Lecture 14: Externalities

December 2, 2025

Course Administration: Wrapping Up

- Final exam Tues. Dec. 16
  - 3 to 5, Cor 207 OR
  - 5:20 to 7:20 SEH 7040
- Can have a 3x5 card, both sides
- 2023 final posted
- Can review exam in person in spring if you want
- Review session Dec. 11, 6 to 7:30, MPA 305
- My remaining office hours
  - Dec 8, 15, regular times
  - Dec. 12, 11:30 to 1:30
- Ask Tanya if you need more
- Will post all grades to review on BB
- You'll have 48 hours to notify me of errors
- Evaluations
  - Do the school's!
  - Mine at the end of class
- Any questions?

Ripped from the Headlines

Afternoon

Finder	Presenter
Leo	Miguel
Hannah	Grace

Evening

Finder	Presenter
Mark	Iris

Today: Externalities

Monopoly leftovers

1. Response to market changes
2. Winner and losers
3. Government's role
4. Long run

Externalities

1. Defining externalities
2. Fixing externalities
3. Coase Theorem

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

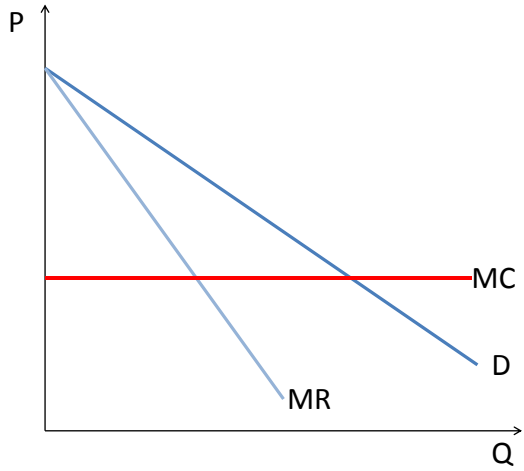
Competitive Market and an Increase in MC

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

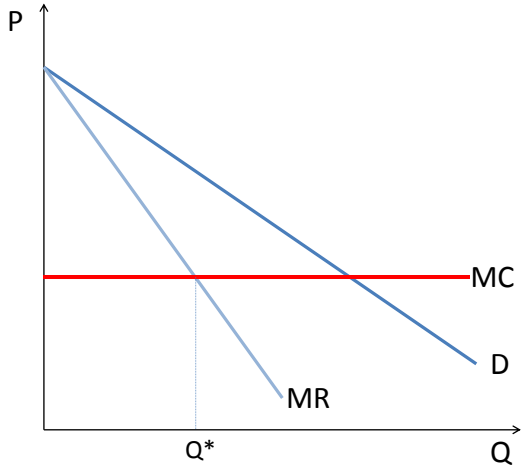
Market Power and an Increase in *MC*

Review: Where is profit maximizing *Q*?



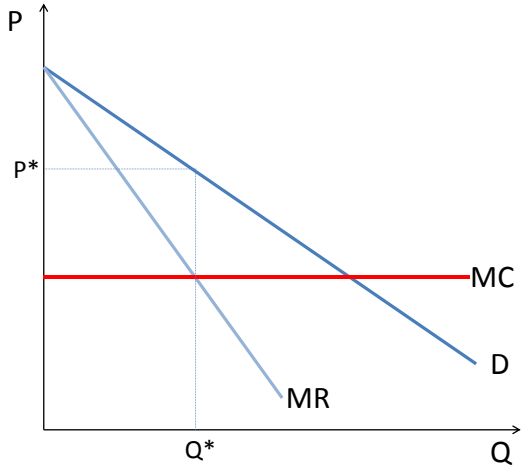
Market Power and an Increase in *MC*

Review: What is Profit Maximizing *P*?



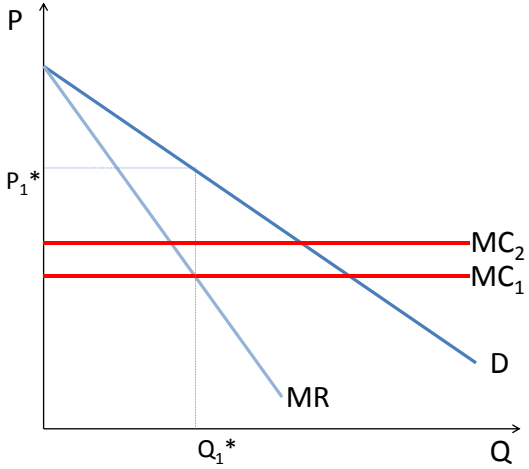
Market Power and an Increase in *MC*

Draw an Increase in *MC*?



