Table 10.4

Income Effect and Substitution Effect of a Price Change

When price . . .	consumer purchasing power . . .	The income effect causes quantity demanded to . . .	The substitution effect causes the opportunity cost of consuming a good to . . .
decreases,	increases.	increase for a normal good and decrease for an inferior good.	decrease when the price decreases, which causes the quantity demanded of the good to increase.
increases,	decreases.	decrease for a normal good and increase for an inferior good.	increase when the price increases, which causes the quantity demanded of the good to decrease.

Substitution effect The change in the quantity demanded of a good that results from a change in price making the good more or less expensive relative to other goods, holding constant the effect of the price change on consumer purchasing power.

The Substitution Effect When the price of pizza falls, pizza becomes cheaper *relative* to Coke, and the marginal utility per dollar for each slice of pizza you consume increases. If we hold constant the effect of the price change on your purchasing power and just focus on the effect of the price being lower relative to the price of the other good, we have isolated the **substitution effect** of the price change. The lower price of pizza relative to the price of Coke has reduced the *opportunity cost* to you of consuming pizza because now you have to give up less Coke to consume the same quantity of pizza. Therefore, the substitution effect from the fall in the price of pizza relative to the price of Coke causes you to eat more pizza and drink less Coke. In this case, both the income effect and the substitution effect of the fall in price cause you to eat more pizza. If the price of pizza had risen, both the income effect and the substitution effect would have

Shutdown

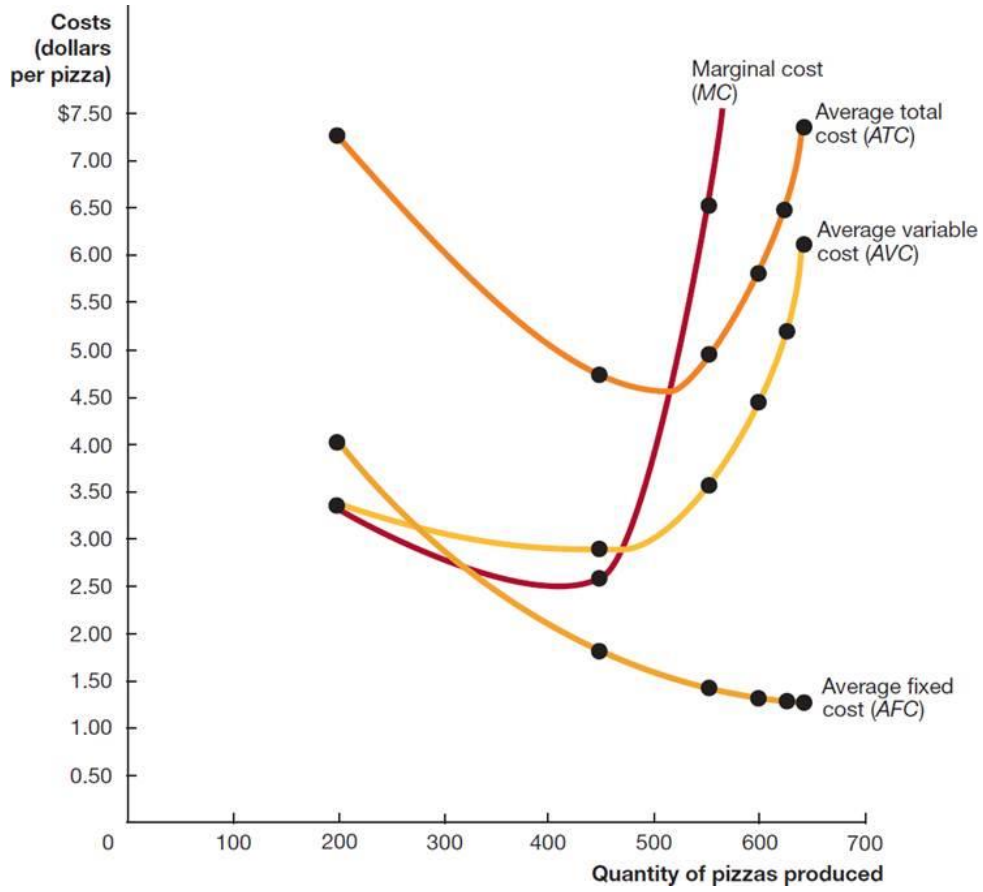
- Given $P = 4$, $Q = 500$, $\text{ATC} = 4.5$, and $\text{AVC} = 3$, why can a firm not avoid losses by shutting down and not producing at all?

- Shutting down can reduce variable costs to zero, but in the short run, the firm has already paid for fixed costs (sunk costs).

- If the firm produces a quantity of zero, it would still make losses because it would still need to pay for its fixed costs.

Sunk Cost

- Suppose that you have signed a contract to rent a machine that costs $750 per month, which is a sunk cost.
- The marginal costs for hiring a worker is $1,500 for the month.
- If the first shut down, it must still pay the rent, but it would not need to hire labor.



Scenarios

1. The store is shut down, there is no need to hire labor, but you face a loss of $750.

2. If you continue to open the store, you earn a revenue of $2,000 for the month, but ultimately experiences a loss of $250.

- In the long run, the store should exit the market. But in the short run, when the price is higher than the AVC, the loss diminishes when the store remains open, so the store should not shut down.

Shutdown Point

- When the price is lower than $\mathrm{ATC} = 4.5$, say $P = 2.5$, shutting down the store yields a loss of \$750.
- If you continue to open the store, you earn a revenue of \$1,250 for the month, but ultimately experiences a loss of \$1,000, which is worse off.
- Only when $P = AVC = 3$, remaining open earns a revenue of _____, while the loss of the store is _____.

