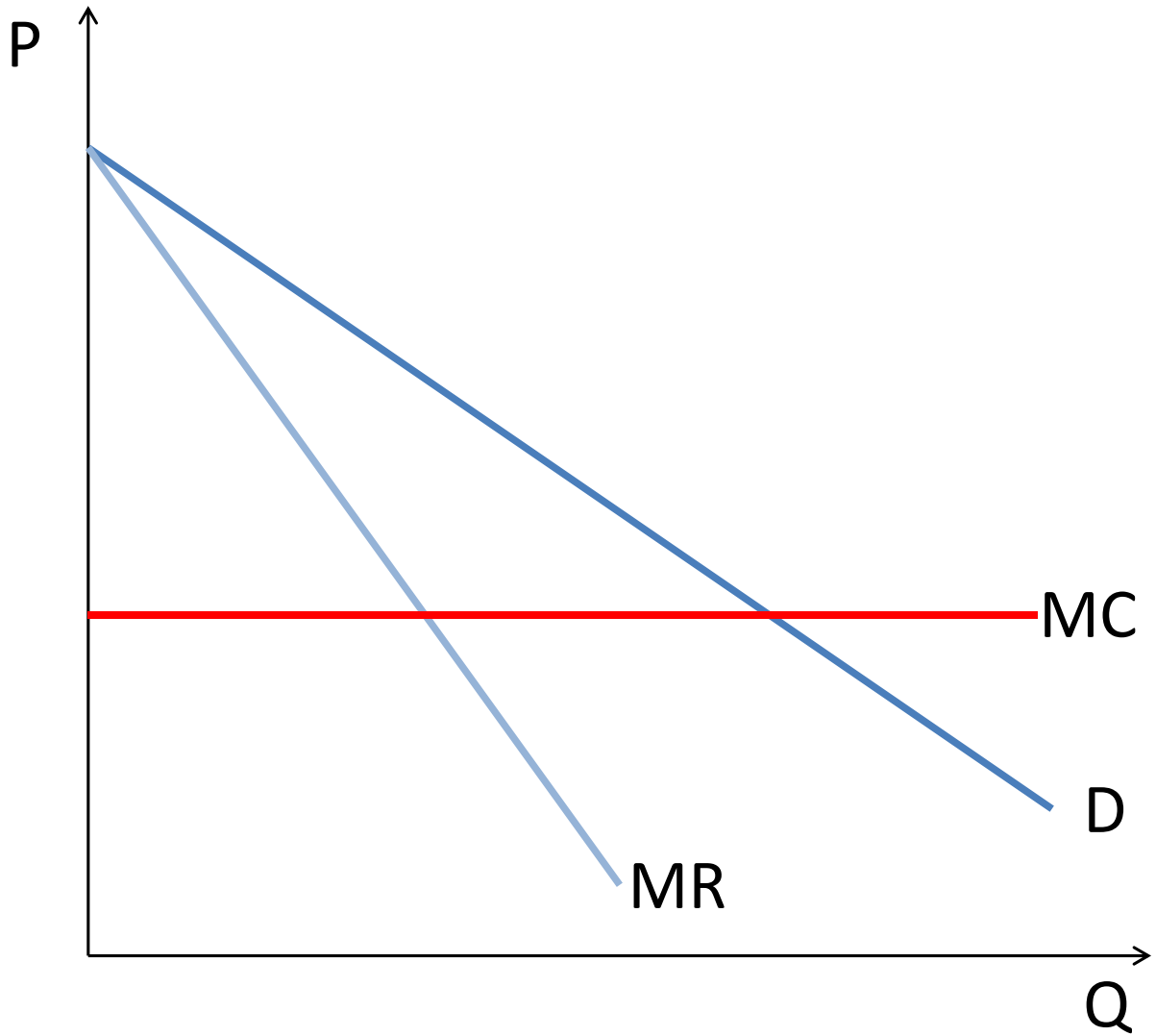
Competitive Market and an Increase in *MC*

What happens to the equilibrium price and quantity?

- Supply curve shifts inward
- If supply is elastic, curve just shifts up
- Price increases
- Equilibrium Q declines
- In the long run, cost increases fully passed along to consumers

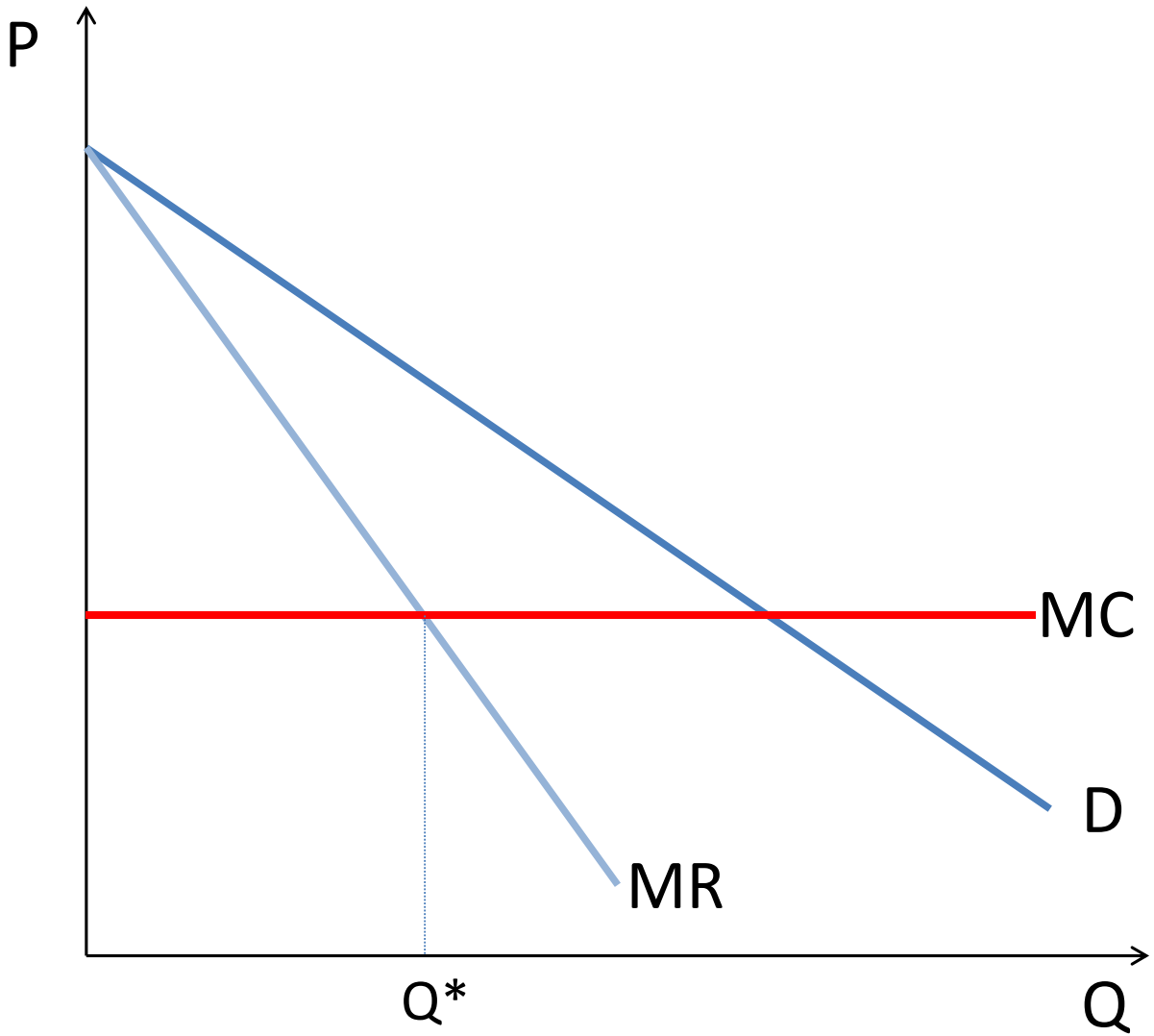
Market Power and an Increase in *MC*

Review: Where is profit maximizing *Q*?



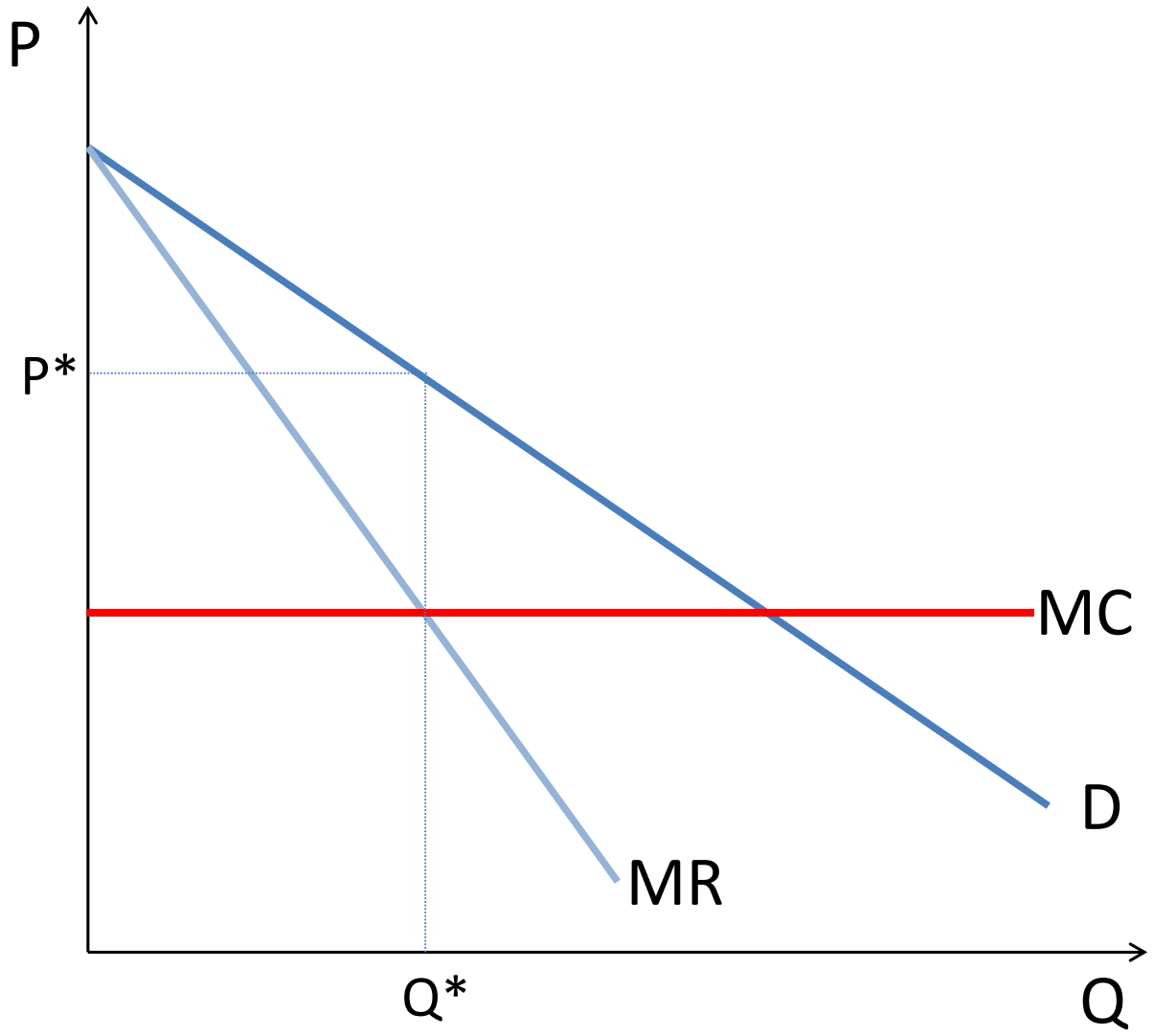
Market Power and an Increase in *MC*

Review: What is Profit Maximizing *P*?