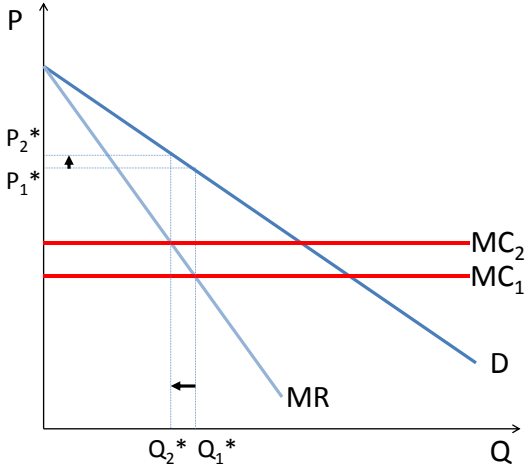
Market Power and an Increase in *MC*

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



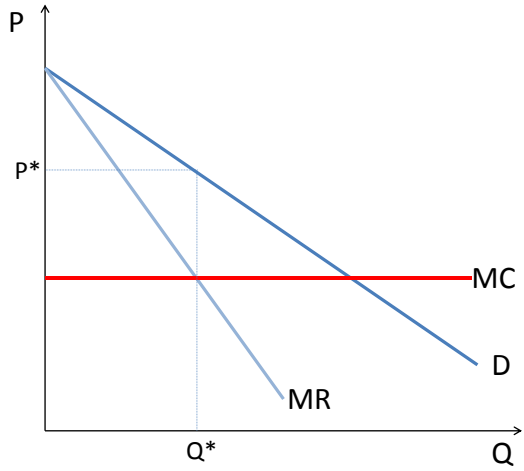
Market Power and an Increase in *MC*

Prices Increase, Quantity Falls



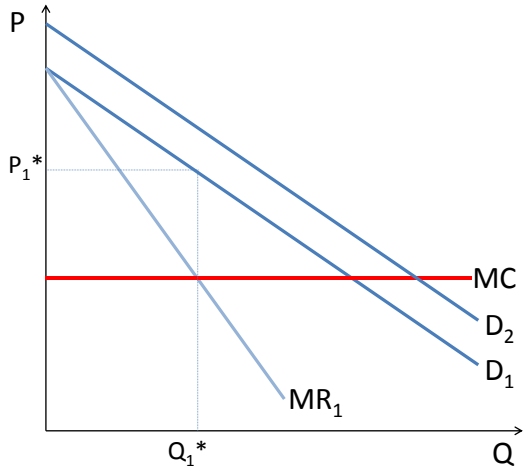
P and Q and Outward Shift in Demand

What Does an Increase in Demand Look Like?



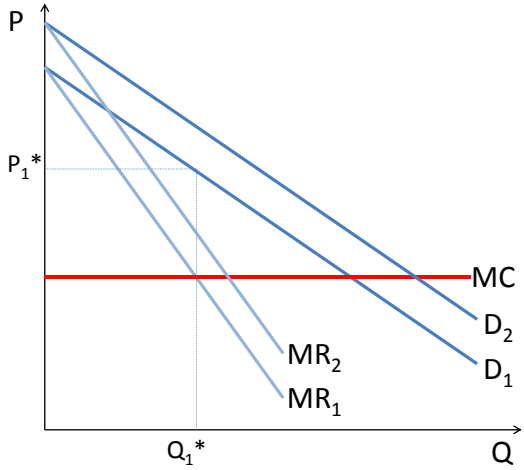
P and Q and Outward Shift in Demand

Where is the New MR?



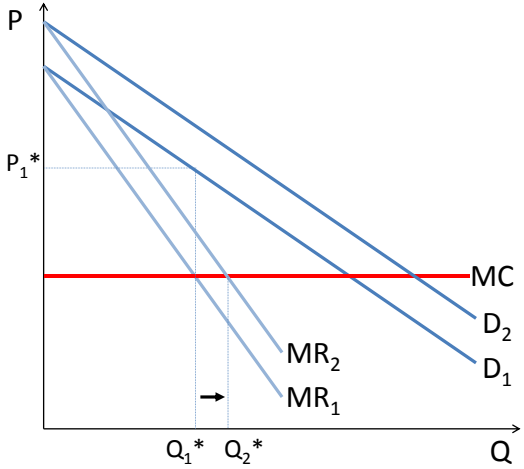
P and Q and Outward Shift in Demand

Where is the New Q?



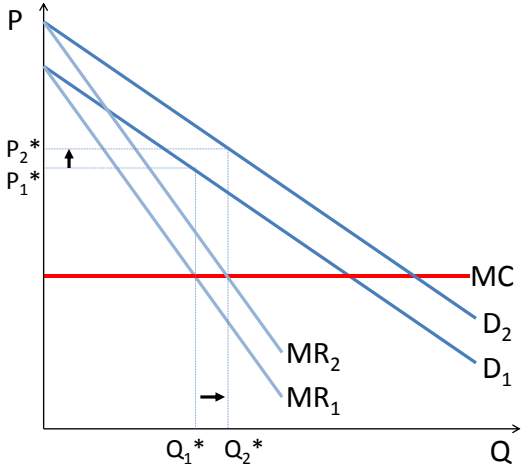
P and Q and Outward Shift in Demand

Where is the New P?



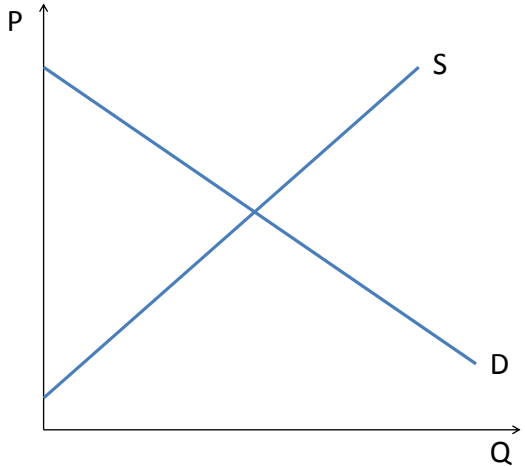
P and Q and Outward Shift in Demand

Q increases, P increases



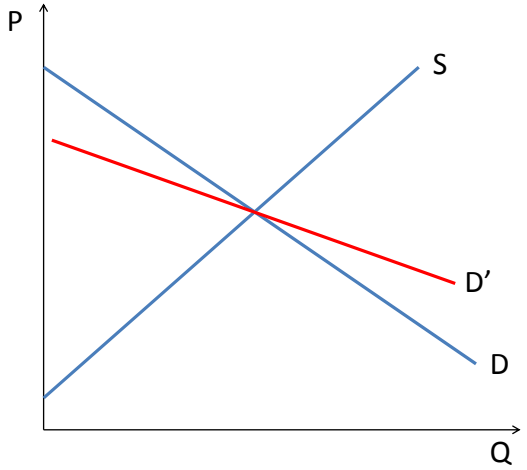
Rotation of the Demand Curve: Perfect Competition

