

Why Do Gasoline Prices React to Things That Have Not Happened?

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Have you ever wondered why gasoline stations raise their prices in response to fears about future supplies of oil? You may have thought to yourself, “I know the gasoline in the station’s underground storage tank was purchased before the world price increased. How can they raise the gas price now? The gasoline market must be rigged.”

In fact, gasoline stations should raise their prices to reflect increased future costs of replacing their inventories. Prices act like engine or voltage regulators—they automatically speed up or slow down the flow of the commodity in order to maximize performance, or what economists call allocative efficiency. (Consumers get the goods for which they are willing and able to pay.)

Oil and Gas, Here and There, Then and Now

To understand why U.S. gas prices respond now to things that might happen in the future, halfway around the world, one must understand how spot and futures prices for storable commodities, such as oil or gasoline, are related to each other.

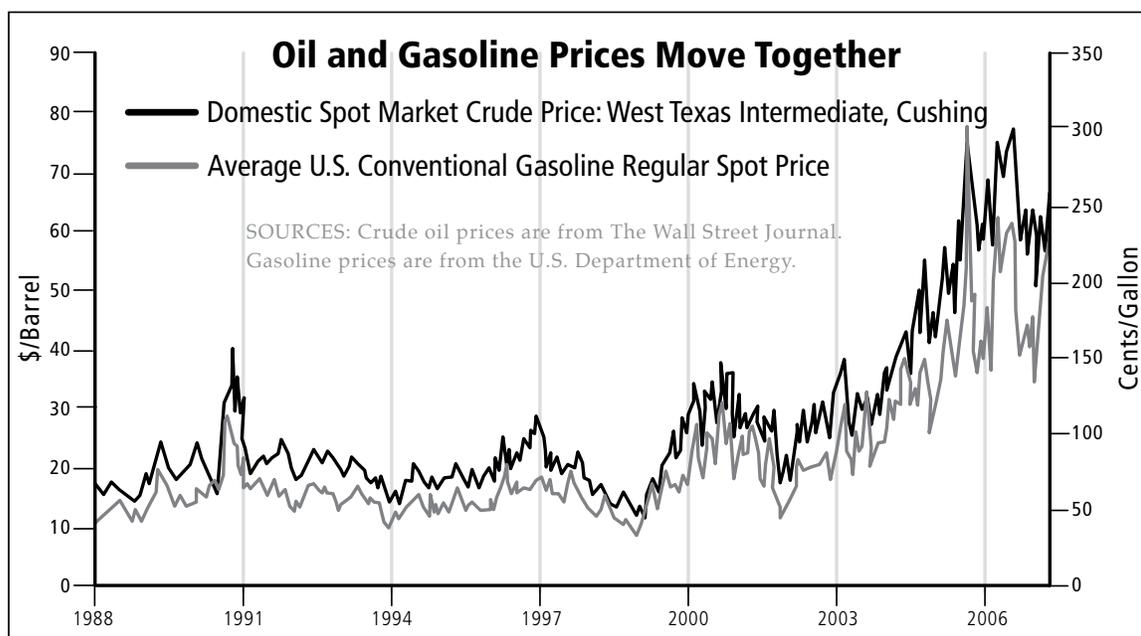
The cost of oil comprises about half the cost of gasoline, but oil is the most volatile component; other factors, such as taxes and profit margins, do not change often.

The figure below shows that while gasoline prices can diverge from oil prices for short periods because of seasonal demand, tax changes or other reasons, the two prices are closely linked over longer periods.

Because oil can be transported anywhere, trading on global spot and futures markets determines the global price of a given grade of oil, aside from local taxes and transportation costs. Oil can either be sold for immediate delivery or stored for sale in the future; so, firms adjust their inventories in response to news about the future supply and/or demand for oil.

Because oil is such an important component of gasoline, wholesale gasoline prices react instantly to changes in oil prices, including those caused by expectations of future events. The price at your local gas station will change nearly as quickly as the wholesale price.

Let’s see how two hypothetical competing gasoline stations in a small town might react to a sudden increase in the price of oil. On one quiet morning, both the Conch Gas station and the Pegasus Gas station were charging \$1.999 per gallon of regular gasoline. They each had bought their inventories a few days before at a cost of \$1.48 per gallon. With federal, state and local taxes combining for 50 cents per gallon, each station calcu-



lated that it would make about 2 cents per gallon at a retail price of \$1.999.

During the late morning, news of an unsuccessful terrorist attack on Saudi Arabian oil fields spurred widespread fears of cuts in future oil supplies. As frenzied trading on exchanges in New York, London and elsewhere bid up the world price of oil, the station owners learned that wholesale gasoline prices for delivery next week had increased by \$1 per gallon. Both owners raised their prices to \$2.99 per gallon.

