Lecture 1: Supply and Demand

September 1, 2015

Overview

Course Administration

1. Expectations

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   - Call me Leah
   - Class should be hard, but not impossible
   - What we learn should be clearly applicable
   - Come prepared to give examples, as I will call on you
   - Understand that no class can satisfy all students
2. Review Syllabus

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4. Ripped from Headlines Sign-up

Chapters 1 and 2

1. Why Economics?
2. Supply and Demand
   - Markets and Models
   - Demand
   - Supply
   - Market Equilibrium
   - Some elasticity, more in class on elasticity (9/22)

Why Economics?

- An important language for policy makers
- A shared set of assumptions about how the world works
- Understand the assumptions and logic if you want to challenge it
- Learn the power of models

What is a Market?

A set of many things

- type of product sold
- location
- point in time

Markets Policy Aside: Antitrust

- Federal anti-trust policy prohibits monopolies and "excessive" market concentration
- Whether or not a market is concentrated depends on how you define the market
- Expedia / Orbitz propsed merger
  - Expedia owns Travelocity, wants to buy Orbitz
  - Hotel owners say market is online bookings, and merger would give new company 75% of all online bookings
  - Expedia says market is hotel reservations, and merged company will account for 17% of hotel bookings[1]

[1] Full story here and a different interesting example here.

Key Assumptions of Supply and Demand Model

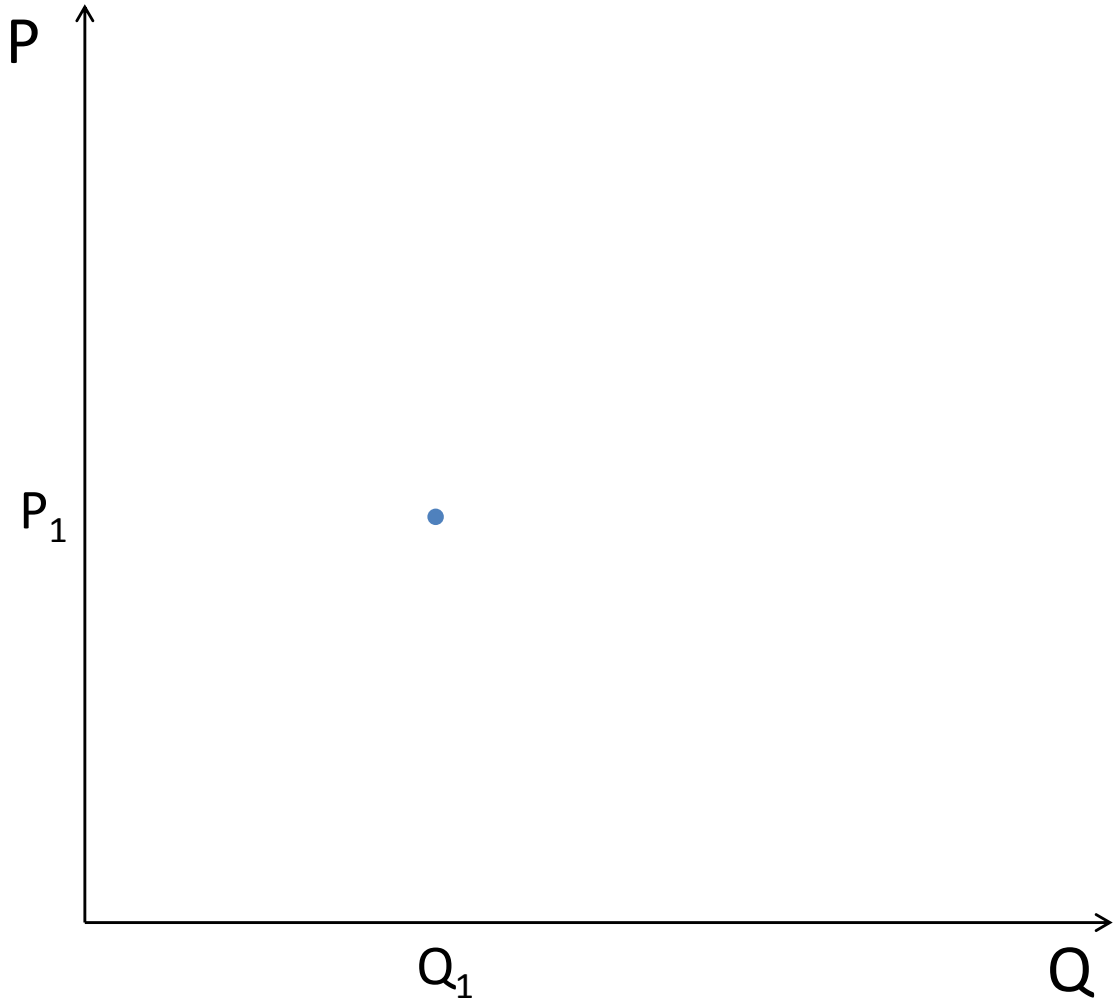
1. We restrict our focus to one single market
   Supply $\equiv$ total amount of a good that all producers are willing to sell
   Demand $\equiv$ total amount of a good that all consumers are willing to buy
2. All goods bought and sold in the market are identical
3. All goods sold in the market sell for the same prices and everyone has the same information about prices and quality
4. There are many buyers and sellers in the market

Demand Curves

We want a way to summarize everyone's demand in the market

- Demand curve $\equiv$ relationship between the quantity of a good demanded and the price consumers are willing to pay, holding all else constant
- Demand curves almost always slope downward

Picturing Demand for a Product You Know



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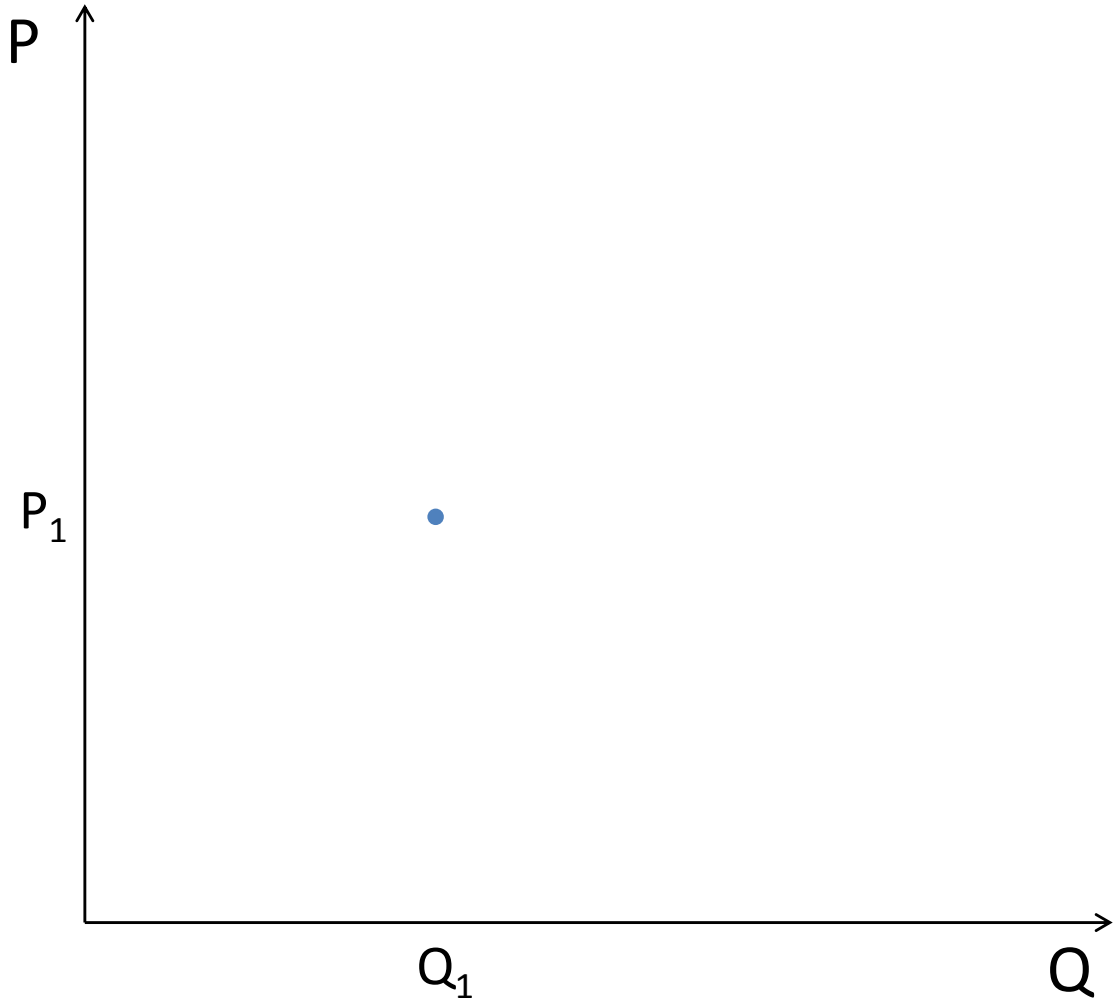
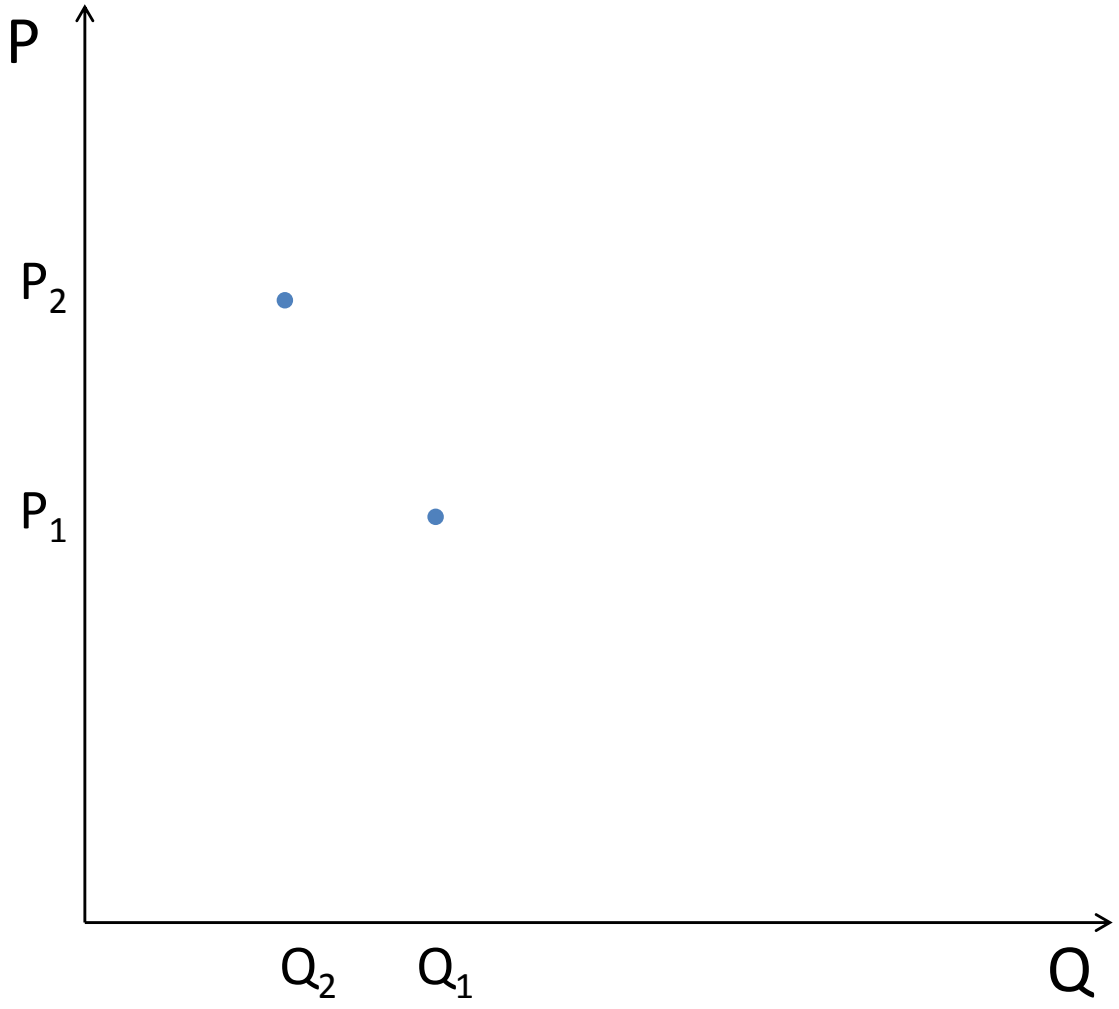


Then, what if the price increases?