With P Constant, Rotate Demand Curve



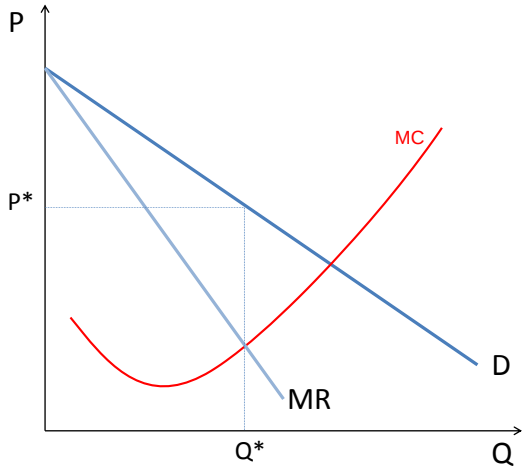
Rotation of the Demand Curve: Perfect Competition

No Response in P or Q



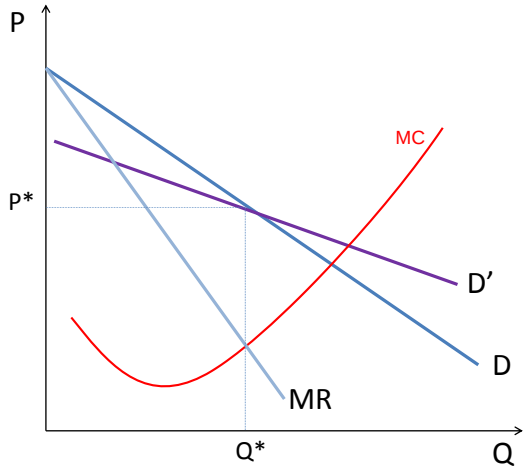
Rotation of the Demand Curve: Market Power

Rotate Demand Curve



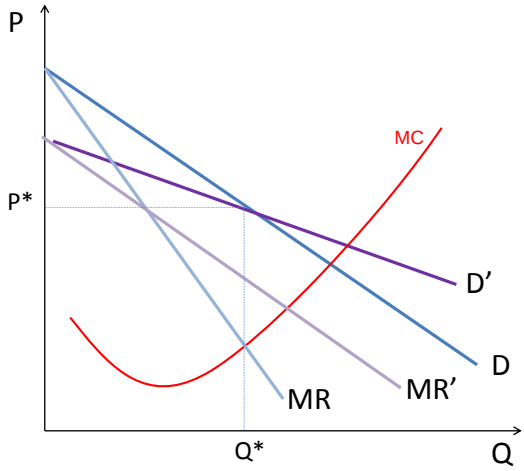
Rotation of the Demand Curve: Market Power

Where is New *MR*?



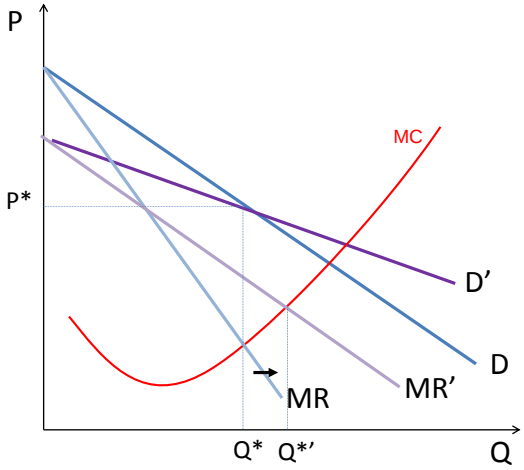
Rotation of the Demand Curve: Market Power

Where is the New Q?



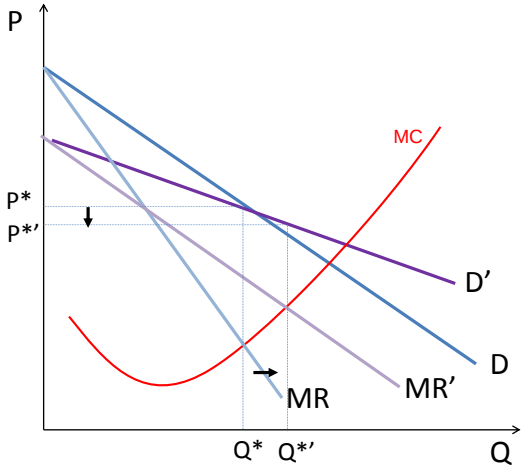
Rotation of the Demand Curve: Market Power

Where is the New P?



Rotation of the Demand Curve: Market Power

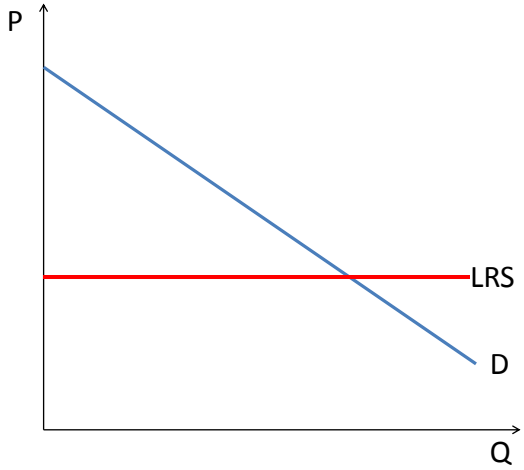
Q increases, *P* decreases



Winners and Losers from Market Power

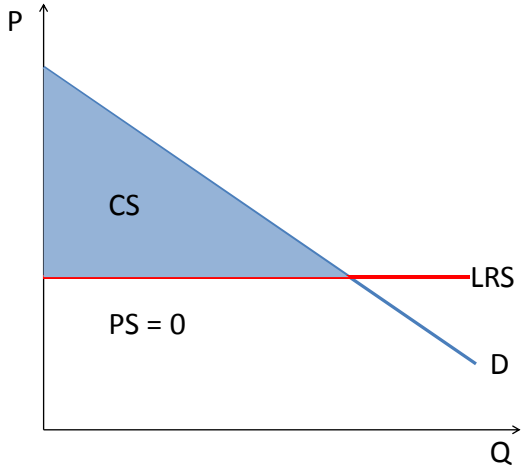
Producer and Consumer Surplus in Perfect Competition

Where are Consumer and Producer Surplus?



