ECON 101 · WEEK 3

Lecture 3: Supply and Demand

How a market finds its price

Bring this handout to the seminar. Every page leaves room on the right for your notes.

One example runs through the lecture: the coffee cart outside the library.

Today's plan

1. **Demand**
   What buyers want at each price
2. **Supply**
   What sellers offer at each price
3. **Equilibrium**
   Where the two meet
4. **Shifts**
   What moves the curves
5. **Elasticity and price controls**
   How strongly buyers react, and what caps do

“

A market is any place where buyers and sellers meet to trade, from a coffee cart to a website.

WORKING DEFINITION FOR THIS COURSE

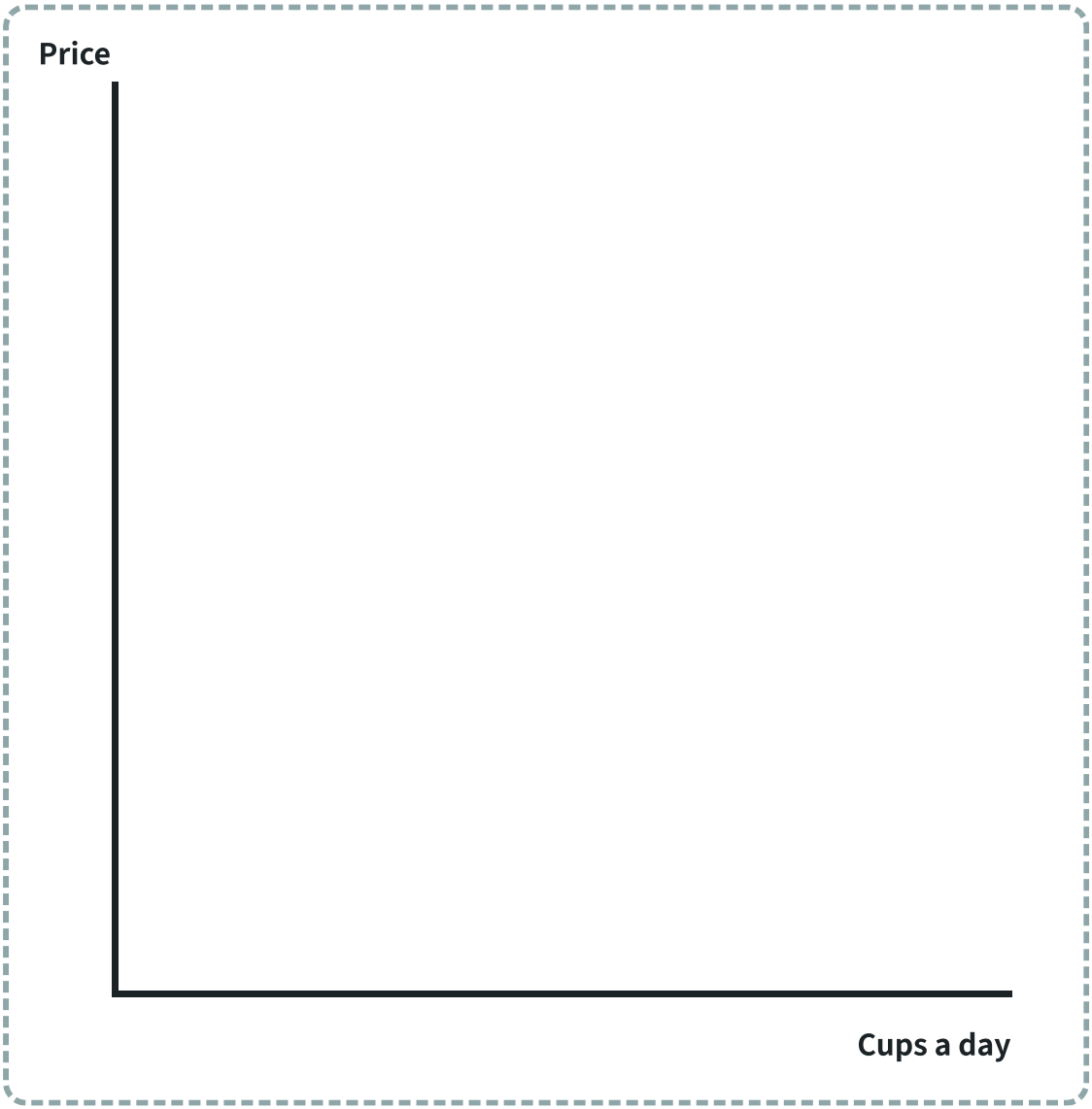
A

Demand

Demand is how much buyers want to buy at each possible price, when nothing else changes.

Your turn: draw the demand curve

Use the schedule on the next page. Put price on the side and cups a day along the bottom.



Join the dots. Which way does your line slope?