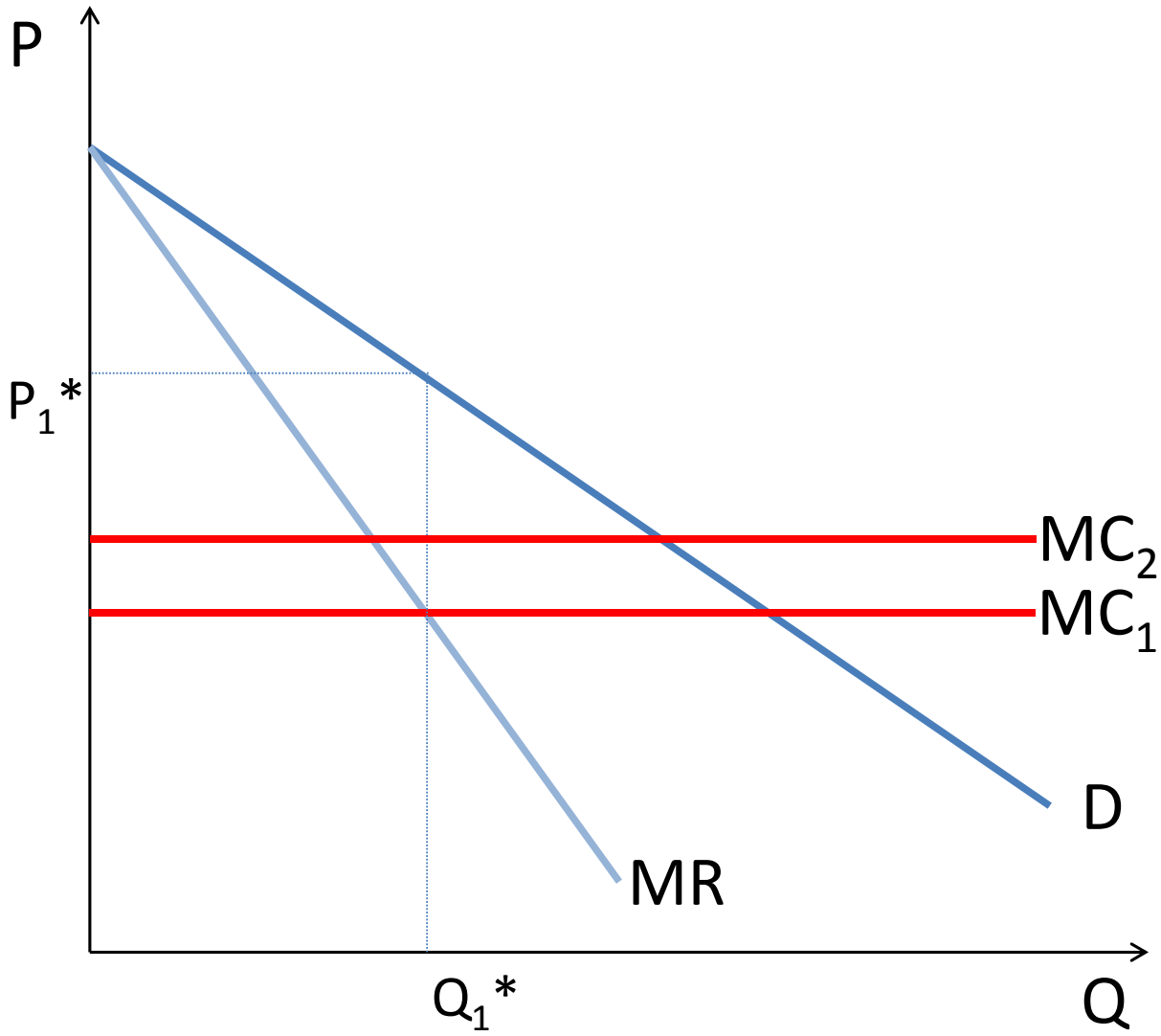
Market Power and an Increase in *MC*

Draw an Increase in *MC*?



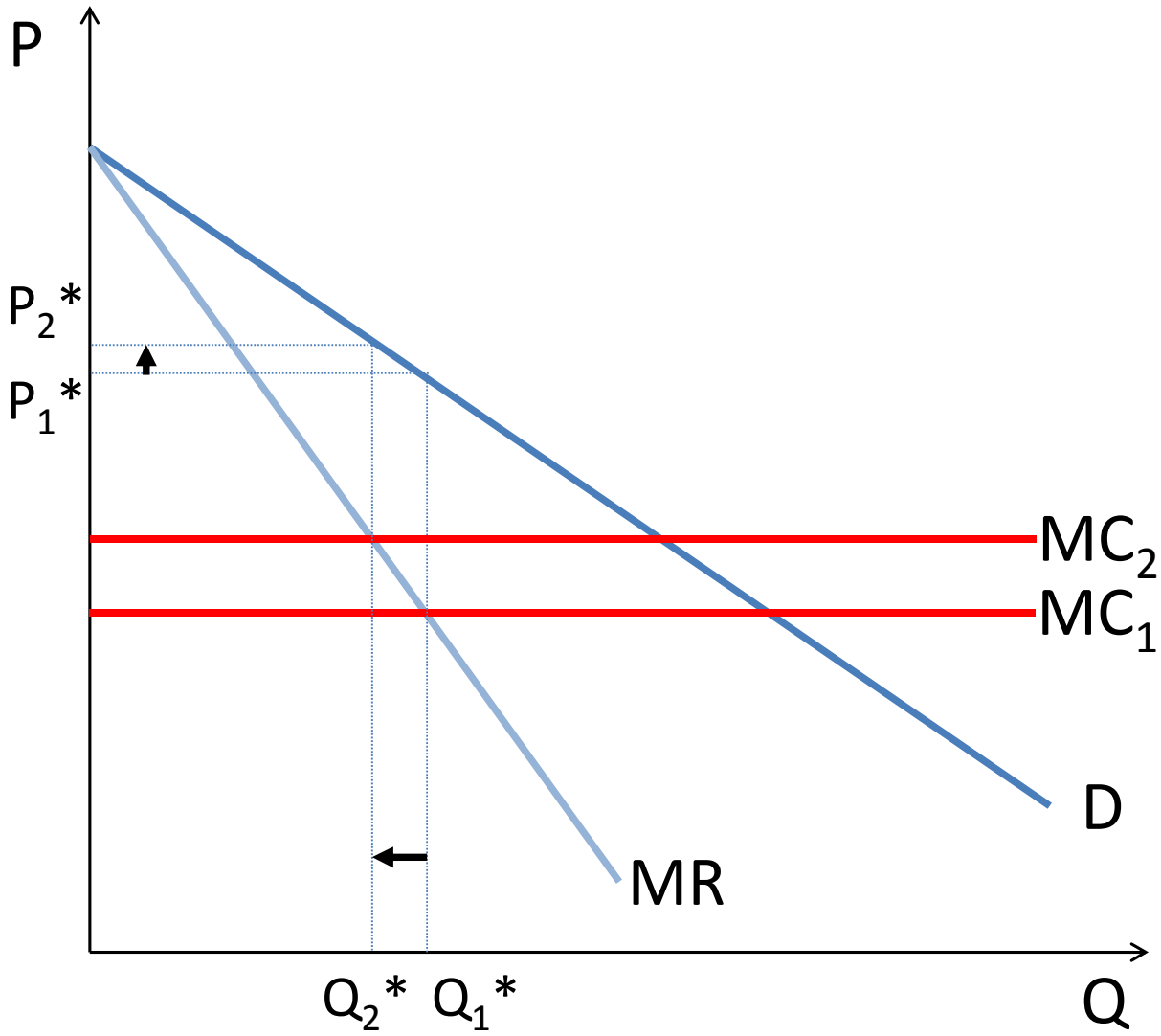
Market Power and an Increase in *MC*

What are New Profit Maximizing *P* and *Q*?