Producer and Consumer Surplus in Perfect Competition

It Stinks for Producers, and Is Good for Consumers



No Supply Curve for Firms with Market Power

In a perfectly competitive market

- supply exists independently of demand
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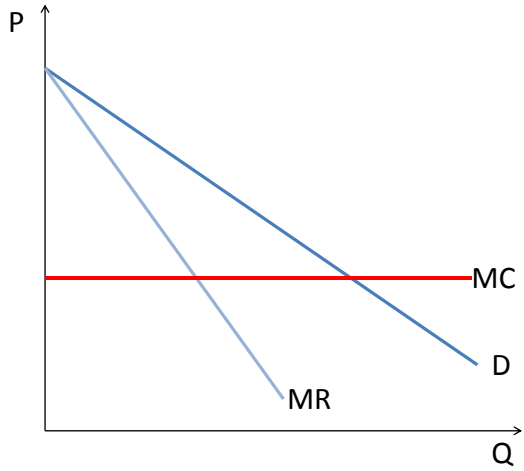
In a world with market power

- 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

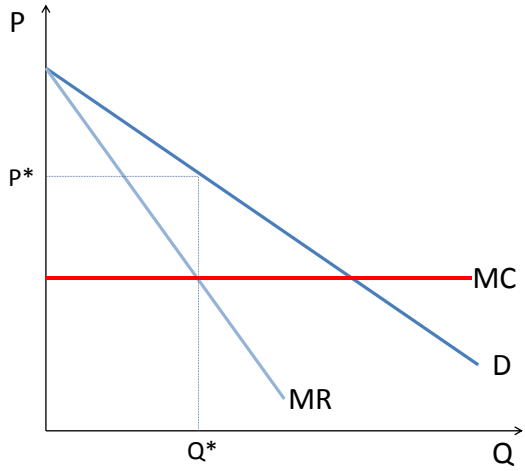
Producer and Consumer Surplus with Market Power

Where is the Profit Maximizing P and Q?



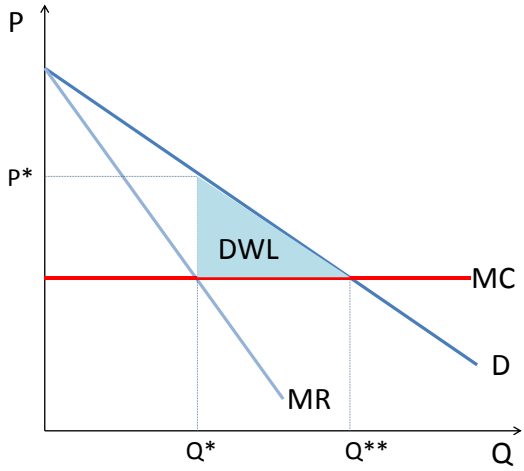
Producer and Consumer Surplus with Market Power

Where are the Trades that Don't Take Place?



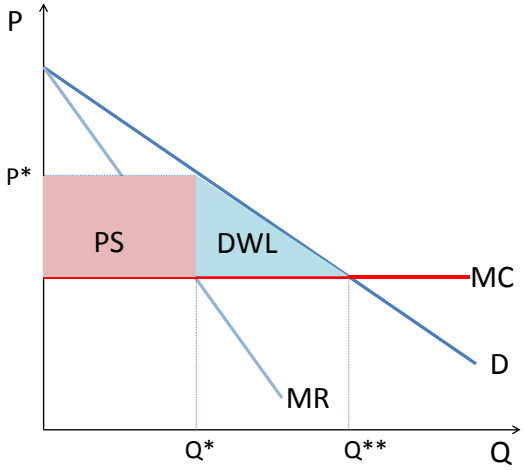
Producer and Consumer Surplus with Market Power

Where is *PS*?



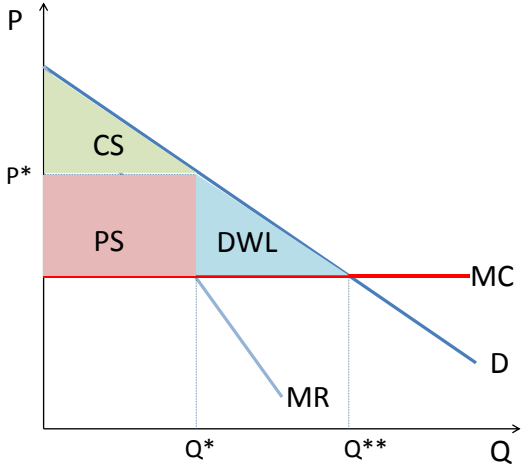
Producer and Consumer Surplus with Market Power

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

Monopolies in the Long Run

But Monopolies Never Last Forever: Diamonds

- Two DeBeers brothers find diamonds on their South African farm in 1860s
- Cecil Rhodes, colonizer extraodinaire, purchases almost all diamond mines in South Africa
- "Rhodes was concerned about the break-up of the new monopoly, stating to shareholders in 1896 that the company's 'only risk is the sudden discovery of new mines, which human nature will work recklessly to the detriment of us all'."
- This happened in the early 1900s and this new mine outstrips DeBeers production
- What can they do?

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All quotes from DeBeers Wikipedia page.

The End of the Diamond Monopoly Era

- For most of the 20th century, De Beers keeps a close handle on supply through limitations on sales
- It also
  - buys competitors, or
  - stockpiles diamonds and then sells products similar to competitor products when they exist
- Market share of 90 percent in 1980s
- Market share of 30 percent by 2019
- What happened?

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- Market share of 90 percent in 1980s
- Market share of 30 percent by 2019
- What happened? Competition by
  - American and Canadian producers
  - other gems, via "blood diamonds"
  - synthetic diamonds

1. Defining Externalities

Externality Definition

Externality $\equiv$ cost or benefit accruing to party not involved in economic transaction

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Who are the parties in an economic transaction?