Despite much grumbling at the price increases, sales at the Conch Gas and the Pegasus Gas stations proceeded much as before—both stations sold out their existing inventories right on schedule and then took delivery on a new load of gasoline at the new, higher wholesale prices. The station owners made a tidy, unexpected profit that week—\$1.02 per gallon.

Are the Gas Stations Gouging Us?

Did the stations' simultaneous price changes the week before wholesale prices actually went up prove that Conch Gas and Pegasus Gas were colluding to gouge consumers? No. These competing station owners did not have much choice if they wanted to remain as profitable as their competitors and stay in business over the long haul.

Suppose first that only Conch Gas had held its price at \$1.999, while Pegasus Gas had raised its price to \$2.999. Conch Gas obviously would have captured all of the traffic that day, but its storage tank would have run dry much sooner than expected. By the first or second day after the overseas disruption in the oil market, the owner-manager of Conch Gas might as well have gone on vacation—unpaid, it should be noted. Meanwhile, the manager of Pegasus Gas—who took his vacation in the first two days of the crisis—returned to sell out his remaining inventory at \$2.999 per gallon. In the end, the Pegasus Gas station made a much larger profit.

Now suppose that both Conch Gas and Pegasus Gas decided to show home-town solidarity by keeping their prices at \$1.999, at least until the new, higher-cost gasoline inventories arrived in a few days. Local residents certainly would have been appreciative, but so would all of the eager drivers from neighboring towns who would have driven in to enjoy “cheap” gas. Both the Conch and Pegasus stations would have run dry before their replacement inventories arrived. Anyone in this town who was unfortunate enough to need gas on the third day of the crisis would have been out of luck.

What if all the gasoline stations in the state had agreed to keep their prices at \$1.999 until higher-cost supplies started arriving? Even if the flow of out-of-

Classroom Discussion

1. How do prices in a market economy serve as a signal to producers and consumers?
2. If prices in a market economy were not allowed to rise when a commodity was becoming relatively more scarce, how would producers and consumers discover that the commodity was in short supply?
3. If prices are not allowed to rise as a commodity becomes in short supply, what are some methods that society could use to ration the scarce commodity, and how efficient would these methods be?

state bargain hunters might turn out to be small, a state-wide shortage of gasoline would almost certainly result. Recognizing that gas prices were only temporarily low and were bound to rise soon, all rational owners of cars, trucks, tractors, off-road vehicles, lawn mowers or leaf blowers would fill up their tanks as quickly as possible. That is, any attempt to constrain the retail price of gasoline in the face of higher future prices simply induces a scramble among buyers to beat the price increase. Many people would make wasteful extra trips to top off half-full tanks, and others would be genuinely inconvenienced as shortages developed.

Thus, the simultaneous price increases by Conch and Pegasus Gas are not harmful price gouging at all. Although no one likes to pay more for gas, market-determined gasoline prices operate to prevent shortages and maximize economic efficiency.

This article was adapted from Why Do Gasoline Prices React to Things That Have Not Happened?, which was written by William Emmons, a senior economist at the Federal Reserve Bank of St. Louis, and Christopher J. Neely, an assistant vice president at the Federal Reserve Bank of St. Louis, and was published in the July issue of The Regional Economist, a St. Louis Fed publication.

Lesson Description

Students create a graph of gasoline supply and demand and identify the market-clearing price. Students learn about the determinants of supply and demand. They graph a decrease in demand for gasoline and a decrease in supply of gasoline to understand how those factors affect prices.

Note: Students should know what supply and demand are and be able to graph supply and demand data as well as draw supply and demand graphs.

Concepts

Market-clearing price
Determinants of demand
Determinants of supply

Objectives

Students will:

- identify and define market-clearing price;
- identify and give examples of non-price determinants of demand and non-price determinants of supply; and
- analyze the effects of a change in demand or supply on price.

Content Standards

National Standards in Economics

- **Standard 8:** Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust and affect incentives.
 - Benchmark 1, Grade 12: Demand for a product changes when there is a change in consumers' incomes or preferences, or in the prices of related goods or services, or in the number of consumers in the market.
 - Benchmark 2, Grade 12: Supply of a product changes when there are changes in either the prices of the productive resources used to make the good or service, the technology used to make the good or service, the profit opportunities available to producers by selling other goods or services, or the number of sellers in a market.
 - Benchmark 3, Grade 12: Changes in supply or demand cause relative prices to change; in turn, buyers and sellers adjust their purchase and sales decisions.