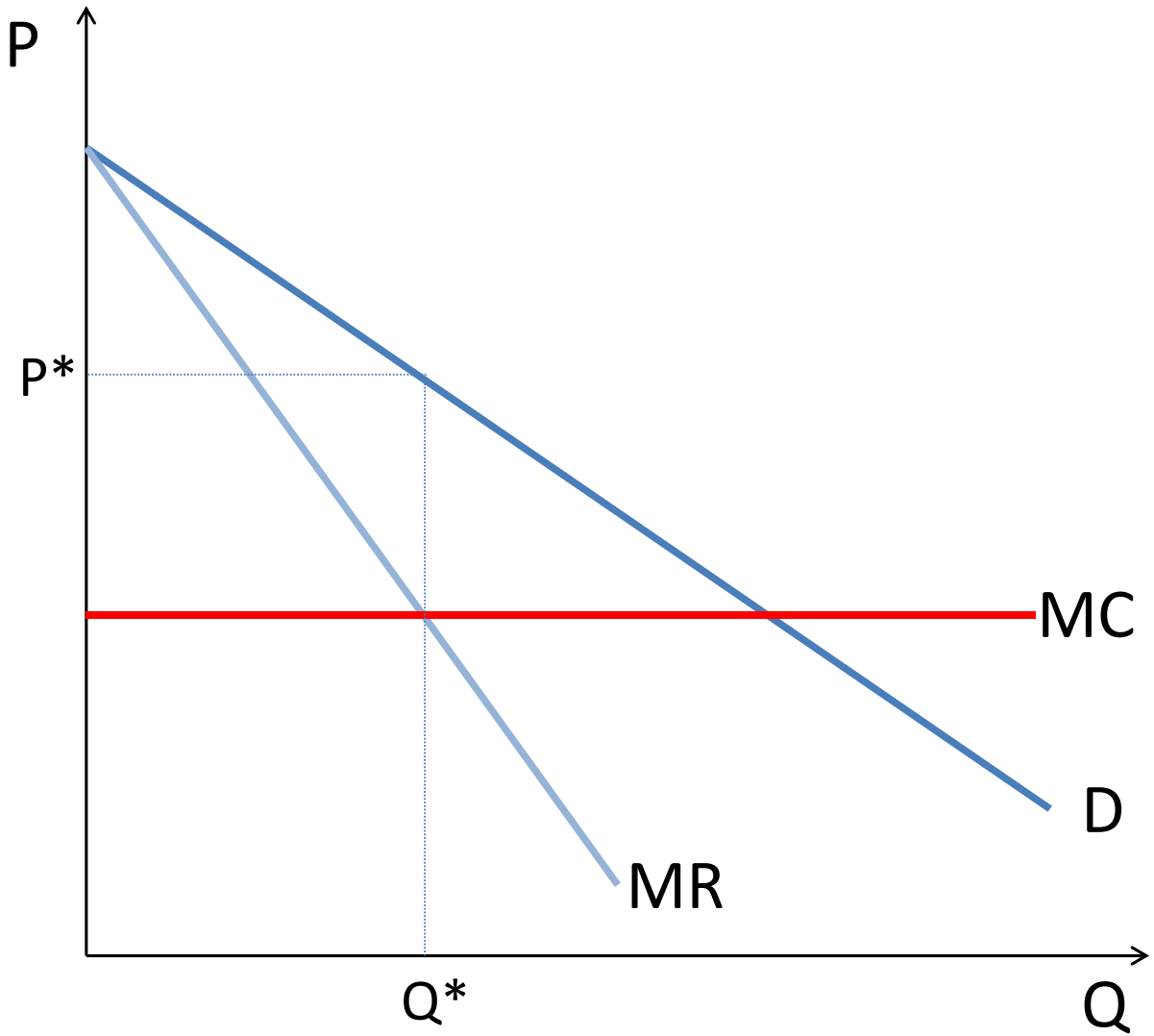
Market Power and an Increase in *MC*

Prices Increase, Quantity Falls



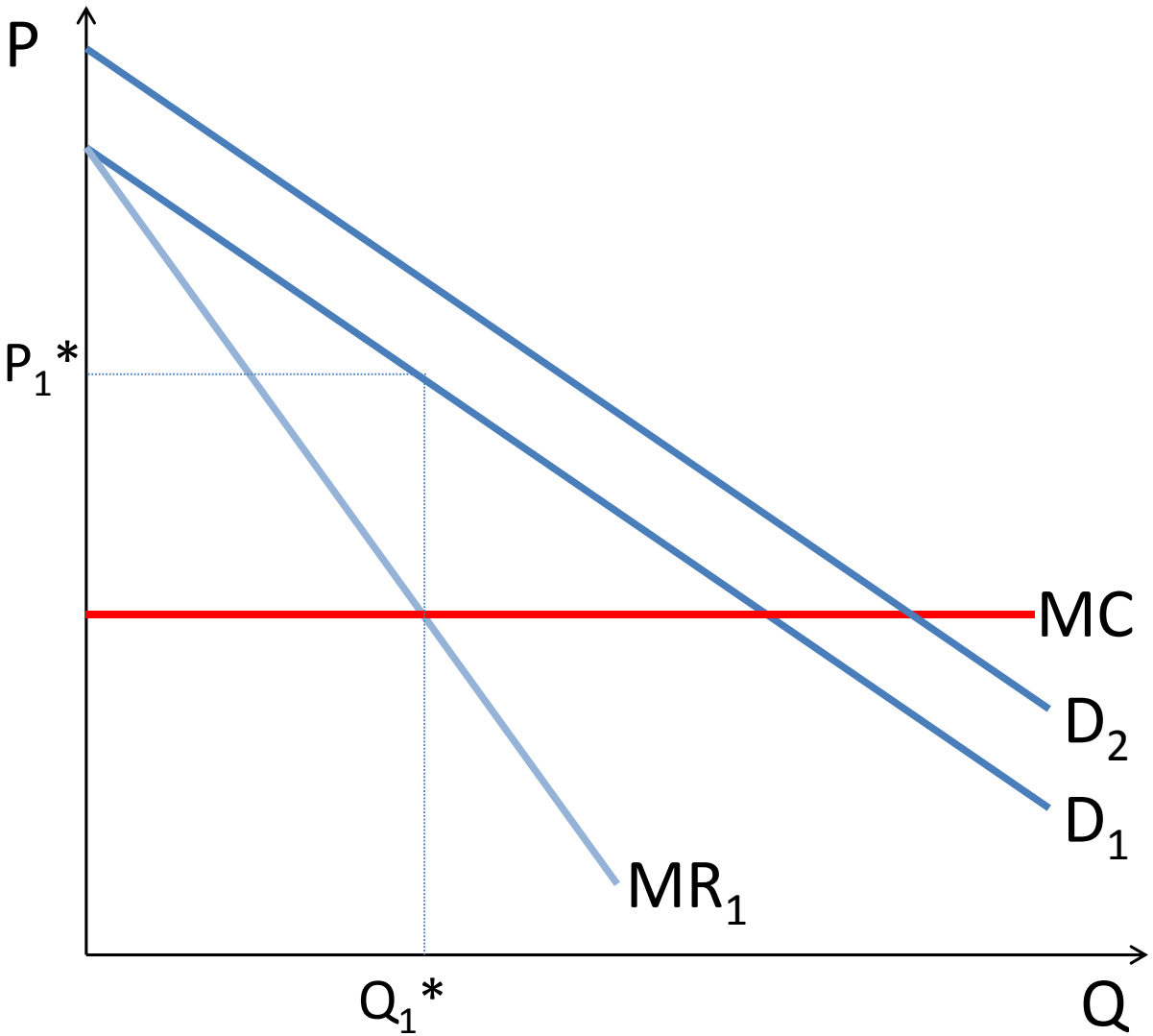
P and Q and Outward Shift in Demand

What Does an Increase in Demand Look Like?



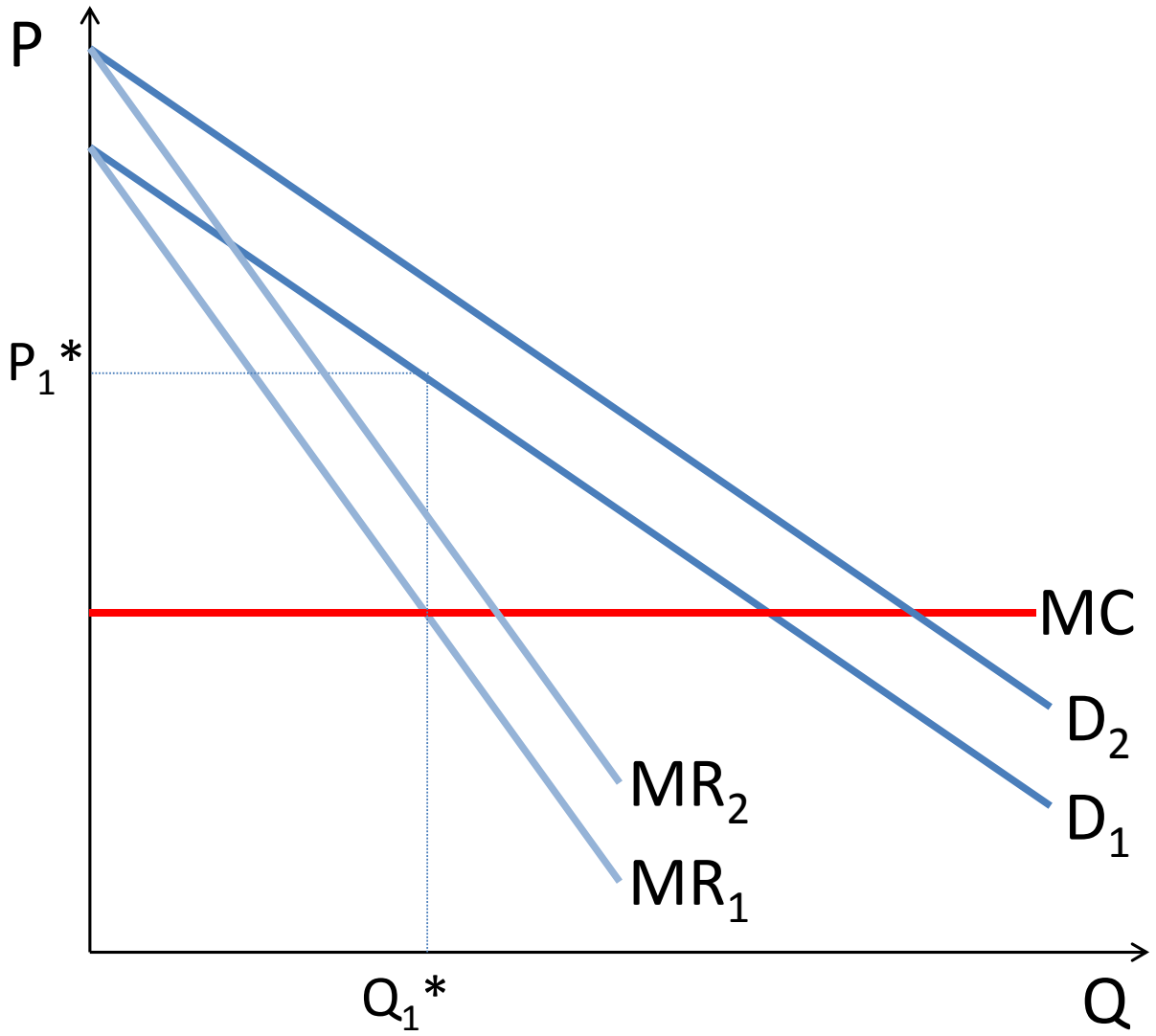
P and Q and Outward Shift in Demand

Where is the New MR?



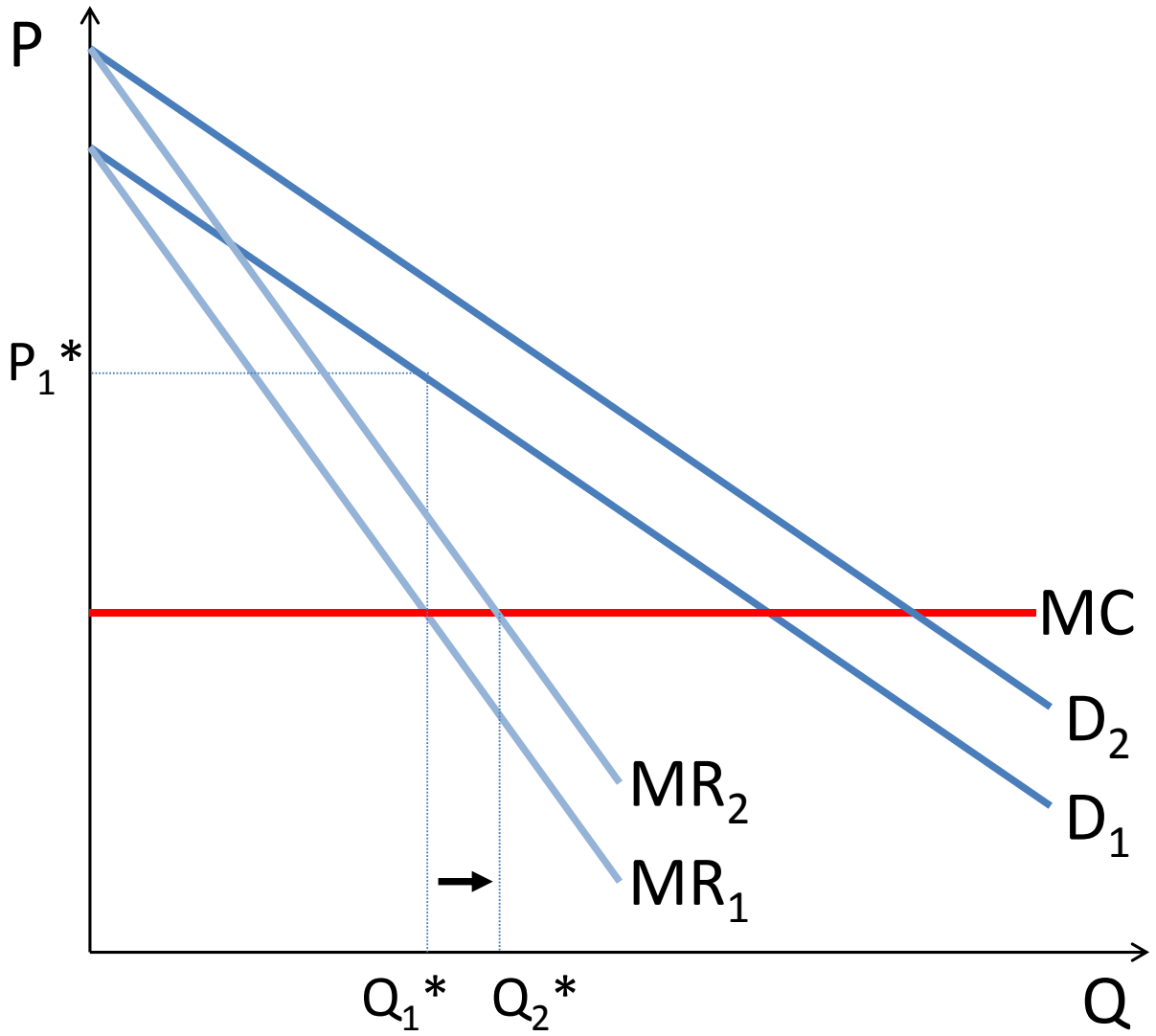
P and Q and Outward Shift in Demand

Where is the New Q?



