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Module 3: Markets: Basic Demand and Supply

Introduction

The material in this unit covers the basic demand and supply model used in economics to describe market outcomes in perfectly competitive markets, discussed more thoroughly in another module. This model is a critical component of the economist's analytical tool kit. The module introduces how highly competitive markets operate and the concepts of demand and supply. Specifically, it explains and illustrates the concepts of equilibrium price and quantity and the effects of changes in demand or supply on the equilibrium. Here we go!

Learning objectives

When you are done with this lesson, you should be able to:

1. [Define and give an example of a market.](#)
2. [Compare and illustrate demand, the law of demand, and maximum willingness to pay.](#)
3. [List, apply and illustrate the determinants of demand and distinguish between a change in demand versus a change in quantity demanded.](#)
4. [Compare and illustrate supply, the law of supply, and minimum supply price, also referred to as minimum willingness to accept.](#)
5. [List, apply and illustrate the determinants of supply and distinguish between a change in supply versus a change in quantity supplied.](#)
6. [Define, illustrate, and determine equilibrium price and quantity, shortage, and surplus.](#)
7. [Analyze the effects of changes in supply and/or demand on equilibrium price and quantity.](#)
8. [Differentiate among the types of auctions.](#)



Image 1: Do not buy gas today!

IT HAS BEEN CALCULATED THAT IF EVERYONE IN THE UNITED STATES AND CANADA DID NOT PURCHASE A DROP OF GASOLINE FOR ONE DAY AND ALL AT THE SAME TIME, THE OIL COMPANIES WOULD CHOKED ON THEIR STOCKPILES.

AT THE SAME TIME, IT WOULD HIT THE ENTIRE INDUSTRY WITH A NET LOSS OF OVER 4.6 BILLION DOLLARS WHICH AFFECTS THE BOTTOM LINES OF THE OIL COMPANIES.

THEREFORE, SEPTEMBER 1st HAS BEEN FORMALLY DECLARED "STICK IT UP THEIR BEHIND" DAY AND THE PEOPLE OF THESE TWO NATIONS SHOULD NOT BUY A SINGLE DROP OF GASOLINE THAT DAY.

THE ONLY WAY THIS CAN BE DONE IS IF YOU FORWARD THIS E-MAIL TO AS MANY PEOPLE AS YOU CAN AND AS QUICKLY AS YOU CAN TO GET THE WORD OUT.

WAITING ON THE GOVERNMENT TO STEP IN AND CONTROL THE PRICES IS NOT GOING TO HAPPEN. WHAT HAPPENED TO THE REDUCTION AND CONTROL IN PRICES THAT THE ARAB NATIONS PROMISED TWO WEEKS AGO?

REMEMBER ONE THING, NOT ONLY IS THE PRICE OF GASOLINE GOING UP BUT AT THE SAME TIME AIRLINES ARE FORCED TO RAISE THEIR PRICES, TRUCKING COMPANIES ARE FORCED TO RAISE

THEIR PRICES WHICH EFFECTS PRICES ON EVERYTHING THAT IS SHIPPED. THINGS LIKE FOOD, CLOTHING, BUILDING MATERIALS, MEDICAL SUPPLIES ETC. WHO PAYS IN THE END? WE DO! WE CAN MAKE A DIFFERENCE. IF THEY DON'T GET THE MESSAGE AFTER ONE DAY, WE WILL DO IT AGAIN AND AGAIN.

PROFITS FOR OVERSEAS OWNED AMERICAN OIL COMPANIES LIKE EXXON MOBIL ARE AT RECORD LEVELS.

SO DO YOUR PART AND SPREAD THE WORD. FORWARD THIS EMAIL TO EVERYONE YOU KNOW. MARK YOUR CALENDARS AND MAKE SEPTEMBER 1ST A DAY THAT THE CITIZENS OF THE UNITED STATES AND CANADA SAY "ENOUGH IS ENOUGH"

 Q 3.1

Mark as: None 

After reading this, do you think it will work?

Select an answer and submit. For keyboard navigation, use the up/down arrow keys to select an answer.

- | | |
|---|---------------|
| a | Yes |
| b | No |
| c | Maybe |
| d | I do not know |

 Show submitted answer

 Show correct answer

Check My Answer

3.1 Define and give an example of a market.

Markets



Image 2: A farmer's market

One of the ways to allocate limited resources to satisfy unlimited wants is through **markets**ⁱ. Markets allow for specialization and exchange. For markets to function, well-defined property rights are critical. Understanding how markets work is vital to our ability to answer the "what," "how," and "for whom" questions.

Markets are nothing more than an environment where two groups of **suppliers**ⁱ and **demander**sⁱ come together to trade or exchange. Markets are everywhere. Some examples include the stock market, the supermarket, eBay, and even someone posting a tweet on their Twitter account about someone else. If there are suppliers and demanders, there will always be markets.

Also, markets can be considered an economic system that allocates resources. In perfectly competitive markets, supply and demand across markets through relative prices determines this allocation. Have you ever wondered why diamonds are so expensive, but water is relatively cheap? Why is college tuition rising while the price of smartphone services is falling? And what about wages, which is the price of labor? Why does a professional soccer player earn a six-figure salary while a high school custodial worker earns significantly less? Aren't both jobs equally important? Of course, all markets do not have the characteristics of perfectly competitive markets. This difference is why we will cover several types of market structures over the semester, including monopoly, oligopoly, and monopolistic competition.

For all markets, however, we focus on two crucial variables: price and quantity. In addition to determining how scarcity is solved, markets signal the relative value of a good or service by finding the market price. In other words, prices signal which goods or services are relatively scarce (high price) and relatively abundant (low price). Typically, the market price is the more relevant variable compared to quantity.

It is not hard to find examples of markets in everyday life: gasoline or black shoes. Have you ever thought about the market for gossip? Think about it. If someone says, "you'll never believe what I heard." another says, "tell me." What would you be willing to pay to either spill the beans or get the dirt on someone else?

The price of certain things can signal the relative scarcity, like in the case of an eastern wise man vs. the relative abundance of a few words from a couple of wise guys. There is a reason why people often describe giving one's opinion as "giving me your two cents." It is because thoughts are very abundant; thus, the relative value is small.

3.2 Compare and illustrate demand, the law of demand, and maximum willingness to pay.

Law of Demand

Let us focus on **demand**⁽ⁱ⁾. Demand is very closely related to wants, which remember are unlimited. On the other hand, income limits our demand. In other words, in many circumstances, you may want something; however, you cannot demand it because you do not have the income to purchase it. So, demand for a particular good is a way to identify which wants are most important to the consumer. More precisely, demand is a relationship between the price and maximum quantity demanded of an item in a given time, holding everything else constant.

Additionally, demand refers to the maximum quantity demanded at each price. Alternatively, economists define demand as the maximum willingness to pay for each unit of a good or service. Time refers to demand per day, month, year, etc. On the other hand, quantity demanded is the maximum amount of that good you want (are willing to purchase) at a particular price.

The inverse relationship between price and quantity demanded is known as the **law of demand**⁽ⁱ⁾. If a good or service price increases, the **opportunity cost**⁽ⁱ⁾ of consuming that good or service increases. So, as a good or service price increases, the quantity demanded decreases and vice versa. One explanation for this relationship is **decreasing marginal benefit**⁽ⁱ⁾. That principle says as we consume more and more of each additional unit of a good or service, the less we would be willing to pay for each additional unit of a good or service.

Two other explanations help to understand the relationship between price and quantity demanded, the **substitution effect**⁽ⁱ⁾ and the **income effect**⁽ⁱ⁾. Suppose the price of a good increases. The substitution effect says if the price of a good or service increases, the consumer is motivated to buy less

of the good. The income effect says if the price of a good or service increases, **purchasing power**ⁱ decreases and the consumer's overall buying power decreases.



Image 3: If each candy bar was \$1.00, how many do you want?

Assigned as Review ^①

Q 3.2

If your favorite candy bar was \$1, how many candy bars would you buy today?

Responses

Reply

Showing Only Professors and Mine Ordered by Newest Responses



 Q 3.3

If your favorite candy bar was \$0.50, how many candy bars would you buy today?

 Responses ReplyShowing Only Professors and Mine Ordered by Newest Responses  hidden,

11 days ago

10000000000

Comments  0  1 hidden,

12 days ago

200000-0

Comments  0  1

Price	Quantity
\$0.00	12
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0

Figure 1: A Demand Schedule

Let us construct a **demand schedule** ^① based on the demand for candy. Recall, demand is a relationship between price and quantity demanded. If we assume I am selling you candy at different prices, we can determine your quantity demanded. For example, if I am selling candy at 50 cents, what quantity of candy would you be willing to buy? Let us say it is 10. Now I increase the price to \$1.00; chances are your quantity demanded would decrease to eight. If the price increases to \$2.00, you reduce your quantity demanded to four. Increasing candy prices a few times allows us to create the demand schedule for candy.

Based on the previous demand schedule, we can create the **demand curve** ^①. Before we do, always make sure to label your axis. Price is always on the vertical axis, while quantity demanded is always on the horizontal axis

Price of Candy

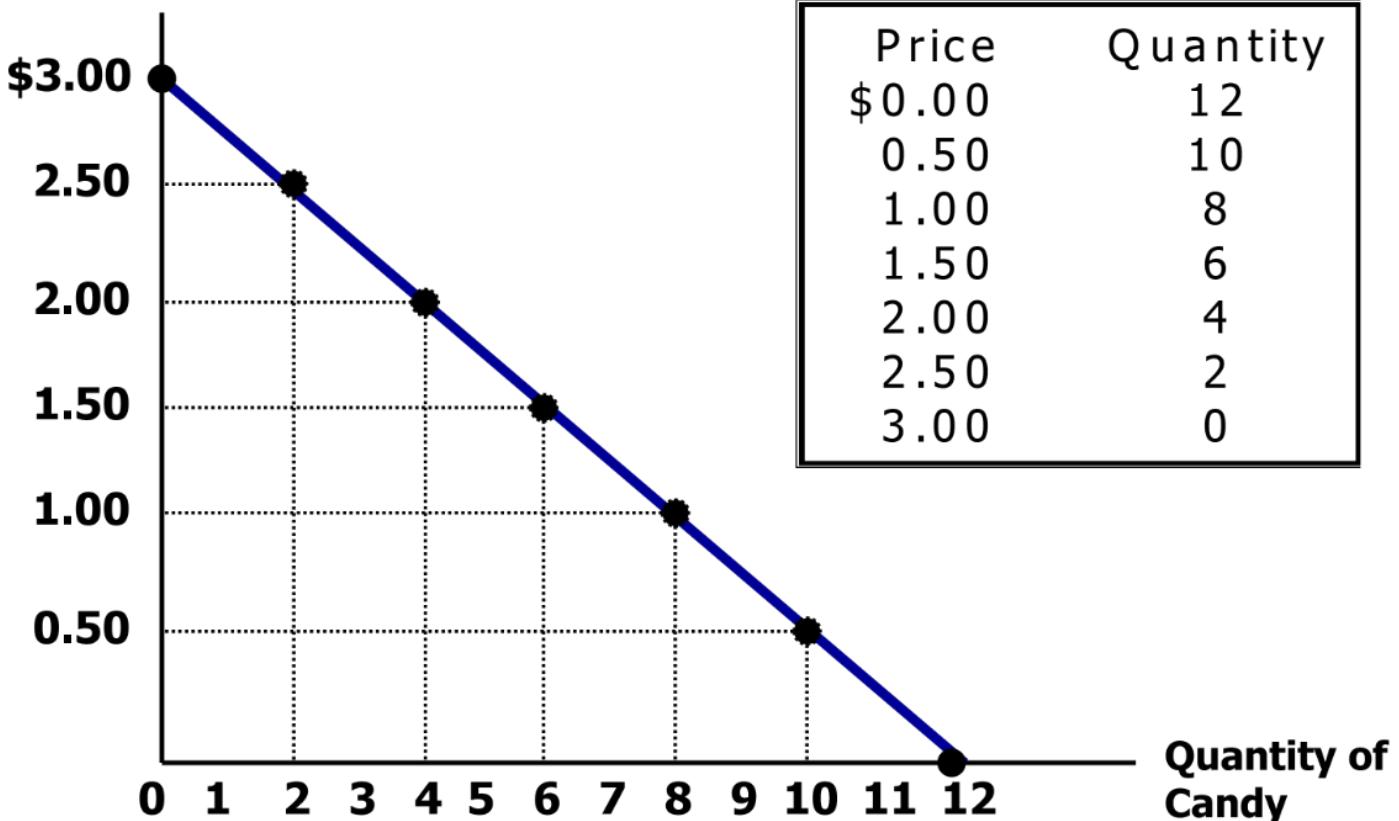


Figure 2: A demand curve and schedule

We plot the price and quantity points from the previous demand schedule, and voila, create a demand curve. Notice the inverse relationship between price and quality demanded shown by the downward sloping demand curve illustrating the law of demand.

Demand reflects what you are willing and able to pay for the quantity of a good or service in a given time (i.e., candy). It is based on the valuation you assign to various amounts of that good, your preferences for other goods, your income or wealth, etc. In turn, this valuation reflects the perceived benefit you expect to gain from that amount of candy. Does this sound familiar? It should since it is the marginal benefit curve.

3.3 List, apply and illustrate the determinants of demand and distinguish between a change in demand versus a change in quantity demanded.

Changes in Demand



Image 4: What does not affect the demand for a bottle of Coke?

Q 3.4

Mark as: None ▾

Which of the following will NOT shift the demand curve for Coke?

Select an answer and submit. For keyboard navigation, use the up/down arrow keys to select an answer.

a An increase in income.

b An increase in the price of Coke.

c A decrease in the number of Coke drinkers.

d An increase in taxes on all soda buyers.

e None of the above.

Show submitted answer

Show correct answer

Check My Answer

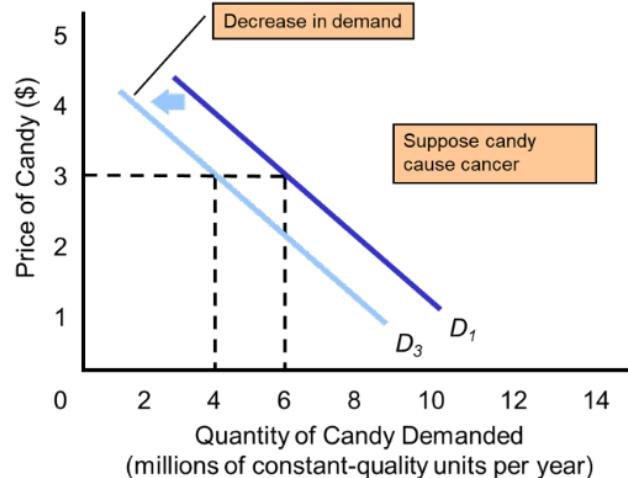
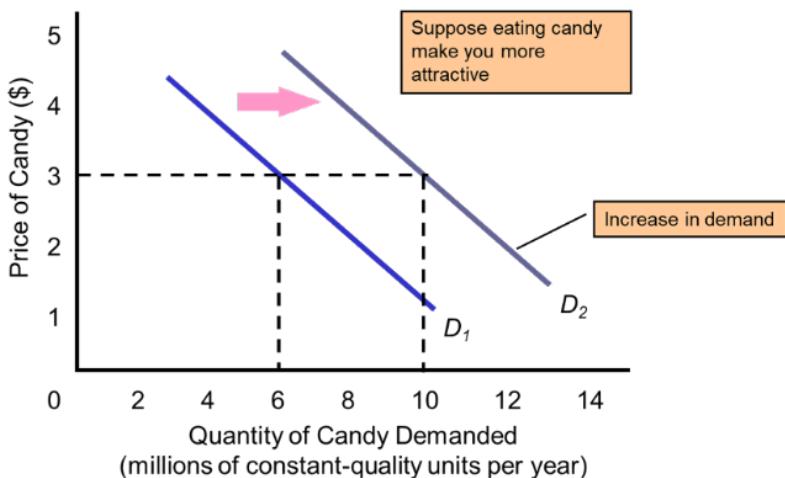


Figure 3: Shifting the demand curve

After constructing the demand curve, let us consider the factors or determinants shifting the demand curve. Many factors affect our ability to buy goods and services. Recall, choices imply a tradeoff, and tradeoffs have opportunity costs. Assume you are watching TV (YouTube) and a commercial for candy comes on, and you recognize a famous actor who states how they were unattractive before they started eating candy. If the actor in this commercial has you believing that you can increase your attractiveness if you just buy and eat candy, then it is likely you will increase your demand for candy. An increase in demand illustratively shifts the demand curve to the right. As demand increases, the quantity demanded increases at all prices.