3.3 Market Equilibrium: Putting Demand and Supply Together

Use a graph to illustrate market equilibrium.

Market equilibrium is a situation in which quantity demanded equals quantity supplied.

Recall that markets with many buyers and sellers are perfectly competitive markets; a market equilibrium in one of these markets is called a **competitive market equilibrium**.

There are $\square 35$ firms selling athletic shoes; we will assume this is enough to generate competitive behavior in the market for athletic shoes.

Figure 3.7 Market Equilibrium

At a price of $100,

- consumers want to buy 10 million pairs of shoes per week, and
- producers want to sell 10 million pairs of shoes per week

We say the **equilibrium price** in this market is $100, and the **equilibrium quantity** is 10 million pairs of shoes per week.

Since buyers and sellers want to trade the same quantity at the price of $100, we do not expect the price to change.

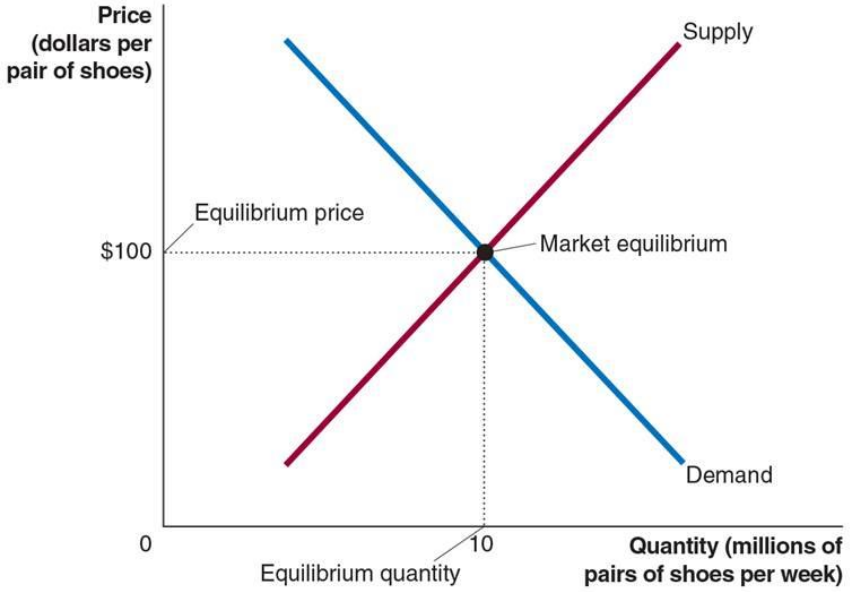


Figure 3.8 The Effect of Surpluses and Shortages on the Market Price (1 of 2)

What if the price were $125 instead?

At a price of $125,

- consumers want to buy 9 million pairs of shoes, while
- producers want to sell 11 million pairs.

This gives a **surplus** of 2 million pairs; a situation in which quantity supplied is greater than quantity demanded.

Prediction: sellers will compete amongst themselves, driving the price down.

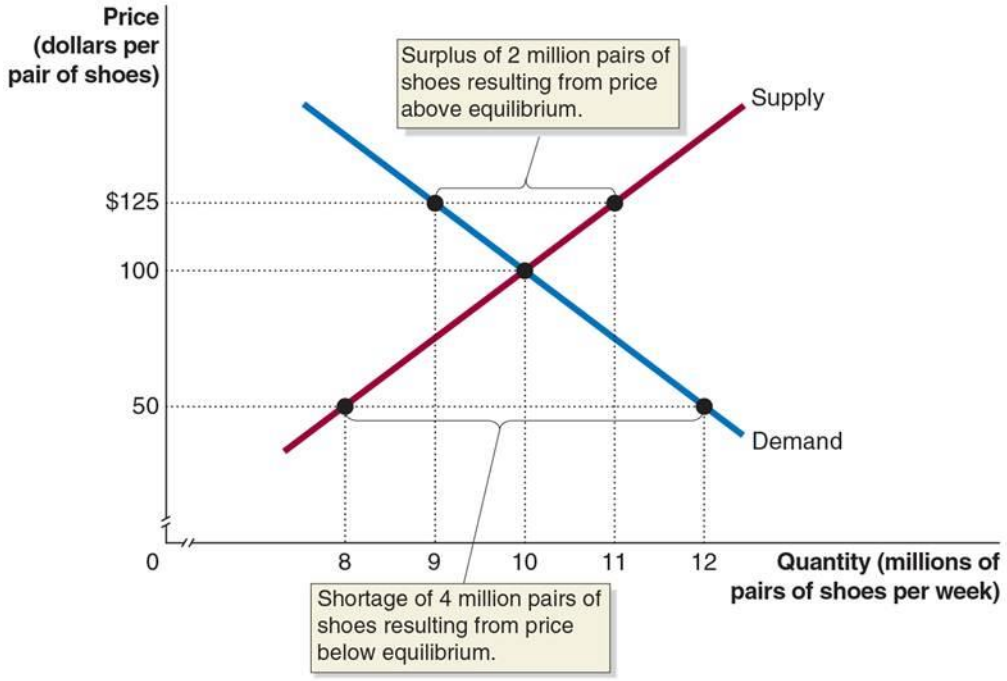


Figure 3.8 The Effect of Surpluses and Shortages on the Market Price (2 of 2)