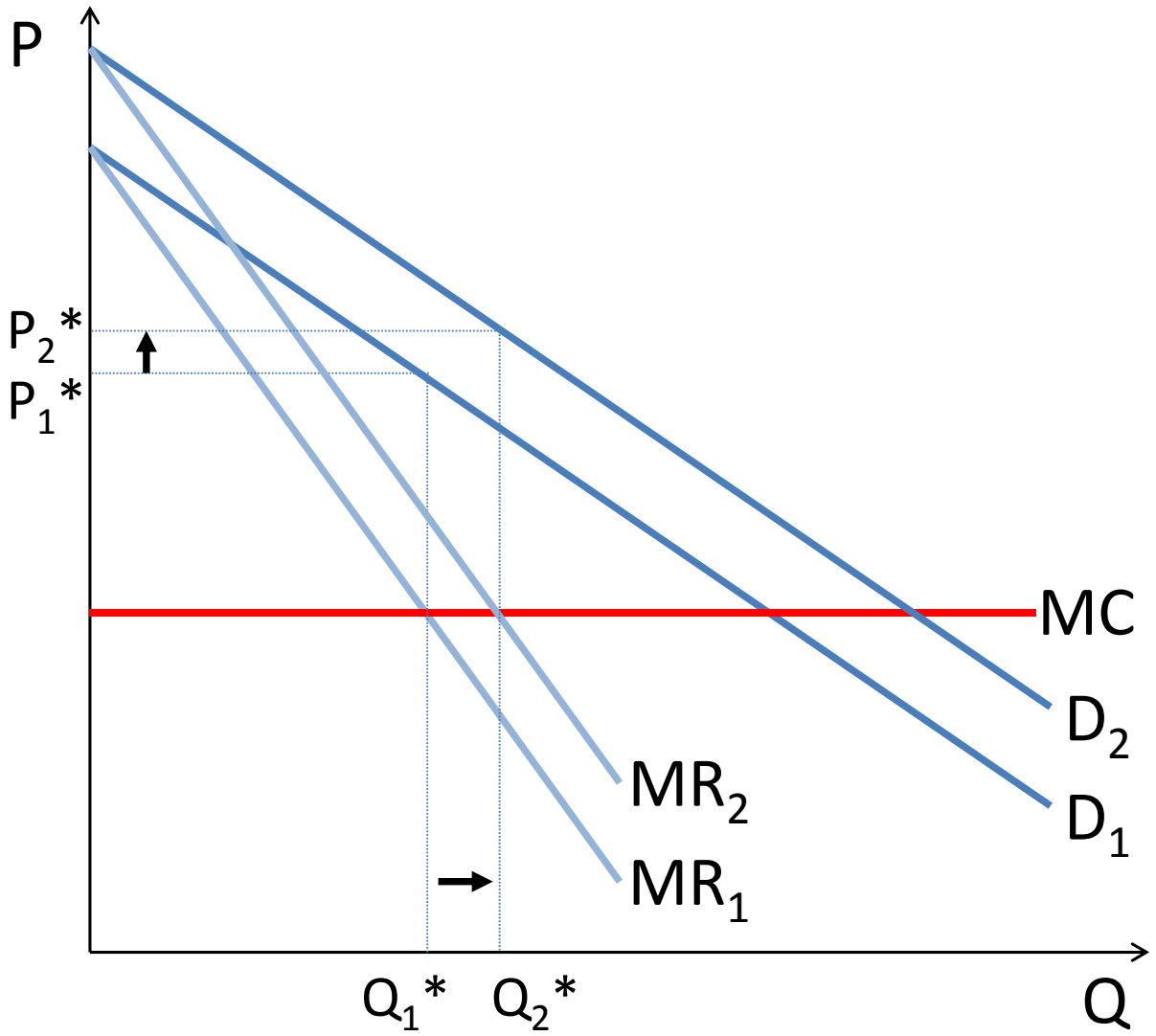
P and Q and Outward Shift in Demand

Where is the New P?



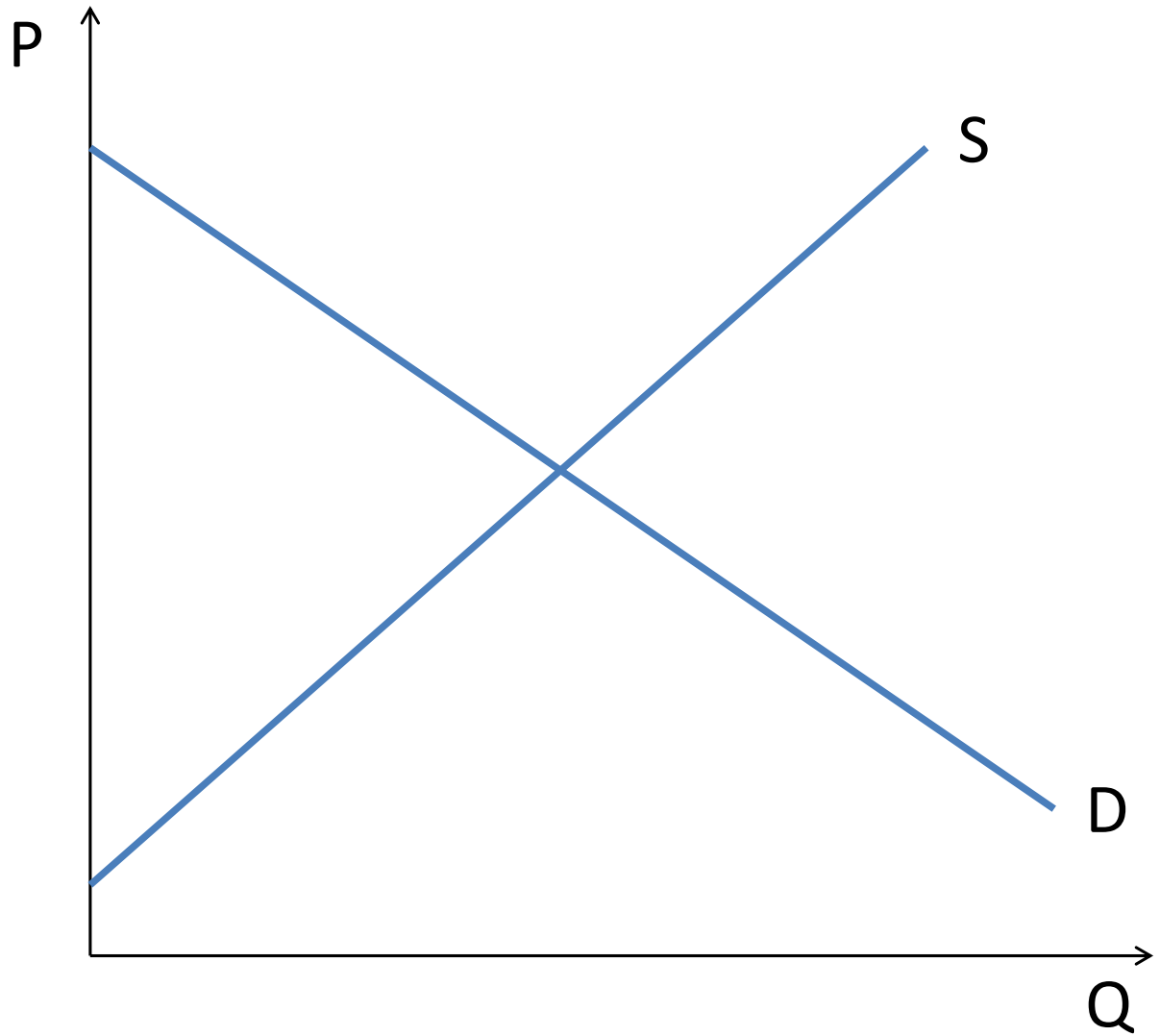
P and Q and Outward Shift in Demand

Q increases, P increases



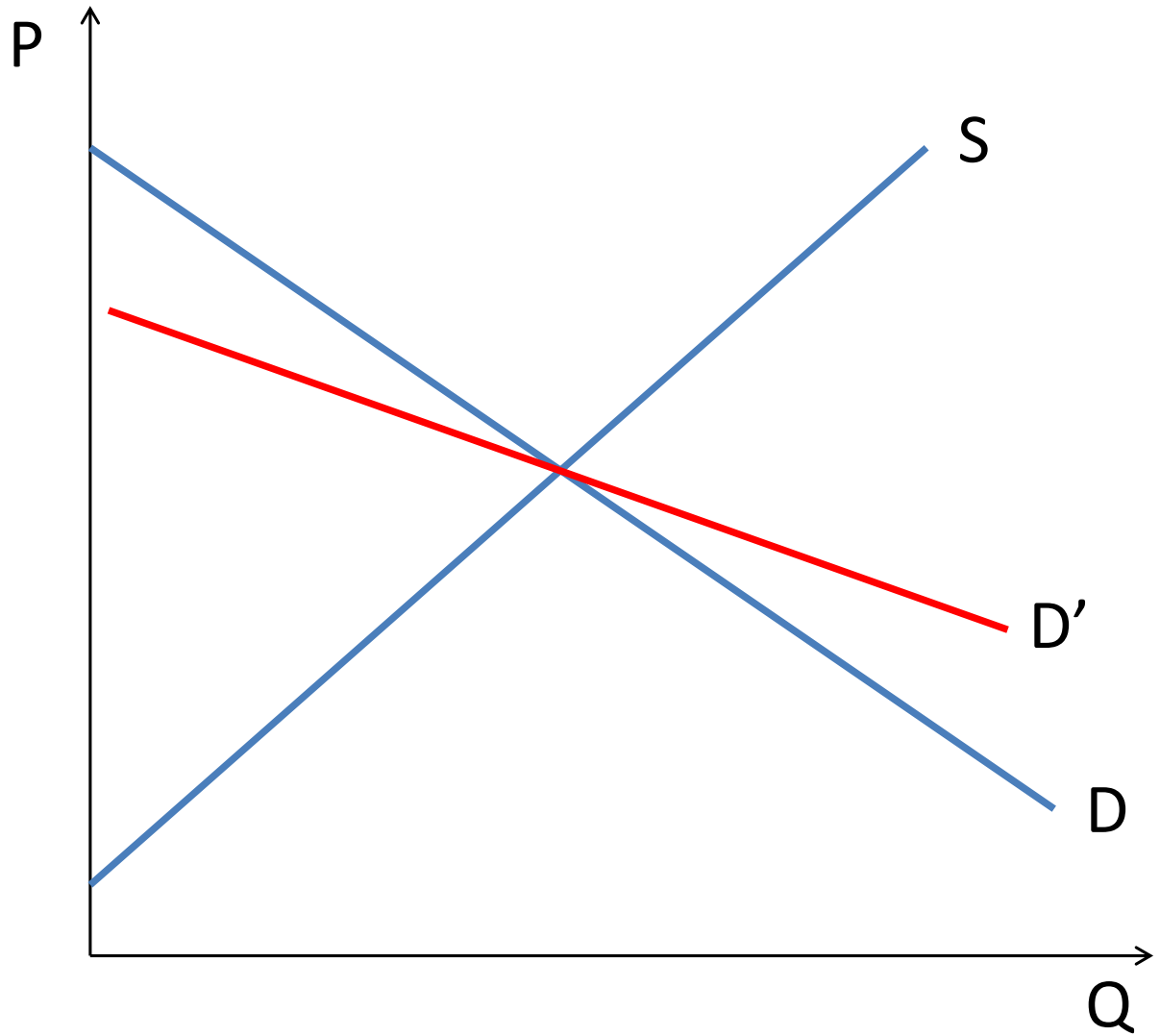
Rotation of the Demand Curve: Perfect Competition