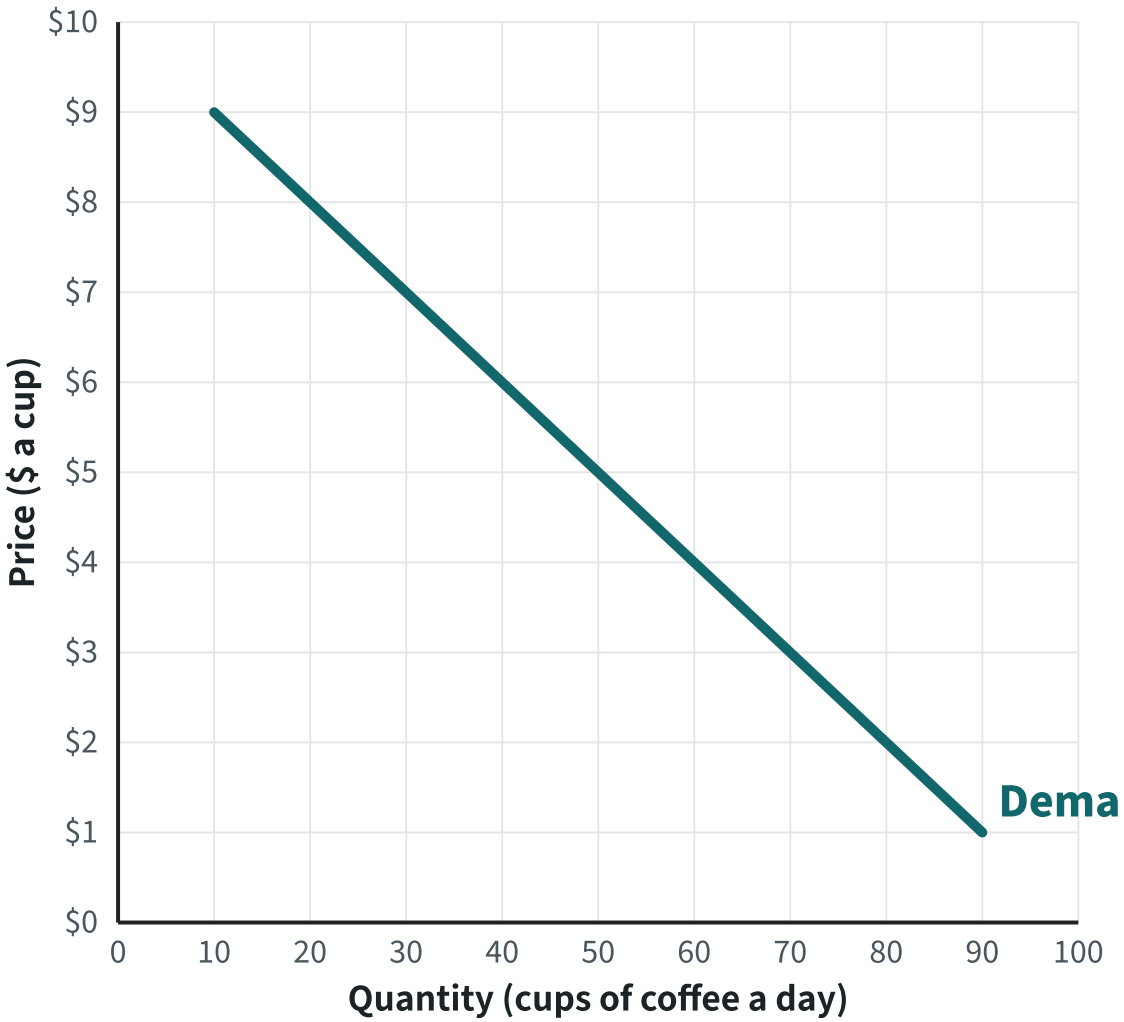
The demand schedule

Cups of coffee students buy from the cart each day, at each price.

Price a cup	Cups demanded a day
$1	90
$2	80
$3	70
$4	60
$5	50
$6	40
$7	30
$8	20
$9	10

Every $1 rise in price means 10 fewer cups.

The demand curve



Each point is one row of the schedule. Higher price, fewer cups.

Demand as an equation

$$Q_d = 100 - 10P$$

Q_d is cups demanded a day and P is the price in dollars. At $0 students would take 100 cups; each extra dollar loses 10.

Why demand slopes down

1

Substitutes

At a higher price some students switch to tea or the free water fountain.

2

Budget

A higher price leaves less money for everything else.