Time Required

75 minutes

Materials

- A copy of handouts 1, 2, 3, 4, 5 and 6 for each student
- Visuals 1 and 2
- A copy of handouts 1, 2, 3, 4, 5 and 6 answer keys for the teacher

Procedures

1. Explain that prices in a market economy change, often reflecting shifts in supply and demand. In this lesson, students will explain how non-price factors affect supply and demand and, thus, prices.
2. Distribute a copy of *Handout 1: Supply of and Demand for Gasoline* to each student. Review the directions, and tell students to draw the supply and demand curves represented by these data on the graph. Tell students to label the axes and the market-clearing price and quantity.
3. Allow time for students to work. Discuss the following:
 - What is the market-clearing (equilibrium) price for gasoline? (*\$3 per gallon*)
 - At this price, how many gallons of gasoline will be bought and sold? (*45 million gallons per day*)
 - How do we know that this is the market-clearing price? (*It is the price at which the quantity consumers are willing and able to buy equals the quantity producers are willing to produce and sell.*)
 - At \$2.25 per gallon, how many gallons are consumers willing and able to buy? (*60 million*)
 - At \$2.25 per gallon, how many gallons are producers willing to produce and sell? (*30 million*)
 - At \$2.25 per gallon, will a shortage or a surplus exist? (*a shortage*)
 - What will happen to the price as a result? (*The price will rise.*)
 - At \$3.50 per gallon, how many gallons are consumers willing and able to buy? (*35 million*)
How many gallons are producers willing to produce and sell? (*55 million*)
 - At \$3.50 per gallon, will a shortage or a surplus exist? (*surplus*)
 - What will happen to the price as a result? (*The price will fall.*)

4. Explain that the demand curve shows the quantity of gasoline people are willing and able to buy at various prices during a given time, holding constant the many other factors beyond price that influence consumers' buying behavior. If any of these factors change, then demand will change; that is, the demand curve will shift. Ask students what factors other than price could change demand for backpacks. *(Answers will vary but may include: celebrities are seen carrying backpacks; backpacks are advertised frequently on television, backpacks are proven to generate less back strain than bags; purses are not allowed in the school building, but backpacks are allowed.)*

5. Display *Visual 1: Determinants of Demand*, and explain that this is a list of the determinants of demand, sometimes called "non-price determinants of demand" because they are factors other than the price of the good or service that can cause the entire demand curve to shift. Explain each of the five determinants using the information on Visual 1, and ask the following questions to check for understanding:
 - **Change in consumer income**
 - If most U.S. students receive an increase in their allowances, would the demand for MP3 players and designer jeans increase or decrease? *(increase)* Is this increase in demand due to a change in the price of the MP3 player or a change in the price of the designer jeans? *(no)* What caused this change in demand? *(change-or increase-in consumer incomes)*
 - If personal income tax rates increase, it will reduce the amount of income consumers have to spend, and the demand for most normal goods will decrease. Under these circumstances, what is the reason for the decrease in demand? *(change-or decrease-in consumer incomes)*

 - **Change in consumer tastes and preferences**
 - If a famous professional athlete strongly endorses peanut butter, would demand for peanut butter likely increase or decrease? *(increase)* Is the change in demand due to a price factor or non-price factor? *(non-price)*

 - **Change in prices of related goods**
 - If the price of residential swimming pools decreases, what will likely happen to the demand for swimming pool services? *(increase)* How are swimming pools and swimming pool services related? *(complementary goods)*

If the price of movie tickets increases significantly, what will likely happen to the demand for DVD rentals? *(increase)* What is the relationship between movie tickets and DVD rentals? *(substitute goods)*
 - Point out that examples of complementary and substitute goods are generally accepted examples. Recognize that for some consumers, Pepsi is not a substitute for Coca-Cola, but that for the general population, we'd assume Pepsi and Coke to be substitute goods.

 - **Change in number of buyers in the market**
 - If the number of students enrolled at a local university increases, what will happen to the demand for textbooks? *(increases)* What are some other goods or services for which demand might increase in an area near the university? *(Answers will vary but might include: fast food, gasoline, tutorial services, laptops or computer paper.)*