With P Constant, Rotate Demand Curve



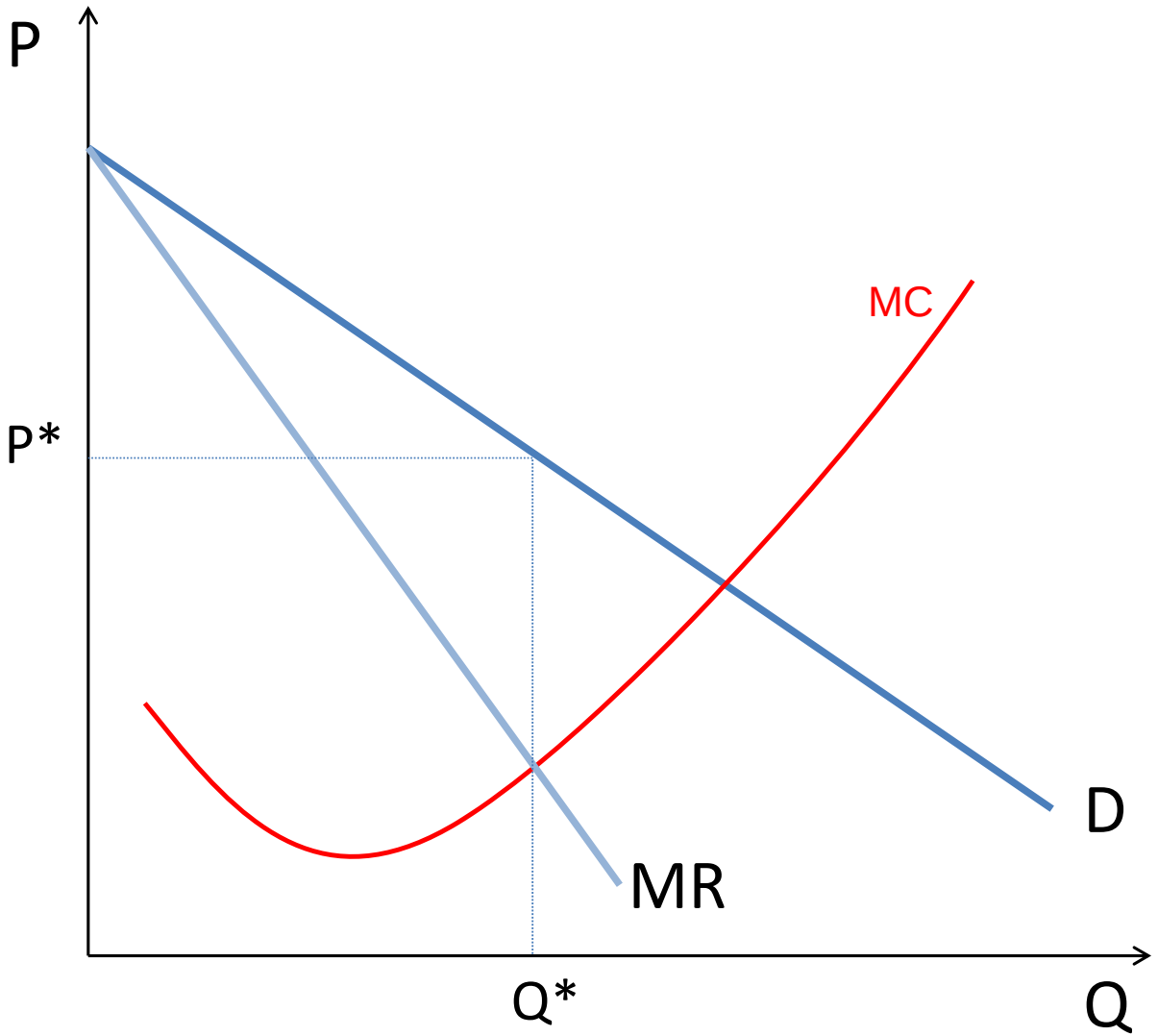
Rotation of the Demand Curve: Perfect Competition

No Response in P or Q



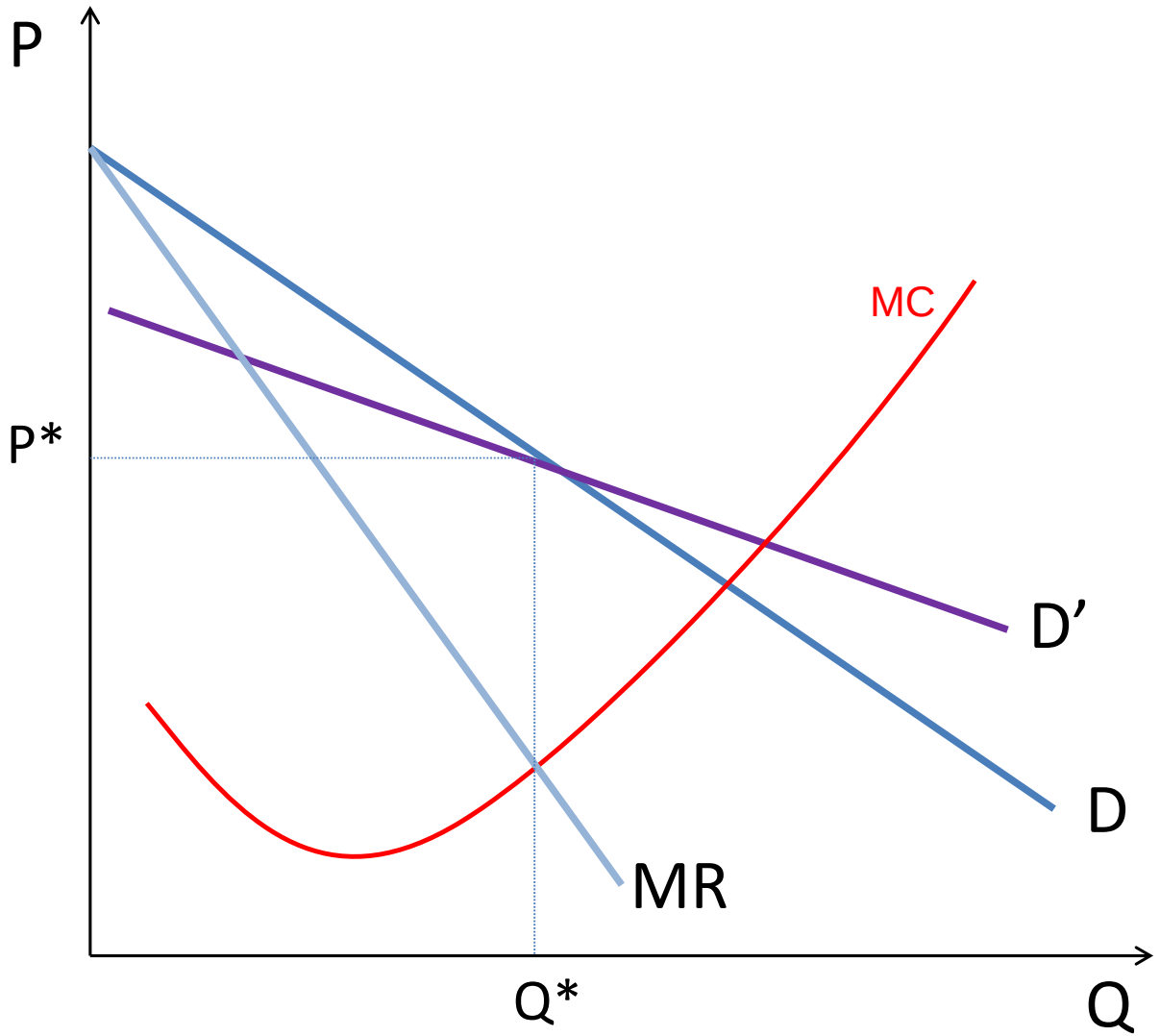
Rotation of the Demand Curve: Market Power

Rotate Demand Curve



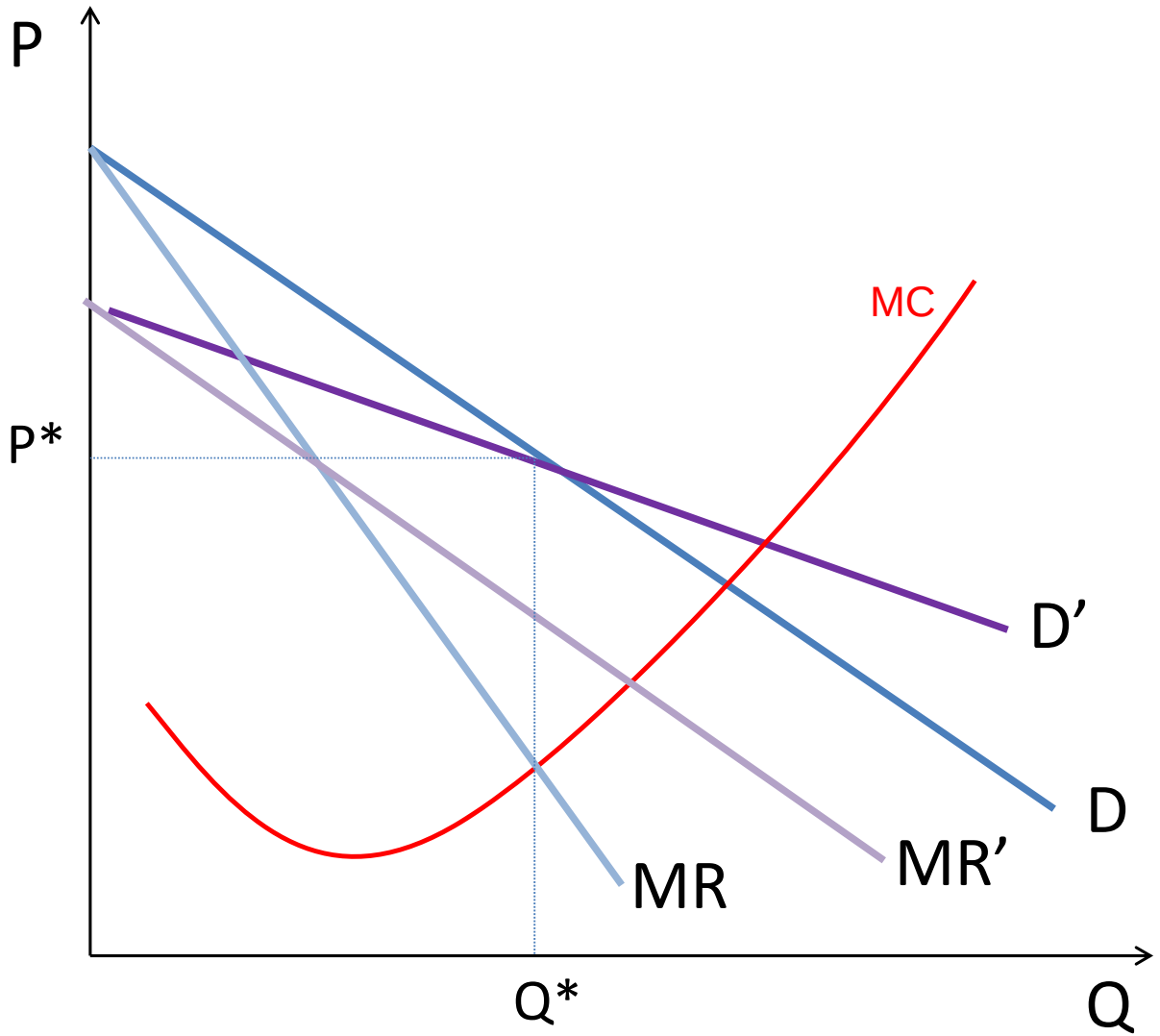
Rotation of the Demand Curve: Market Power

Where is New *MR*?



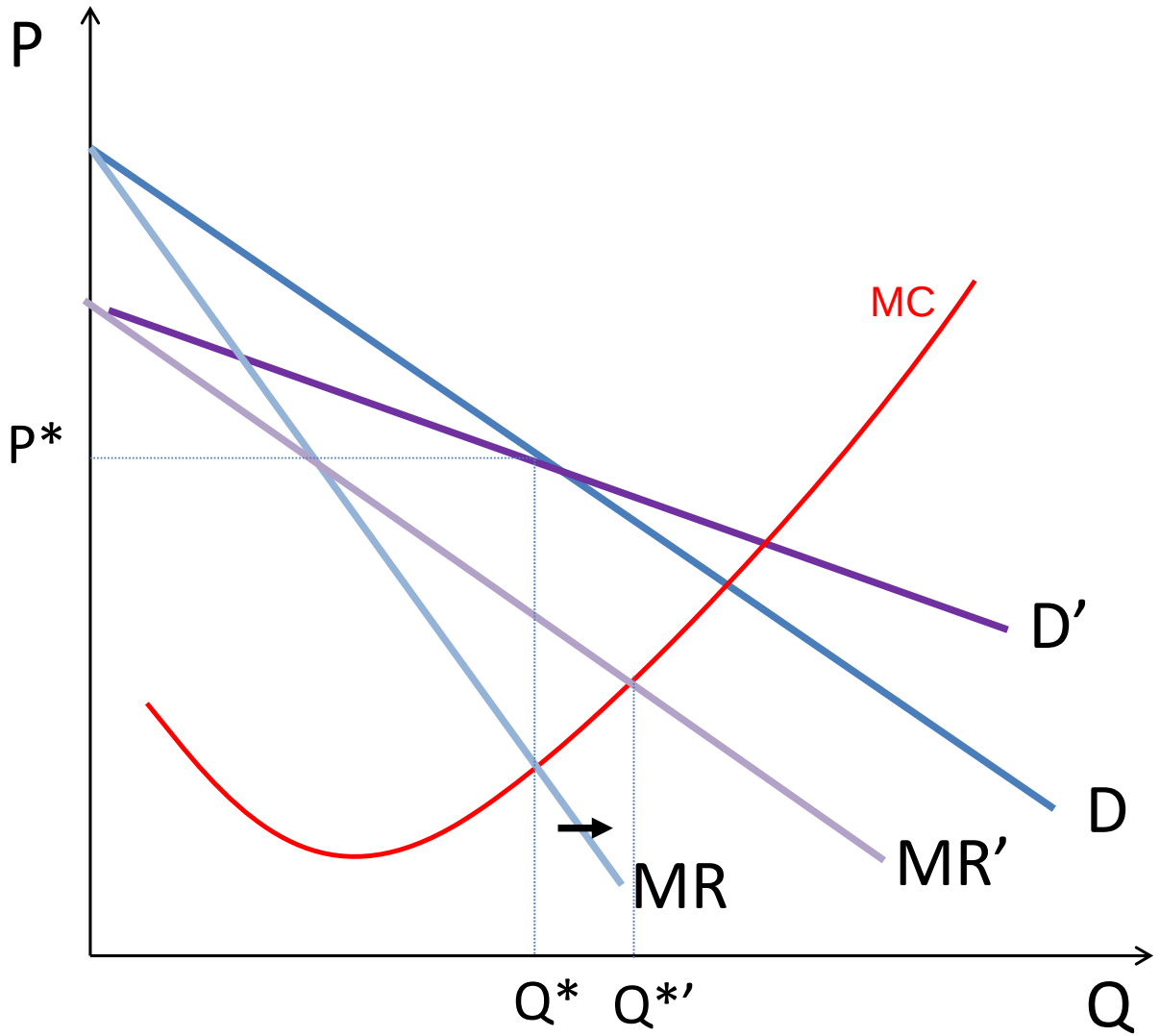
Rotation of the Demand Curve: Market Power

Where is the New Q?