3

Each extra cup is worth less

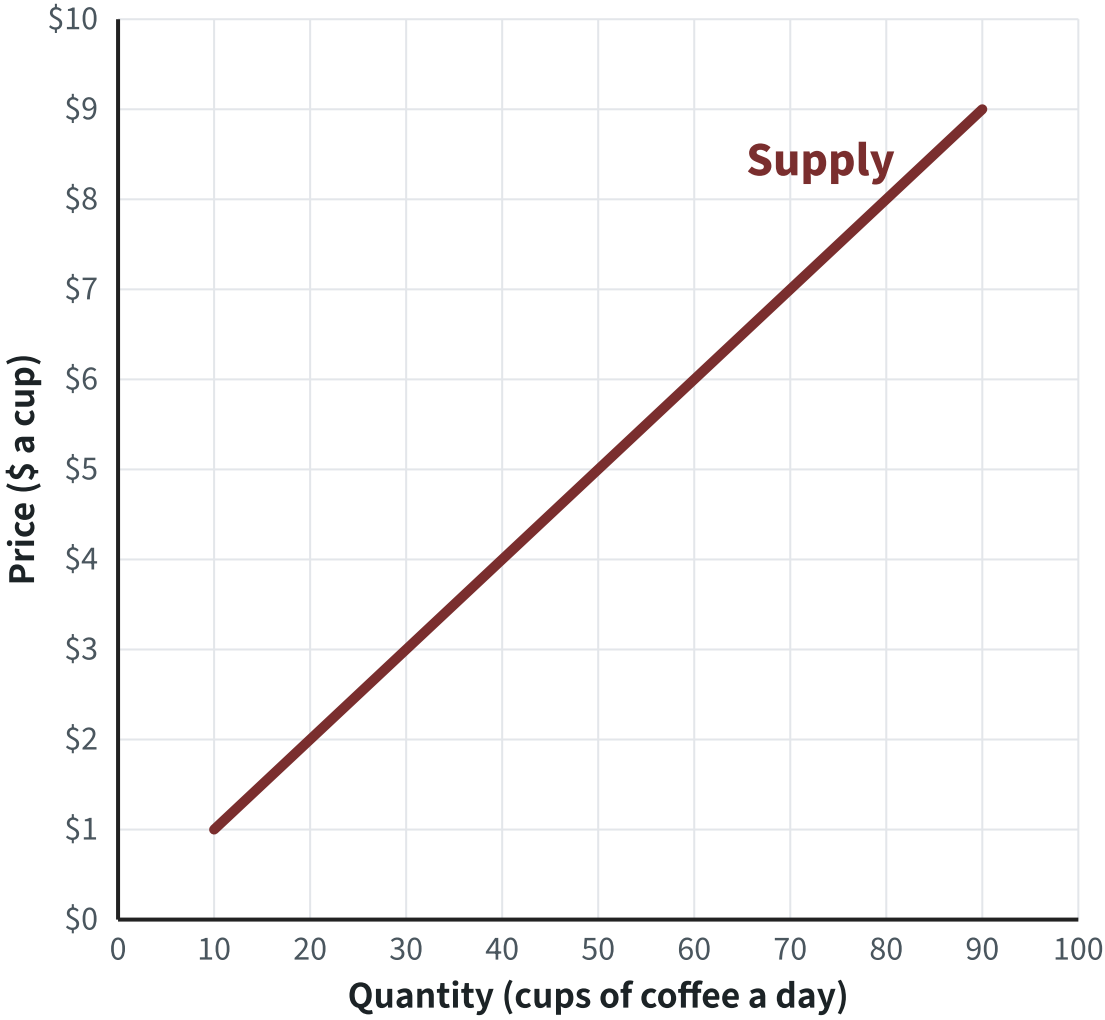
The second coffee of the day means less than the first.

B

Supply

Supply is how much sellers offer at each possible price, when nothing else changes.

The supply curve: $Q_s = 10P$



At $1 the cart owner makes only 10 cups. At $9 it is worth staying open longer: 90 cups.