On the other hand, if a medical report states eating candy causes cancer, demand will likely decrease, and the demand curve shifts to the left. As demand decreases, the quantity demanded decreases at each price.

Study Tip: One way to remind yourself how the change in demand shifts the demand curve. "I" is the first vowel in both increase and right. "E" is the first vowel in both decrease and left.

Here is a list of the determinants or factors affecting demand **ceteris paribus** ⓘ: Our demand model conveys that if there is a change in one or more of these factors, demand changes (shifts).

Determinants of demand

Income

Normal

Inferior

Tastes and preferences

The price of related goods in consumption

Complements

Substitutes

Taxes and subsidies on consumption

Expectations

Future prices

Income

Market size (number of buyers)

Change in income

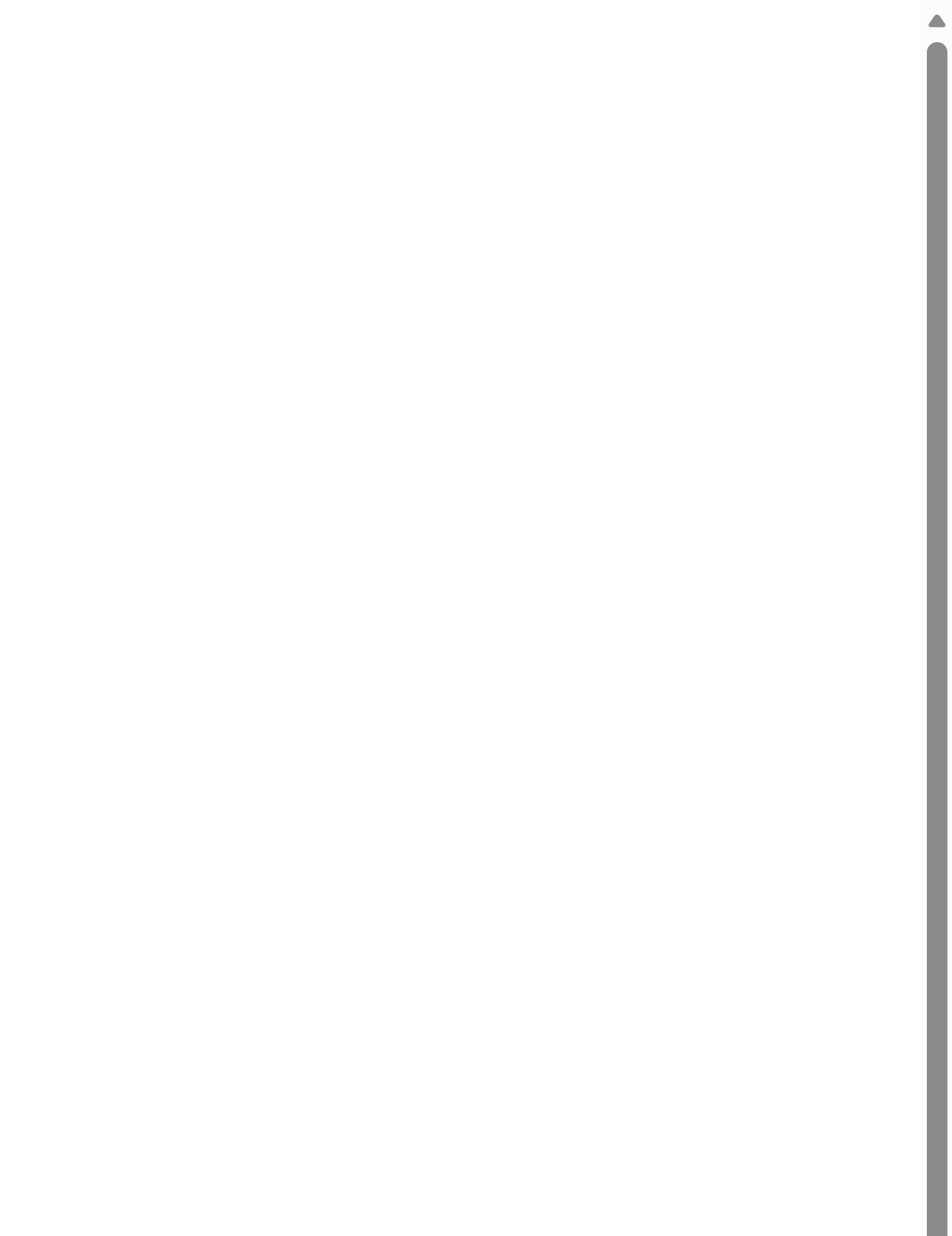




Image 5: Pizza is likely a normal good.

Normal goods ⁱ directly correlate with demand. For example, if your income increases due to a raise at work, you will demand more normal goods, such as chicken or pizza, ceteris paribus.



Image 6: Mac and cheese is likely an inferior good.

Inferior goods ⁱ are indirectly related to demand. As your income increases, your demand for inferior goods goes down. There is nothing wrong with macaroni and cheese, but it may be considered an inferior good for you.

Note that whether a good is a normal or inferior good for you depends on your particular circumstances, which may change over time. Importantly, inferior in this case is NOT defined by some notion that you consider the good "bad" relative to other goods. That may be true, but what makes a good an inferior good is whether you increase (decrease) your demand for that good when your income falls (increases). Test your understanding of this idea. Does it make sense that as your income increases, many goods you consume become inferior goods as you find alternatives?

Changes in tastes and preferences

As your tastes and preferences change, which might be due to a recent advertisement you have seen recently, your demand changes. If you prefer a good more, the demand for that good increases due to your tastes changing.

 Q3.5

Mark as: None 

If two goods are substitutes, the price of one good has a _____ relationship with the demand for the other good. If two goods are compliments the price of one good has a _____ relationship with the demand for the other good.

Select an answer and submit. For keyboard navigation, use the up/down arrow keys to select an answer.

a positive; inverse.

b positive; positive.

c inverse, positive.

d inverse, inverse.

 Show submitted answer

 Show correct answer

Check My Answer

Changes in the price of related goods in consumption

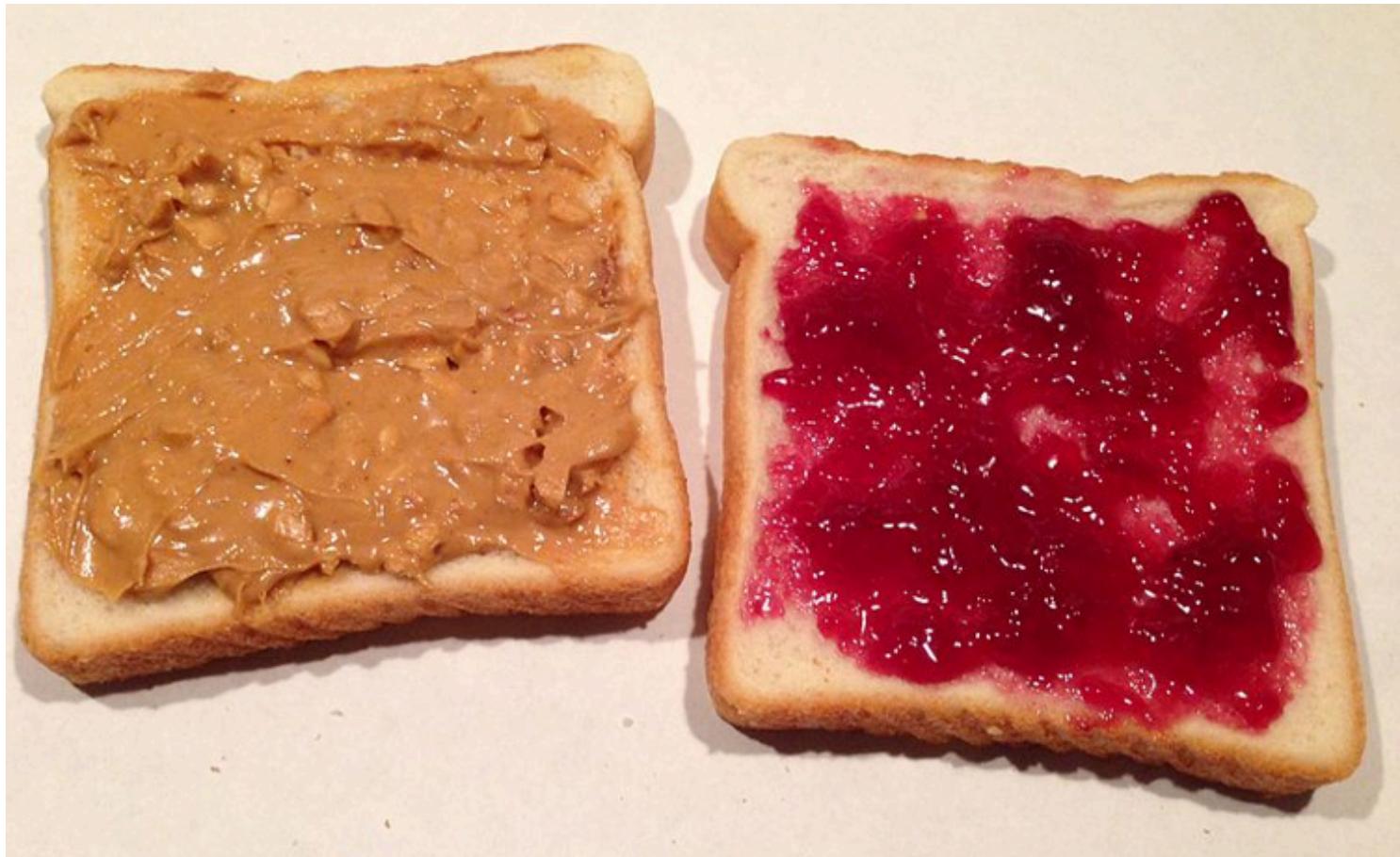


Image 7: Two complementary goods in consumption: peanut butter and jelly

Complementary goods in consumptionⁱ are (two) goods consumed together, like peanut butter and jelly, hot dogs and hot dog buns, or even cookies and milk.

Here we must be careful. Changing the price of one of the complementary goods has an opposite effect on the other complementary good's demand curve. Ceteris paribus, if the price of peanut butter increases, the demand for jelly decreases since peanut butter and jelly must go together. When the price of peanut butter rises, a peanut butter and jelly sandwich is now more expensive. Thus, you would demand less jelly.



Image 4, Image 8: Two substitute goods in consumption: Coke and Pepsi

Suppose you are **indifferent** between consuming two goods. In that case, these goods are (perfect) **substitute goods in consumption**ⁱ like Coke and Pepsi, or coffee and tea. Based on your preferences, there should be no difference between these two goods.

There is a direct relationship between the substitute price of one good and the demand for the other substitute good. For example, if the price of Pepsi increases, then the demand for Coke increases because Coke is now the relatively cheaper good.

Changes in taxes and subsidies on consumption

Increases in the **taxes on consumption**ⁱ decrease demand, while increases in the **subsidies on consumption**ⁱ increase demand.

Changes in expectations

If you change your expected income or the future price of a good, you may change your demand for a good or service today. Suppose you are considering buying a car and are going to borrow the money from a bank. If you get new information that interest rates may increase next month, that may change your current willingness (demand) to purchase a car sooner. By the way, this example suggests how the "price" of a loan is the interest rate you pay to get that loan.

Changes in the market size (number of buyers)

If the number of buyers increases, the demand for a good or service will increase.

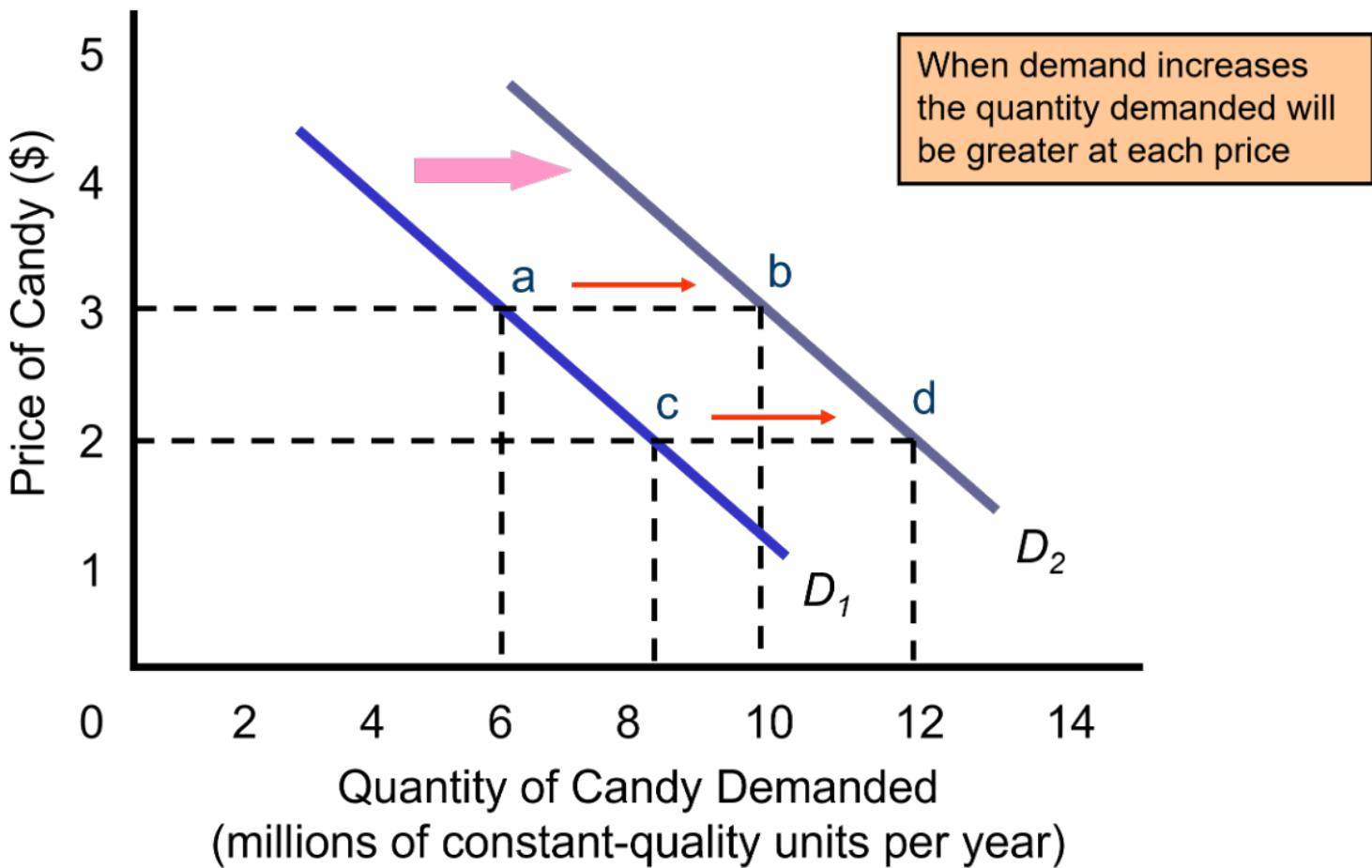
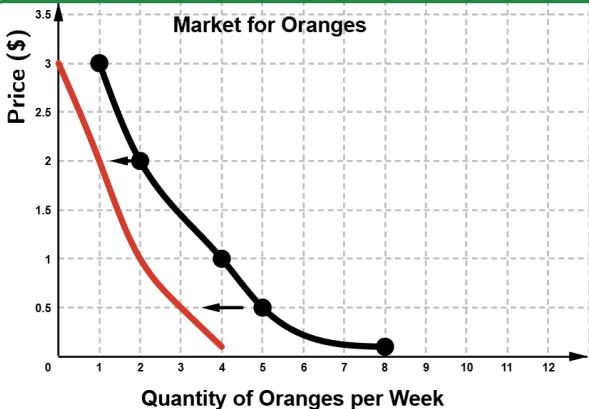


Figure 4: A change in demand and quantity demanded

Completing the list of demand determinants brings us to one of the critical points in this module, distinguishing between movements along the demand and supply curves and times when the entire curves shift to a new location.