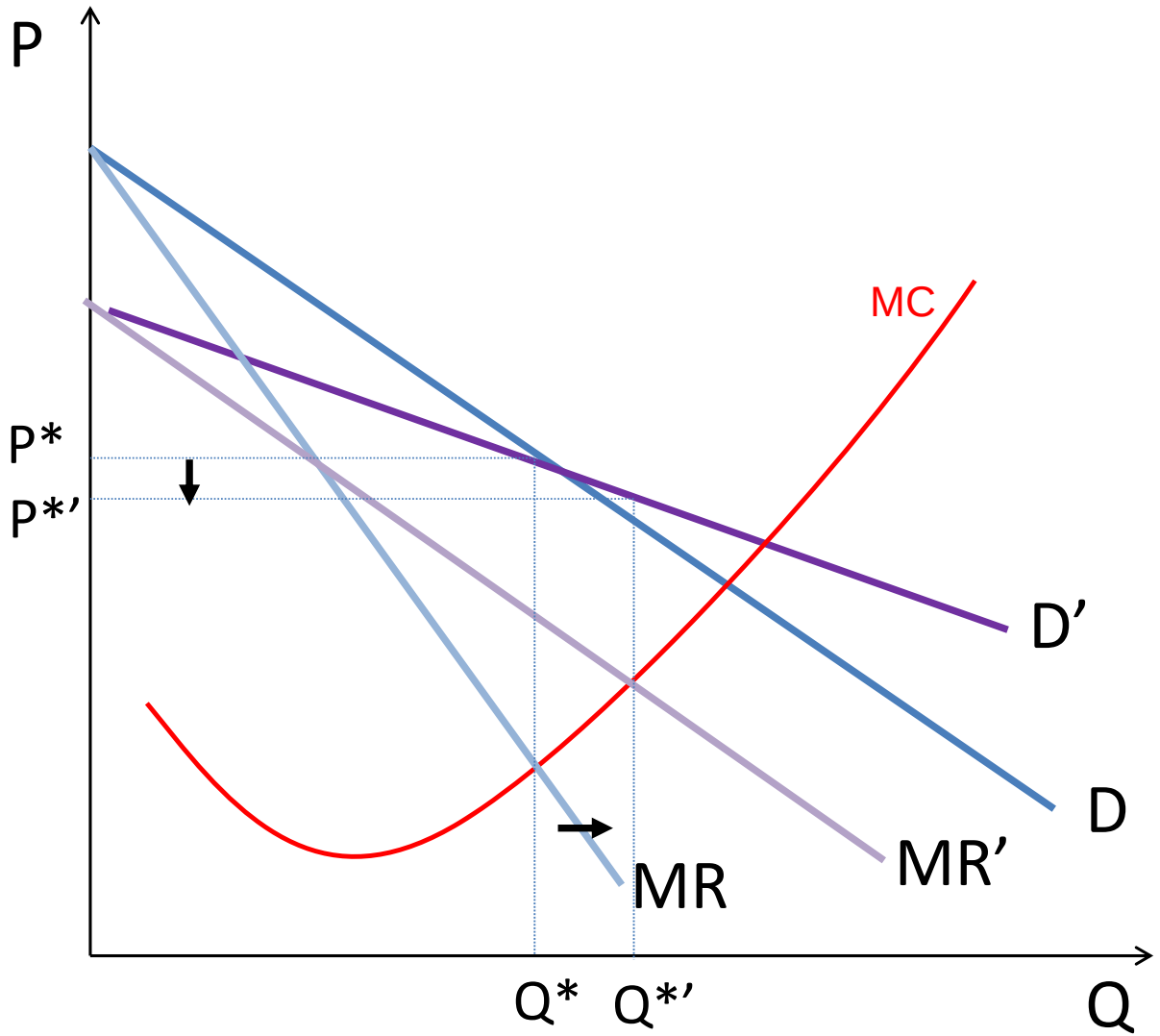
Rotation of the Demand Curve: Market Power

Where is the New P?



Rotation of the Demand Curve: Market Power

Q increases, P decreases



Try it Yourself: Roofer Market Power

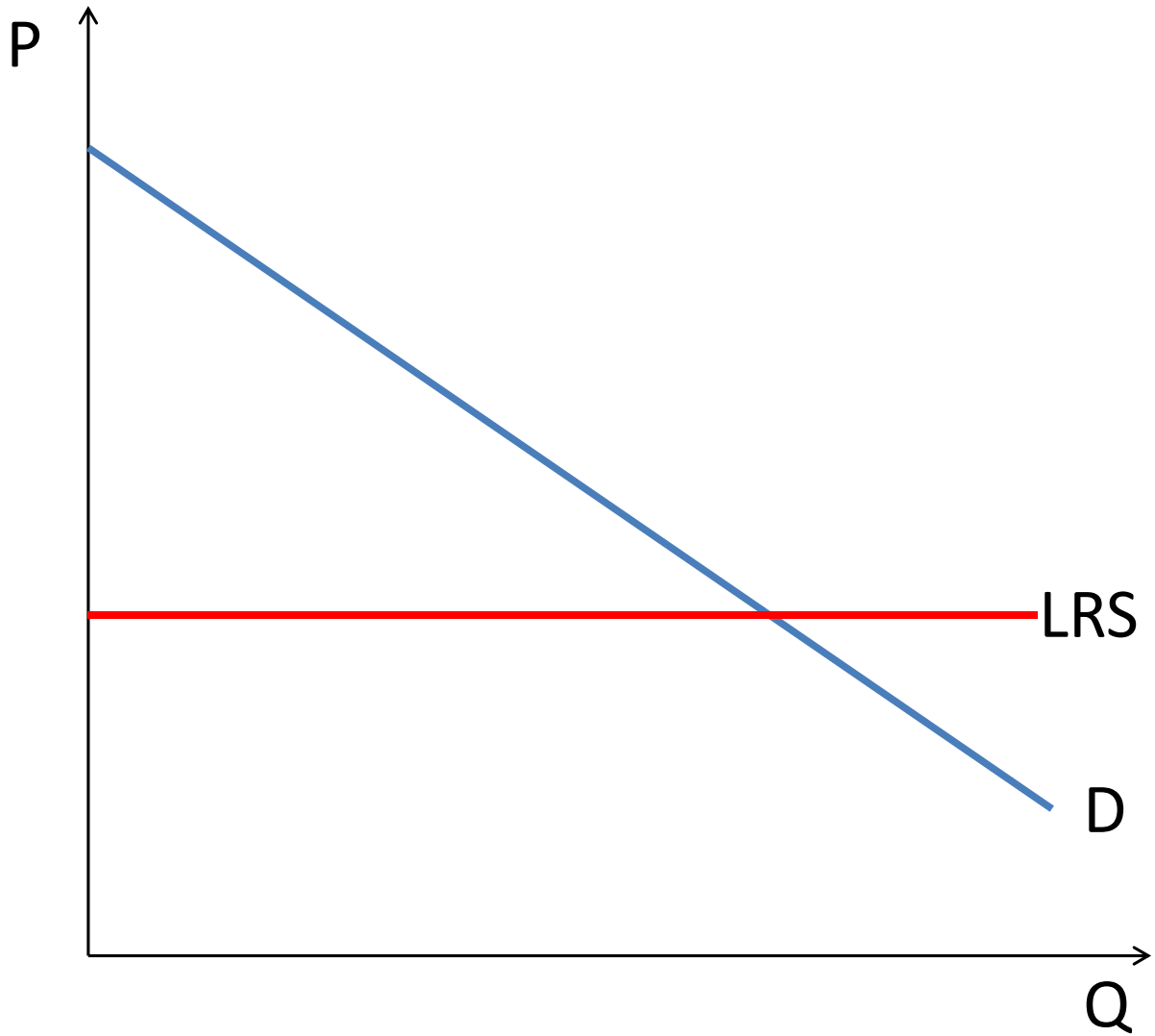
Suppose the local roofing company has market power and faces the demand curve $Q = 200 - P/10$, where Q is the number of roof jobs, and P is in dollars. The marginal cost for the firm is $MC = 200 + 16Q$.

1. What is marginal revenue?
2. What is the profit maximizing output?
3. Price?
4. If the firm's demand changes to $Q = 3500/3 - P/12$, what is the new marginal revenue?
5. Profit maximizing output?
6. Price?

Winners and Losers from Market Power

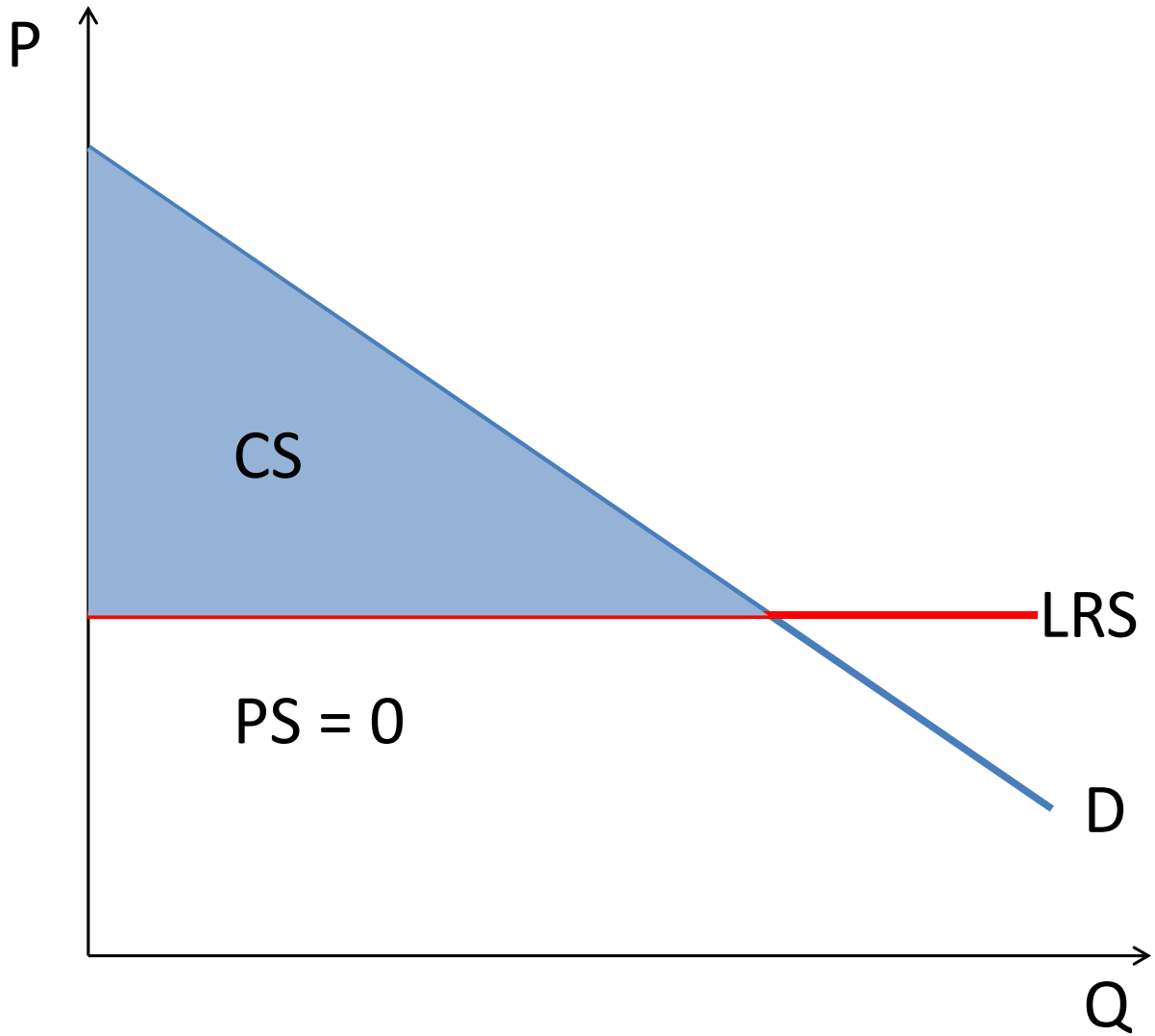
Producer and Consumer Surplus in Perfect Competition

Where are Consumer and Producer Surplus?