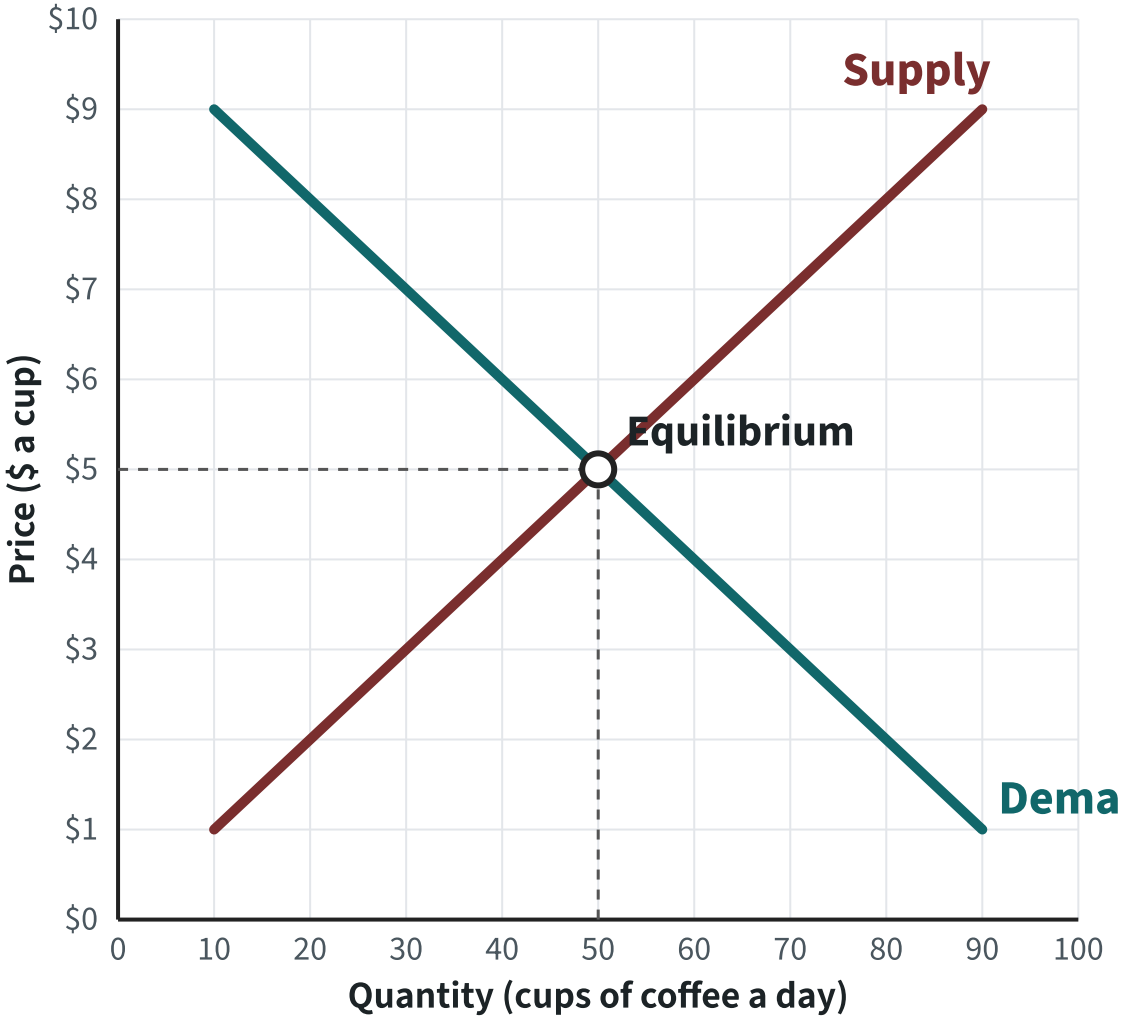
Extra example: umbrellas on a rainy day

A street seller sells 20 umbrellas a day at $8 when it is dry. It starts to rain. What happens?

1. At the same $8, buyers now want 60 umbrellas.
2. The seller has only 25 in the van.
3. A queue forms, so the seller can raise the price.

Demand rose; the price follows

Where the curves cross



Buyers want exactly what sellers offer. Nobody queues and no cups are left over.

Equilibrium price: P* = $4

Set the cups demanded equal to the cups supplied.

1. $100 - 10P = 10P$
2. $100 = 20P$
3. Cups at that price: $Q^* = 10 \times P^*$

P* = $4 a cup, Q* = 50 cups a day

Below the equilibrium: a shortage

Suppose the cart charges $4.

Buyers want

60 cups

$100 - 10 \times 4$

Sellers offer

40 cups

10×4

Above the equilibrium: a surplus

Suppose the cart charges $7.

Buyers want

30 cups

Many walk past.

Sellers offer

70 cups

40 cups are poured away.

“

Prices keep moving until the shortage or the surplus is gone.