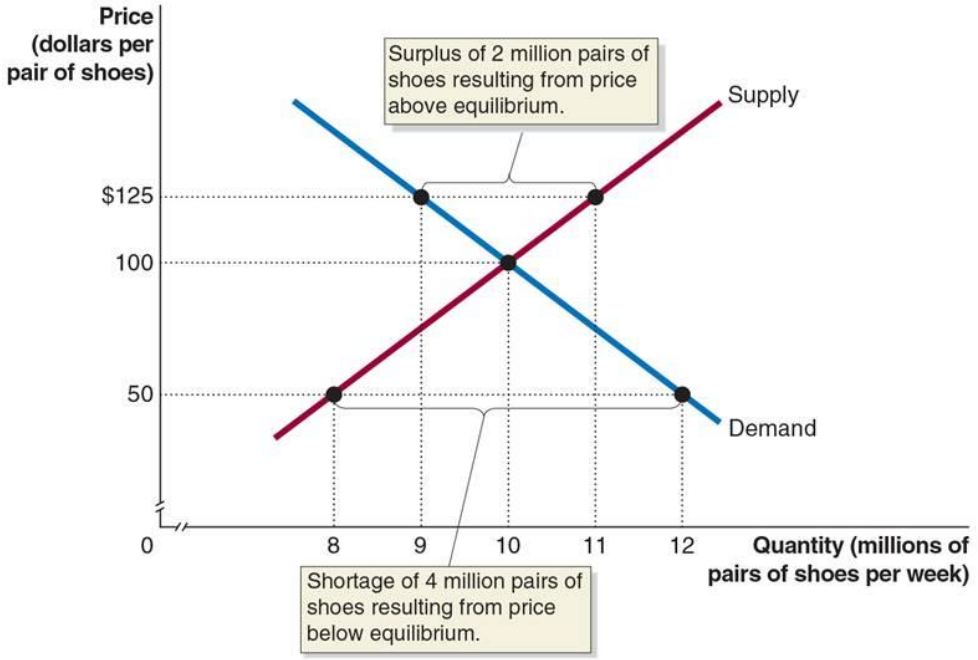
Now what if the price were $50 ?

At a price of $50,

- consumers want to buy 12 million pairs of shoes, while
- producers want to sell 8 million.

This gives a **shortage** of 4 million pairs of shoes; a situation in which quantity demanded is greater than quantity supplied.

Prediction: sellers will realize they can increase the price and still sell as many pairs of shoes, so the price will rise.



Demand and Supply Both Count

Price is determined by the **interaction** of buyers and sellers.

Neither group can dictate price in a competitive market (i.e. one with many buyers and sellers).

However **changes in supply and/or demand** will affect the price and quantity traded.

3.4 The Effect of Demand and Supply Shifts on Equilibrium

Use demand and supply graphs to predict changes in prices and quantities.

Predictions about price and quantity in our model require us to know supply and demand curves.

- Typically, we know price and quantity but **do not know** the curves that generate them.

The power of the demand and supply model is in its ability to predict **directional changes** in price and quantity traded.

Figure 3.9 The Effect of an Increase in Demand on Equilibrium

Suppose incomes increase. What happens to the equilibrium in the athletic shoe market?

Athletic shoes are a **normal good**, so as income rises, demand shifts to the right

$(D_1 \text{ to } D_2)$.

- Equilibrium price rises

$(P_1 \text{ to } P_2)$.

- Equilibrium quantity rises

$(Q_1 \text{ to } Q_2)$.

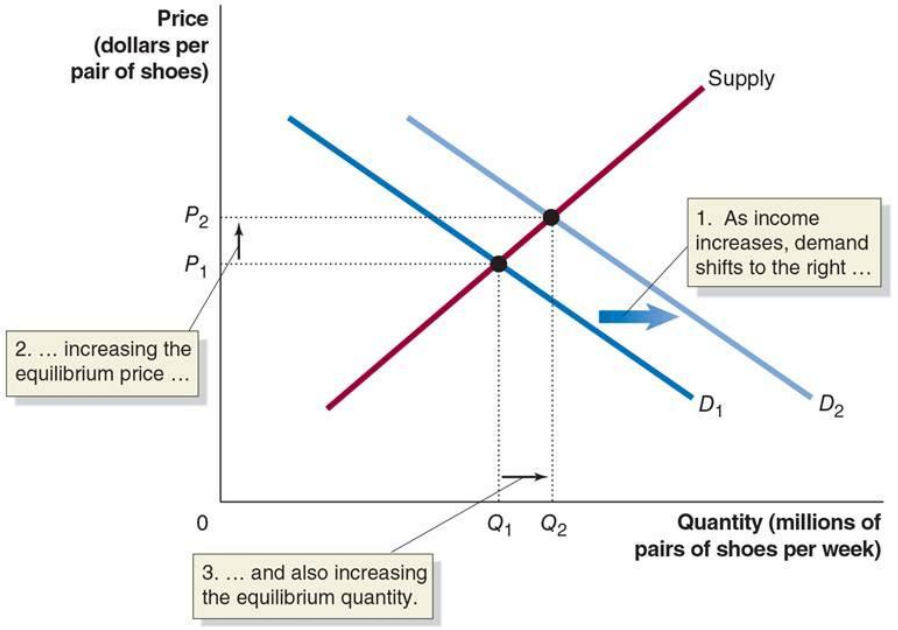


Figure 3.10 The Effect of an Increase in Supply on Equilibrium (1 of 2)

The graph shows the market for athletic shoes as a new shoemaker, Allbirds, enters the market.

When Allbirds enters, more shoes are supplied at any given price—an increase in supply from S_1 to S_2.

- Equilibrium price falls from P_1 to P_2.
- Equilibrium quantity rises from Q_1 to Q_2.