Graphing Practice 3.1

In the graph below, the demand for oranges decreases. Using the data in the table, plot the new demand curve.



Price	Quantity (Original)	Quantity (New)
\$3.00	1	0
\$2.00	2	1
\$1.00	4	2
\$0.50	5	3
\$0.10	8	4

Correct Answer

Show: My Answer

Correct Answer

Reset Question

Changes in Demand vs. Changes in Quantity Demanded (moving along a demand curve)

Curve ball

Let us differentiate between a change in demand versus a change in quantity demanded as we move along a demand curve. Demand changes from a change in one of the non-price determinants discussed above. A change in demand shifts the demand curve. Note that when demand changes, the quantity demanded changes at each price.

However, the opposite is not valid. Quantity demanded changes along a demand curve only due to a change in the price of that (own) product or service. **A change in quantity demanded causes a movement along the demand curve.** So, when the price changes, consumers change "how much" of the good or service they wish to buy. There is no change in demand since price and quantity demanded are part of demand. These variables do not essentially change demand.

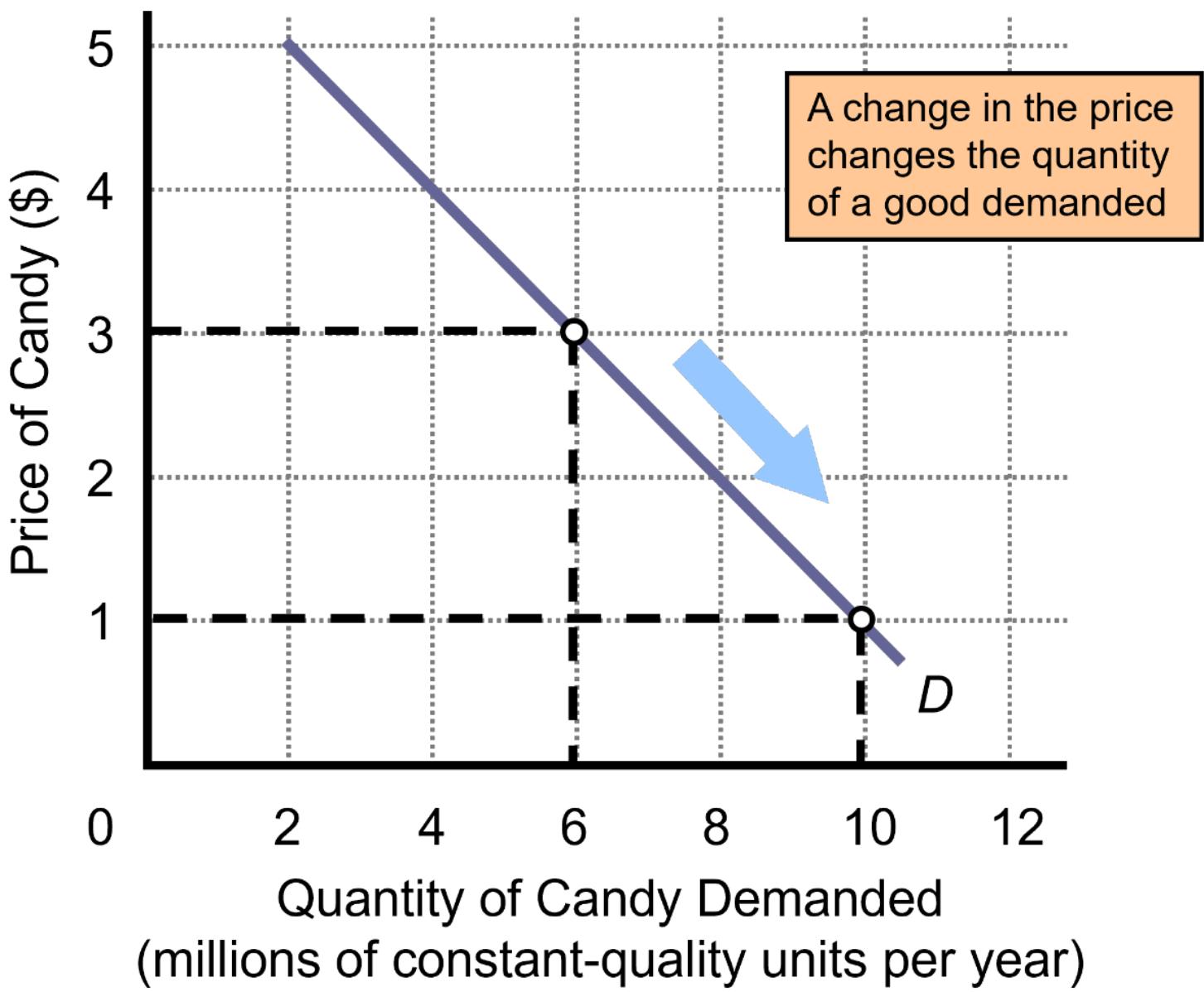
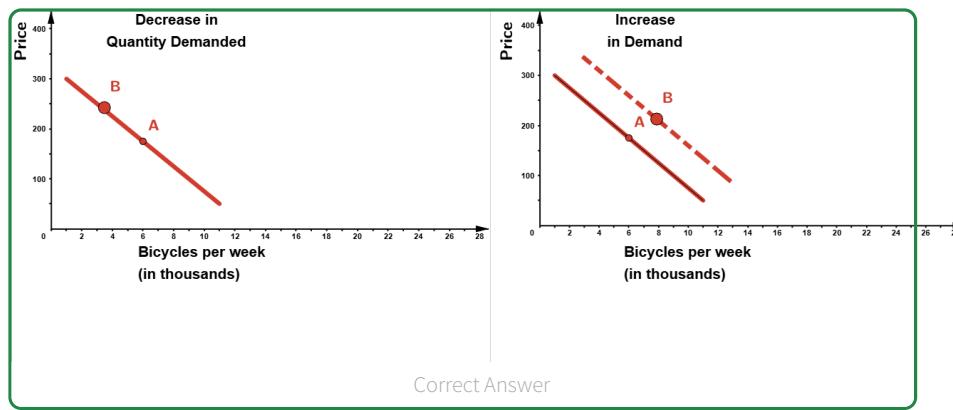


Figure 5: A change in quantity demanded

Graphing Practice 3.2

On the graphs below, show a decrease in the quantity demanded and an increase in demand.

Hint: Quantity demanded is affected by price. A change in demand shifts the entire curve.



Show:

My Answer

Correct Answer

Reset Question

3.4 Compare and illustrate supply, the law of supply, and minimum supply price, also referred to as minimum willingness to accept.



Image 9: Producing toilet paper

After finishing a basic understanding of demand, let us focus on **supply** ⁽¹⁾. People often forget about this market segment when they try to understand markets. Remember, it is *supply* and demand.

Be careful with this topic. Most people can relate to demand since they often buy goods and services as a consumer. But not everyone can relate to supply since it is much less intuitive due to our lack of experience producing a good or service. How often have you sold something and wondered how much to charge? So, viewing supply from a business owner's standpoint may be beneficial. If you owned a business producing a good or service, how would you respond to changes in the price of the good or service you supply? What if your costs to make a good or service increase? As a business owner, how would you respond?

Supply, like demand, is the relationship between price and quality supplied. Just like income constrains your demand curve, resources and technology constrain your supply curve. The **law of supply**ⁱ represents a direct relationship between price and quantity supplied. What explains this relationship? In a word, it is **profit**ⁱ. Ceteris paribus, if the price a producer receives for its product increases, the producer has a profit motive to increase the amount they provide per period. Note: Labor supply yields the same result. If wages increase for a given occupation, more workers are willing to work in that occupation.

Price	Quantity
\$0.00	0
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5

Figure 6: A supply schedule

Just like demand, let us create a **supply schedule**ⁱ for candy. We use the same technique for supply as we did for demand. As the price of the good or service changes, suppliers determine how much quantity supplied for that good or service is produced. For example, if the price is \$1.00, how much candy would you be willing to produce (supply)? At the price of \$2.00, how much candy would you be willing to supply? Again, we see this positive or direct relationship between price and quantity supplied.

Before we construct our **supply curve**ⁱ, based on our supply schedule, make sure to label the axes correctly: the price is on the vertical axis, and the quantity is on the horizontal axis.

Price of Cookies

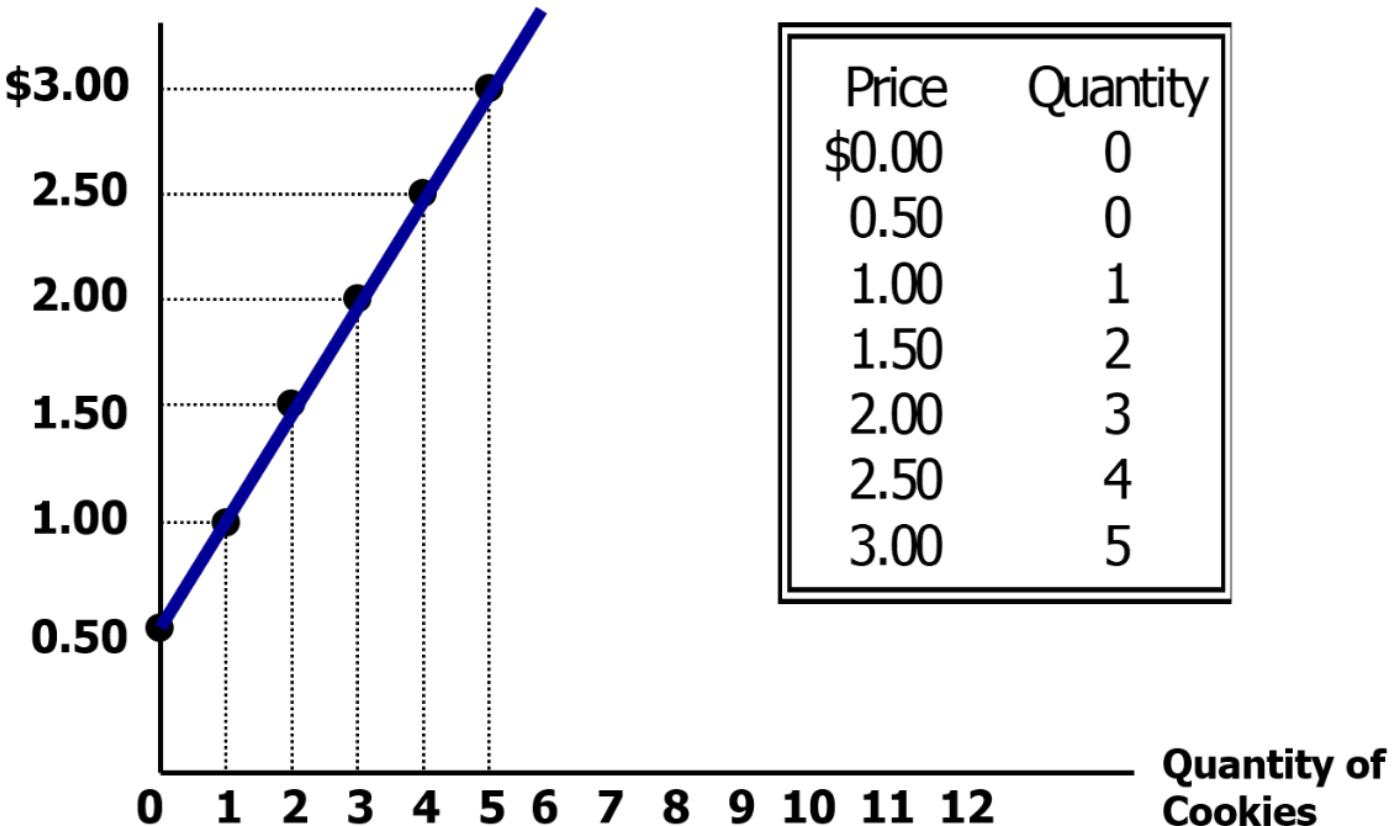


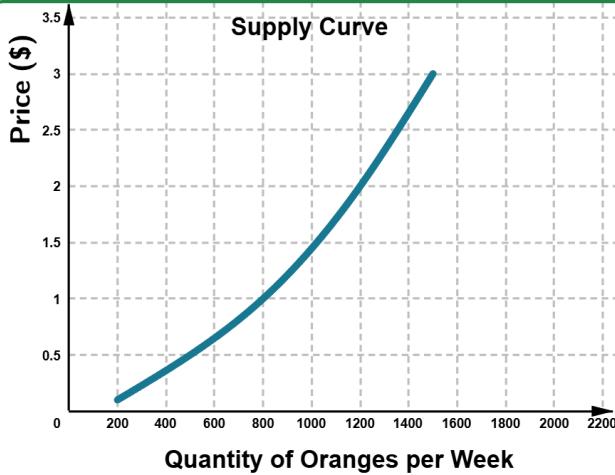
Figure 7: A supply curve and a supply schedule

We plot the price and quantity points using the supply schedule to construct the supply curve. The upward shape of the supply curve illustrates the [law of supply](#). If the price of the good or service increases, then the quantity supplied of the good or service increases and vice versa.