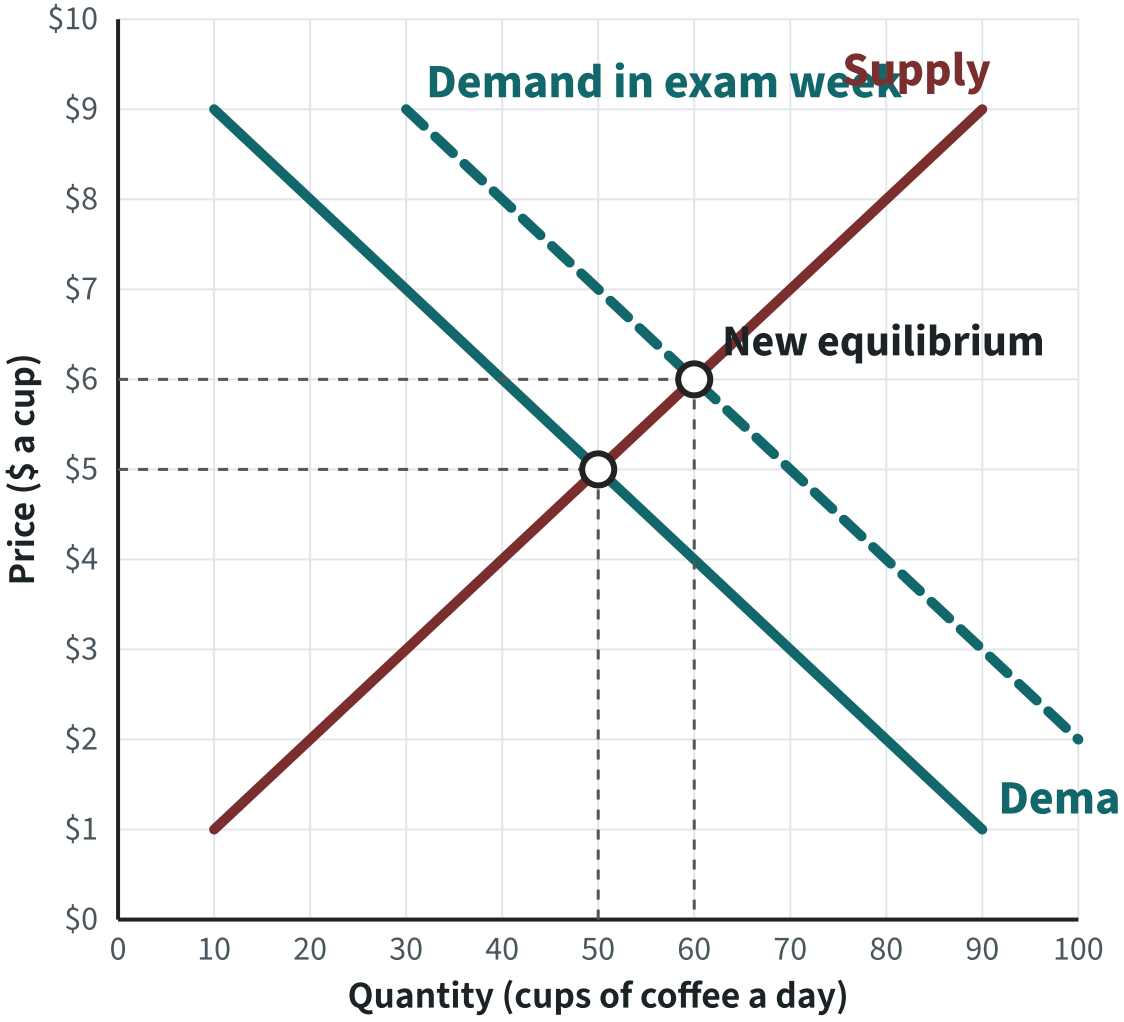
THE MARKET AT WORK

D

Shifts

A change in price moves us along a curve. A change in anything else moves the whole curve.

Exam week: demand shifts right



More students want coffee at every price: $Q_d = 120 - 10P$.

Worked example: exam week

In exam week demand is $Q_d = 120 - 10P$. Supply is unchanged. Find the new price and quantity.

1. $120 - 10P = 10P$
2. $120 = 20P$, so $P = 6$
3. $Q = 10 \times 6 = 60$

$6 a cup, 60 cups a day

What shifts supply

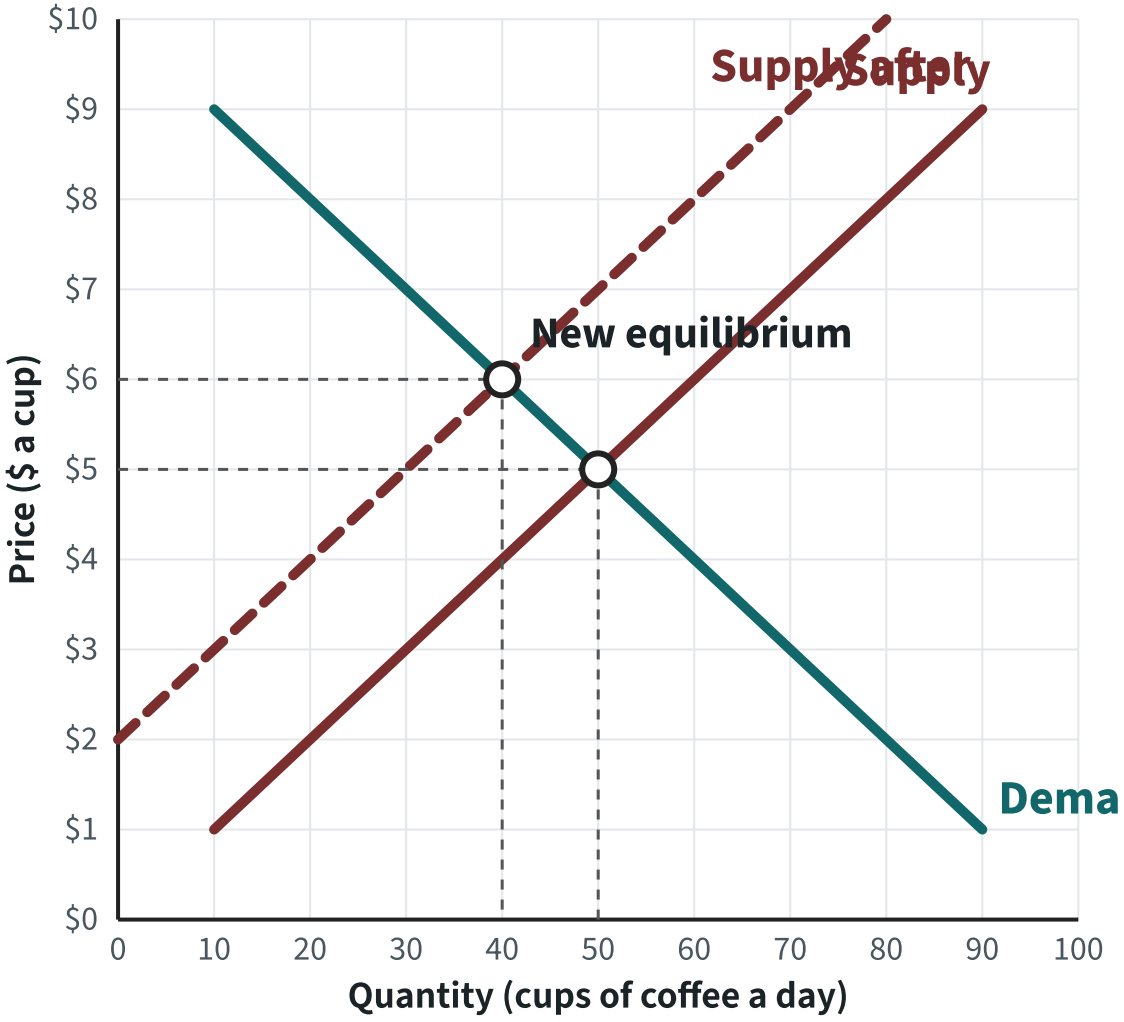
1. **Input prices**
   Milk, beans and cups cost more or less.

2. **Technology**
   A faster machine makes more cups an hour.

3. **Number of sellers**
   A second cart opens by the gym.

4. **Weather and events**
   A broken water pipe closes the cart for a morning.