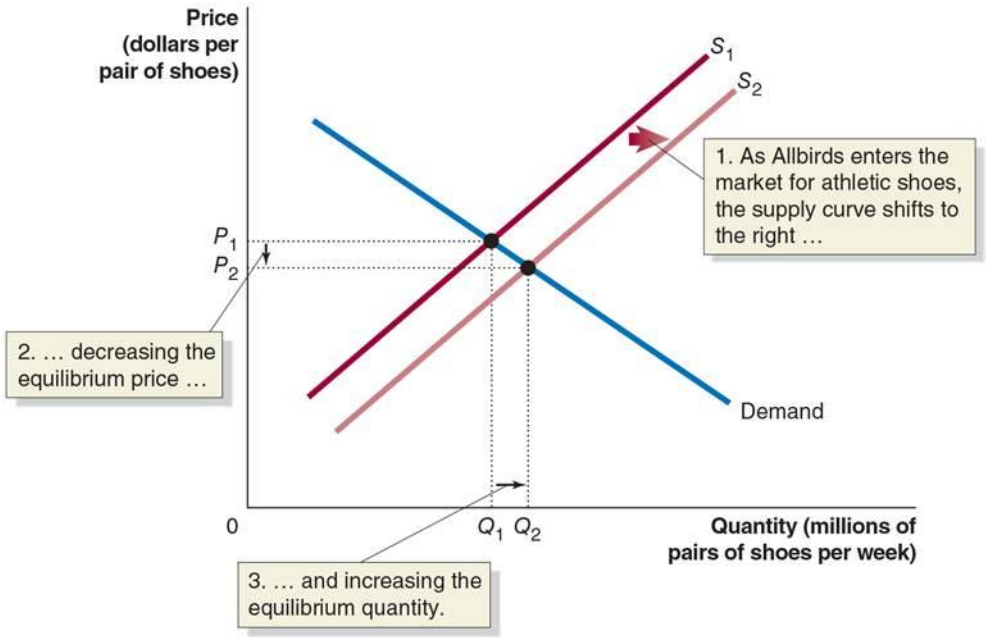


Figure 3.10 The Effect of an Increase in Supply on Equilibrium (2 of 2)

By how much will price fall? By how much will quantity rise?

We cannot say, without knowing more information.

For now, we can only predict that price will fall and quantity traded will rise.

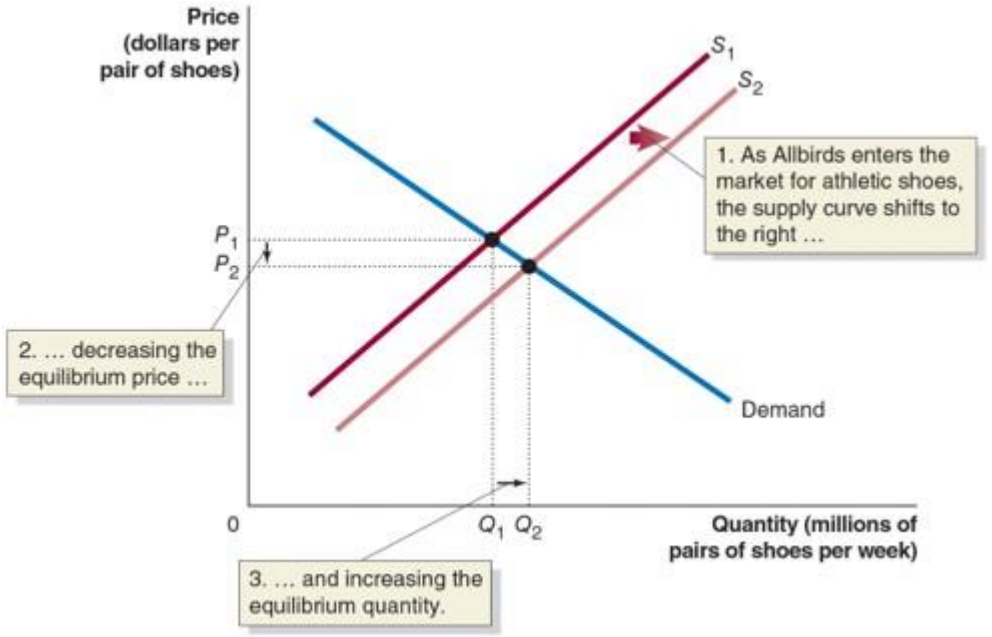


Table 3.3 How Shifts in Demand and Supply Affect Equilibrium Price (*P*) and Quantity (*Q*) (1 of 2)

	Supply Curve Unchanged	Supply Curve Shifts to the Right	Supply Curve Shifts to the Left
Demand Curve Unchange	*Q* unchanged *P* unchanged	*Q* increases *P* decreases	*Q* decreases *P* increases
Demand Curve Shifts to the Right	*Q* increases *P* increases		
Demand Curve Shifts to the Left	*Q* decreases *P* decreases		