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- Positive externality $\equiv$ benefit accruing to party not involved in economic transaction
- Negative externality $\equiv$ cost accruing to party not involved in economic transaction

Externality Examples

Positive externality: benefit accruing to party not involved in economic transaction

Negative externality: cost accruing to party not involved in economic transaction

Examples, please! Example requires

- transaction
- parties to transaction
- external party helped or harmed
- how helped or harmed

In a World Without Externalities

Demand measures private marginal benefit

- equal to social marginal benefit

In a World Without Externalities

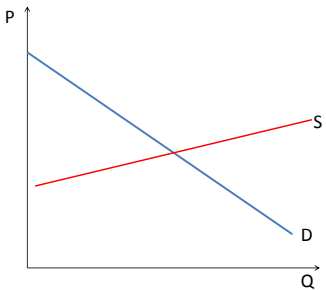
Demand measures private marginal benefit

- equal to social marginal benefit

Supply measures private marginal cost

- equal to social marginal cost

In a Market Without Externalities



- **If** private demand = private marginal benefit = social marginal benefit
- **And** Private supply = private marginal cost = social marginal cost
- **Then** market equilibrium maximizes social welfare, which is total surplus
- Provides goods to consumer at lowest possible cost

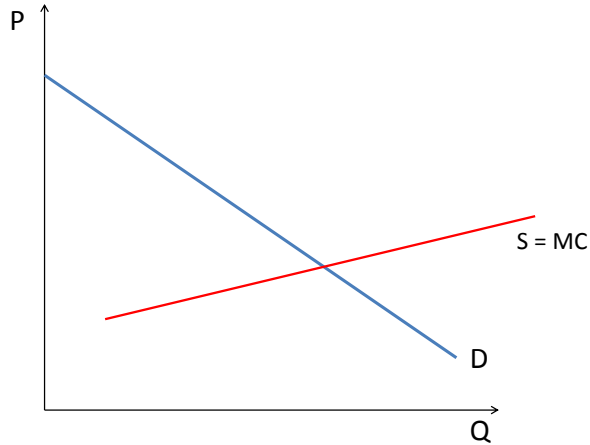
In a Market With Externalities

Assume a negative externality

- $\Longrightarrow$ Social marginal cost $\neq$ private marginal cost
- $\Longrightarrow$ Social marginal cost $=$ private marginal cost $+$ external marginal cost

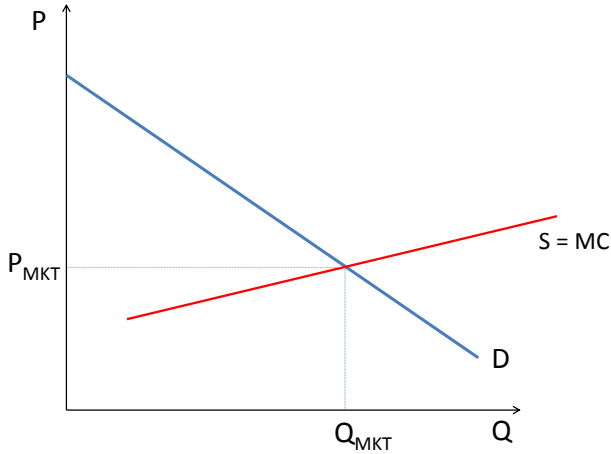
What Does a Negative Externality Do to Market Supply?

Where Are the Private Market P and Q?



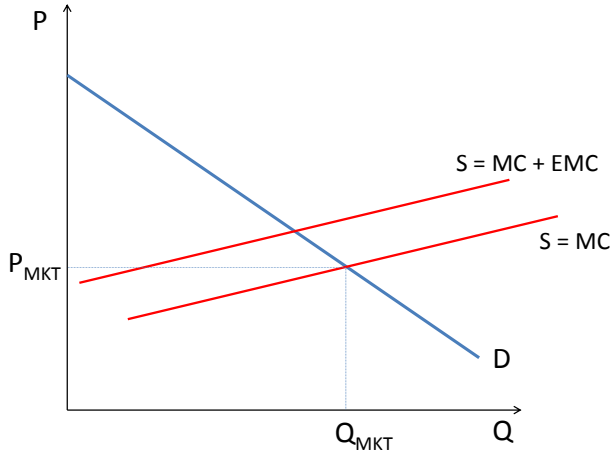
What Does a Negative Externality Do to Market Supply?

Where is the Social Marginal Cost?



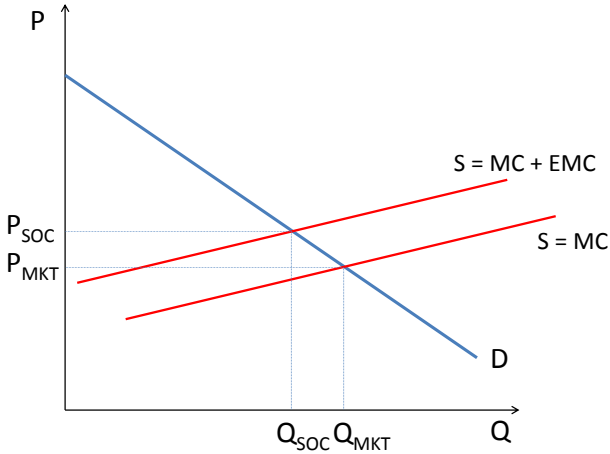
What Does a Negative Externality Do to Market Supply?

What are the Socially Optimal P and Q?



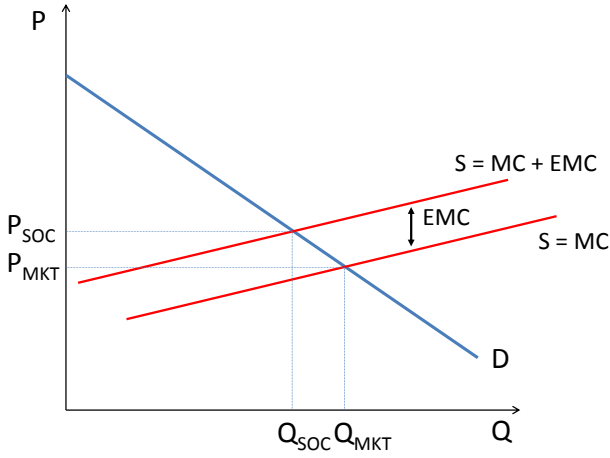
What Does a Negative Externality Do to Market Supply?