Milk costs more: supply shifts left



At every price the cart now offers 20 fewer cups: Q_s = 10P − 20.

Worked example: dearer milk

Supply falls to $Q_s = 10P - 20$. Demand is $Q_d = 100 - 10P$. Find the new equilibrium.

1. $100 - 10P = 10P - 20$
2. $120 = 20P$, so $P = 6$
3. $Q = 100 - 60 = 40$

$6 a cup, 40 cups a day

Four shifts, four results

What happens	Price	Quantity
Demand rises	▲ Up	▲ Up
Demand falls	▼ Down	▼ Down
Supply rises	▼ Down	▲ Up
Supply falls	▲ Up	▼ Down

Learn this table. Exam questions are built from it.

When both curves move

Exam week and dearer milk at the same time.

Price

Both push the price up, so it rises for sure. With our numbers: $7.

Quantity

One pushes it up, the other down. Here they cancel: still 50 cups. In general you cannot tell without numbers.

“

Move along the curve, or move the curve? Ask what changed: the price, or something else.

THE QUESTION TO ASK EVERY TIME

E

Elasticity

Elasticity measures how strongly buyers react when the price changes.

Price elasticity of demand

$$E = \%\ \text{change in } Q \div \%\ \text{change in } P$$

The percentage change in cups demanded, divided by the percentage change in price. Above 1 (ignoring the minus sign) is elastic; below 1 is inelastic.

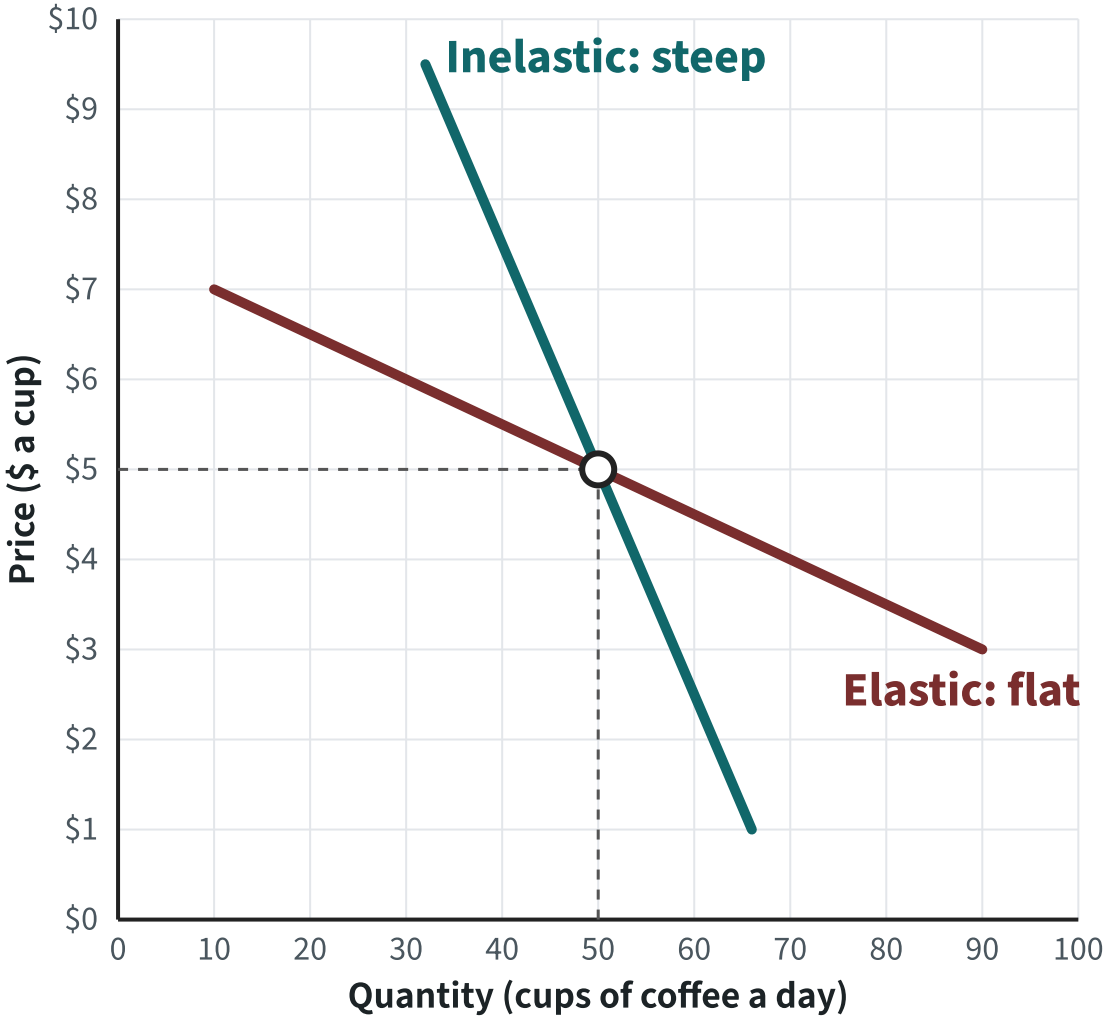
Worked example: from $4 to $5

The price rises from $4 to $5. Cups demanded fall from 60 to 50. Is demand elastic?