Producer and Consumer Surplus in Perfect Competition

It Stinks for Producers, and Is Good for Consumers



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In a perfectly competitive market

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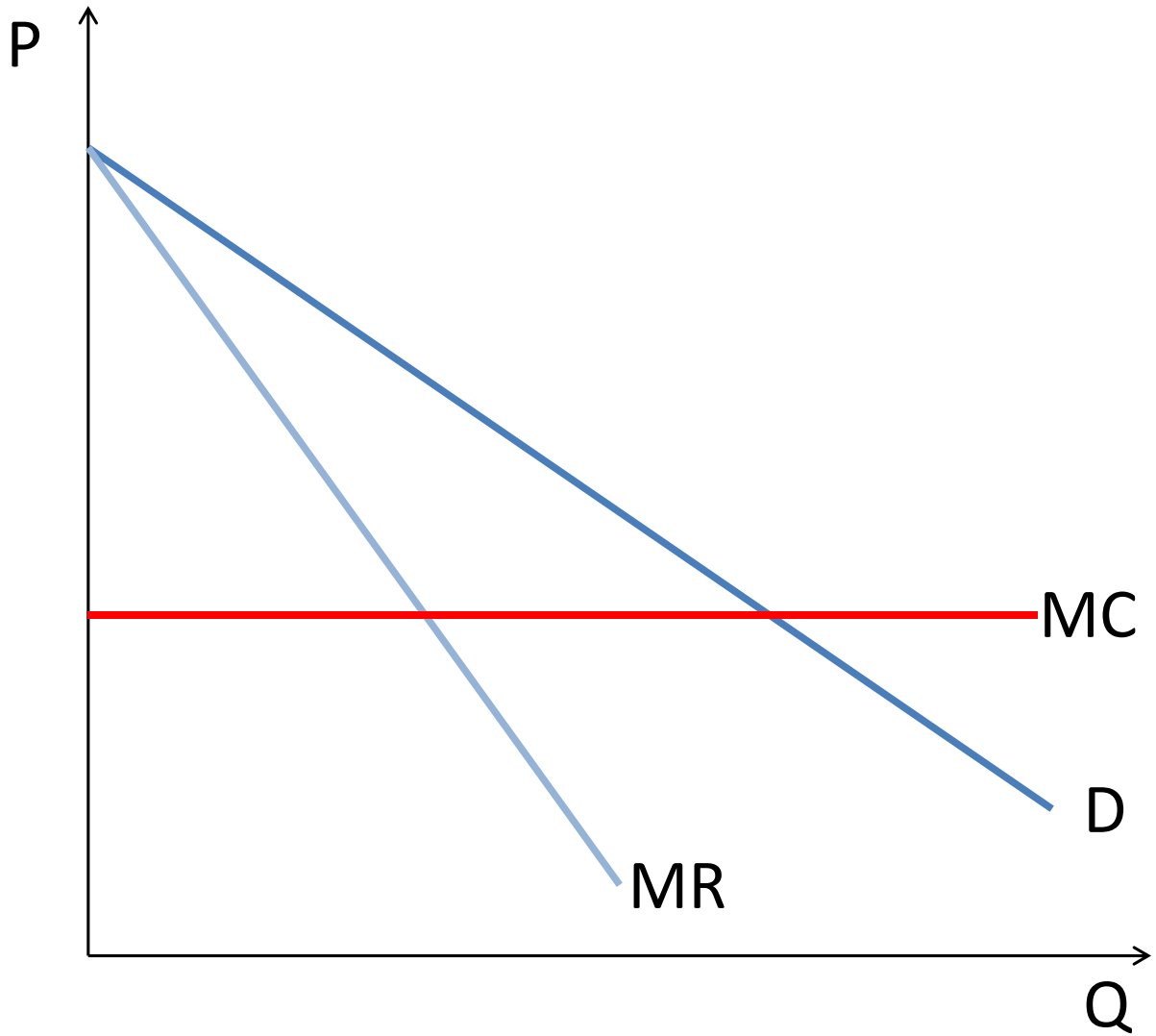
In a world with market power

- profit maximizing P and Q depend on demand
- to calculate producer surplus, rely on marginal cost curve
- this still tells us about the firm's ability to produce more cheaply than it sells

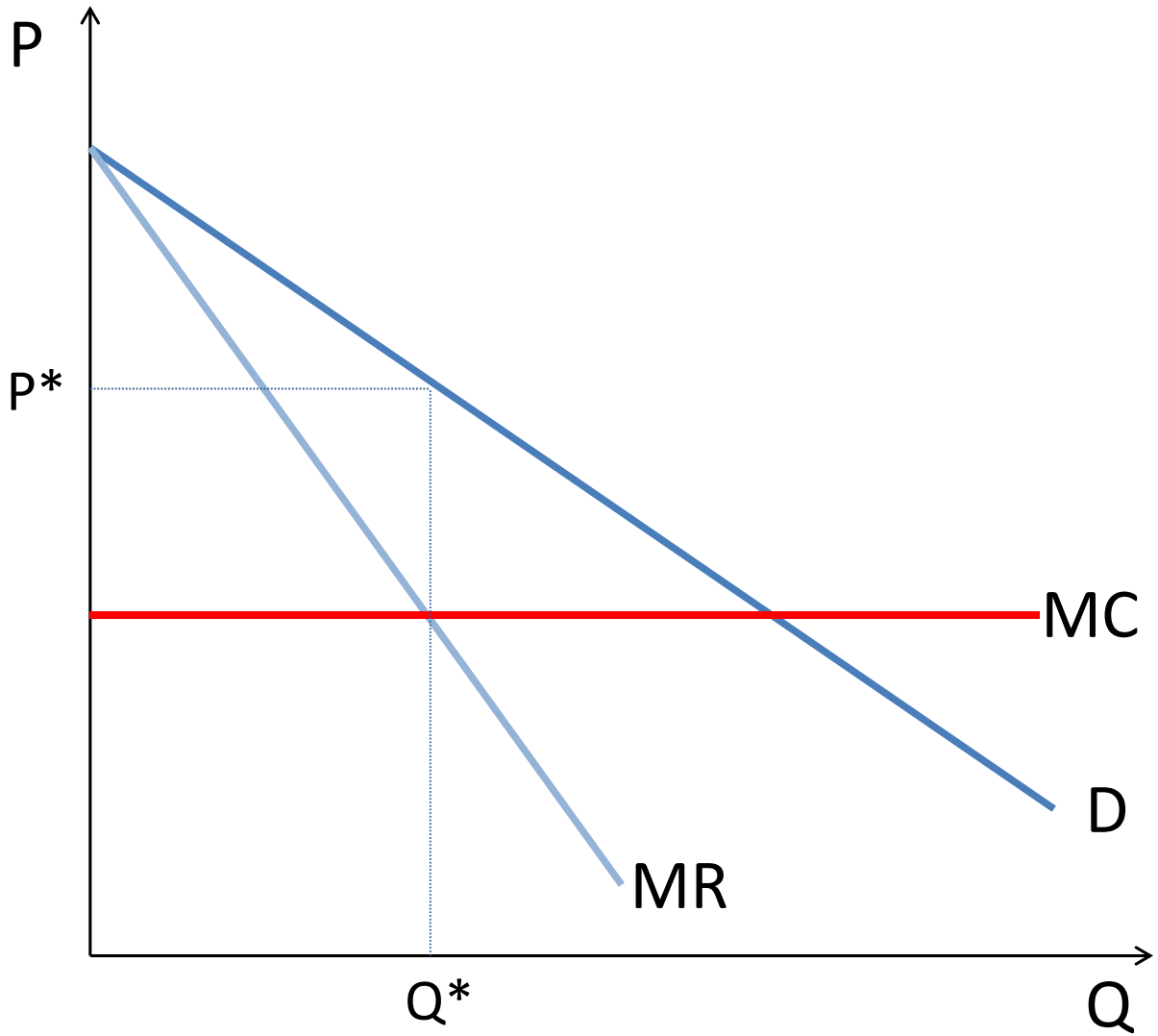
Producer and Consumer Surplus with Market Power

Where is the Profit Maximizing P and Q?



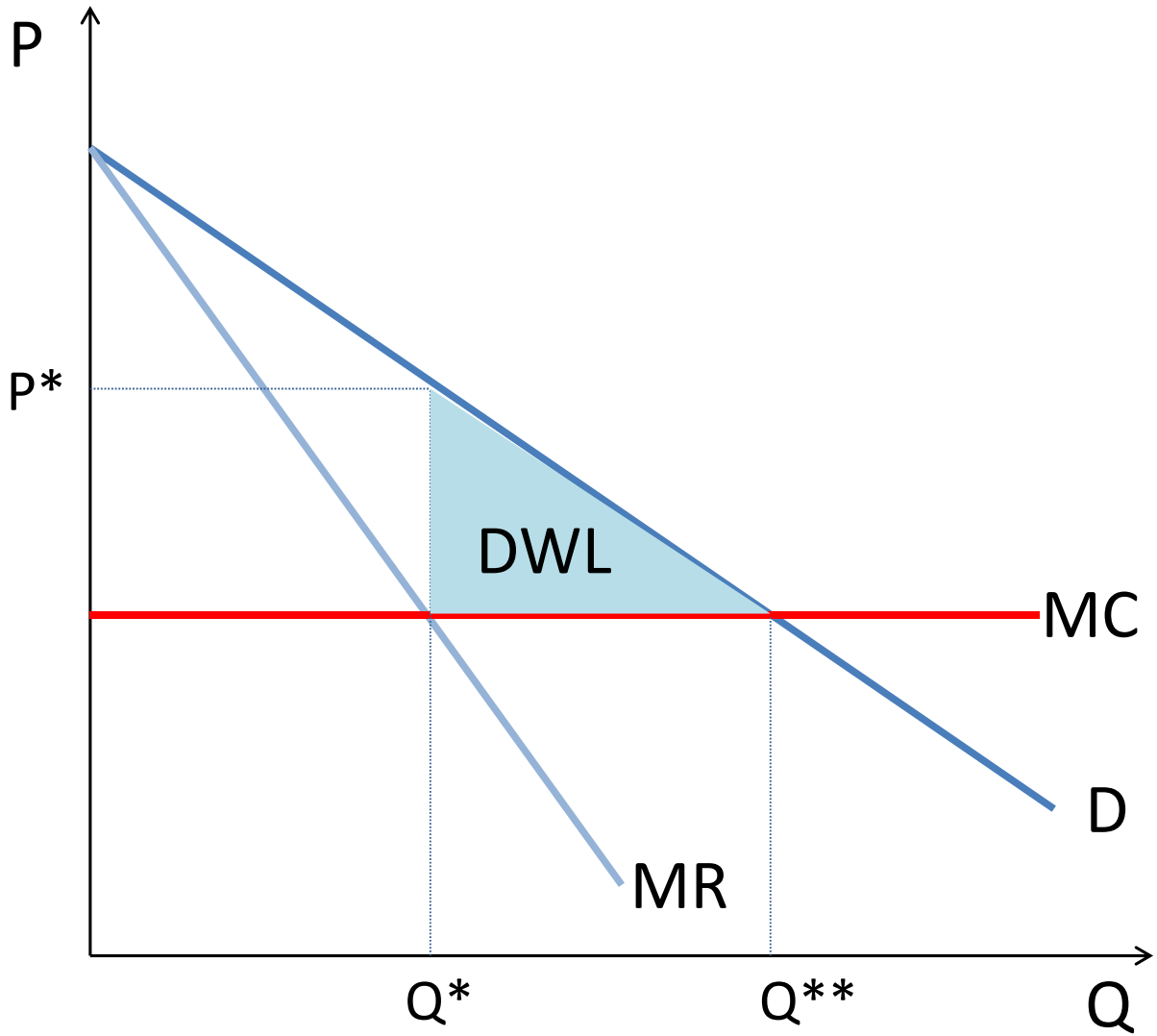
Producer and Consumer Surplus with Market Power

Where are the Trades that Don't Take Place?