The supply curve is also called the minimum price or willingness to accept curve. If you want to be a successful or profitable producer of candy, then the lowest price you would be willing to accept to supply a certain amount of candy is the marginal cost to produce that amount of candy. So, the supply curve is the marginal cost curve.

Graphing Practice 3.3

Using the data in the table, plot a supply curve for an individual firm growing oranges.



Correct Answer

Show: My Answer

Correct Answer

Reset Question

3.5 List, apply and illustrate the determinants of supply and distinguish between a change in supply versus a change in quantity supplied.

Producers also face choices, tradeoffs, and opportunity costs. Many factors affect their ability to sell goods and services. When factors affecting the production or supply of candy, other than the price of candy, change, supply changes, and the supply curve shifts. For example, if your costs to produce candy (ex. the price of sugar) decrease, your supply of candy increases (you would be willing to offer more candy at each price). So, your supply curve increases or shifts to the right because your costs of providing candy decreased. In other words, you are willing and able to supply more goods and services at all prices.

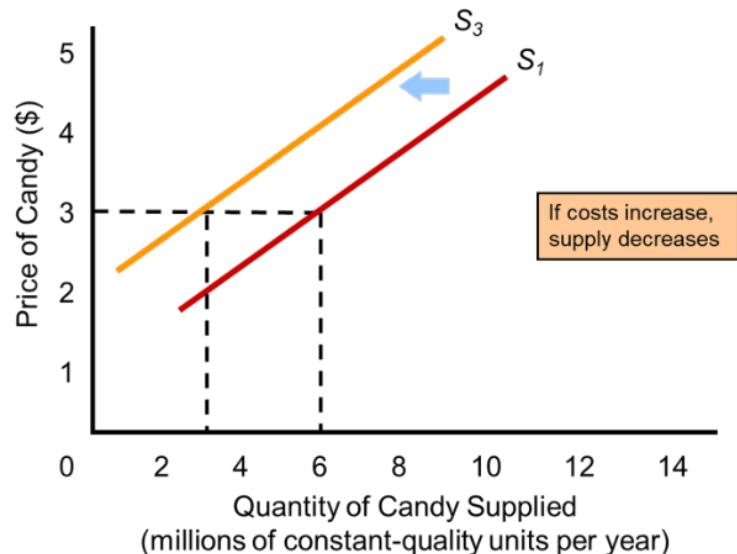
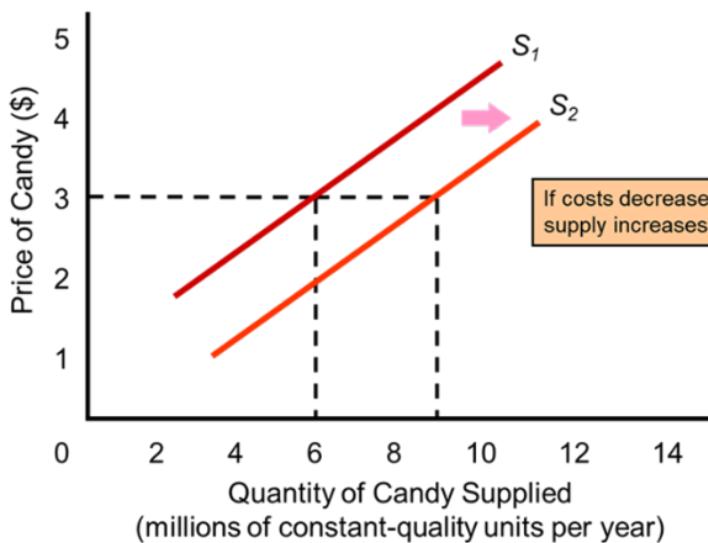


Figure 8: Shifting the supply curve

Remember, the supply curve shifting to the right illustrates an increase in supply. Like demand and quantity demanded, quantity supplied increases at each price when supply increases.

On the contrary, if **costs increase for producing a particular good**, then the supply of that good decreases. As a result, the supply curve would shift to the left.

Study Tip: One way to remind yourself how the change in supply shifts the supply curve. "I" is the first vowel in both increase and right. "E" is the first vowel in both decrease and left.

Here is a list of the non-price determinants or factors affecting the supply curve **ceteris paribus^①**: Our supply model conveys that if there is a change in one or more of these factors, supply changes (shifts).

Determinants of supply

Cost of inputs

The price of related goods in production

Complements

Substitutes

Technology and productivity

Taxes and subsidies on production

Price expectations

Number of firms

Changes in the cost of inputs

First, the cost of inputs, ingredients, or resources affects supply. Recall, there is an inverse or indirect relationship between the price of inputs and the supply curve. So, if the cost of an input increases, the supply of the good or service decreases.

Changes in the price of related goods in production



Image 10: Two complementary goods in production: 2x4 wood planks and sawdust

Once again, be careful with the price of related goods. It may be helpful to view this from a supplier's perspective. **Complementary goods in production**^① originate from the same source. The production of one good automatically causes the production of another good. In other words, the output of one good creates a byproduct of another good. For example, a cattle rancher produces beef and leather, or a sawmill manufactures two-by-fours and sawdust. If the price of one of the complementary goods (beef) increases due to an increase in demand for beef, then the supply of the other good (leather) increases because it is a byproduct of more beef produced. As a result, a direct relationship occurs between the price of one complementary good or service and the other complementary good or service supply.



Image 12, Image 13: Two substitute goods in production: corn and wheat

On the other hand, **substitute goods in production**ⁱ indirectly affect each other. If the price of a substitute good or service in production increases due to an increase in demand for that good, then the supply of the other substitute good or service decreases. Substitute goods or services in production are two more goods possibly produced using the same resources. Making one good or service prevents the supplier from using those same resources to produce the other good or service. For example, a farmer produces either corn or wheat but not both. When the demand for corn increases, a farmer's profit from growing corn increases. As a result, there is an increase in the opportunity cost of growing wheat (which we know reduces the wheat supply).

 Q3.6

Mark as: None 

If two goods are substitutes in production the price of one good has a _____ relationship with the supply of the other good. If two goods are compliments in production the price of one good has a _____ relationship with the supply of the other good.

Select an answer and submit. For keyboard navigation, use the up/down arrow keys to select an answer.

a positive; negative.

b positive; positive.

c negative, positive.

d negative, negative.

 Show submitted answer

 Show correct answer

Check My Answer

Changes in technology and productivity

Technology and **productivity**ⁱ also shift the supply curve. Technological improvements or increases in productivity increase supply.

Changes in taxes and subsidies on production

Higher **taxes on production**ⁱ decreases supply, while higher **subsidies on production**ⁱ increase supply.

Changes in price expectations

Once again, price expectation plays a role in shifting the supply curve. When technology allows it, if suppliers of a product have revised expectations of higher prices for their product in the future, they would decrease their supply today and increase it tomorrow. A good example is the supply of loans. Suppose mortgage companies have revised expectations that interest rates will rise in the near future. In that case, this will decrease their willingness to supply loans in the current market (this is a decrease in supply in the current market).

Changes in the number of firms

If the number of firms increases, then there are more suppliers, increasing supply.

Changes in Supply vs. Changes in Quantity Supplied (moving along a supply curve)

Curve ball

Again, let us differentiate between a change in supply versus a change in quantity supplied. A change in supply is illustrated as a supply curve shift when supply changes due to a change in one of the non-price determinants from the previous list. However, when supply changes, the quantity supplied changes at each possible price.

However, the opposite is not valid. Moving along a supply curve, quantity supplied changes due to a change in the (own) product or service price. For example, if demand increases for a product, the price increases, resulting in a movement up the supply curve (a change in quantity supplied). So, when the price changes, producers determine "how much" of the good or service they wish to sell. There is no change in supply since price and quantity supplied are part of supply. These variables do not essentially change supply.



Image 13: A shortage of food in a grocery store

3.6 Define, illustrate, and determine equilibrium price and quantity, shortage, and surplus.

So far, we have focused on demand and supply individually. Still, the above picture shows the real power of using markets to analyze the world around us by examining how supply and demand interact through the market process. In this case, we observe what looks like a shortage of many of the goods in the store. What would cause such a problem to exist, and what would we expect to be the impact on this market?

Equilibrium

Let us combine demand and supply to understand better how markets operate. As we will see, the interactions and exchanges between demanders (buyers) and suppliers (sellers) are coordinated through the price rationing mechanism, revealing the power of markets to address scarcity. So, understanding how perfectly competitive markets function shows how unrestricted (free) markets gravitate toward the "Holy Grail" of economics: equilibrium.

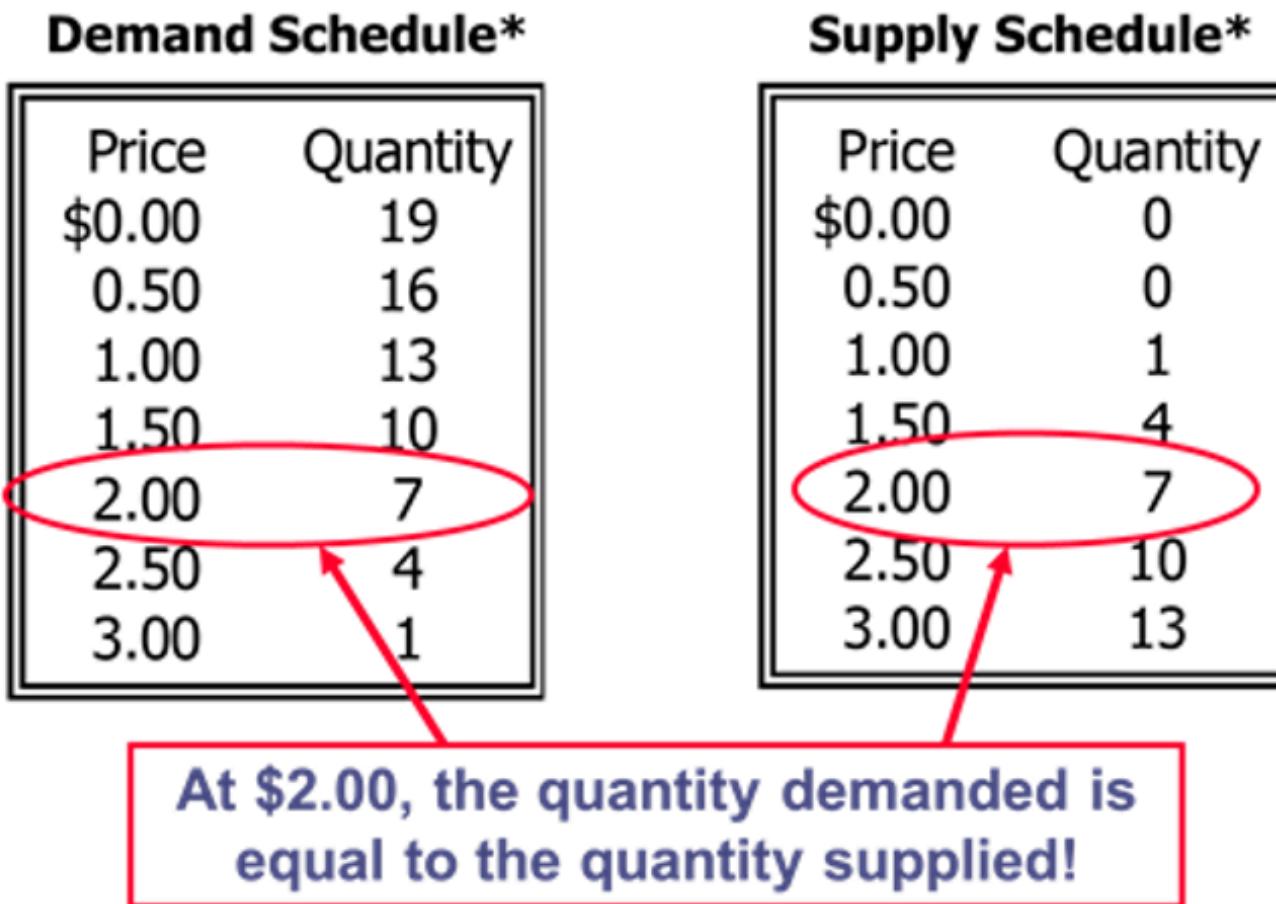


Figure 9: Equilibrium using demand and supply schedules

When we put the two schedules next to each other, you will notice at the same price, the quantity demanded and the quantity supplied are different except for one point. At \$2.00, the quantity demanded is seven, and the quantity supplied is seven. When quantity demanded equals quantity supplied, it is known as **equilibriumⁱ**.

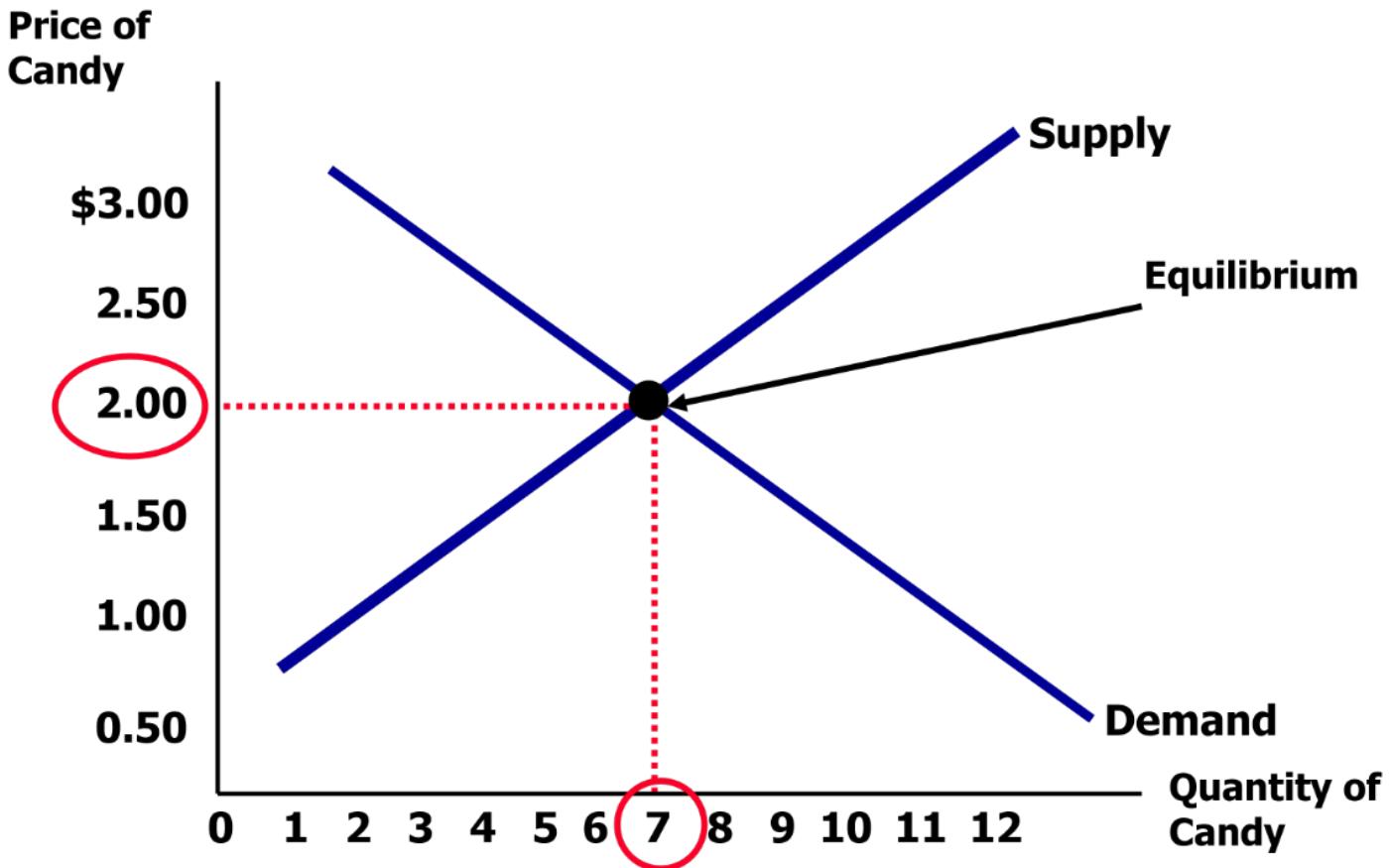


Figure 10: Equilibrium using demand and supply curves

Equilibrium is shown graphically as the intersection point between the demand and supply curves. The equilibrium price is \$2.00, located along the vertical axis, and the equilibrium quantity is seven cookies on the horizontal axis.