1. Price: 1 ÷ 4 = +25%
2. Cups: −10 ÷ 60 = −16.7%
3. E = −16.7 ÷ 25 = −0.67

Inelastic: 0.67 is below 1

Steep and flat demand



Both pass through $5 and 50 cups. A price rise costs the flat one far more customers.

Elastic or inelastic?

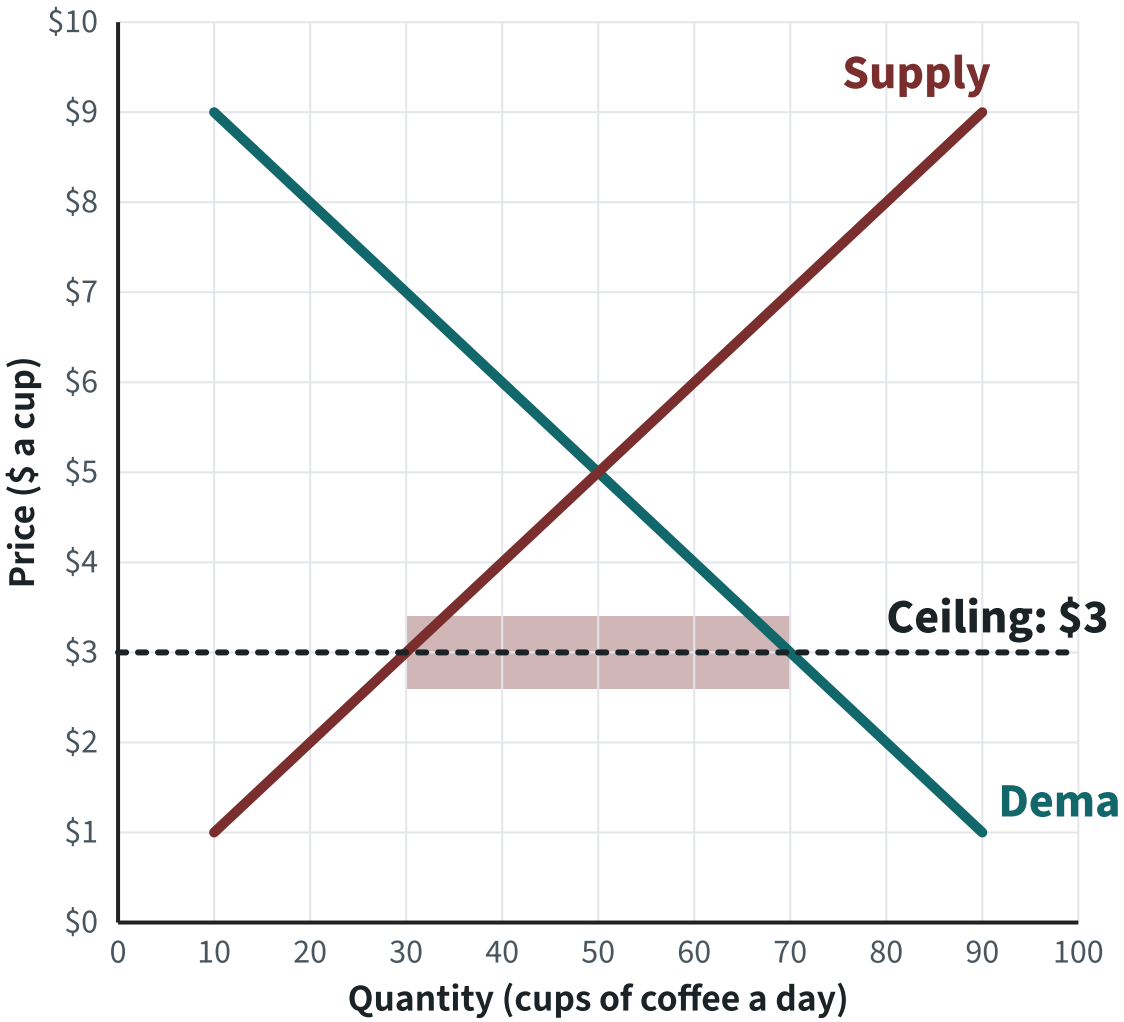
Good	Usually	Why
Coffee from one cart	Elastic	Other carts and cafes nearby
Coffee in general	Inelastic	Few close substitutes for many people
Gas for the car this week	Inelastic	Hard to change how you travel quickly
Concert tickets	Elastic	Easy to stay home
Course textbook	Inelastic	You need it for the exam