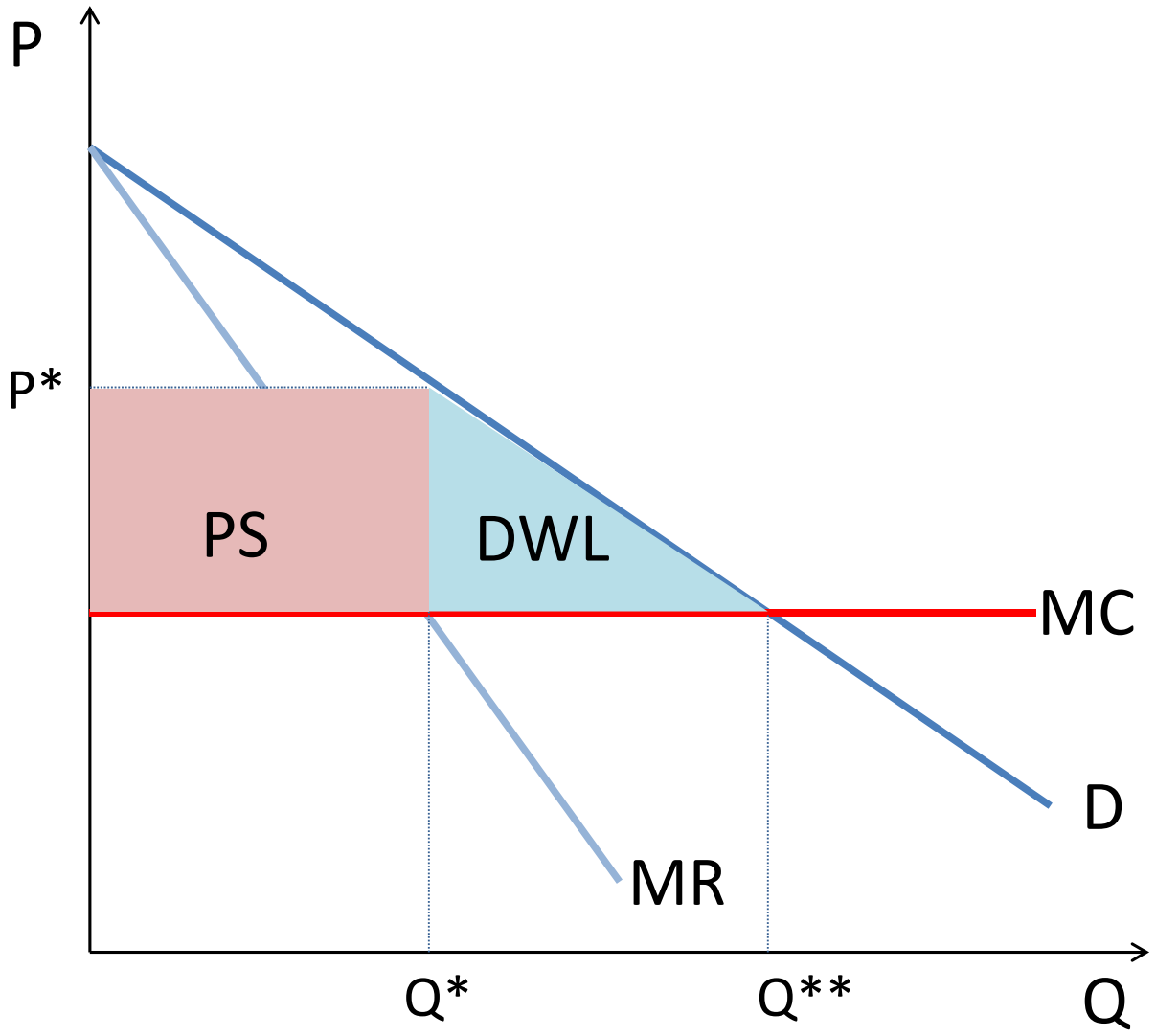
Producer and Consumer Surplus with Market Power

Where is *PS*?



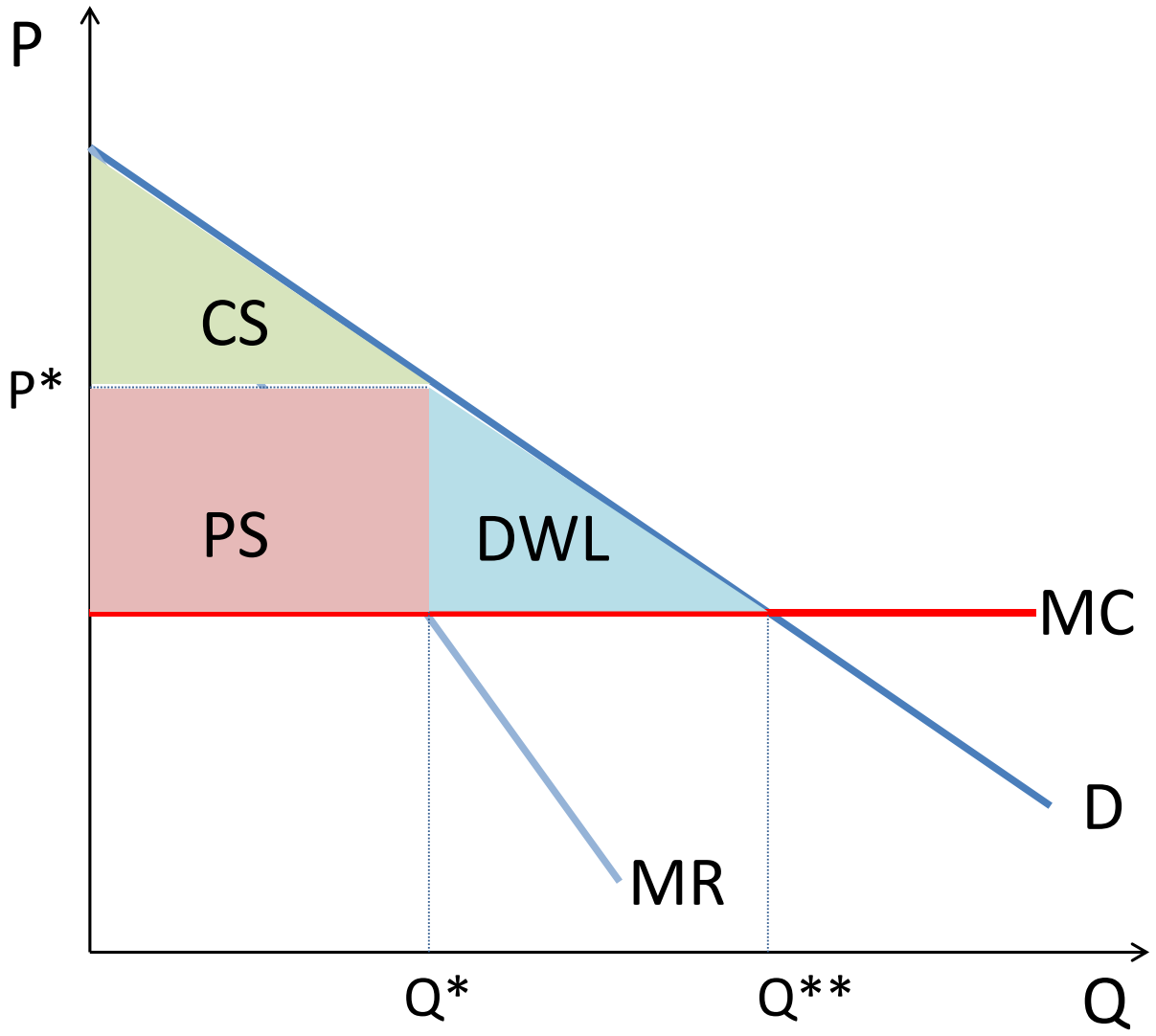
Producer and Consumer Surplus with Market Power

Where is *CS*?



Producer and Consumer Surplus with Market Power

Consumers Worse Off, Producers Better Off



Government's Role
In the Presence of Market Power

A Role for Government

Economists believe that may be a role for government to improve efficiency if the market is not perfectly competitive.

- Direct price regulation
- Antitrust
- Granting monopolies: patents and copyright

Direct Price Regulation for Natural Monopolies

- Recall that whether a firm is a natural monopoly depends on its cost structure
- *ATC* are always decreasing
- When technology changes, cost structure may change

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Direct Price Regulation for Natural Monopolies

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At different points in time, these industries are or have been natural monopolies:

- telephone service
- public transit
- electricity distribution
- water and sewer services

How to Set the Regulated Price?

- With a true natural monopoly, it's most efficient to have only one firm in the market
- But might charge monopoly price
- $\rightarrow$ government price regulation
- Government cannot set a price below ATC, even if this is the perfectly competitive price. Why?

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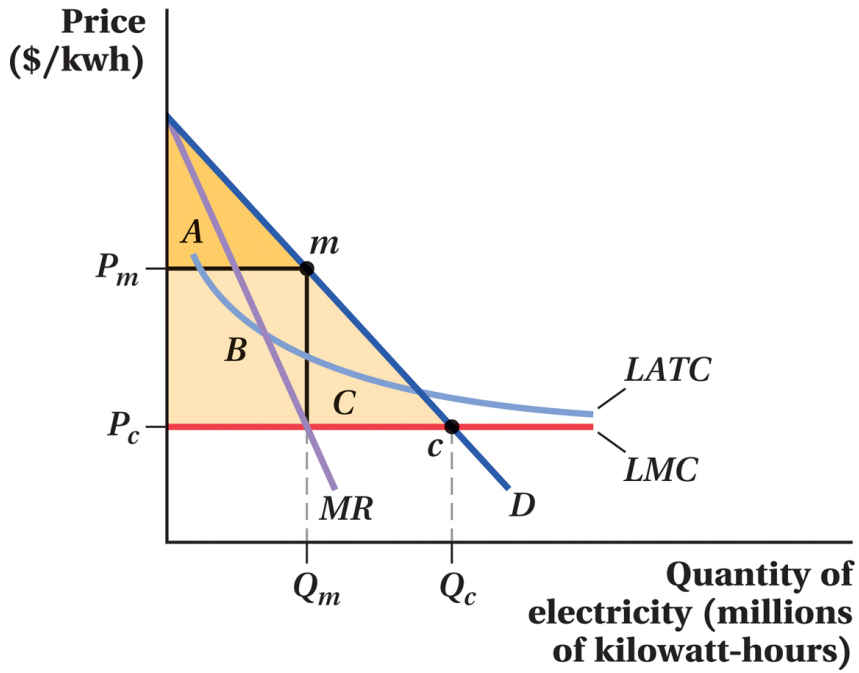

Recap of Today

- Market power
- Market power and marginal revenue
- Market power and profit maximization
- Reaction to market changes
- Welfare
- The role of government

Next Class

- Turn in Problem Set 10
- Public Goods and externalities
  - GLS Chapter 16, pages 643-665 (sections 16.1 and 16.2)
  - Reading packet
    - Gruber, Chapter 7, pages 184-189
    - Rosen and Gayer, Chapter 4, pages 54-70
  - Two podcasts, linked on webpage