What is the Vertical Distance Between the Supply Curves?



What Does a Negative Externality Do to Market Supply?

Where is the Deadweight Loss?



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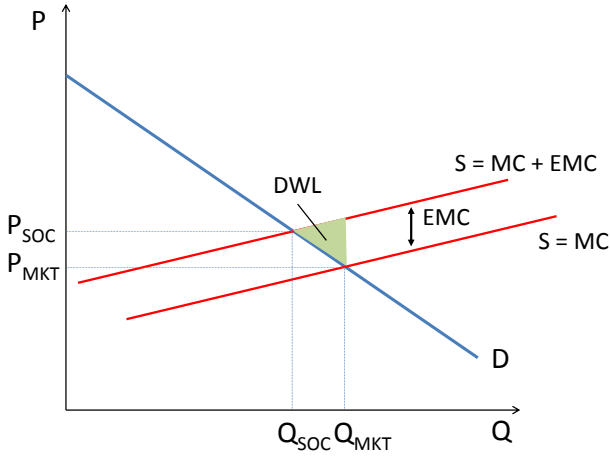
Too Much Production, at Too Low a Price



In a Market With Externalities

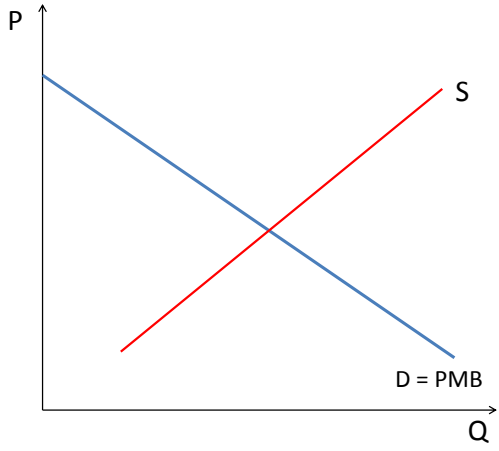
Assume a positive externality

- $\Longrightarrow$ Social marginal benefit $\neq$ private marginal benefit
- $\Longrightarrow$ Social marginal benefit = private marginal benefit + external marginal benefit

What does this mean for the relationship between market equilibrium P_{MKT} and Q_{MKT} and socially optimal P_{SOC} and Q_{SOC}?

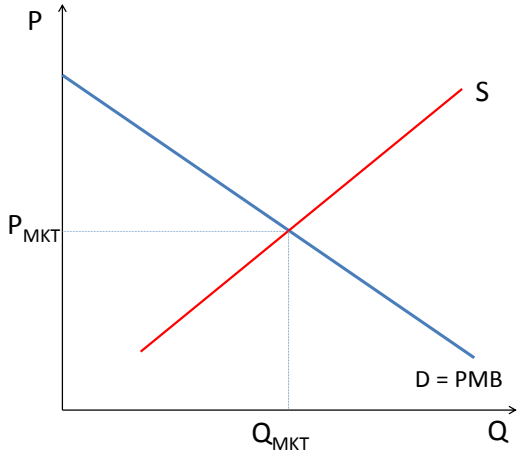
Positive Externalities

Where Are Market Equilibrium P and Q?



Positive Externalities

Where is the Social Marginal Benefit Curve?



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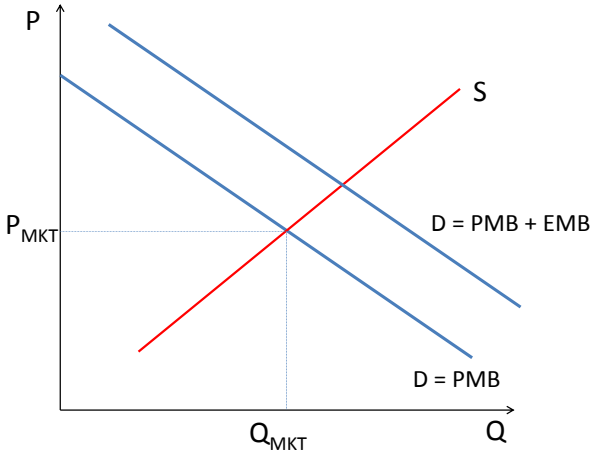
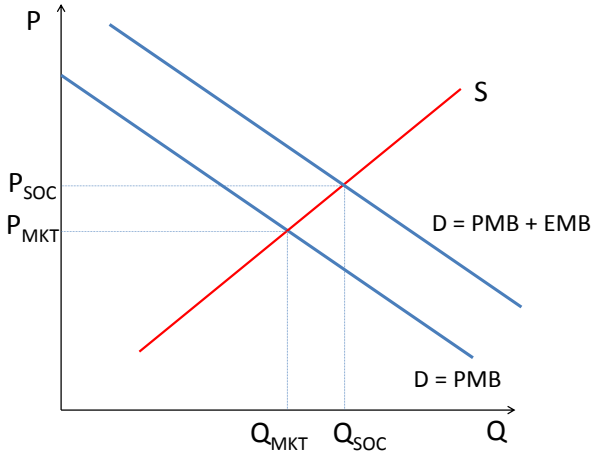


Positive Externalities

What is the Vertical Difference Between the Demand Curves?