Quantity Demanded at an Increased Price



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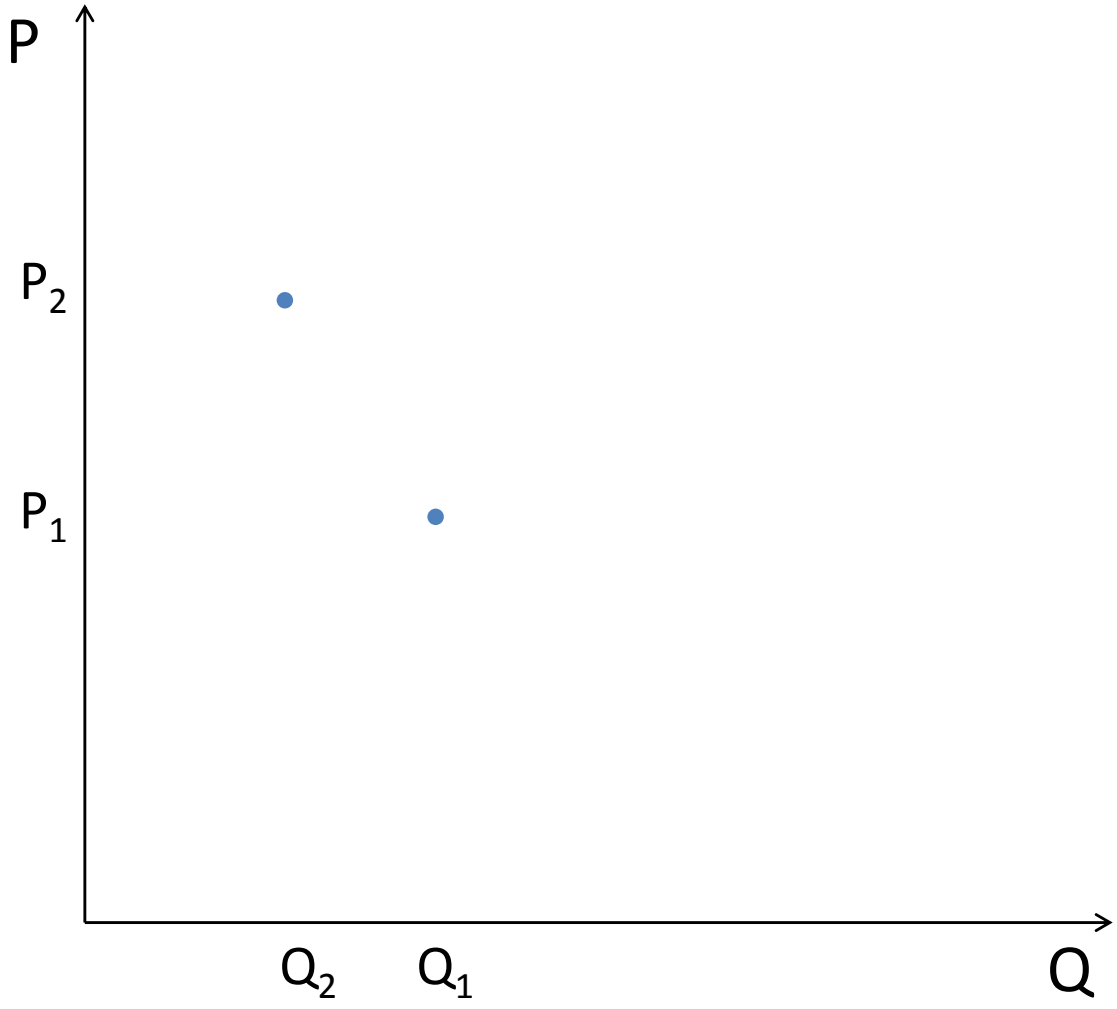
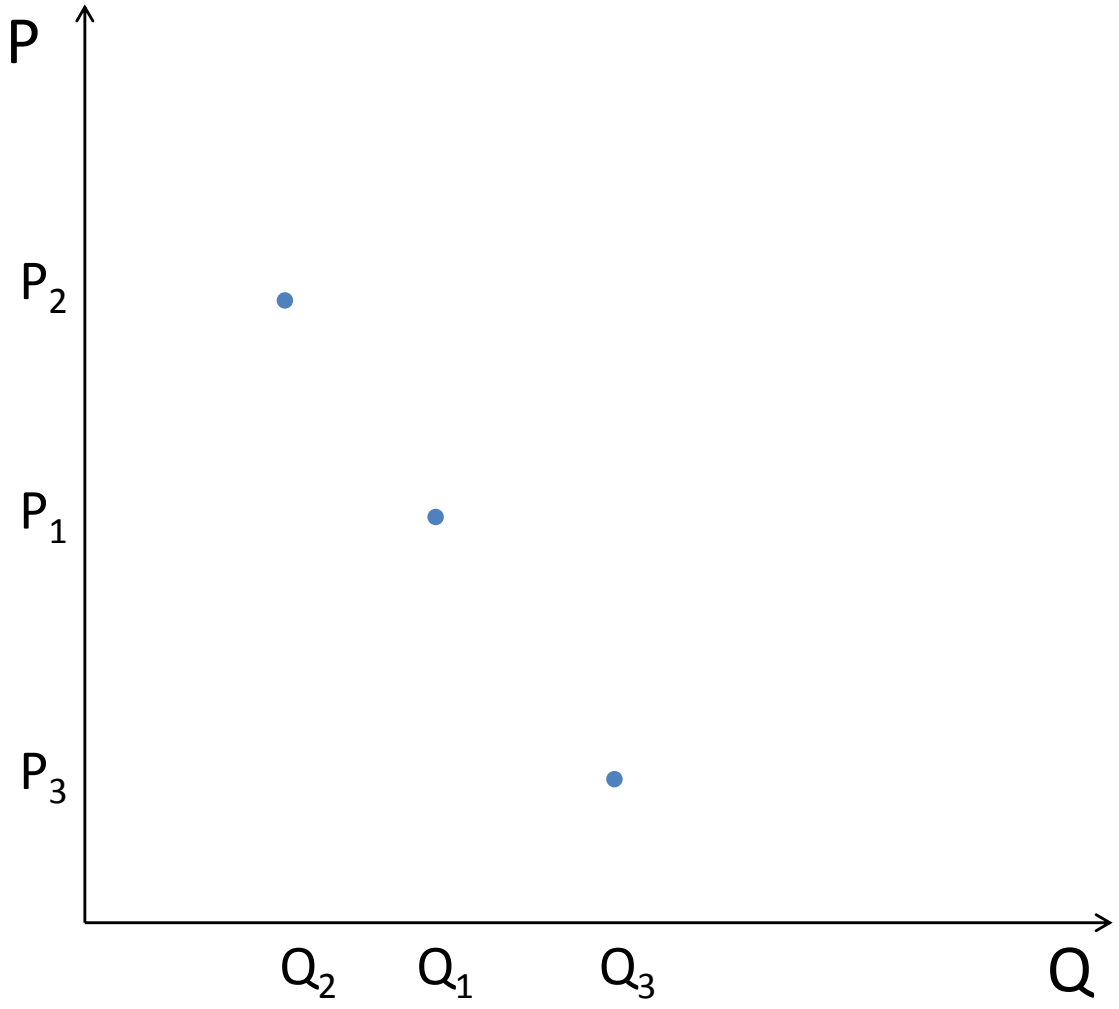
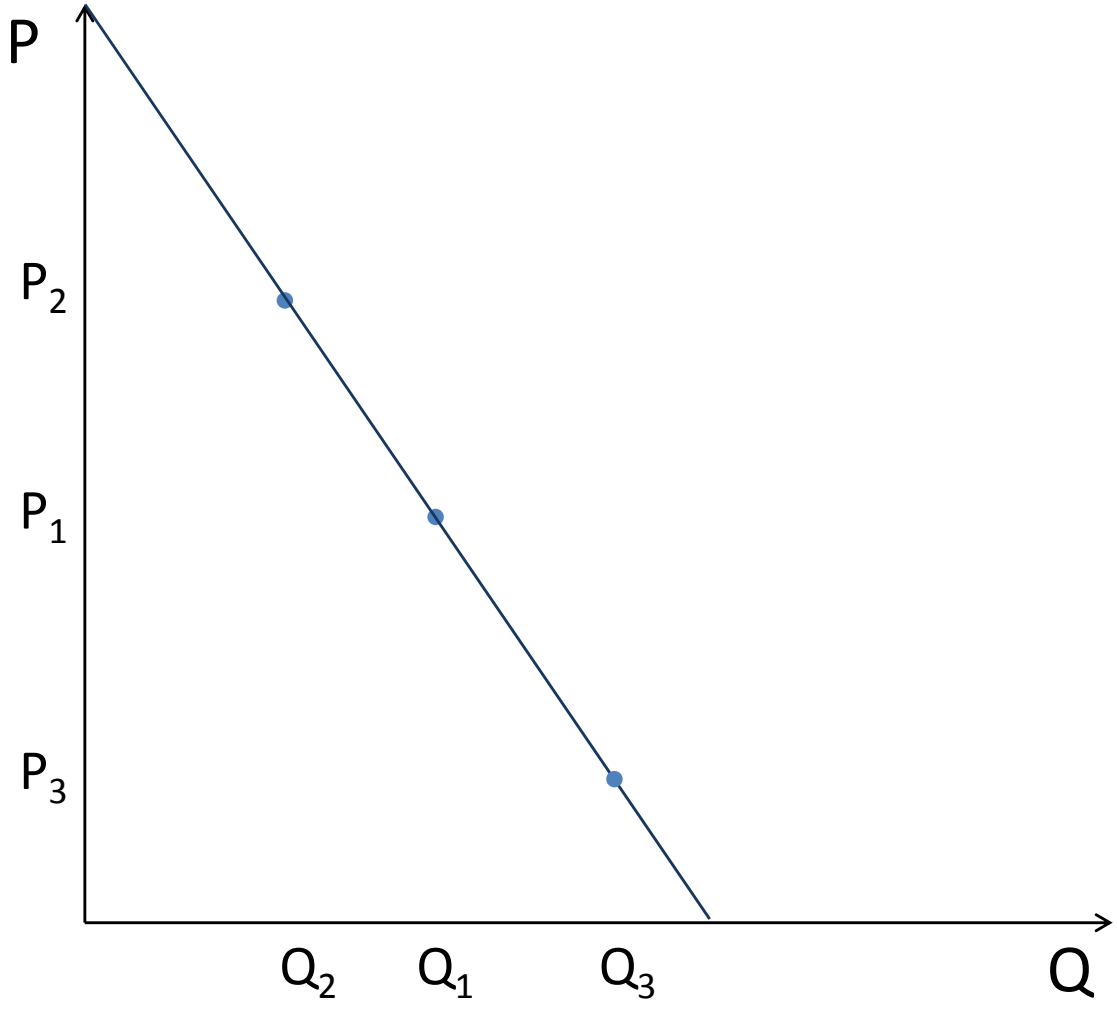


What if the price had instead decreased?