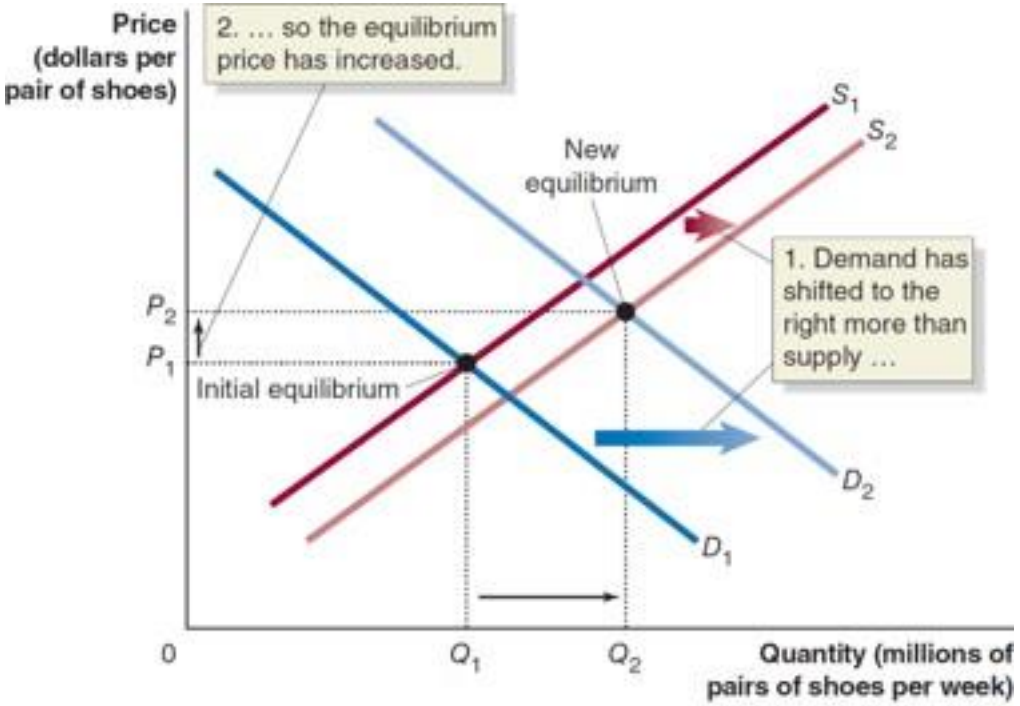
The table summarizes what happens when the demand curve shifts **or** the supply curve shifts, with the other curve remaining unchanged.

Figure 3.11 Shifts in Demand and Supply over Time (1 of 3)

Over time, it is likely that **both** demand and supply will change.

For example, as new firms enter the market for athletic shoes **and** incomes increase, we expect:

- The supply curve will shift to the right, **and**
- The demand curve will shift to the right.



(a) Demand shifting more than supply

Figure 3.11 Shifts in Demand and Supply over Time (2 of 3)

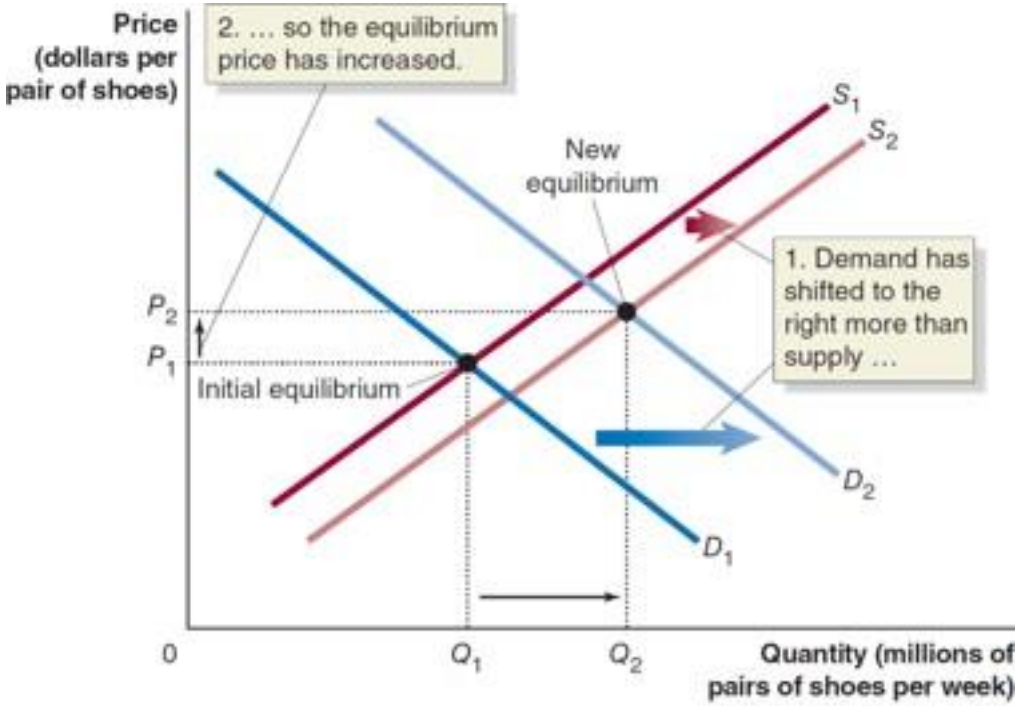
What does our model predict?

$$S \uparrow \rightarrow \left(P \downarrow \text{and } Q \uparrow\right)$$

$$D \uparrow \rightarrow \left(P \uparrow \text{and } Q \uparrow\right)$$

So we can be sure equilibrium quantity will rise, but the effect on equilibrium price is not clear.

This panel shows demand shifting more than supply: equilibrium price and quantity both rise.