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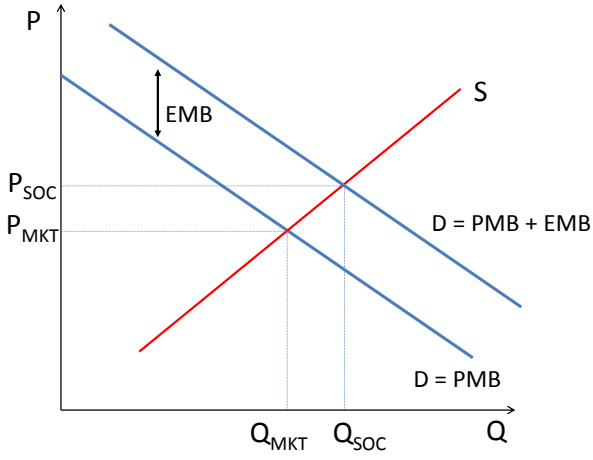
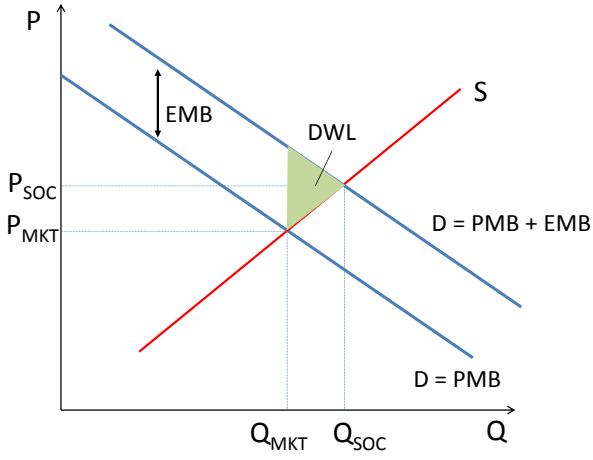


Positive Externalities

Too Little Production, at Too High a Price



Bottom Line

- Externalities cause a "market failure"
- This is defined as when market doesn't produce the efficient outcome

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- Externalities cause a "market failure"
- This is defined as when market doesn't produce the efficient outcome
- What can we do?

2. Fixing Externalities

Before Fix, Note that Optimal Level of Negative Externality is Not Zero

- What is the optimal level of pollution?
  - Where costs of pollution equal benefits of pollution

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  - Where costs of pollution equal benefits of pollution
- What are benefits of pollution?
  - Ex: Air bags. Production is dirty, application saves lives
  - Ex: AirPods. Production and consumption use plastic, allow solo enjoyment

Getting to the Socially Optimal P and Q

Two methods

1. Change prices
2. Change quantities
3. A mix of the two: Tradeable permits

1. Using Taxes and Subsidies to Return to the Efficient Point

- Suppose we know the external marginal cost
- Charge a tax equal to the external marginal cost
- This returns us to the socially optimal equilibrium outcome
- Called a Pigouvian tax
- Requires that you (the policymaker) know the cost exactly
- Can redistribute tax revenues to those harmed by policy

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Policy relevant? See Citizens' Climate Lobby's proposal for a carbon fee.

To Be Clear

Before tax

- private marginal cost $= MC$
- social marginal cost $= MC + EMC$

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- private marginal cost $= MC$
- social marginal cost $= MC + EMC$

After tax, $T = EMC$

- private marginal cost $= MC + T$
- social marginal cost $= MC + EMC$

To Be Clear

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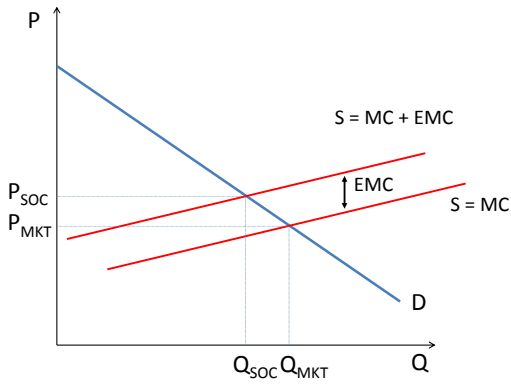
After tax, $T = EMC$

- private marginal cost $= MC + T$
- social marginal cost $= MC + EMC$

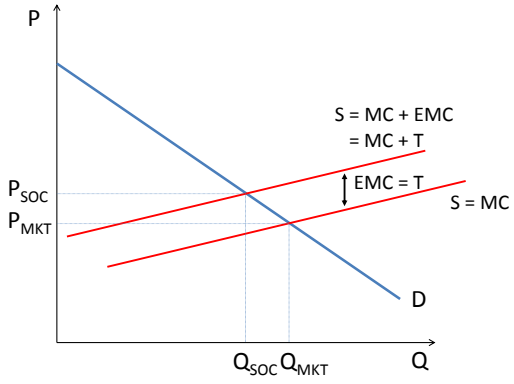
- Note that these all express $P = f(Q)$
- To find social marginal cost, add $P_{\text{social}} = P_{\text{private}} + EMC$

Correcting for a Negative Externality



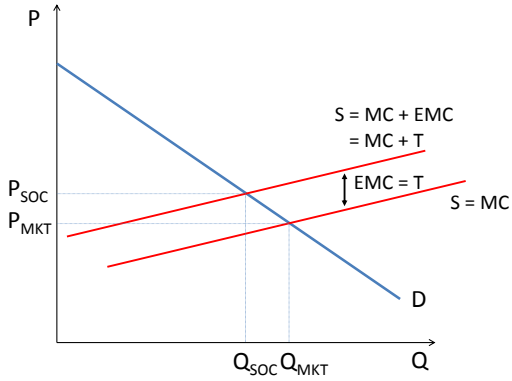
Before tax:
private supply (MC) $\neq$
social supply ($MC + EMC$)

Correcting for a Negative Externality



Before tax:
private supply $(MC) \neq$ social supply $(MC + EMC)$
After tax:
private supply $(MC + T) =$ social supply $(MC + EMC)$

Correcting for a Negative Externality



Before tax:

private supply $(MC) \neq$ social supply $(MC + EMC)$

After tax:

private supply $(MC + T) =$ social supply $(MC + EMC)$

What happens to the deadweight loss?