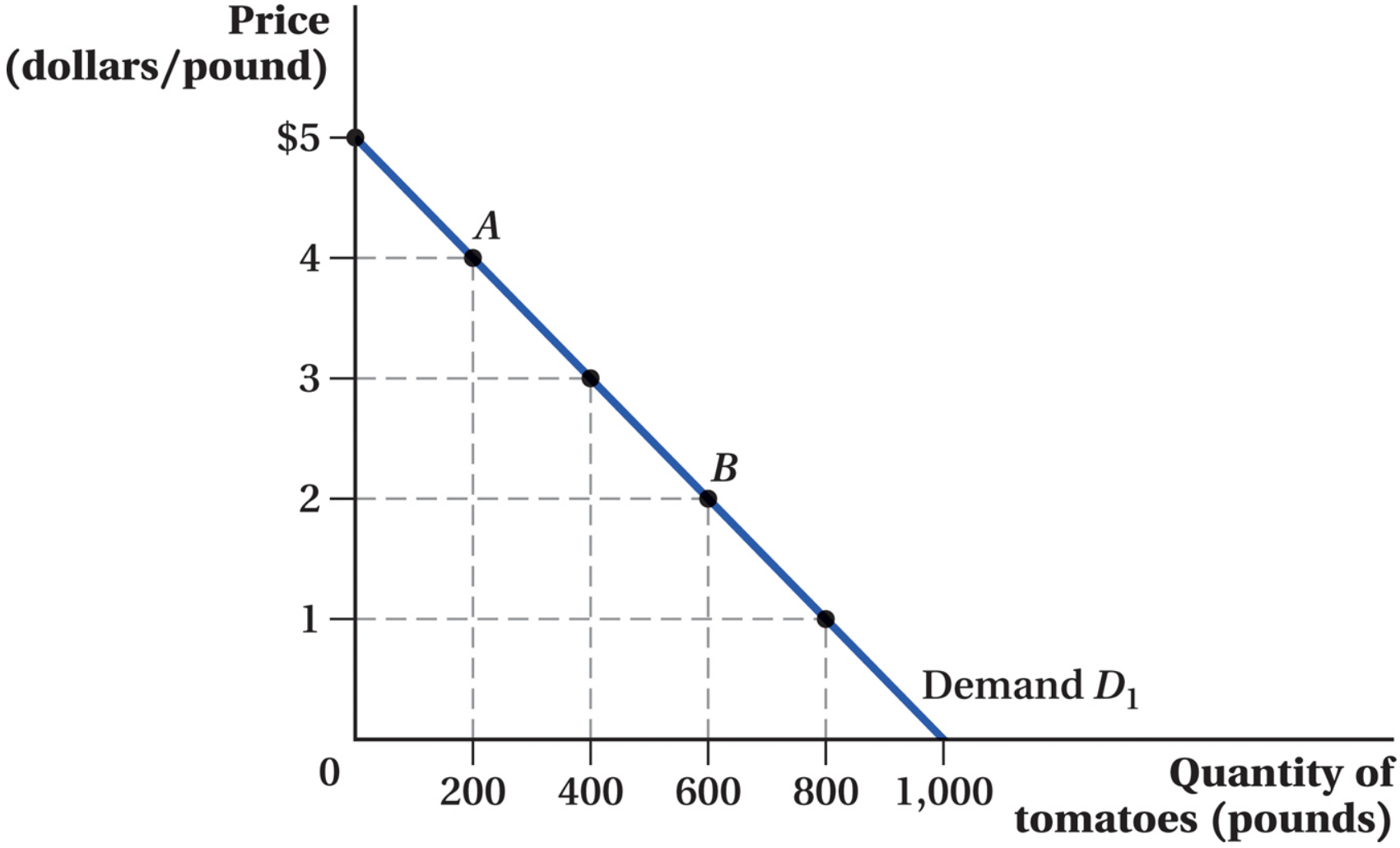
Quantity Demanded at a Decreased Price



Think about a Q for any P



The Textbook's Demand Curve



Demand Curve: Graph to Algebra

- If you can draw it in a graph, you can write an equation for it
- We can write the previous picture's line as $Q^D = 1000 - 200P$
  - This is a function of Q in terms of P, which we can write in general as $Q = f(P)$

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- If you can draw it in a graph, you can write an equation for it
- We can write the previous picture's line as $Q^D = 1000 - 200P$
  - This is a function of Q in terms of P, which we can write in general as $Q = f(P)$
- $Q^D = 1000 - 200P$ is entirely the same as $P = 5 - Q^D/200$
  - This is a function of P in terms of Q, which we can write $P = g(Q)$ – call it the inverse demand curve
  - The $P = g(Q)$ version matches the previous graph
  - You can read the negative slope ($-1/200$) from the equation

Factors that Influence Demand

Factors that Influence Demand

1. Price
2. Number of consumers
3. Consumer income or wealth
4. Consumer tastes
5. Prices of other goods

How Do Other Goods Influence the Price of the Good We're Considering?

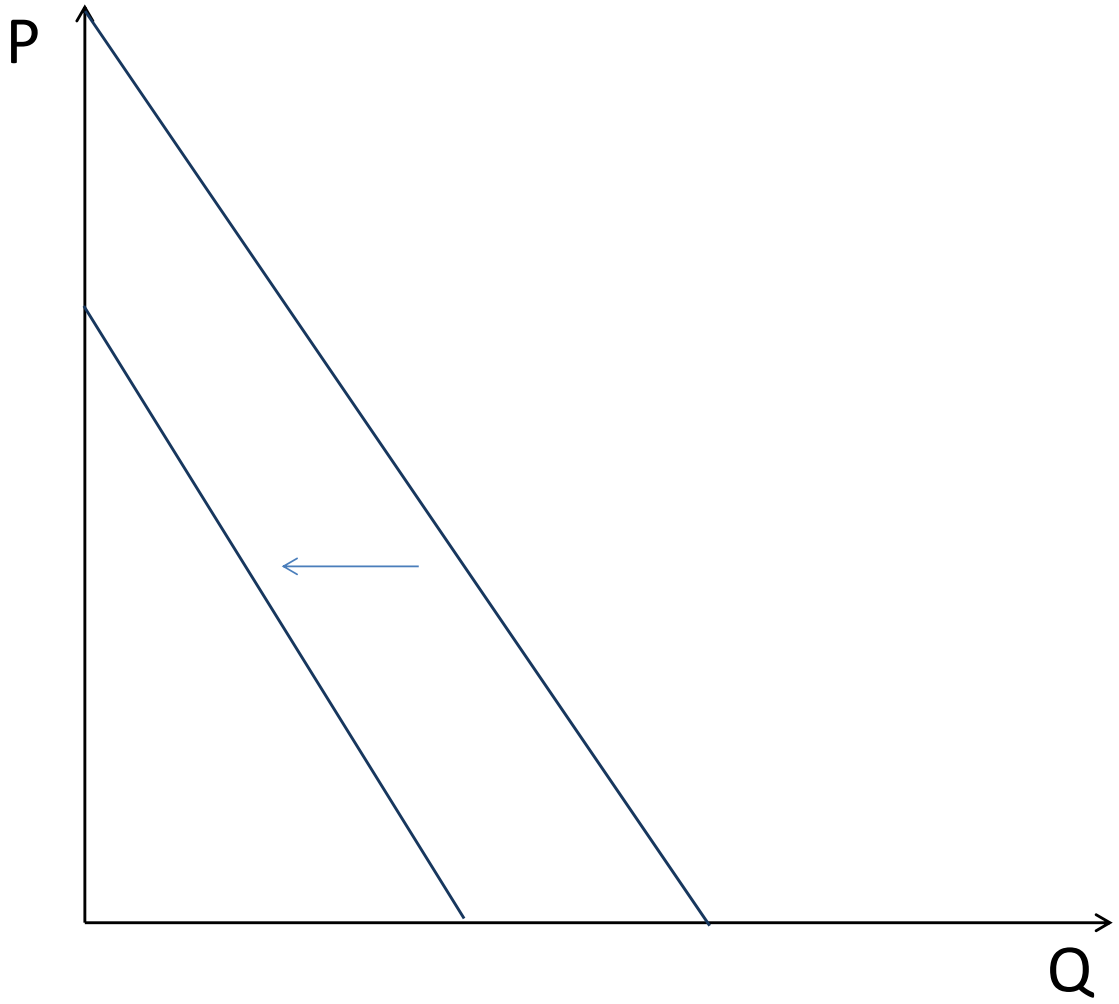
- Substitute $\equiv$ a good that could replace the good under consideration
- Complement $\equiv$ a good that you consume with the good under consideration

If the price of a perfect substitute decreases, what happens to your demand for the main good?

Demand Curve Shifts

- If we want to understand how the market demand changes when price changes, we move **along** the demand curve
- If we want to understand when there is a change in any other determinant of demand, we **shift** the demand curve

What Could Make a Demand Curve Shift Inward?



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So what does a supply curve look like? Upward sloping.