Study Tip: Notice, the supply and demand curves are nothing more than an “X” over an “L,” which represents the axes.

Unrestricted (free) competitive markets gravitate toward equilibrium. Finding a real-world equilibrium example is challenging since the forces affecting demand and supply change constantly. However, in equilibrium, they are in balance. So, when they are in balance, we describe equilibrium as a condition where the quantity demanded equals the quantity supplied at a price. Graphically it occurs where the supply and demand curves intersect. It is also a market condition where there is neither surplus nor shortage. The equilibrium price determines who produces the good or service and for whom (consumer).

Finally, it is also known as the Holy Grail of economics. Economists and even economics students sense equilibrium in the real world. If you ever see an economist walking in the street and suddenly smiling for no reason, it is likely because she senses true equilibrium in the real world.



Image 14: Equilibrium is found

Disequilibrium: Surpluses and Shortages

Now let us describe and graphically illustrate the two types of disequilibrium: a **surplus** ⁽ⁱ⁾ and a **shortage** ⁽ⁱ⁾.

Surplus:

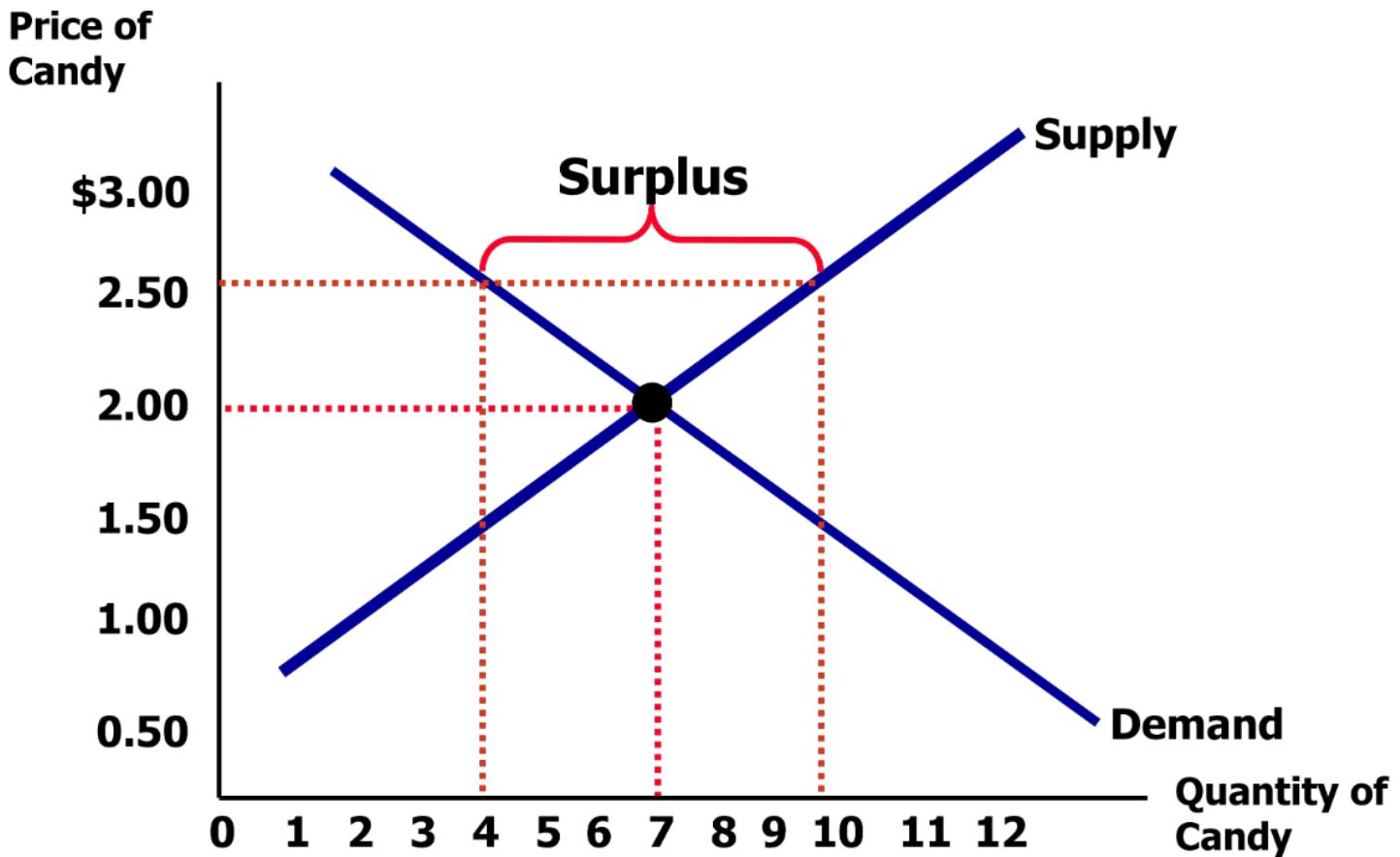


Figure 11: A surplus

First, a surplus occurs when the market price is above the equilibrium price. It also happens whenever the quantity demanded is less than the quantity supplied. For example, at \$2.50, the quantity demanded for four pieces of candy is less than the quantity supplied for 10 pieces of candy. Suppose a surplus occurs when the market price is above the equilibrium price, and the market is free to adjust. In that case, the surplus causes the market price to decrease, moving the market toward equilibrium (seven pieces of candy).

Shortage:

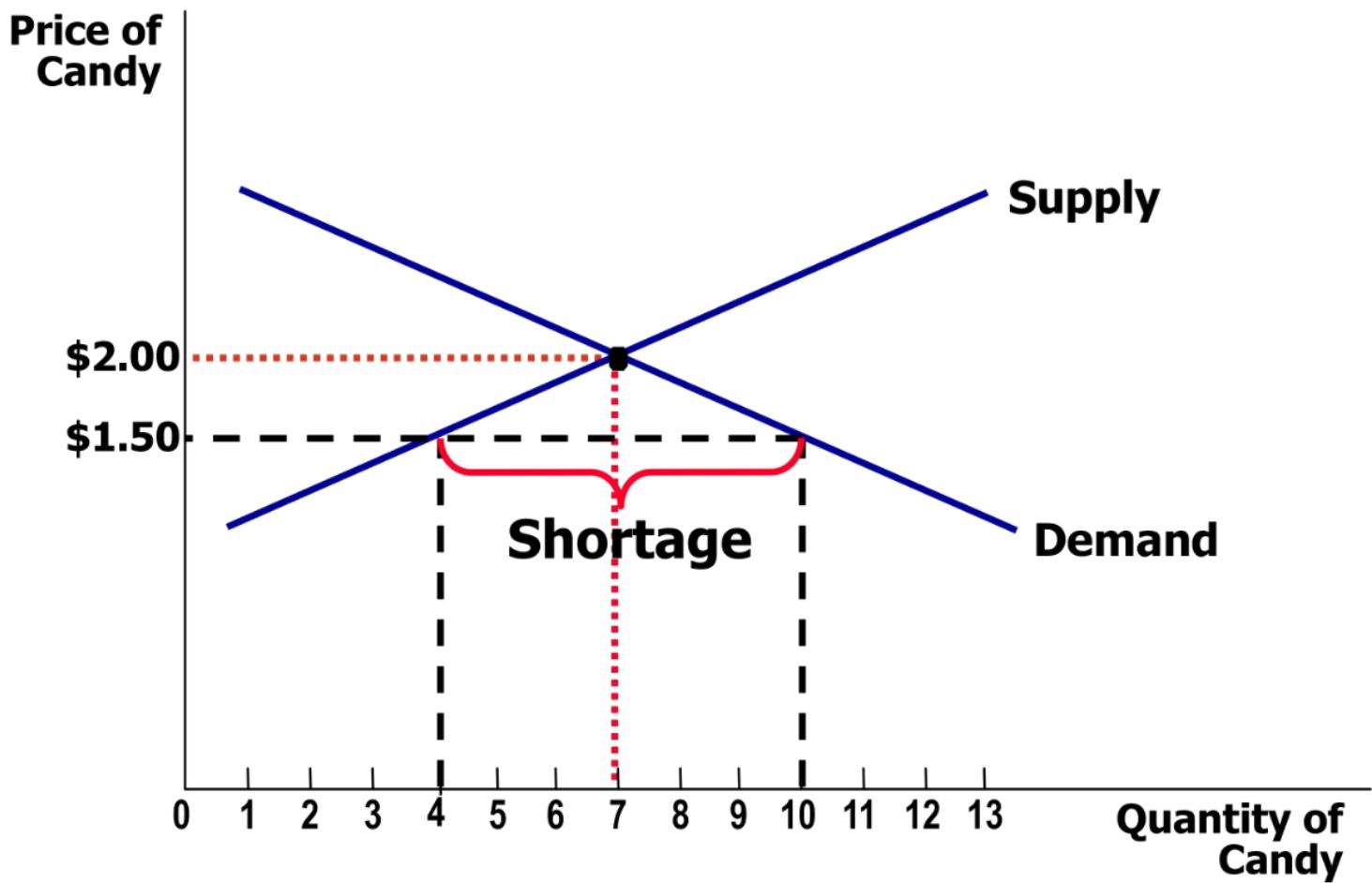


Figure 12: A shortage

Second, a shortage occurs when the market price is below the equilibrium price. It also happens whenever the quantity demanded is greater than the quantity supplied. For example, at \$1.50, the quantity demanded of 10 pieces of candy is greater than the quantity supplied of four pieces of candy. Suppose a shortage occurs when the market price is below the equilibrium price, and the market is free to adjust. The shortage causes the market price to move upward toward equilibrium (seven pieces of candy). Also, a shortage is a temporary disequilibrium. It is not the same as scarcity. Remember, scarcity is the economic problem that is never fully solved.

3.7 Analyze the effects of changes in supply and or demand on equilibrium price and quantity.

Now let us apply everything we have learned so far about supply and demand to understand how perfectly competitive markets operate in the world around us. We can now explain or illustrate why gas prices or other commodity prices for sugar and wheat are increasing or decreasing. This same analysis applies to equities (stocks) such as shares of IBM, Microsoft, Apple, etc. Note that in these cases, traders exchange ownership of shares of a company. Further, there are thousands of potential buyers and suppliers of these shares of stocks.

Three-Step Process

We begin with the three-step process. **First**, we will start with an initial equilibrium. **Second**, one or more factors or determinants affecting demand or supply will shift the demand, supply, or both curves. As a result, a temporary disequilibrium occurs before the market price adjusts, yielding either a shortage or a surplus. **Third**, after the market price adjusts, a new equilibrium is found.



Image 15, Image 16: Stock market prices quickly adjust, while housing prices change more slowly

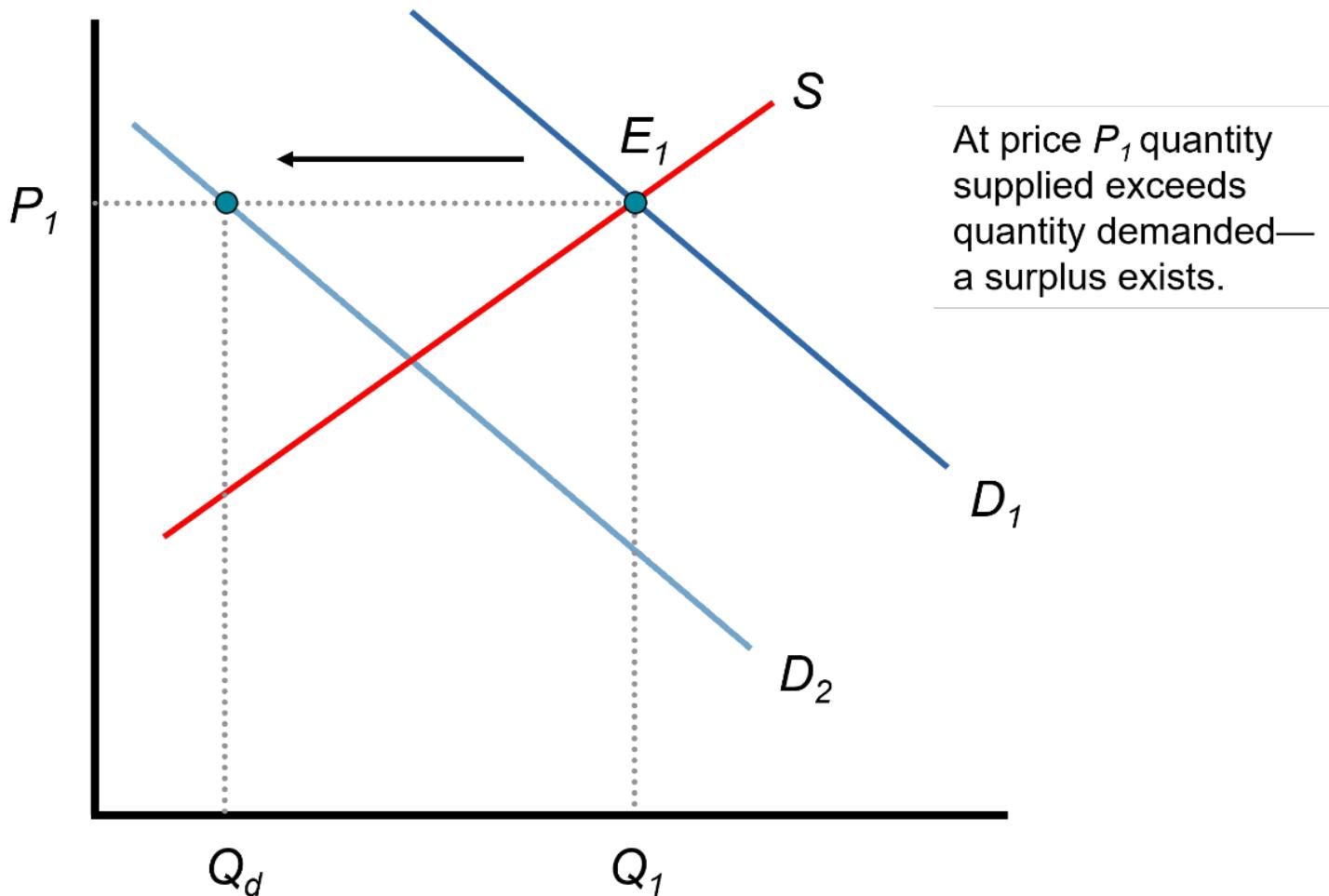
How quickly markets adjust from the old (initial) equilibrium to the new equilibrium depends on the characteristics of the marketplace, explicitly the speed and flexibility of market prices. For example, when demand or supply changes in the stock market, stock prices typically adjust quickly to reflect the new equilibrium price. However, when demand or supply changes in a particular housing or labor market, those market prices usually do not adjust quickly. So, it may take a while before the housing market finds a new equilibrium and may even over-adjust at times.