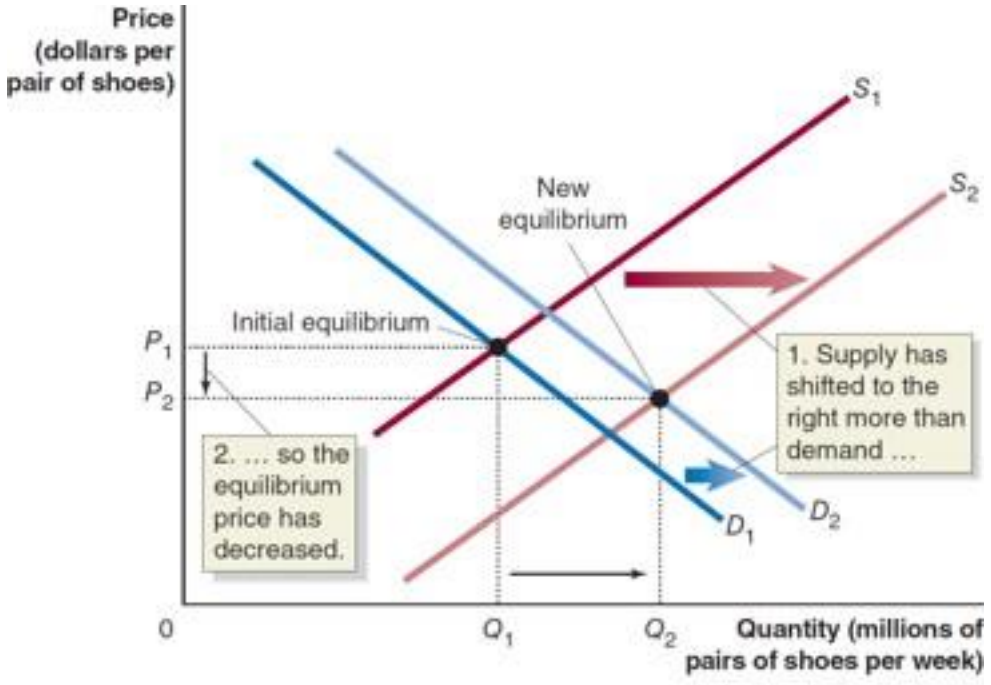
(a) Demand shifting more than supply

Figure 3.11 Shifts in Demand and Supply over Time (3 of 3)

This panel shows supply shifting more than demand: quantity rises, but equilibrium price falls.

Without knowing the relative size of the changes, the effect on equilibrium price is ambiguous.

It is possible, but unlikely, that the equilibrium price will remain unchanged.



(b) Supply shifting more than demand

Table 3.3 How Shifts in Demand and Supply Affect Equilibrium Price (*P*) and Quantity (*Q*) (2 of 2)

	Supply Curve Unchanged	Supply Curve Shifts to the Right	Supply Curve Shifts to the Left
Demand Curve Unchanged	*Q* unchanged *P* unchanged	*Q* increases *P* decreases	*Q* decreases *P* increases
Demand Curve Shifts to the Right	*Q* increases *P* increases	*Q* increases *P* increases, decreases, or is Unchanged	*Q* increases, decreases, or is unchanged *P* increases
Demand Curve Shifts to the Left	*Q* decreases *P* decreases	*Q* increases, decreases, or is unchanged *P* decreases	*Q* decreases *P* increases, decreases, or is unchanged

We can now fill in the rest of Table 3.3.

The cell in red is the example that we just did.

4.2 The Efficiency of Competitive Markets

Explain the concept of economic efficiency.

We can think about efficiency in a market in two ways:

1. A market is efficient if all trades take place where the **marginal benefit** exceeds the **marginal cost**, and no other trades take place.
2. A market is efficient if it maximizes the sum of consumer and producer surplus (i.e. the total net benefit to consumers and firms), known as the **economic surplus**.

Figure 4.5 Marginal Benefit Equals Marginal Cost Only at the Competitive Equilibrium (1 of 2)

Recall that the demand curve describes the marginal benefit of each additional cup of tea, while the supply curve describes the marginal cost of each additional cup of tea.

If the quantity is too low, the value to consumers of the next unit exceeds the cost to producers.

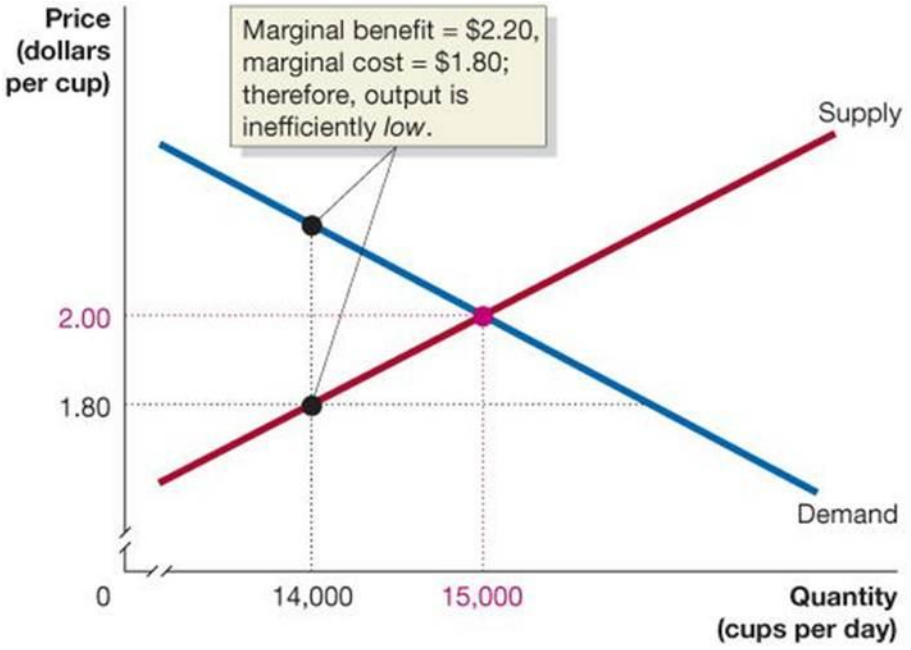


Figure 4.5 Marginal Benefit Equals Marginal Cost Only at the Competitive Equilibrium (2 of 2)

If the quantity is too high, the cost to producers of the last unit is greater than the value consumers derive from it.

Only at the competitive equilibrium is the last unit valued by consumers and producers equally—economic efficiency.