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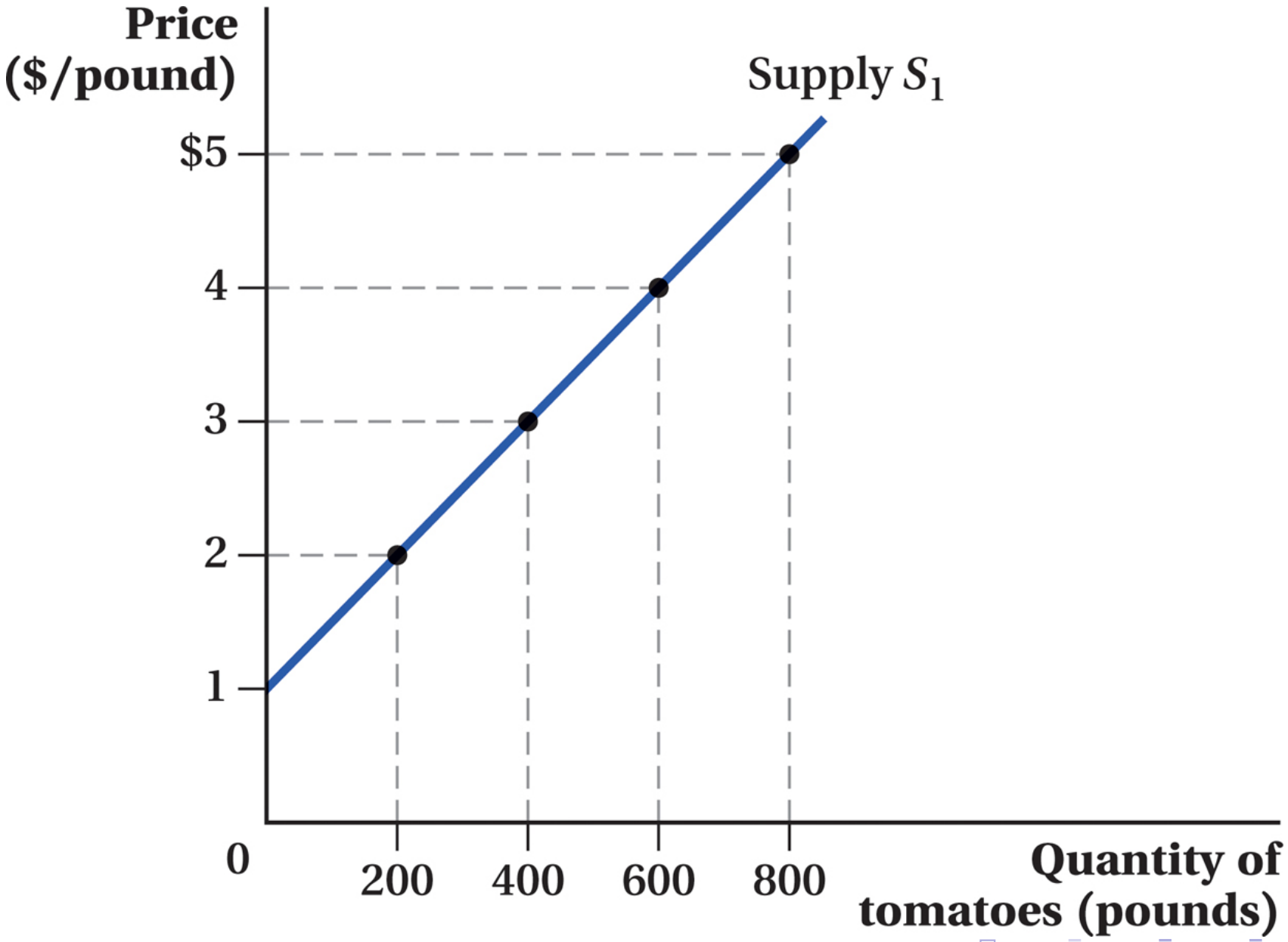


An Equation for the Supply Curve

- Just like demand, we can write an equation for supply
- $Q^S = 200P - 200$, or $Q = f(P)$

Shifts in the Supply Curve

- Does a price change shift the supply curve or move along the supply curve?

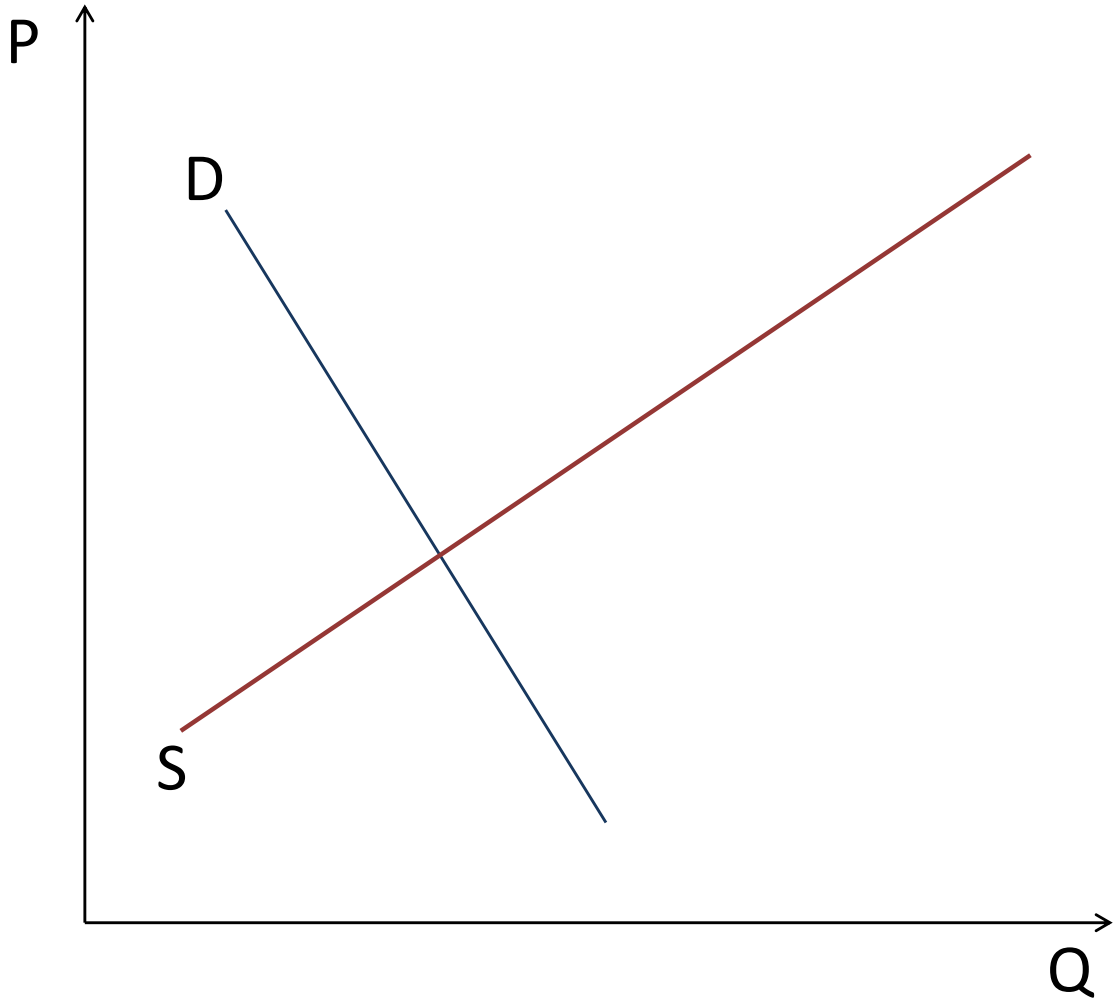
Shifts in the Supply Curve

- Does a price change shift the supply curve or move along the supply curve?
- Do non-price changes cause shifts or moves along the supply curve?

Defining Market Equilibrium

- Point at which consumers' quantity demanded equals producers' quantity supplied
  - $Q^D = Q^S$
- Equilibrium price $\equiv$ price at which quantity supplied equals quantity demanded
  - P such that $Q^D = Q^S$

Equilibrium in a Graph



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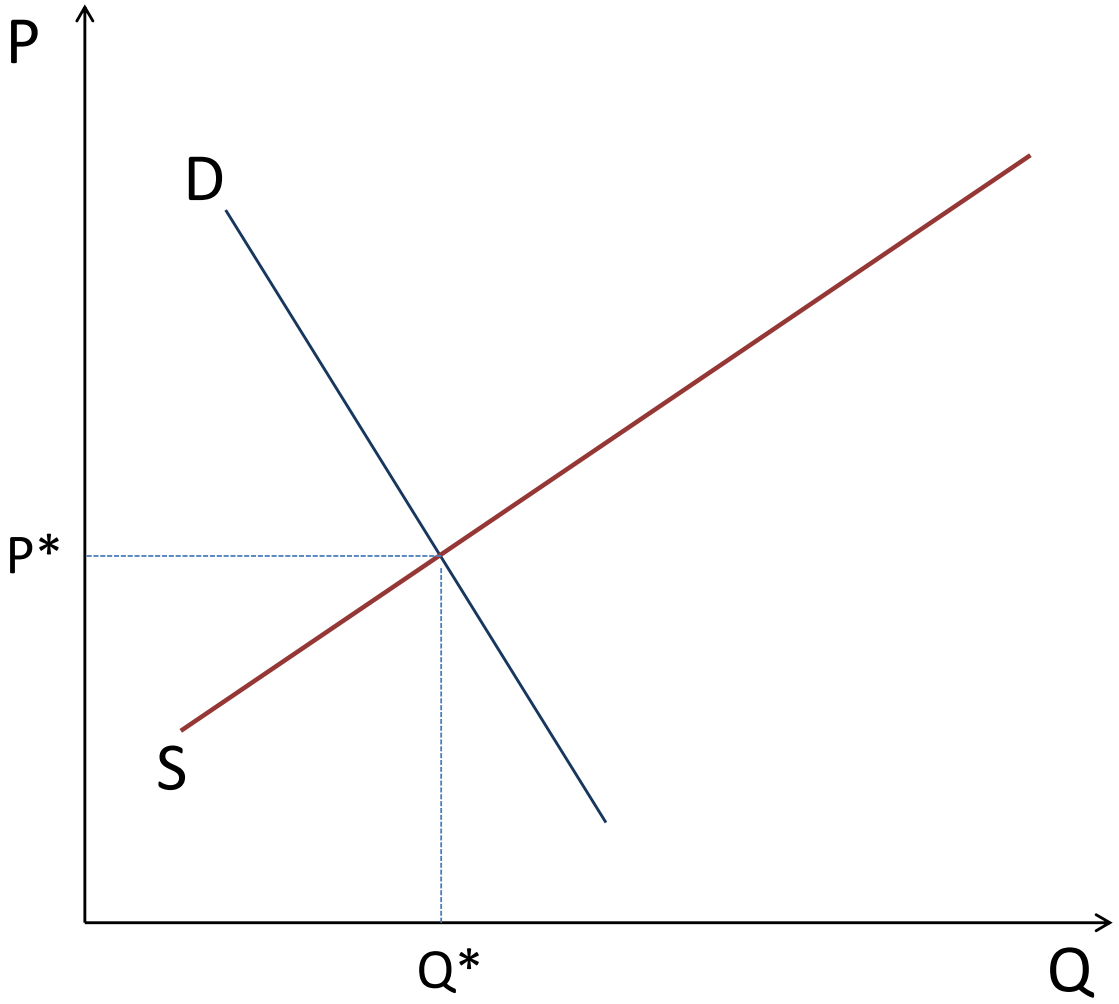

Equilibrium in Algebra

Using our tomato example

$$Q^D = Q^S$$

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Given P, what are Q^D and Q^S?
Before putting pencil to paper, what must be true about Q^D and Q^S?

Equilibrium in Algebra

Using our tomato example

$$\begin{aligned} Q^D &= Q^S \\ 1000 - 200P &= 200P - 200 \\ P &= 3 \end{aligned}$$

Given P, what are Q^D and Q^S?
Before putting pencil to paper, what must be true about Q^D and Q^S? They must be the same.
Using our tomato example

$$\begin{aligned} Q^D &= 1000 - 200P = 1000 - 200(3) = 400 \\ Q^S &= 200P - 200 = 200(3) - 200 = 400 \end{aligned}$$

Getting to Equilibrium

That's just the math. The magic is getting there!