Let us look at the eight possible cases (outcomes) when demand or supply changes. First, we will look at cases one through four. These four cases illustrate a single shift of the demand curve or the supply curve while holding the other curve constant. Specifically, we should be able to go "forward" and "backward" with this demand and supply model. Going forward: we change a factor or determinant of demand or supply to explain and show its effect on the equilibrium price and equilibrium quantity. Going backward: Upon observing a change in the equilibrium price and equilibrium quantity, we can determine which factors or determinants of the change in demand or supply caused this equilibrium change.

Changes in Demand or Supply: Cases 1-4:

Case 1: A decrease in demand holding supply constant.

Decrease Demand with Supply Constant



At price P_1 , quantity supplied exceeds quantity demanded—a surplus exists.

Figure 13: A temporary surplus

We begin in equilibrium E_1 , where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 where the quantity demanded equals the quantity supplied. If personal incomes decrease and a good or service is a normal good, we know demand decreases and the demand curve shifts to the left. Recall, when demand decreases, the quantity demanded at the original price of P_1 decreases from Q_1 to Q_d , while the quantity supplied remains at Q_1 . Before the price can adjust, the decline in demand (holding supply constant) creates a temporary disequilibrium. A surplus occurs since the quantity demanded (Q_d) is less than the quantity supplied (Q_1) at the original equilibrium price P_1 .

Decrease Demand with Supply Constant

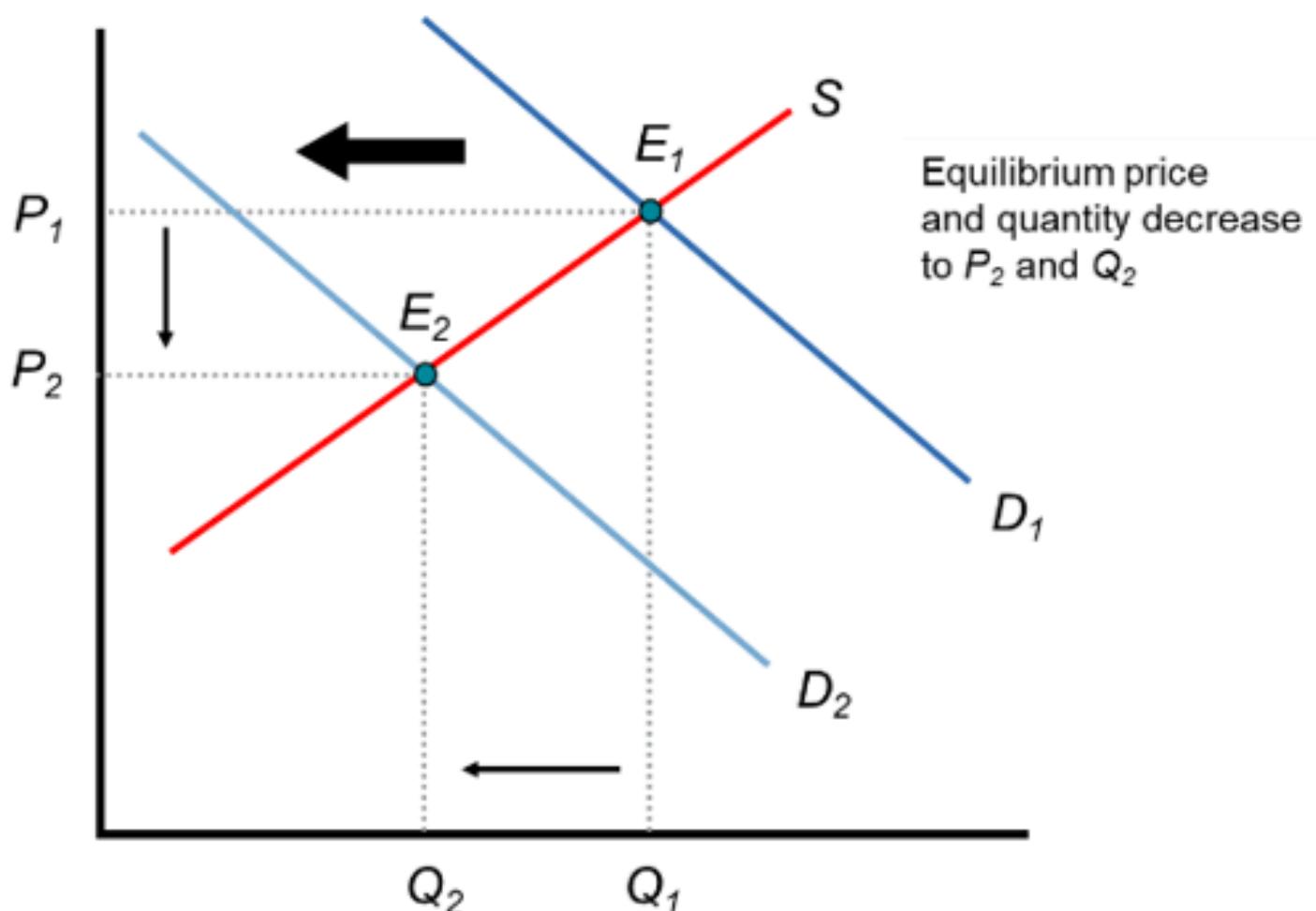


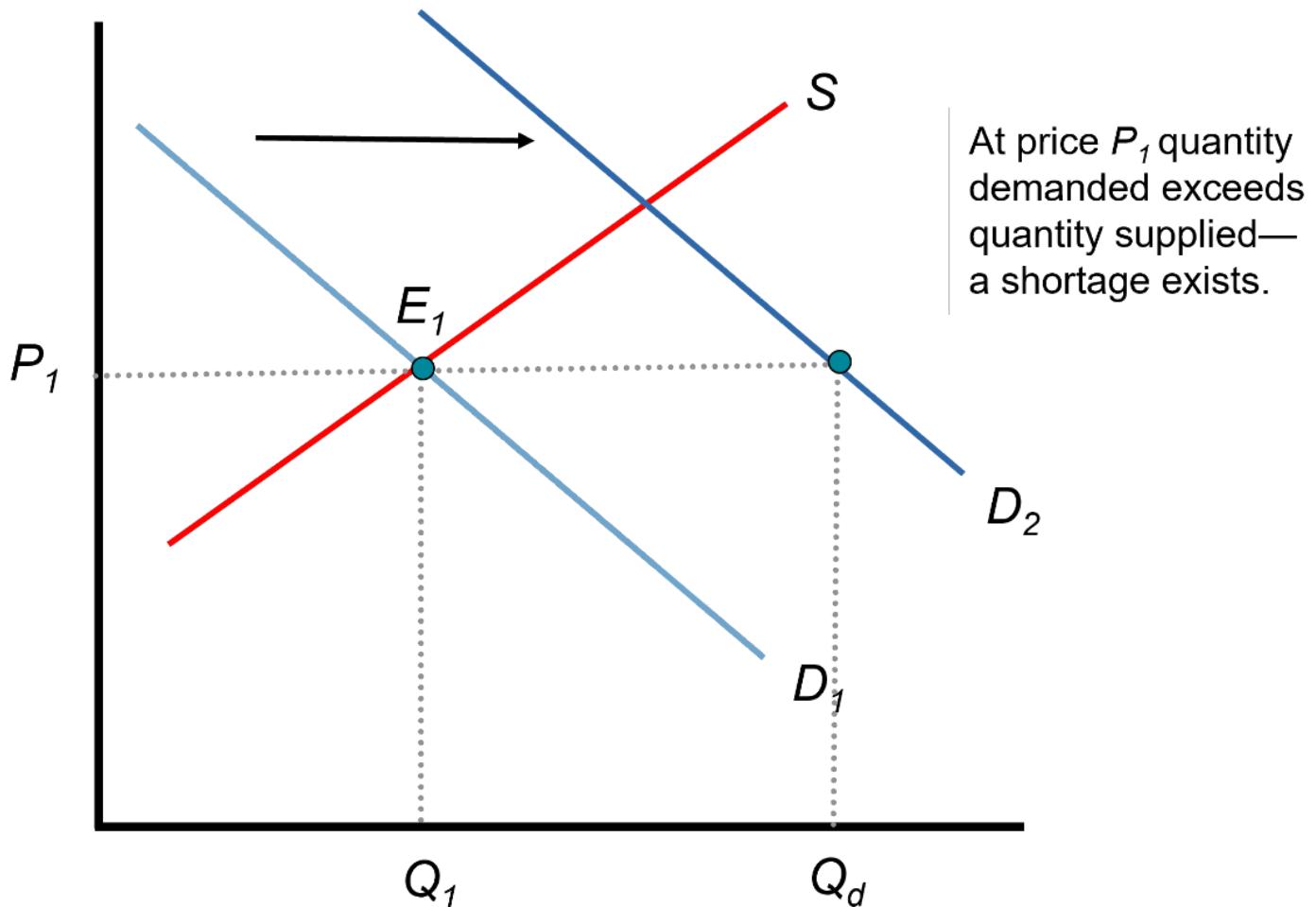
Figure 14: A decrease in demand

When a surplus occurs, and the price can adjust, the price decreases until the market reaches a new equilibrium point at E_2 . As a result, the equilibrium price decreases from P_1 to P_2 , and the equilibrium quantity decreases from Q_1 to Q_2 .

When demand decreases, the demand curve shifts to the left, and the equilibrium price and equilibrium quantity both decrease.

Case 2: An increase in demand holding supply constant

Increase Demand with Supply Constant



At price P_1 , quantity demanded exceeds quantity supplied—a shortage exists.

Figure 15: A temporary shortage

Case 2 is the opposite of case 1. We begin in equilibrium E_1 , where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 , where the quantity demanded equals the quantity supplied. If personal incomes increase and a good or service is a normal good, we know demand increases, and the demand curve will shift to the right. When demand increases, the quantity demanded increases from Q_1 to Q_d , while the quantity supplied remains at Q_1 . Before the price can adjust, an increase in demand (holding supply constant) creates a temporary disequilibrium. Since the quantity demanded (Q_d) is greater than the quantity supplied (Q_1) at the original equilibrium price P_1 , a shortage occurs.

Increase Demand with Supply Constant

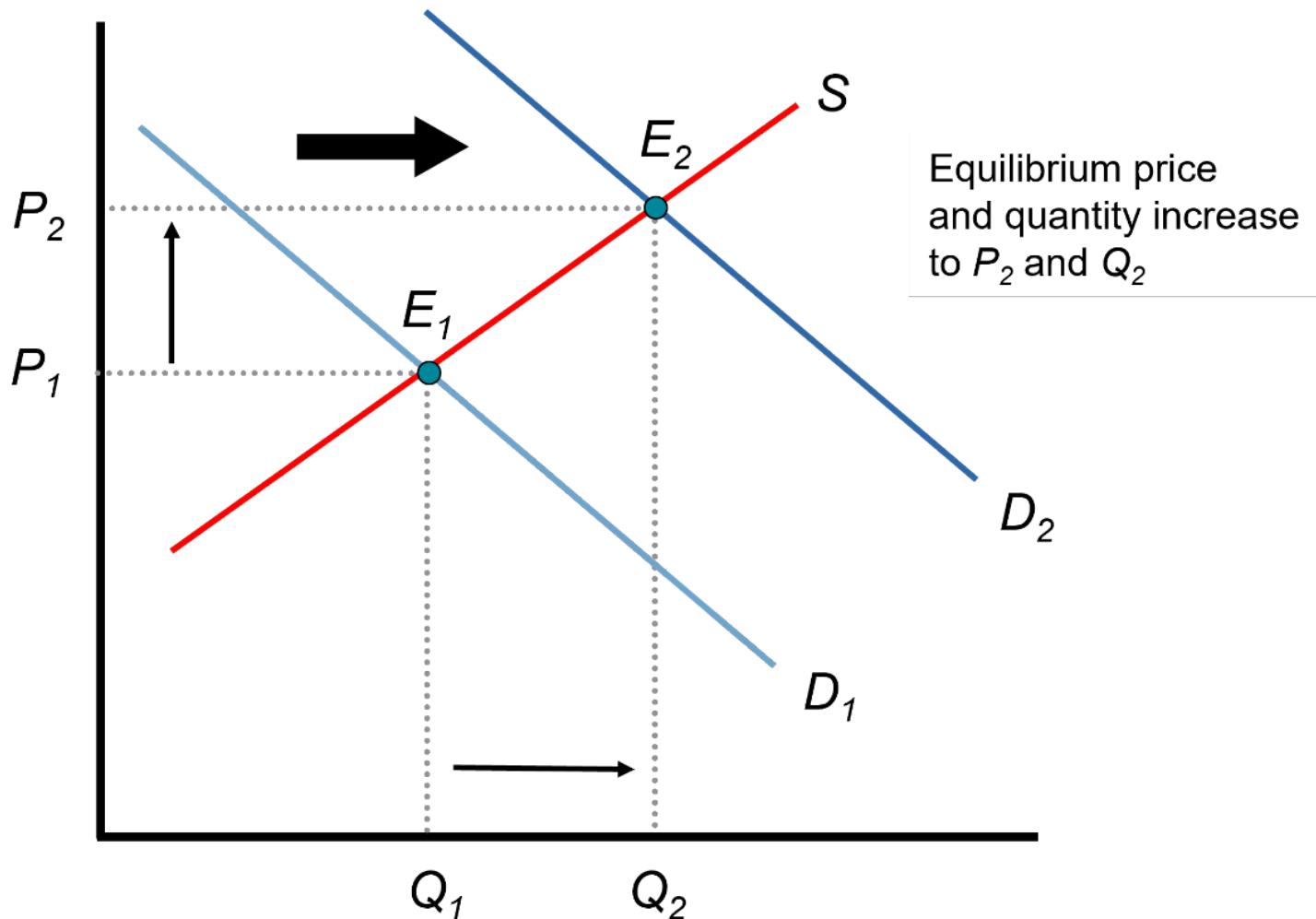


Figure 16: An increase in demand

When a shortage occurs, and the price can adjust, the price increases until the market reaches a new equilibrium point at E_2 . As a result, the equilibrium price increases from P_1 to P_2 , and the equilibrium quantity increases from Q_1 to Q_2 .

When demand increases, the demand curve shifts to the right, and the equilibrium price and equilibrium quantity both increase.

Case 3: An increase in supply holding demand constant.