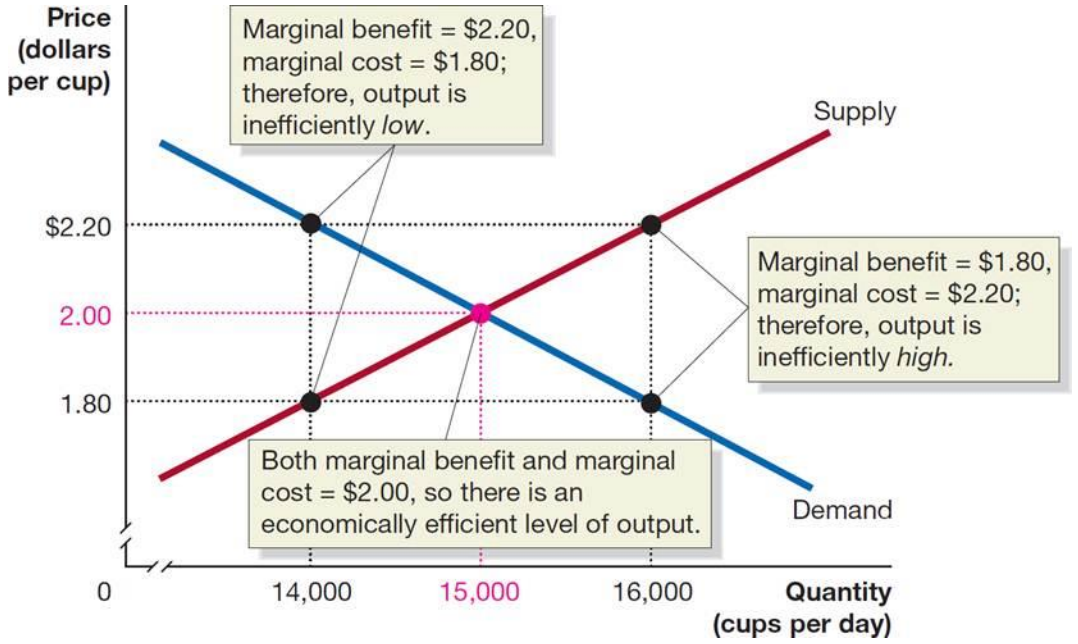
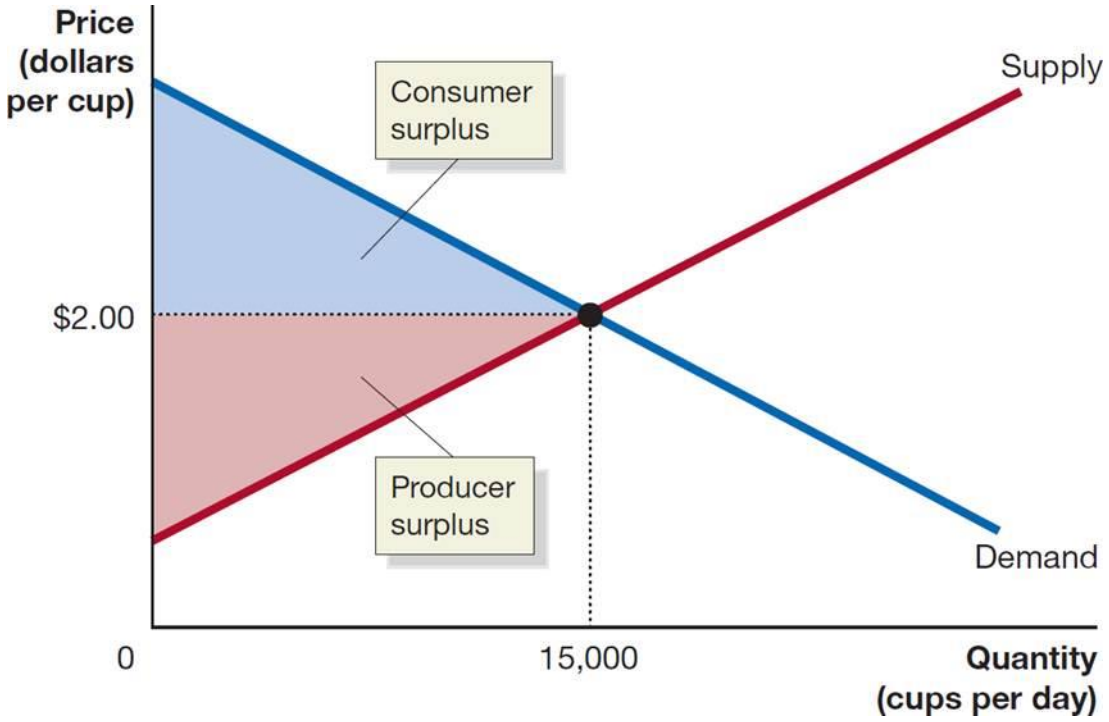


Figure 4.6 Economic Surplus Equals the Sum of Consumer Surplus and Producer Surplus

The figure shows the economic surplus (the sum of consumer and producer surplus) in the market for chai tea.

At the competitive equilibrium quantity, the economic surplus is maximized.

Our two concepts of economic efficiency result in the same level of output!



Economic Efficiency

Since our two ideas of economic efficiency coincide, we are in a position to define economic efficiency:

Economic efficiency: A market outcome in which the marginal benefit to consumers of the last unit produced is equal to its marginal cost of production and in which the sum of consumer surplus and producer surplus is at a maximum.

Figure 4.7 When a Market Is Not in Equilibrium, There Is a Deadweight Loss (1 of 2)

When the price of chai tea is $2.20 instead of $2.00, consumer surplus declines from an amount equal to the sum of areas *A*, *B*, and *C* to just area *A*.