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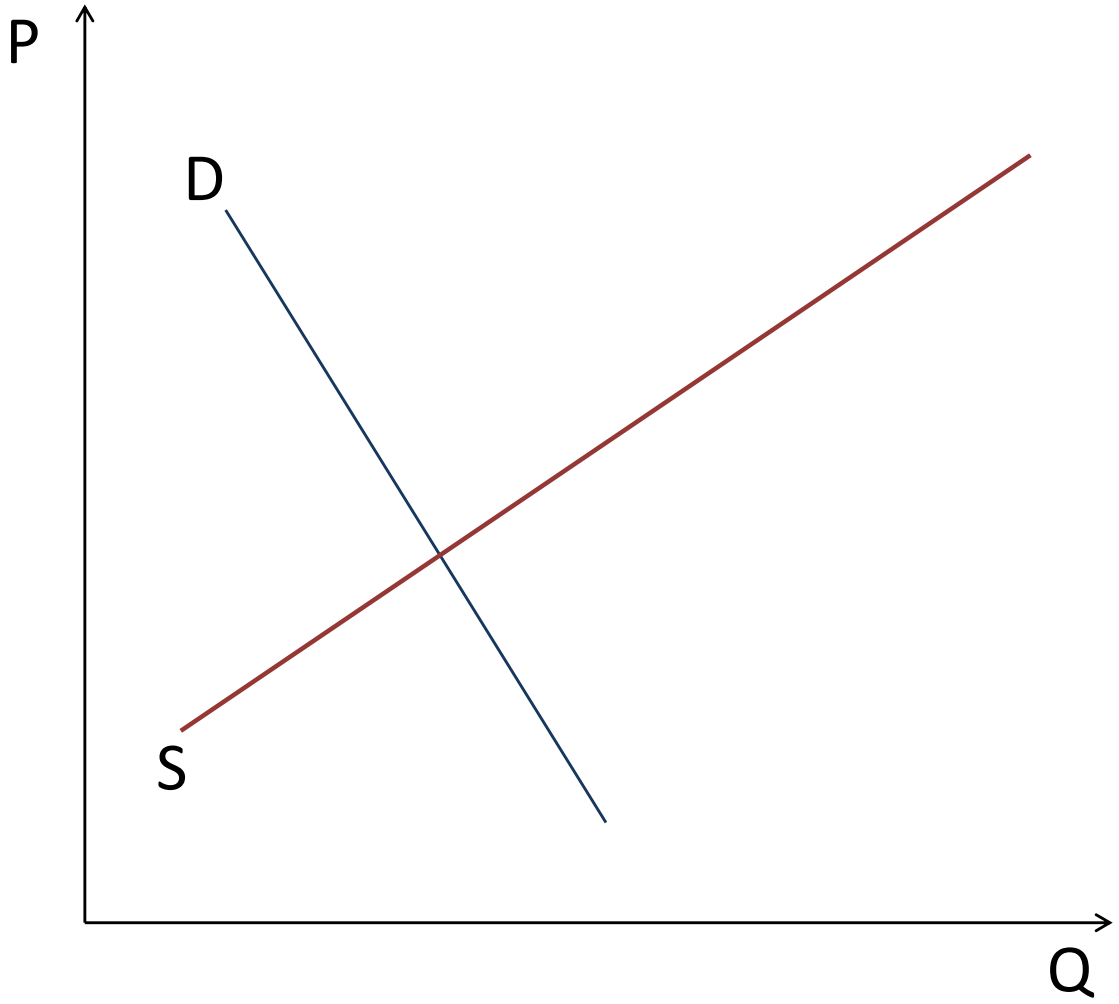
Note that these are all movements along existing curves.

Impact of Shift in Demand

- Suppose that we learn that tomatoes ruin the fluoride on your teeth
- What happens to the demand curve?

Where Does Demand Curve Go?



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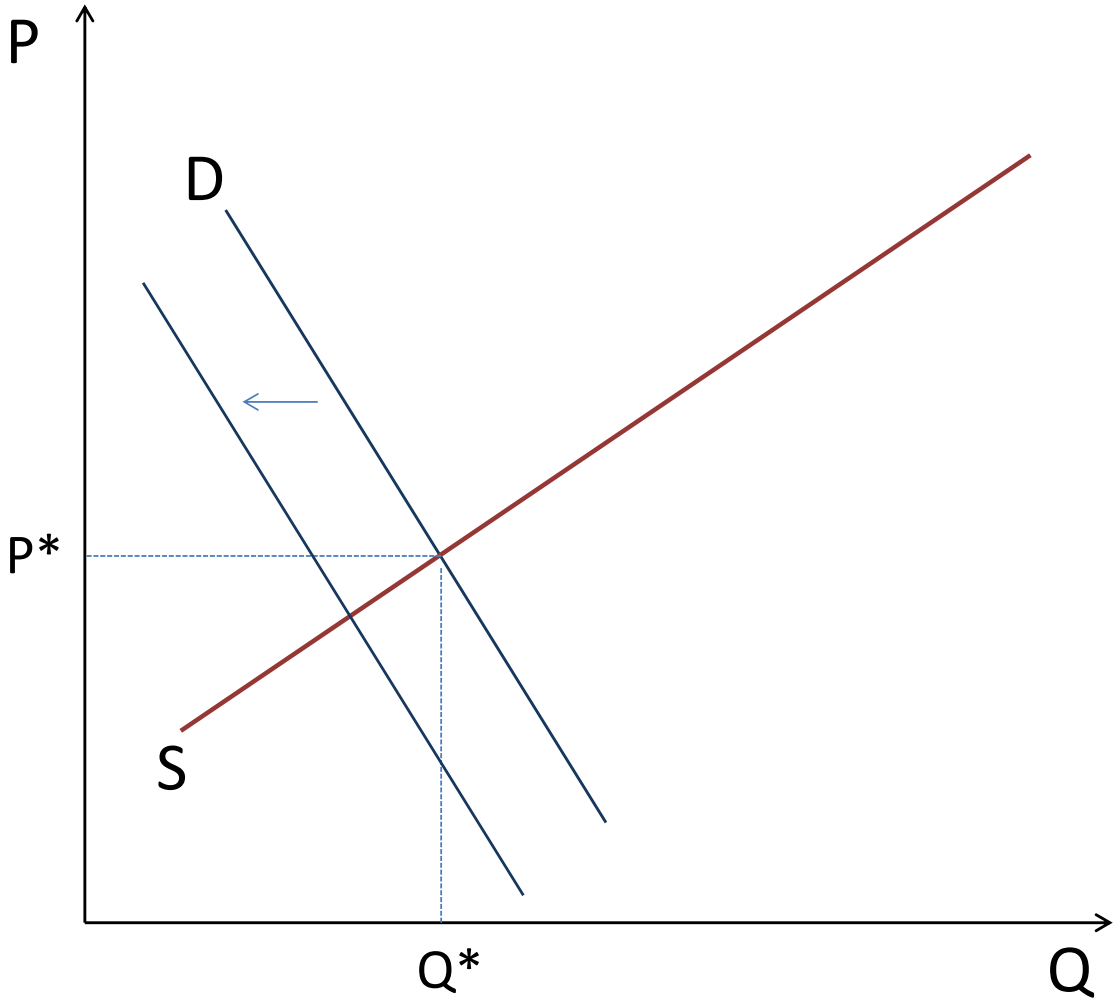

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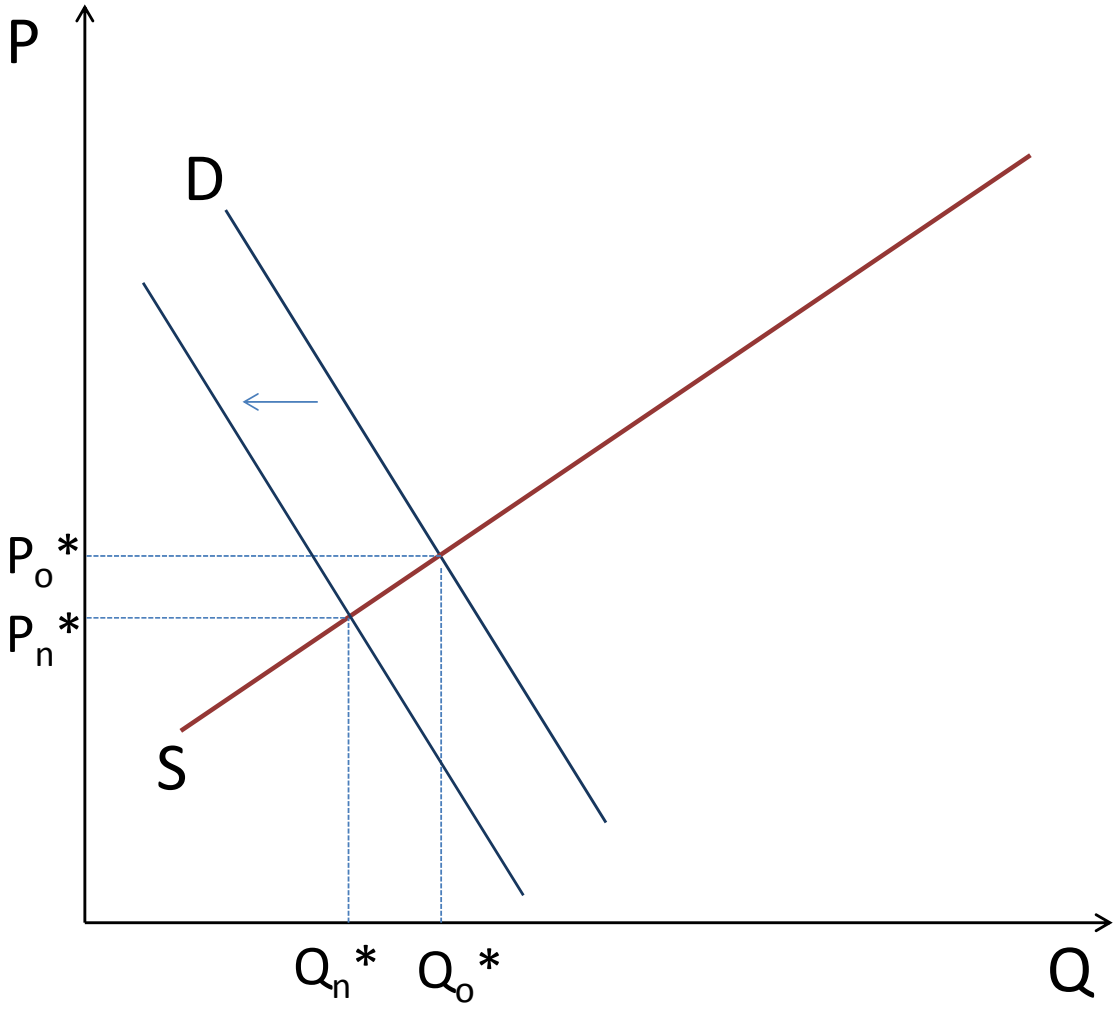

What does this mean for equilibrium?