Increase Supply with Demand Constant

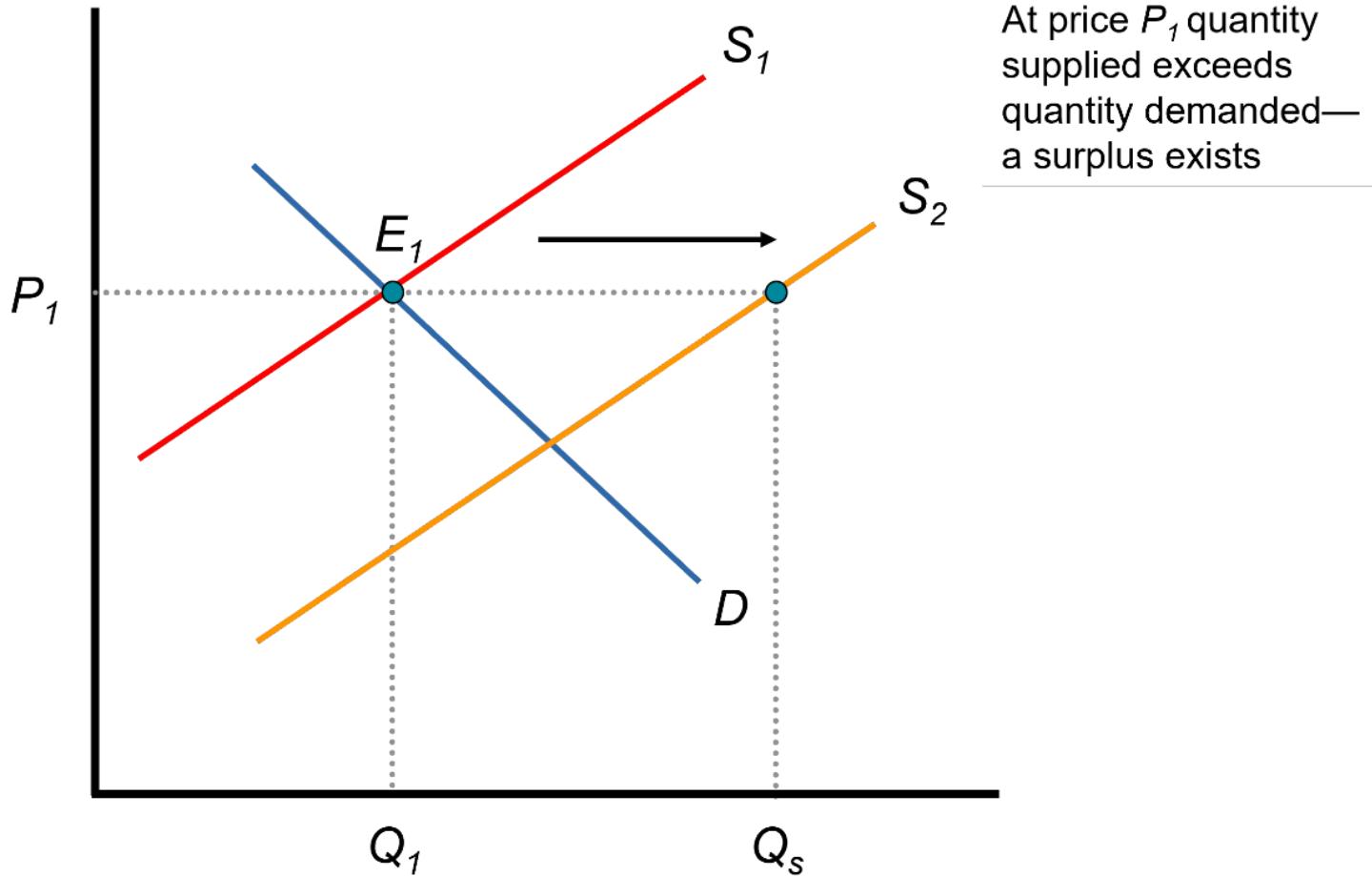


Figure 17: A temporary surplus

Now let us look at a change in supply. We begin in equilibrium E_1 , where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 , where the quantity demanded equals the quantity supplied. As a producer, if the cost of production (input price: employee wages) decreases, supply increases, and the supply curve shifts to the right. Recall, when supply increases, the quantity supplied increases from Q_1 to Q_s , while the quantity demanded remains at Q_1 . Before the price can adjust, an increase in supply (holding demand constant) creates a temporary disequilibrium. A surplus occurs since the quantity demanded (Q_1) is less than the quantity supplied (Q_s) at the original equilibrium price P_1 .

Increase Supply with Demand Constant

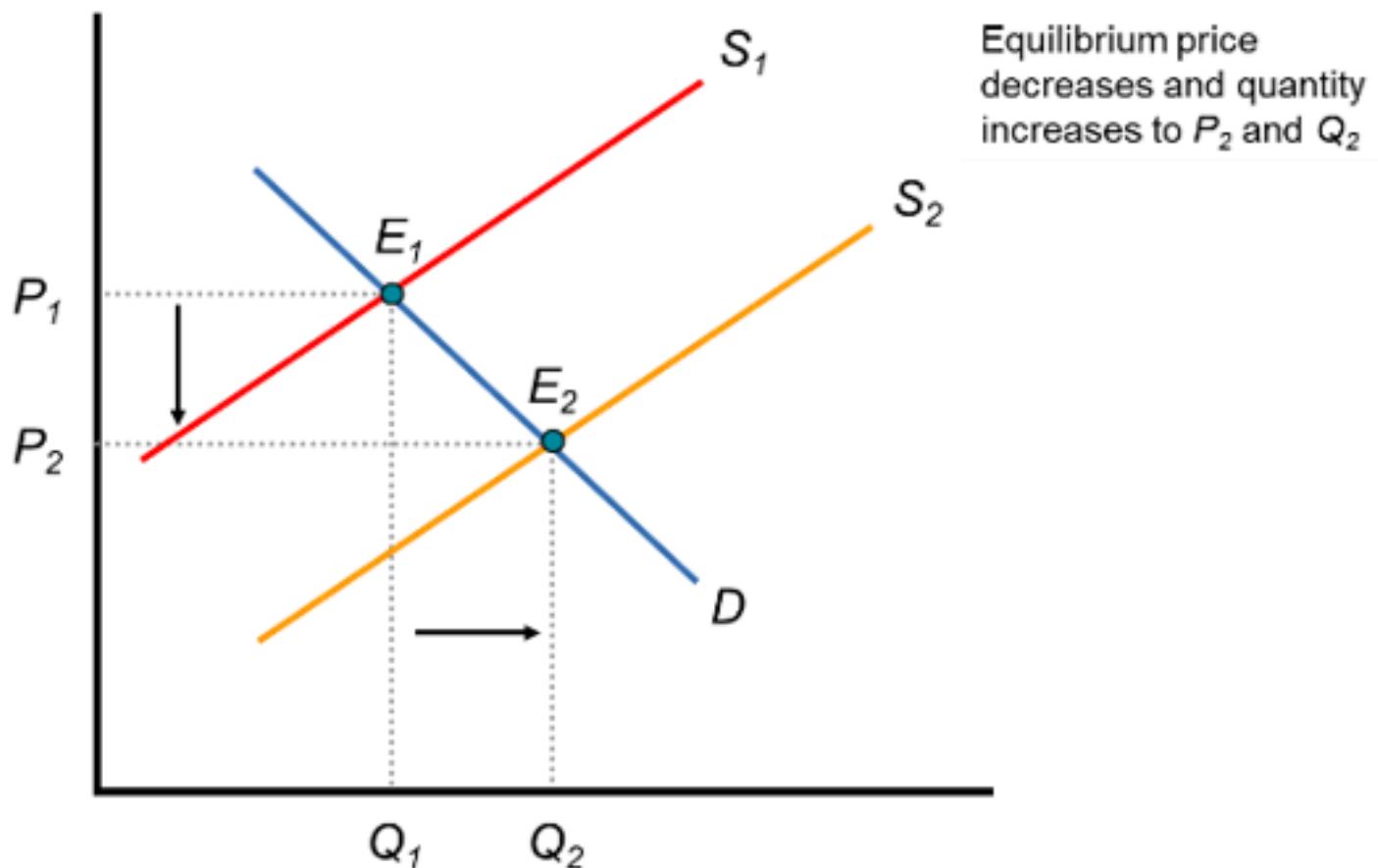


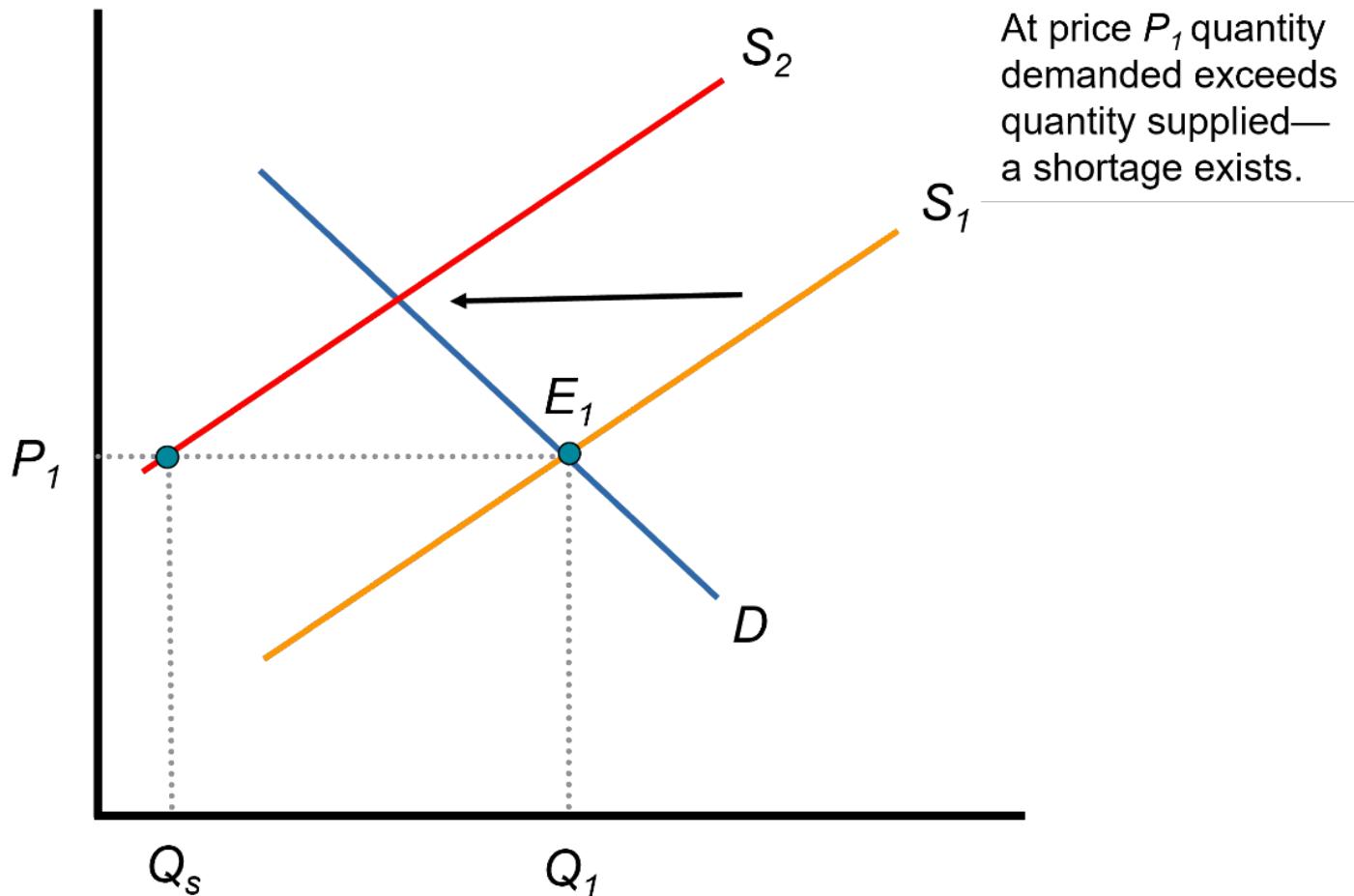
Figure 18: An increase in supply

When a surplus occurs, and the price can adjust, the price decreases until the market reaches a new equilibrium point at E_2 . As a result, the equilibrium price decreases from P_1 to P_2 , and the equilibrium quantity increases from Q_1 to Q_2 .

When supply increases, the supply curve shifts to the right, the equilibrium price decreases, and the equilibrium quantity increases.

Case 4: A decrease in supply holding demand constant.

Decrease Supply with Demand Constant



At price P_1 , quantity demanded exceeds quantity supplied—a shortage exists.

Case 4 is the opposite of case 3. We begin in equilibrium E_1 , where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 , where the quantity demanded equals the quantity supplied. As a producer, if the cost of production (input price: employee wages) increases, supply decreases, and the supply curve shifts to the left. Recall, when supply decreases, the quantity supplied decreases from Q_1 to Q_s , while the quantity demanded remains at Q_1 . Before the price can adjust, a decrease in supply (holding demand constant) creates a temporary disequilibrium. A shortage occurs since the quantity demanded (Q_1) is greater than the quantity supplied (Q_s) at the original equilibrium price P_1 .

When a shortage occurs, and the price can adjust, the price increases until the market reaches a new equilibrium point at E_2 . As a result, the equilibrium price increases from P_1 to P_2 , and the equilibrium quantity decreases from Q_1 to Q_2 .