Producer surplus increases from the sum of areas *D* and *E* to the sum of areas *B* and *D*.

Economic surplus decreases by the sum of areas *C* and *E*.

-	At Competitive Equilibrium	At a Price of $2.20
Consumer surplus	*A+B+C*	*A*
Producer surplus	*D+E*	*B+D*
Deadweight loss	*None*	*C+E*

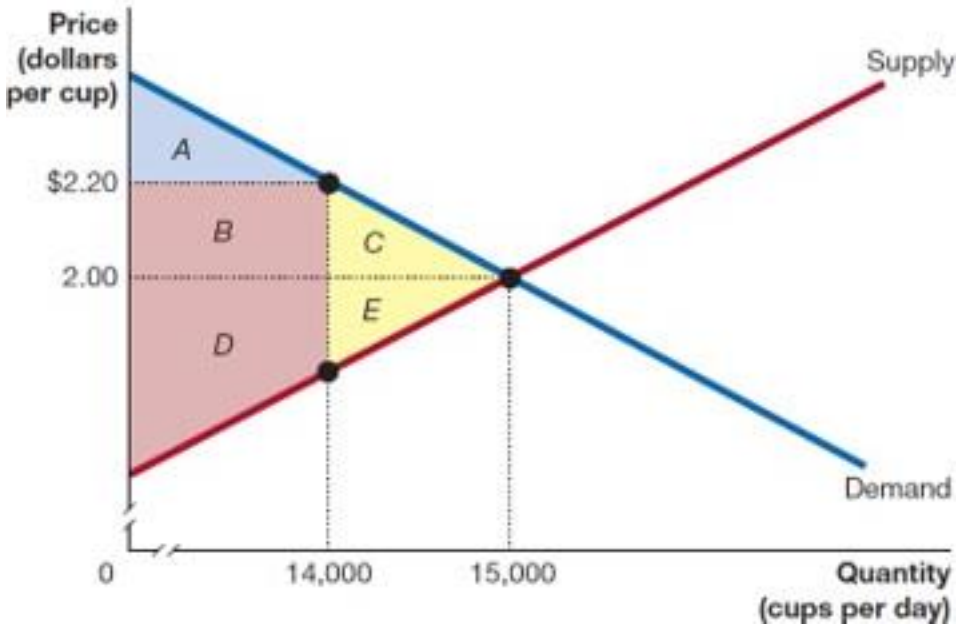
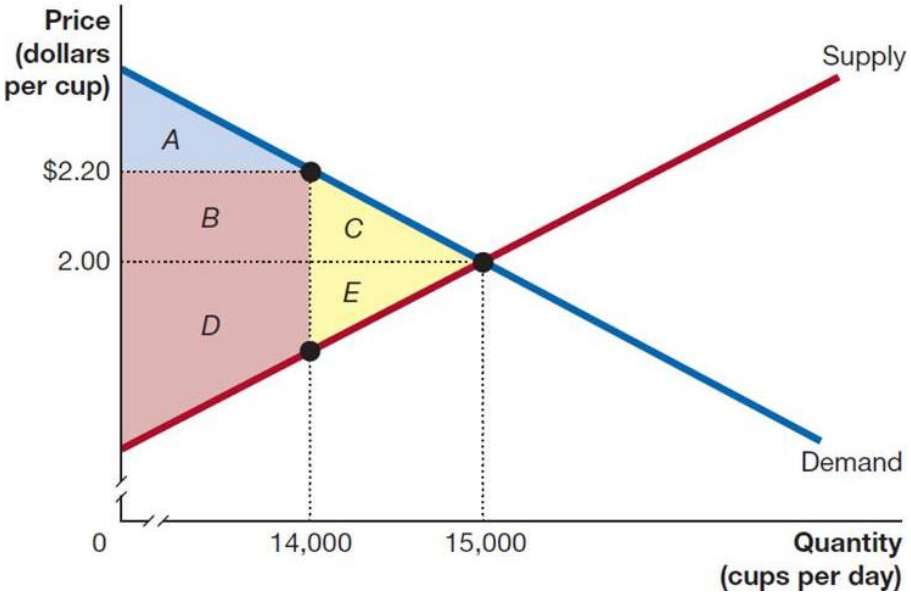


Figure 4.7 When a Market Is Not in Equilibrium, There Is a Deadweight Loss (2 of 2)

The reduction in economic surplus resulting from a market not being in competitive equilibrium is known as **deadweight loss**.

Deadweight loss can be thought of as the amount of inefficiency in a market. In competitive equilibrium, deadweight loss is zero.

	At Competitive Equilibrium	At a Price of $2.20
Consumer surplus	*A+B+C*	*A*
Producer surplus	*D+E*	*B+D*
Deadweight loss	*None*	*C+E*



4.3 Government Intervention in the Market: Price Floors and Price Ceilings

Explain the economic effect of government-imposed price floors and price ceilings.

One option a government has for affecting a market is the imposition of a **price ceiling** or a **price floor.**

- **Price ceiling**: A legally determined maximum price that sellers may charge.
- **Price floor**: A legally determined minimum price that sellers may receive.

Price ceilings and floors in the USA are uncommon, but include:

- Minimum wages
- Rent controls
- Agricultural price controls

Figure 4.8 The Economic Effect of a Price Floor in the Wheat Market (1 of 2)

The equilibrium price in the market for wheat is $\$6.50$ per bushel; 2.0 billion bushels are traded at this price.

If wheat farmers convince the government to impose a price floor of $\$8.00$ per bushel, quantity traded falls to 1.8 billion.

Area *A* is the surplus transferred from consumers to producers.

Economic surplus is reduced by area $B + C$, the deadweight loss.