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  - $Q^{D,original} = 1000 - 200P$

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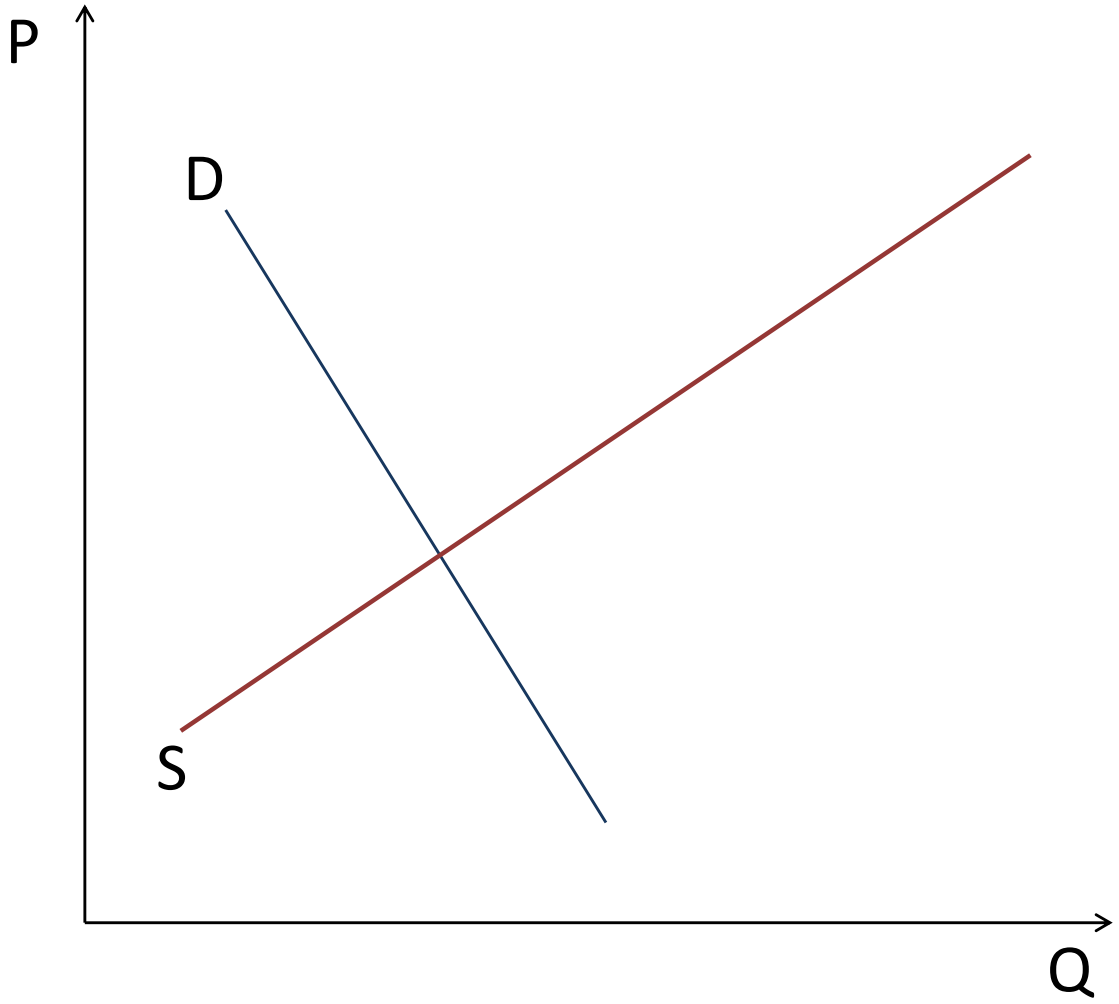
  - And new equilibrium quantities?
  - $Q^{D,new} = 500 - 200P = 500 - 200(1.75) = 150$
  - $Q^S = 200P - 200 = 200(1.75) - 200 = 150$
- We find
  - Price falls
  - Equilibrium quantity falls

Impact of Shift in Supply

- Suppose that the drought in California ends, and California can now produce more tomatoes
- What happens to the supply curve?

Where Does Supply Curve Go?



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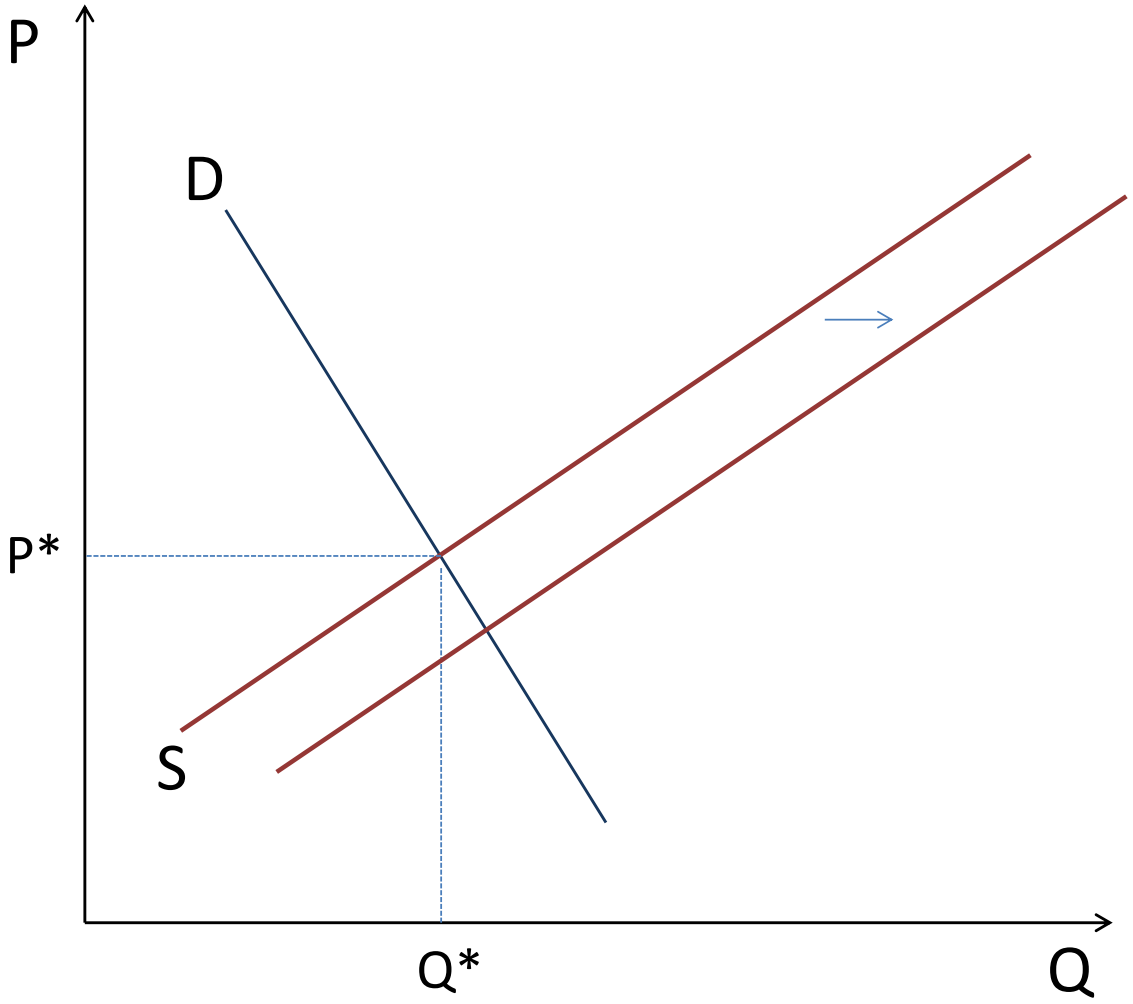

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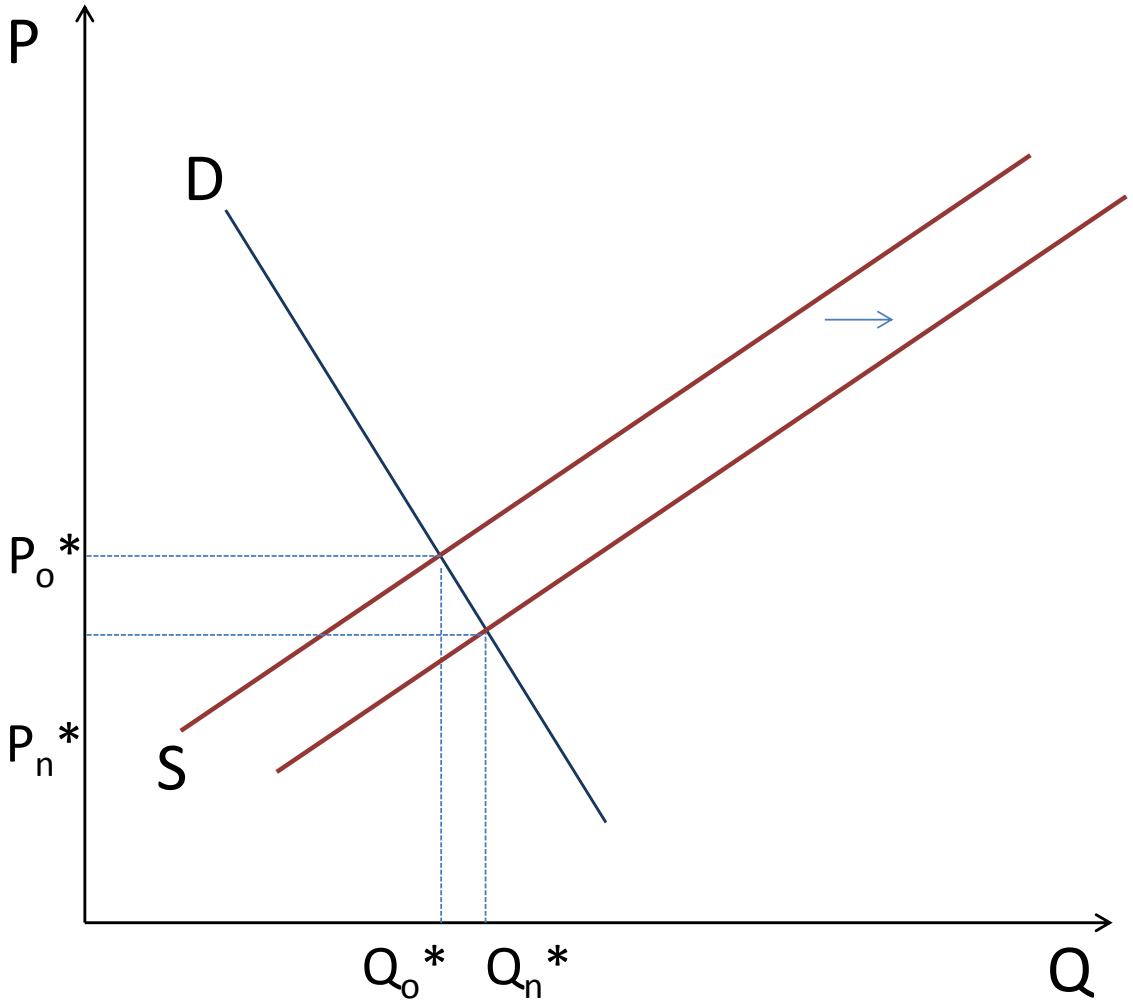

Algebra: Impact of Shift in Supply

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  - And new equilibrium quantities?
  - $Q^D = 1000 - 200P = 1000 - 200(2) = 600$
  - $Q^{S,new} = 200P + 200 = 200(2) + 200 = 600$
- We find
  - Price falls
  - Equilibrium quantity increases

Deducing Changes to Supply and Demand from Changes in P and Q

- Assume only supply or demand changes
- Suppose that we observe a decrease in the wages for undocumented immigrants
- And suppose that we also observe an increase in the number of undocumented immigrants
- What can we assume happened to supply and demand?
- Work through problem step-by-step

Deducing Changes to Supply and Demand from Changes in P and Q

Assume only supply or demand changes and that (1) wages decrease and (2) number of undocumented immigrants increases

- Wages decrease picture

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  - Consistent with decrease in demand
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- Quantity increases picture

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- Quantity increases picture
  - Consistent with increase in demand
  - Consistent with increase in supply
- $\rightarrow$ Demand constant, supply increased.