With Positive Externalities: Subsidy

Before subsidy (negative tax)

- private marginal benefit $= MB$
- social marginal benefit $= MB + EMB$

With Positive Externalities: Subsidy

Before subsidy (negative tax)

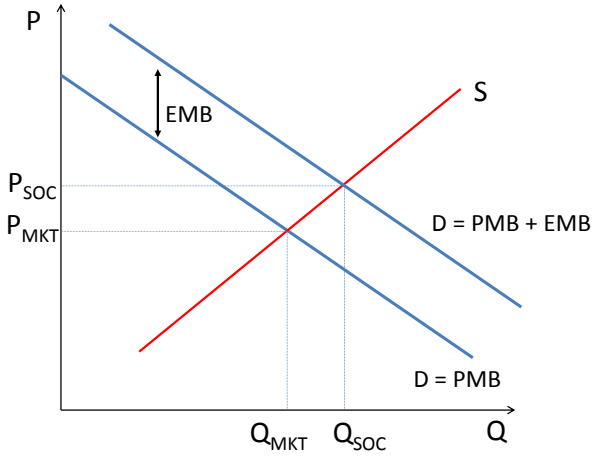
- private marginal benefit $= MB$
- social marginal benefit $= MB + EMB$

After subsidy, $T = EMB$

- private marginal benefit $= MB + T$
- social marginal benefit $= MB + EMB$

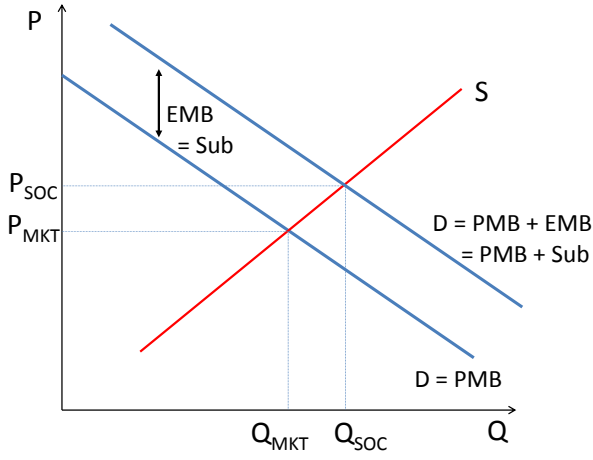
Correcting for a Positive Externality

Private and Social Demand Before a Subsidy



Correcting for a Positive Externality

After the Subsidy, Private Demand = Social Demand



Try It Yourself: Negative Externalities

Suppose that leather is sold in a perfectly competitive industry. The industry short-run supply curve (marginal cost curve) is $P = MC = 3Q$, where Q is measured in millions of hides per year. The demand for leather hides is given by $Q = 60/7 - P/7$.

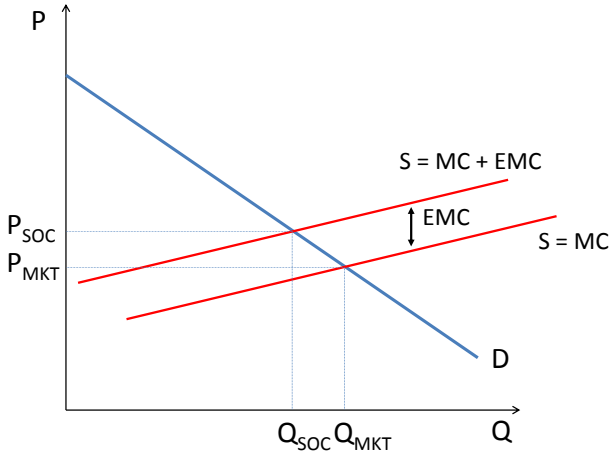
1. Find the equilibrium market price and quantity.
2. Suppose that the leather tanning releases bad stuff into waterways. The external marginal cost is \$4/hide. Calculate the socially optimal level of output and price for the tanning industry.
3. What tax should you charge to the socially optimal equilibrium?

Leather Production and Negative Externalities

1. Need to set supply = demand. Note that for demand, $P = 60 - 7Q$. Let supply = demand, $3Q = 60 - 7Q$, or $10Q = 60$, or $Q = 6$, and $P = 3(6) = 18$.
2. $SMC = MC + EMC = 3Q + 4$. Set supply = demand, or $3Q + 4 = 60 - 7Q$, or $Q = 5.6$. Then $P = 3(5.6) + 4 = 20.80$.
3. Set Pigouvian tax equal to external marginal cost

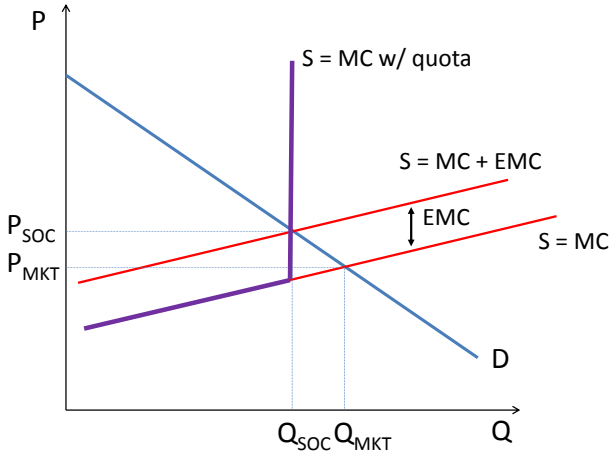
2. Using a Quota to Get to Efficient Point

Private and Social Supply Before a Quota



2. Using a Quota to Get to Efficient Point

With a Quota



What Could Go Wrong with Quotas?

What Could Go Wrong with Quotas?

1. May be hard to know optimal market output level
2. Tricky to assign by firm
   - Even if optimal market output is known, policy must assign quotas by firm
   - To assign quotas by cost of reduction, you need to know firm-specific costs
3. All costs and benefits are borne by market participants; no tax revenues to redistribute

Recap of Today: Externalities

1. Defining
2. Fixing
3. Coase Theorem

Now please do my evaluation!

Thank you