Decrease Supply with Demand Constant

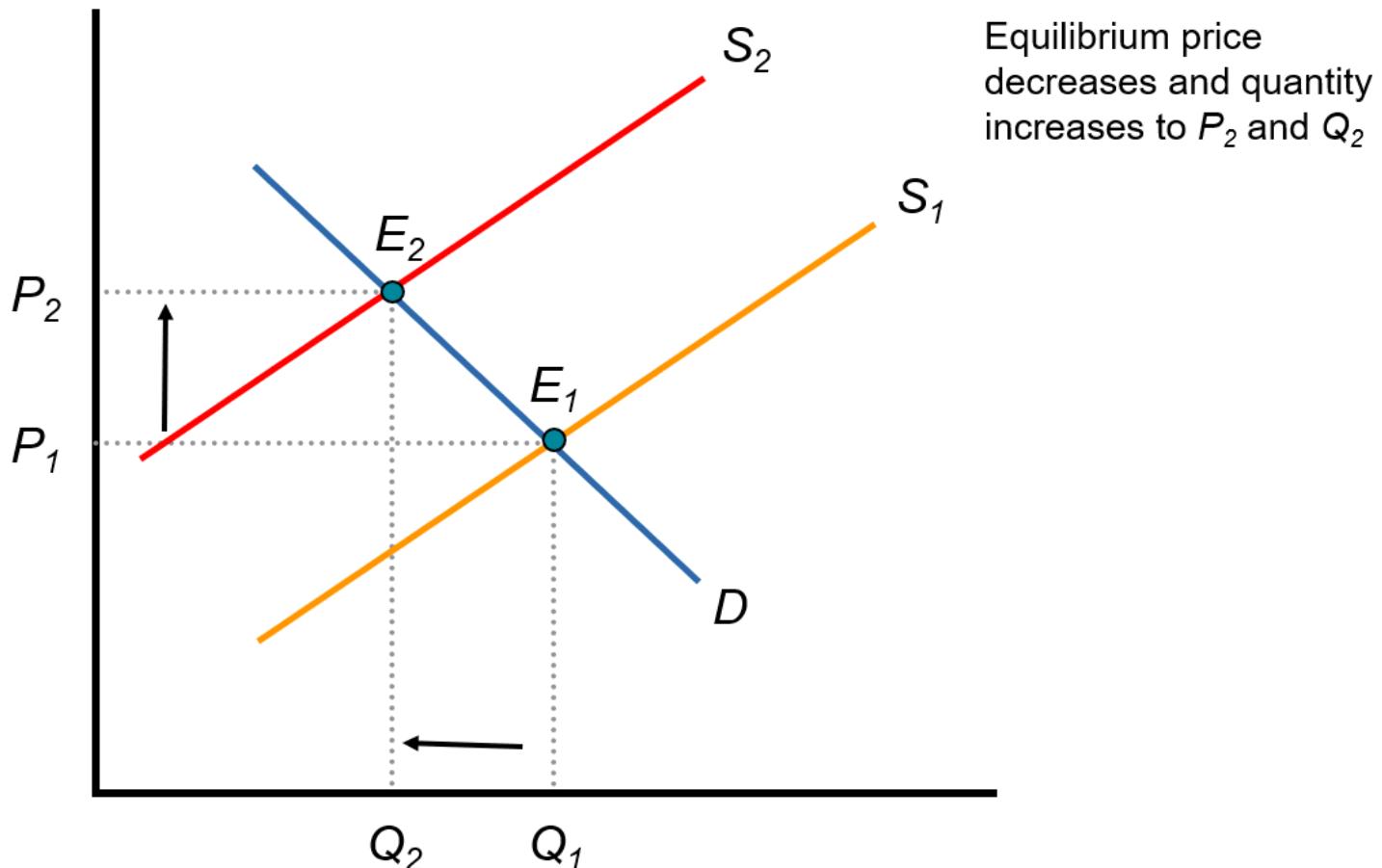


Figure 20: A decrease in supply

When supply decreases, the supply curve shifts to the left, the equilibrium price increases, and the equilibrium quantity decreases.

Here is a summary of the first four cases: single changes in either demand or supply.

Summary of cases 1-4:

1. A decrease in *demand* decreases the equilibrium price and quantity.
2. An increase in *demand* increases the equilibrium price and quantity.
3. An increase in *supply* decreases the equilibrium price and increases the equilibrium quantity.
4. A decrease in *supply* increases the equilibrium price and decreases the equilibrium quantity.

Study Tip:

When demand changes, equilibrium price and equilibrium quantity change in the same direction as demand. Also, when supply changes, equilibrium quantity changes in the same direction as supply. But, when supply changes, equilibrium price changes in the opposite direction as supply.

If both supply and demand increase, we can say *with certainty* that:

Select an answer and submit. For keyboard navigation, use the up/down arrow keys to select an answer.

a Equilibrium price will increase.

b Equilibrium quantity will increase.

c Equilibrium price and quantity will increase.

d Equilibrium price and quantity will decrease.

e Equilibrium price will decrease.

f Equilibrium quantity will decrease.

Show submitted answer

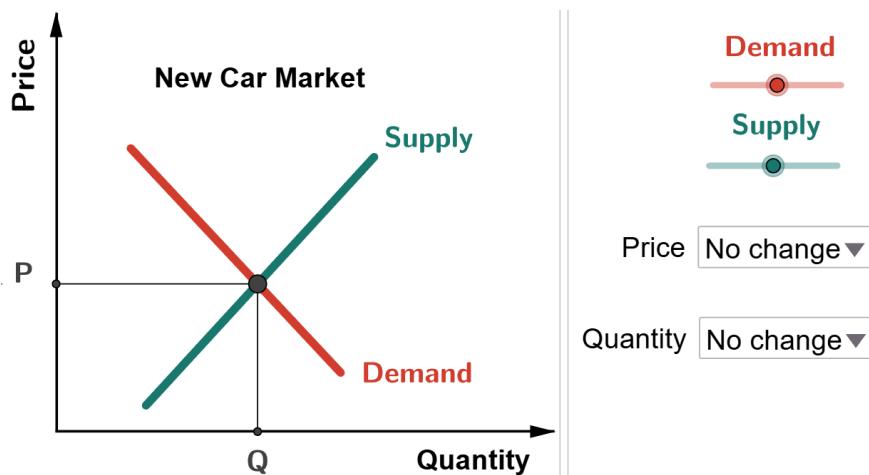
Show correct answer

Check My Answer

Graphing Practice 3.4

If everyone in a country received an increase in income, what would happen to the market for new cars? (You may assume that new cars are a normal good.)

Using the slider bars to the left, show the shift in supply or demand. Then, using the drop down menu, indicate the change in equilibrium price and quantity.



Show Answer

Check Answer

Changes in Demand and Supply: Cases 5-8:

The following four cases are nothing more than a combination of cases one through four and are simultaneous (double) shifts of demand and supply curves. Be careful with the double shifts of cases five through eight. **If the shifts' relative size (magnitude) is not specified, one equilibrium variable will be unknown or indeterminate.** Simultaneous shifts in demand and supply curves have contradictory effects on either price or quantity. The result depends upon which of the two shifts has a more significant impact on price and quantity than the other. But if we do not know which curve shifts more than the other, then one of the equilibrium variables will be unknown or indeterminate.

Case 5: An increase in demand and supply (A combination of cases 2 & 3)

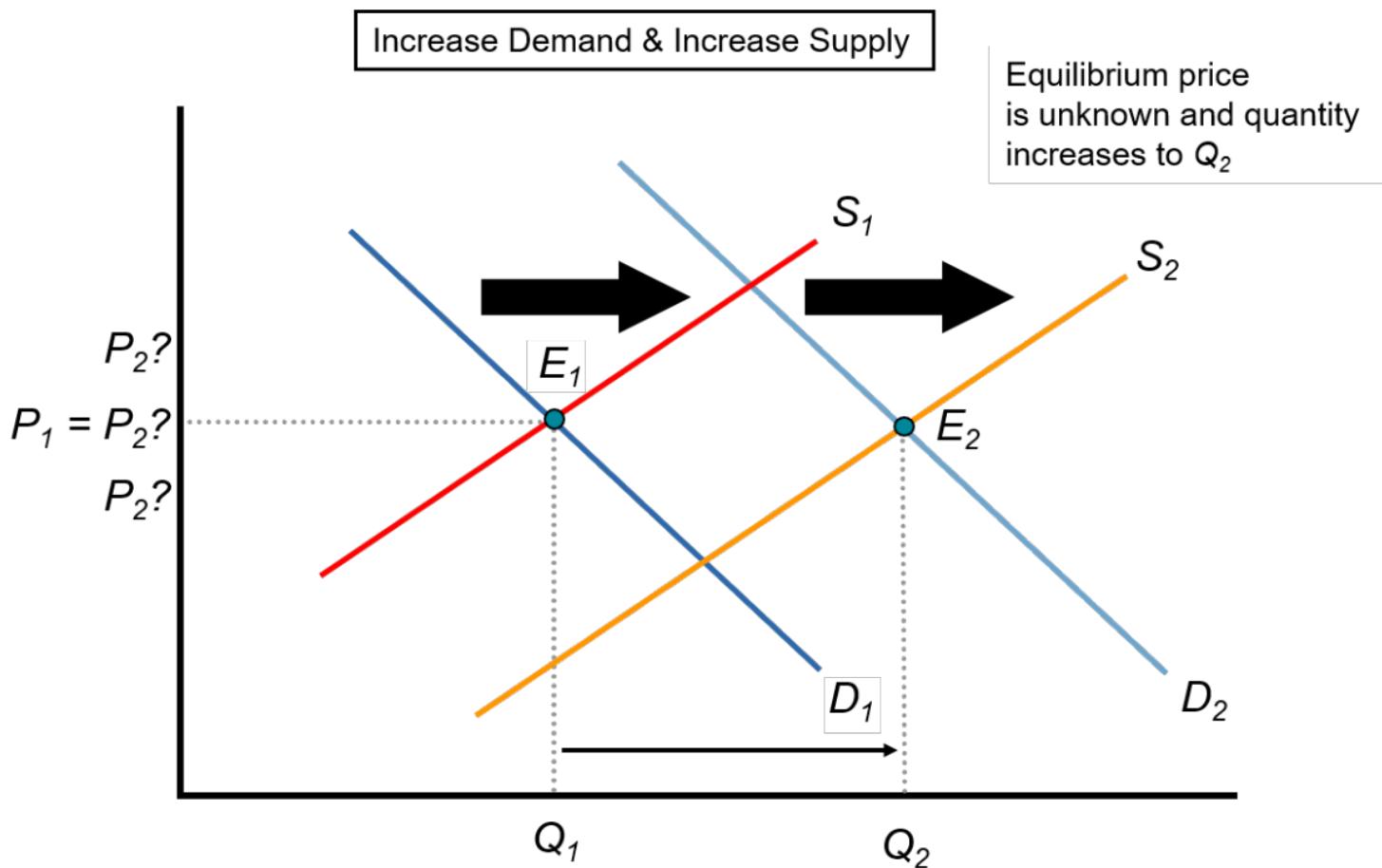


Figure 21: An increase in demand and supply

We begin in equilibrium E_1 , where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 , where the quantity demanded equals the quantity supplied. If personal incomes increase and a good or service is a normal good, and the cost of production decreases for that good, we know both demand and supply increase, and the demand and supply curves will shift to the right. Recall, when demand and supply increase, the quantity demanded and the quantity supplied increase from Q_1 to Q_d and Q_1 to Q_s , respectively. If we do not know which curve has shifted more than the other, we do not see the type of temporary disequilibrium created by these shifts. Also, since we do not know which curve has shifted more than the other, at the new equilibrium point E_2 , the equilibrium price may increase, decrease, or remain unchanged. In other words, the equilibrium price is

indeterminate at P_2 . But since an increase in both curves increases the market quantity, at the new equilibrium point E_2 , the equilibrium quantity increases from Q_1 to Q_2 .

When demand and supply increase, the demand and supply curve shift to the right, the equilibrium price may increase, decrease, or remain unchanged (indeterminate), and equilibrium quantity increases.

Case 6: A decrease in demand and supply (A combination of cases 1 & 4)

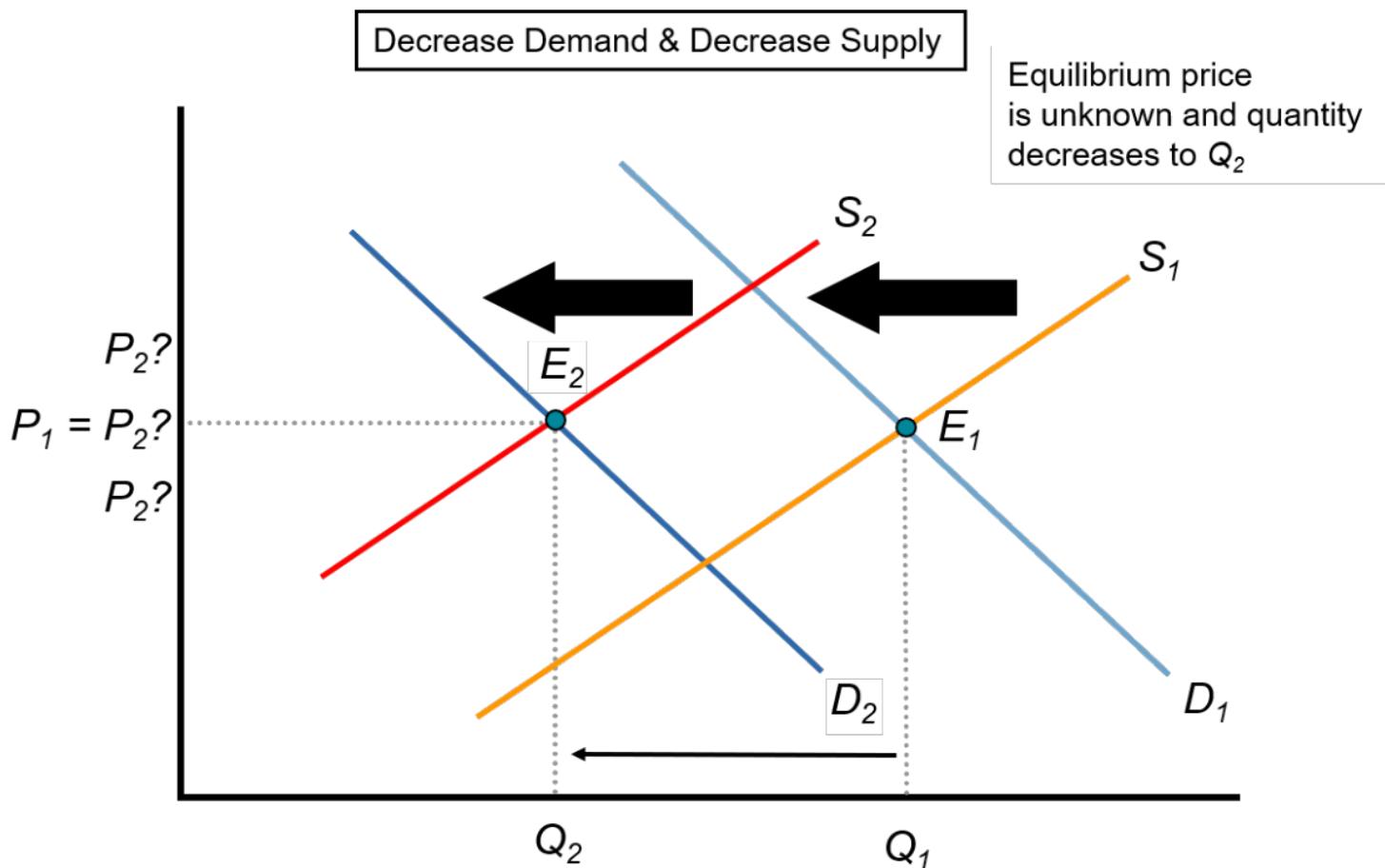


Figure 22: A decrease in demand and supply

Case 6 is the opposite of case 5. We begin in equilibrium E_1 where the equilibrium price from the vertical axis is P_1 , and the equilibrium quantity from the horizontal axis is Q_1 , where the quantity demanded equals the quantity supplied. If personal incomes decrease, and a good or service is a normal good, and the cost of production increases for that good, then we know both demand and supply decrease, and the demand and supply curves will shift to the left. Recall, when demand and supply decrease, the quantity demanded and the quantity supplied decrease from Q_1 to Q_d and Q_1 to Q_s , respectively. If we do not know which curve has shifted more than the other, we do not see the type of temporary disequilibrium created by these shifts. Also, since we do not know which curve has shifted more than the other, at the new equilibrium point E_2 , the equilibrium price may increase, decrease, or remain unchanged. In other words, the equilibrium price is indeterminate at P_2 . But since a decrease in both curves decreases market quantity, at the new equilibrium point E_2 , the equilibrium quantity decreases from Q_1 to Q_2 .

When demand and supply decrease, the demand and supply curve shift to the left, the equilibrium price may increase, decrease, or remain unchanged (indeterminate), and equilibrium quantity decreases.

Case 7: An increase in demand and a decrease in supply (A combination of cases 2 & 4)