Elasticity

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- Health care reform: how do emergency room visits respond to health insurance expansion?
  - Consumers have cheaper emergency room substitutes
  - But the emergency room cost is also lower
  - How elastic is $Q^D_{\text{emergency room}}$? Does the elasticity change?
- Formally, percentage change in one value relative to percentage change in another

Do Not Confuse Slope and Elasticity

- In math, elasticity is

$$\frac{\%\Delta Q}{\%\Delta P} =$$

Do Not Confuse Slope and Elasticity

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$$\frac{\%\Delta Q}{\%\Delta P} = \frac{\Delta Q/Q}{\Delta P/P}$$

Do Not Confuse Slope and Elasticity

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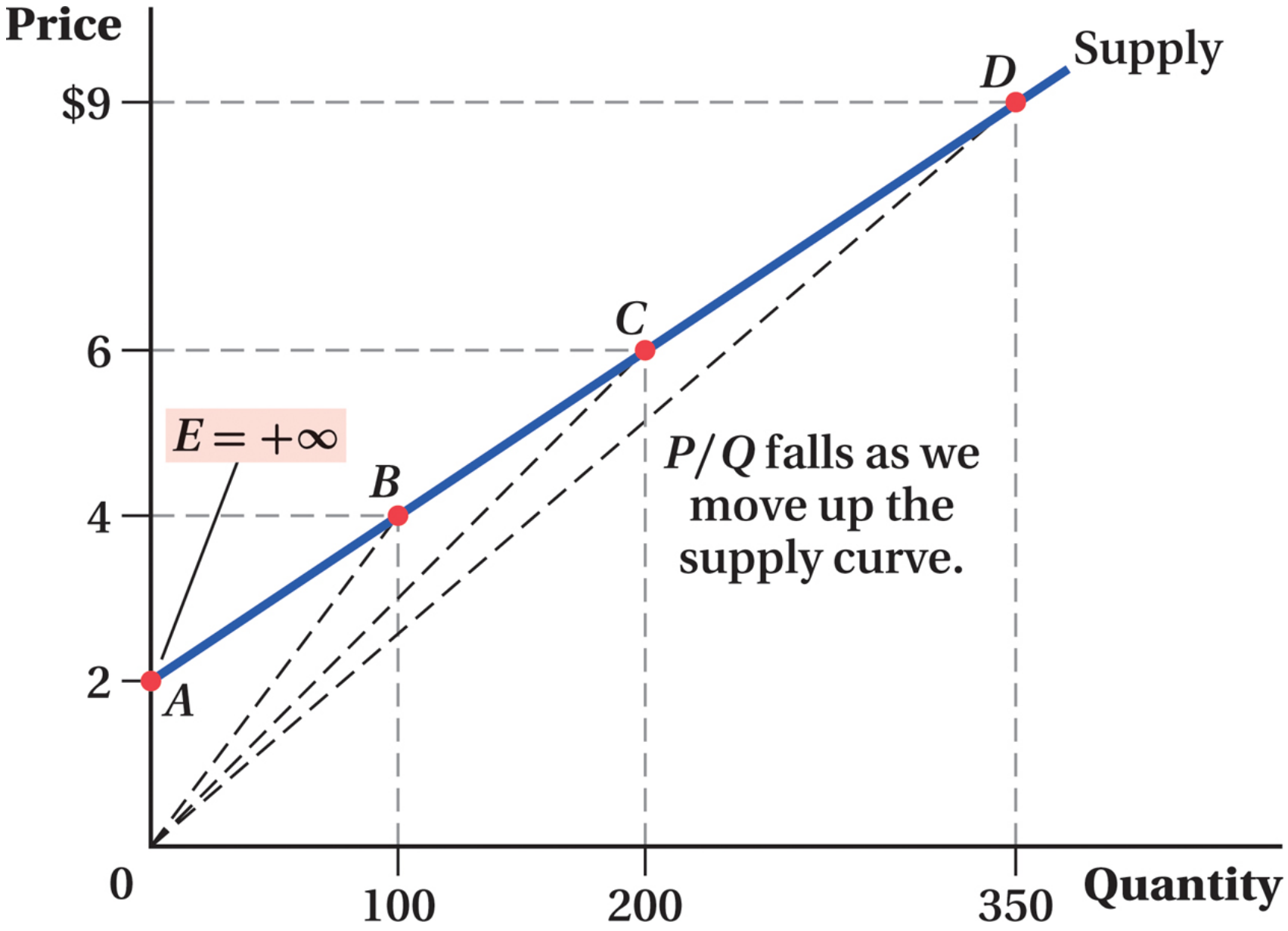
$$\frac{\%\Delta Q}{\%\Delta P} = \frac{\Delta Q/Q}{\Delta P/P} = \frac{\Delta Q}{\Delta P} * \frac{P}{Q}$$

- We will always assume that the initial Q and P are zero
- Slope is $\frac{\Delta P}{\Delta Q}$
- Benefit of using elasticity rather than slope is comparing across goods
- Do you think demand for milk or video games is more elastic?

Graphic Version of Elasticity Calculation



Price Elasticities of Demand and Supply

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  - If price increases by 1%, do we expect a positive or negative change in quantity demanded?

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  - What does this imply for E^S?
  - In general, $E^S \geq 0$

What Makes Elasticity Big or Small?

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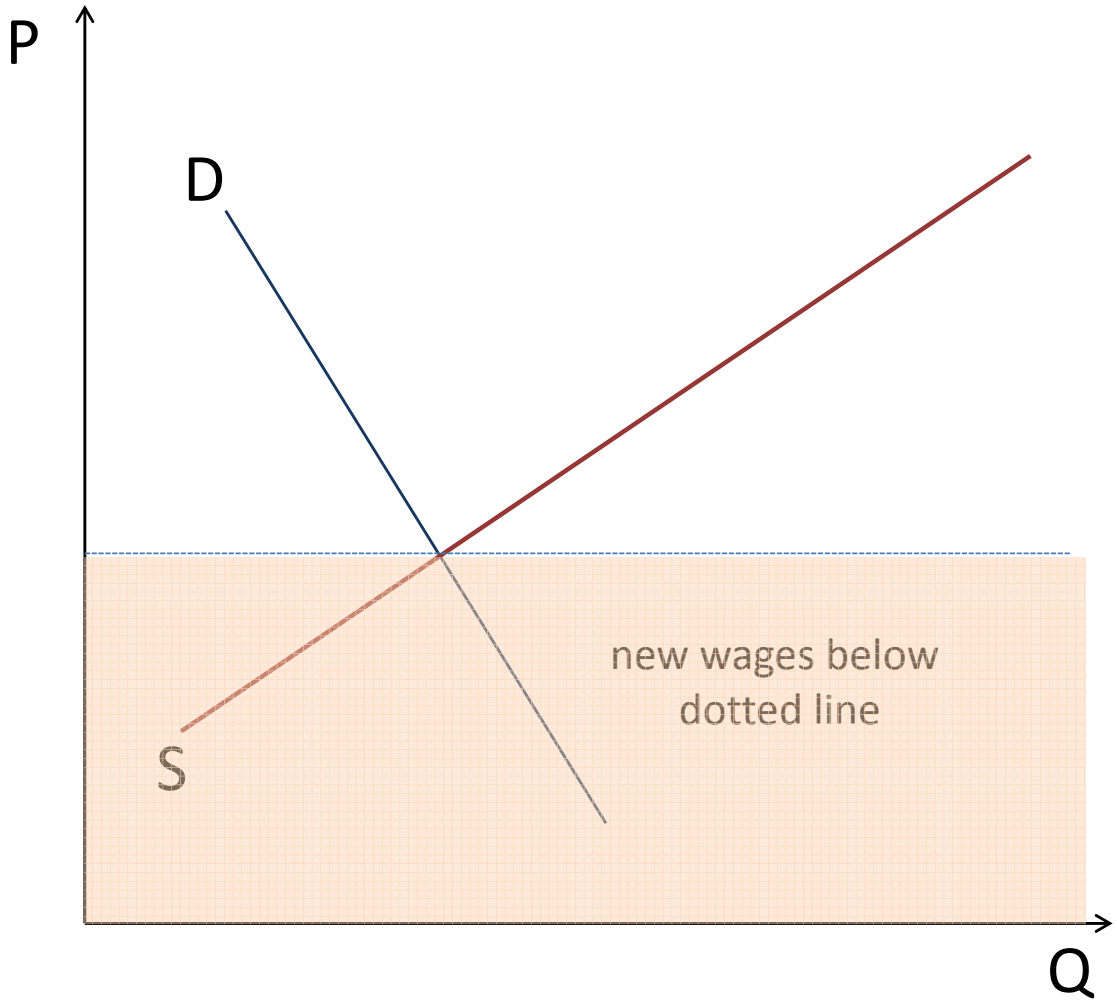
A non-complete list includes

- For demand, presence of substitutes
- For supply, ability to change levels of production
- Time horizon

Exploring Wage Decrease



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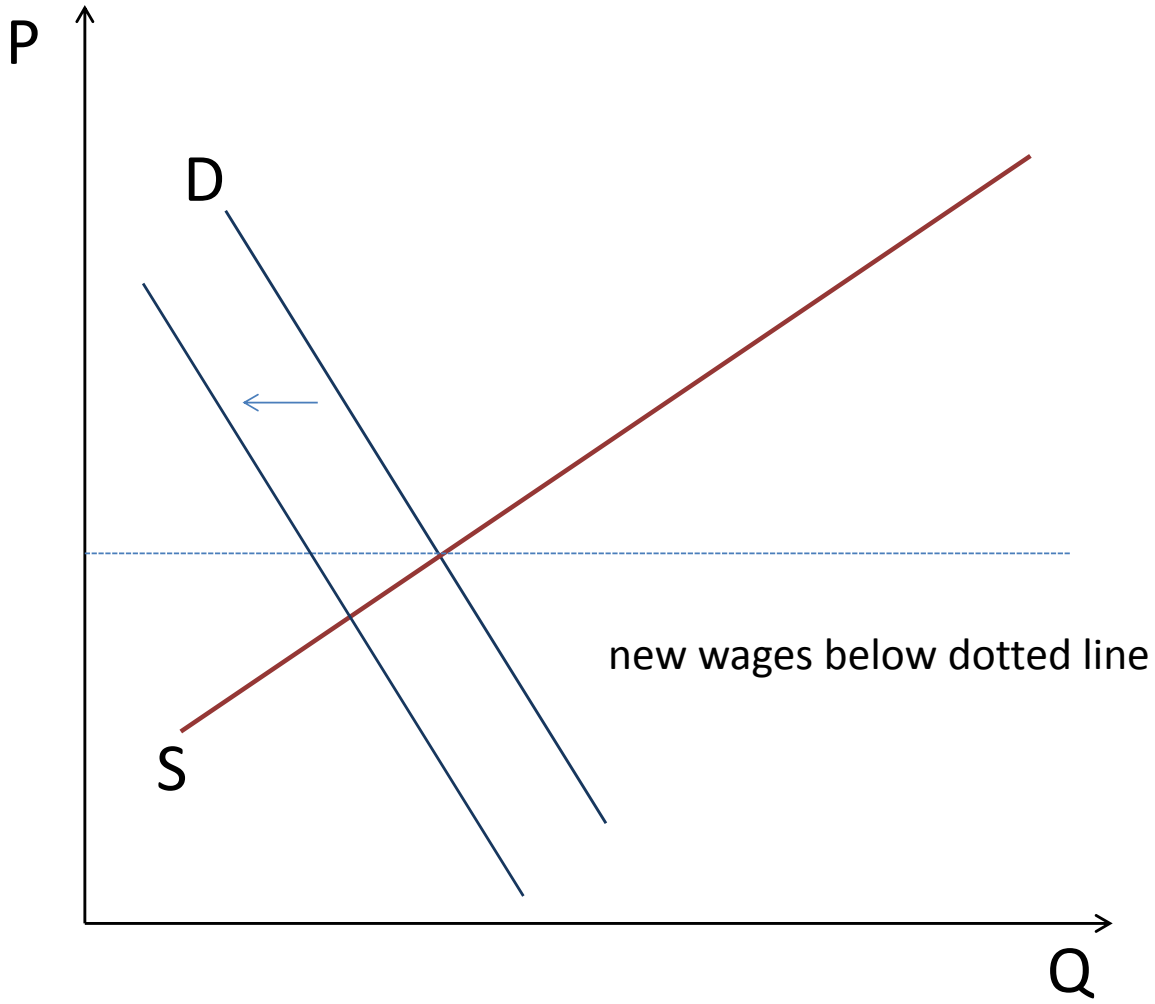