F

Price controls

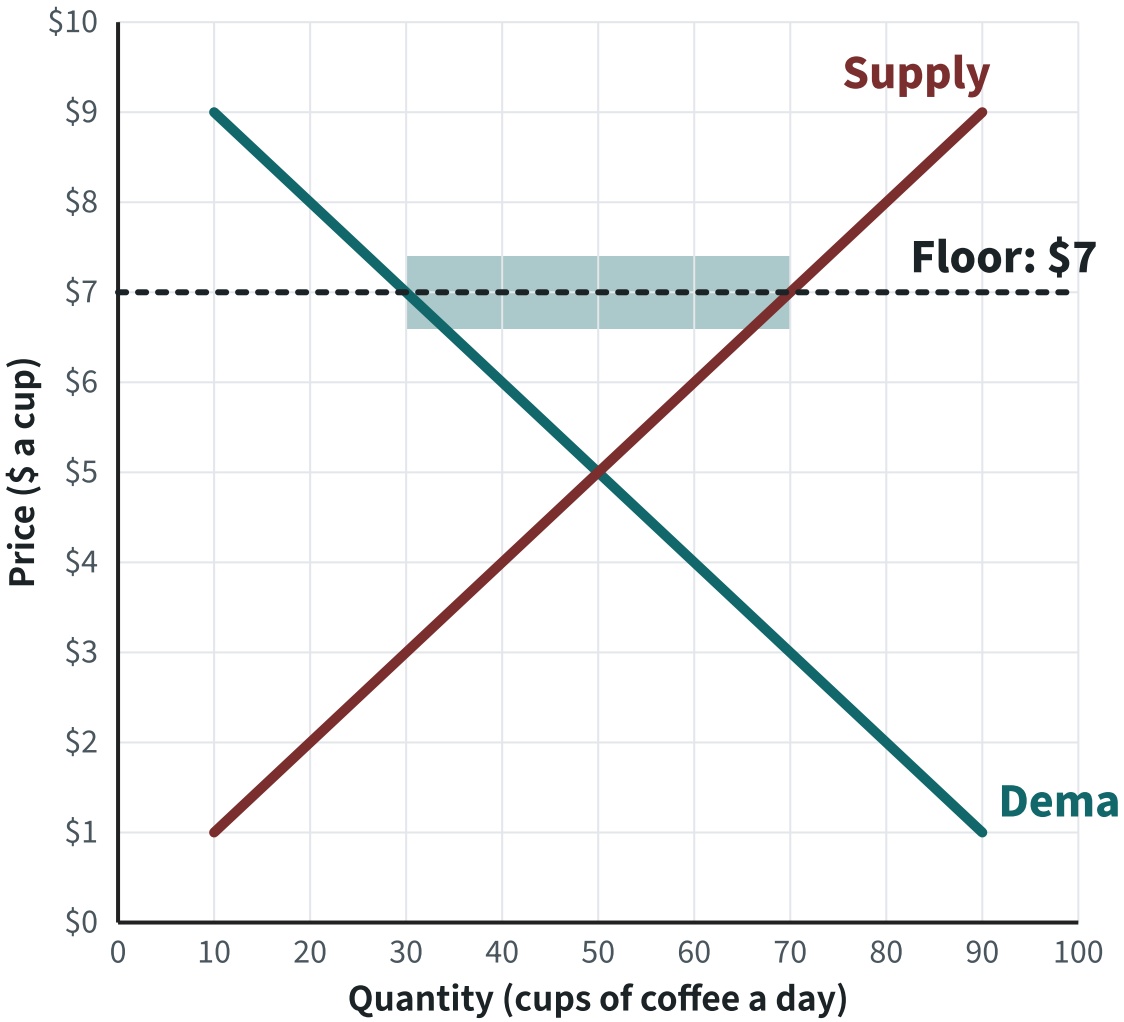
Sometimes a rule sets the price instead of the market. Then the market cannot clear.

A price ceiling at $3



At $3 buyers want 70 cups but the cart offers 30: a shortage of 40 cups.

A price floor at $7



At $7 the cart offers 70 cups but buyers want 30: a surplus of 40 cups.

Worked example: a cap on rents

A town caps apartment rents below the price where supply meets demand. What do you expect?

> **1.** More people want apartments at the low rent.
>
> **2.** Owners offer fewer apartments, or let them run down.
>
> **3.** Waiting lists grow; apartments go to whoever finds them first.

A shortage, not cheaper housing for all

“

A ceiling below the equilibrium makes a shortage. A floor above it makes a surplus.

RULE OF THUMB

The lecture on one page

Idea	In one line
Demand	Higher price, fewer cups wanted
Supply	Higher price, more cups offered
Equilibrium	Where demand meets supply: $5 and 50 cups
Shift	Anything but the price moves the whole curve
Elasticity	How strongly quantity reacts to price
Ceiling and floor	Rules that stop the market clearing

Practice questions

Answers are on the next page. Try them first.

1. At $2 a cup, how many cups do students want? How many does the cart offer?
2. A new cart opens and supply becomes $Q_S = 10P + 20$. Find the new equilibrium.
3. Is the market for one brand of running shoes likely to be elastic? Why?
4. Draw a price floor below the equilibrium. Does it change anything?

Answers

1. 80 wanted, 20 offered: a shortage of 60.
2. $100 - 10P = 10P + 20$, so $P = \$4$ and $Q = 60$ cups.
3. Elastic: many other brands are close substitutes.
4. No. The market price is already above the floor, so the floor never binds.

Next week: who gains from trade?

Lecture 4 measures what buyers and sellers each get out of a market, and what a tax takes away.

Before the lecture

Read chapter 4 of the course reader. Bring your answers to the practice questions to the seminar.

Formula sheet

What	Formula	Our cart
Demand	$Q_d = a - bP$	$100 - 10P$
Supply	$Q_s = c + dP$	$10P$
Equilibrium	$Q_d = Q_s$	$P^* = \$5$, $Q^* = 50$
Elasticity	% change in Q ÷ % change in P	−0.67 from \$4 to \$5
Shortage	$Q_d - Q_s$ below P^*	40 cups at \$3
Surplus	$Q_s - Q_d$ above P^*	40 cups at \$7