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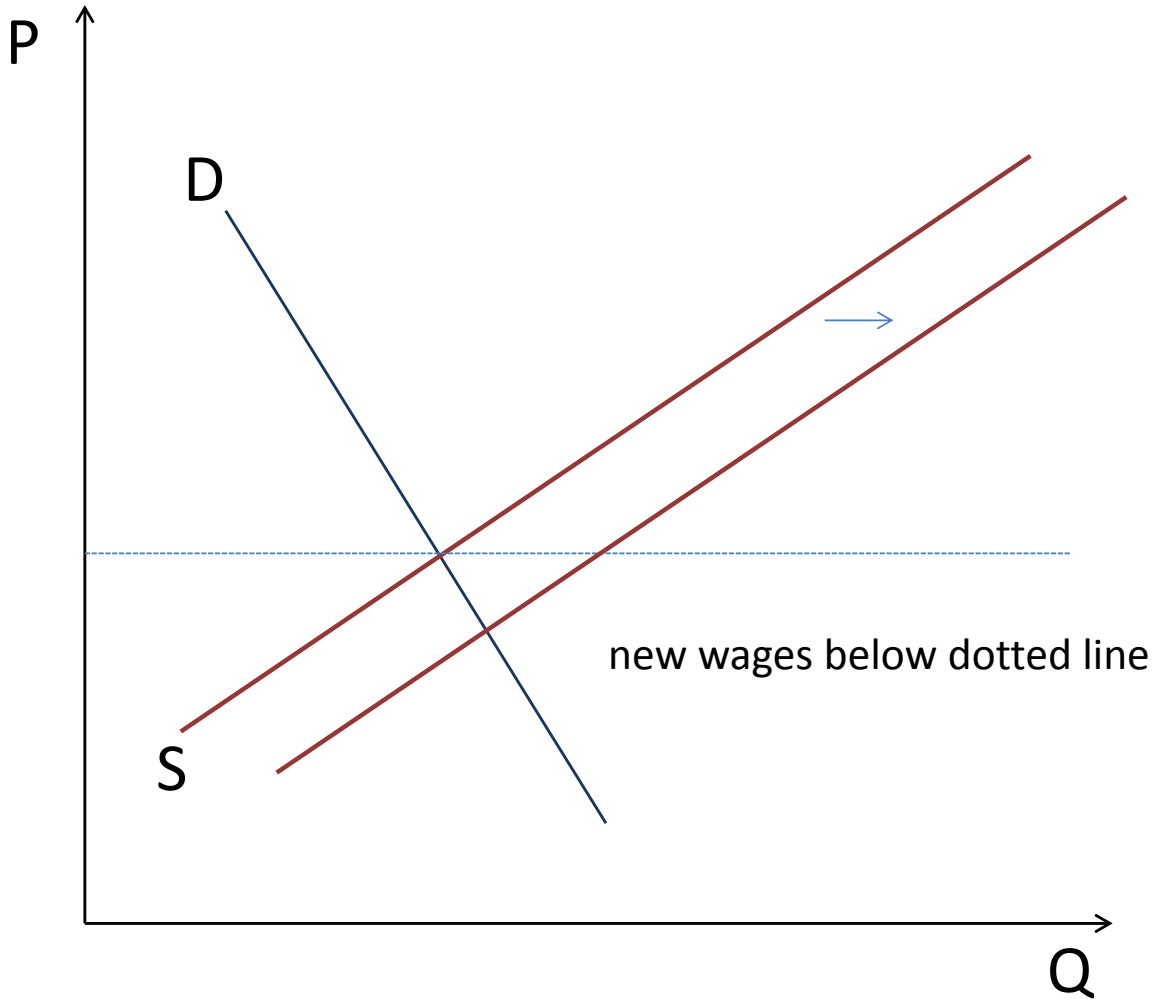
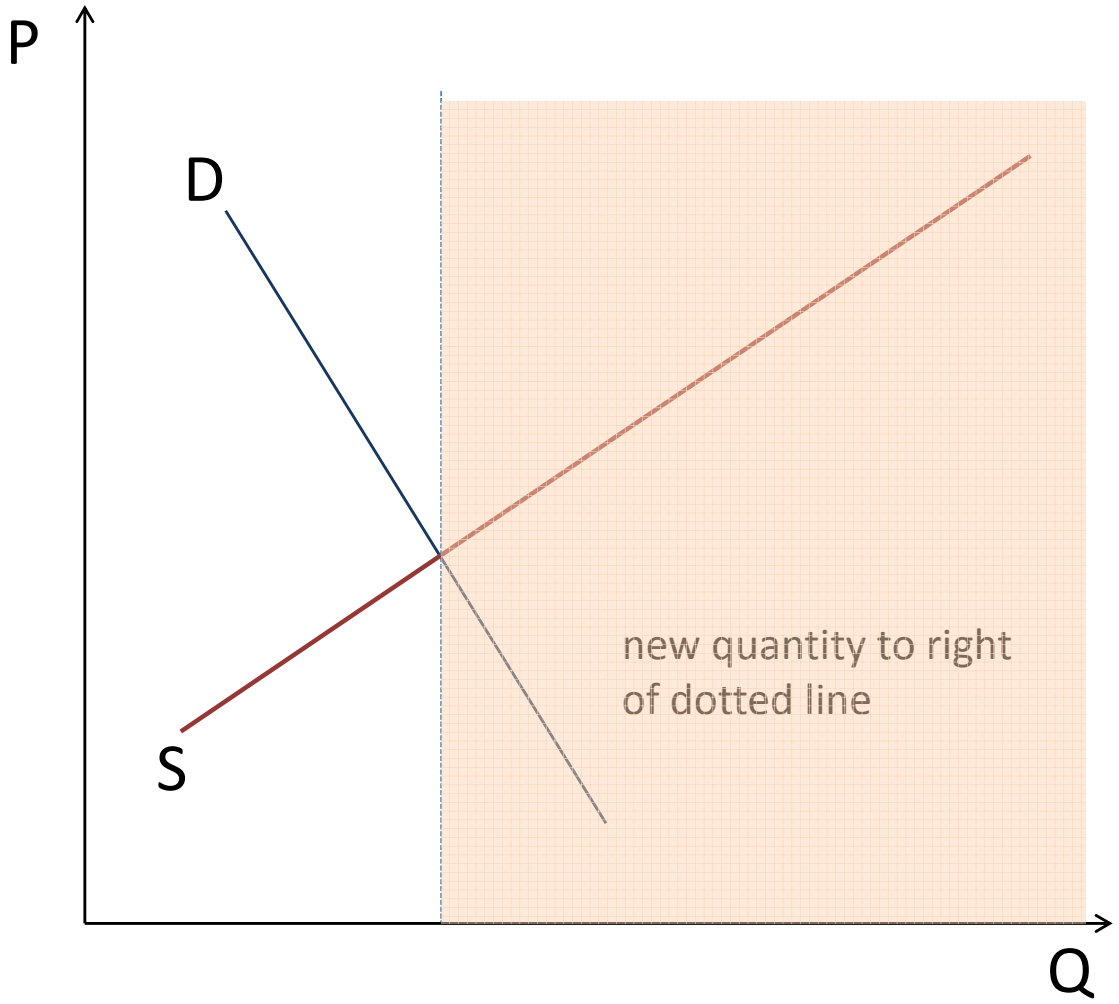


Exploring Quantity Increase



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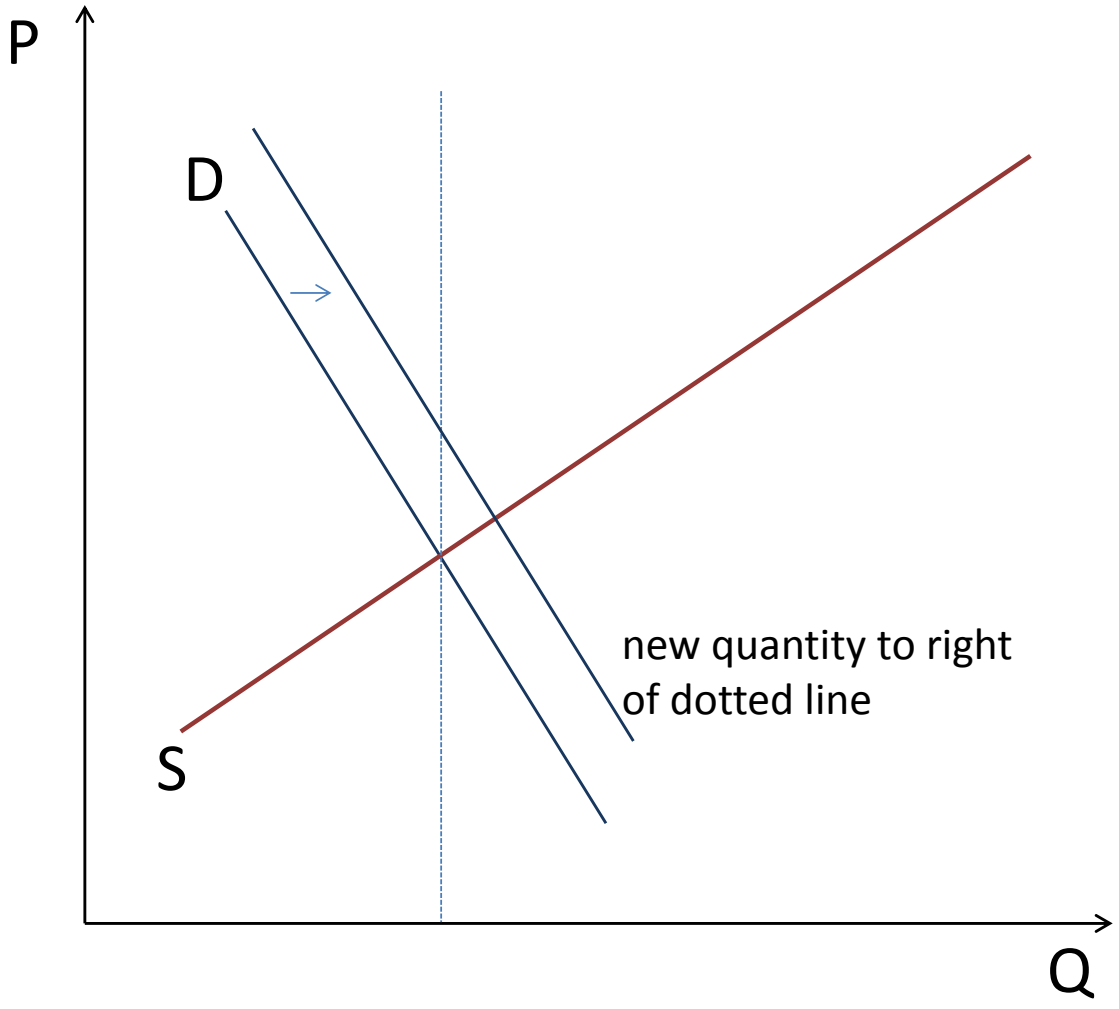

Exploring Quantity Increase