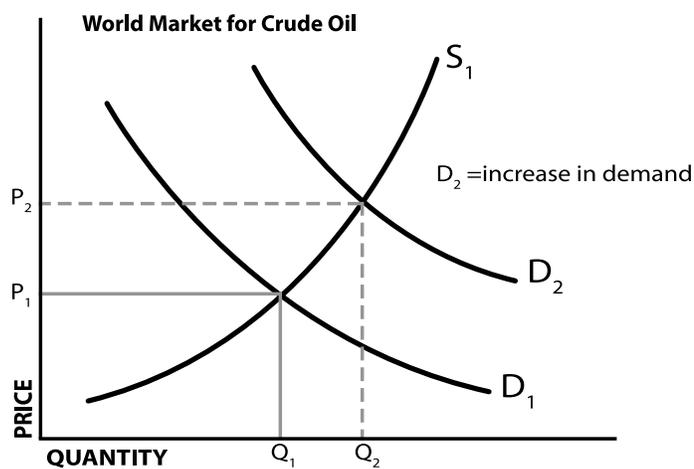
- **Change in consumer expectations**
 - If people expect the price of laptop computers to fall next year, what might happen to their demand for laptops this year? (*Demand might fall this year because some people will wait until next year to buy their laptops.*)
- 6. Distribute a copy of *Handout 2: Which Determinant of Demand Is This?* to each student, and tell students to follow the instructions and complete the handout. When students have finished, check for understanding using *Handout 2: Answer Key*.
- 7. Distribute a copy of *Handout 3: Demand Changes* and review the scenario with students. Tell students to complete the table, graph the new demand curve on the graph on Handout 1, and answer the remaining questions on Handout 3. Use *Handout 3: Demand Changes Answer Key* to discuss the questions.
- 8. Explain that the supply curve shows the quantity of gasoline people are willing and able to sell at various prices during a given time, holding constant the many other factors beyond the price of the product that influence producers' selling behavior. If any of these factors that are held constant change, then supply will change; that is, the entire supply curve will shift. *Display Visual 2: Determinants of Supply* and explain that this is a list of the non-price determinants of supply. The determinants of supply are the factors that can shift the supply curve. Discuss each of the five determinants using the information on Visual 2.
 - Change in input prices
 - Change in taxes or subsidies
 - Change in technology
 - Change in producer expectations

Note: It's difficult to generalize the effect of a change in producer expectations because producers may respond differently depending on the type of product they produce. For example, if producers expect to sell their product for a higher price in the future, they may withhold some of their product today in order to supply more when the price rises. On the other hand, an expected price increase may attract additional producers, and the supply may increase.

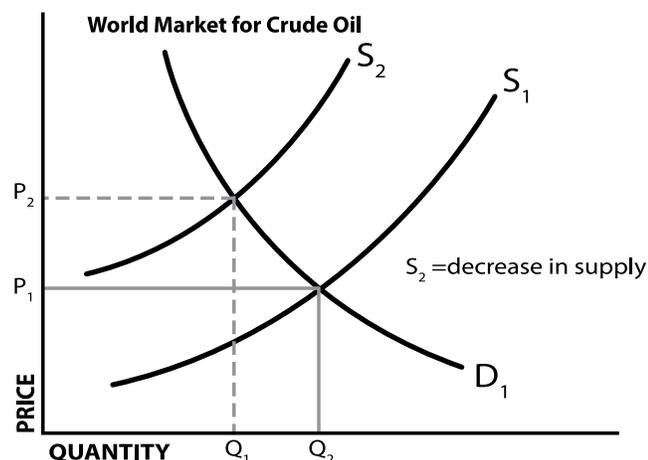
 - Change in the number of sellers
- 9. Distribute a copy of *Handout 4: Which Determinant of Supply Is This?* to each student, and tell students to follow the instructions and complete the handout. When students have finished, check for understanding by using *Handout 4: Which Determinant of Supply Is This? Answer Key*.
- 10. Distribute a copy of *Handout 5: Supply Changes* and review the scenario with students. Tell students to complete the table, graph the new supply curve on the graph on Handout 1, and answer the remaining questions on Handout 5. Use *Handout 5: Supply Changes Answer Key* to discuss the questions.

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11. Explain that in the gasoline examples, demand decreased, which caused the demand curve to shift to the left; supply decreased, which caused the supply curve to also shift to the left. Point out that with the original equilibrium (first supply and demand curves), the market clearing price of gasoline was \$3 per gallon, with 40M gallons being bought and sold. With the decrease in demand, the price of gasoline decreased to \$2.50 per gallon, and the quantity bought and sold decreased. Then, with the supply decrease, the price rose to \$3 again, and the quantity bought and sold decreased.
12. Tell the students that the world demand for crude oil continues to increase as developing nations such as China and India require more oil to operate production facilities. Draw a supply-and-demand graph. Explain that this drawing represents the world market for crude oil. Draw an increase in demand and ask the students what happens to the graph if the world demand for crude oil increases. (*The demand curve shifts to the right, the price of crude oil increases and the amount of crude oil bought and sold increases. See graph below.*)



13. Draw another supply and demand graph on the board. Explain that this graph represents the market for crude oil. Draw an decrease in supply and ask the students to predict what would happen if due to war or natural disaster, the production of crude oil were reduced. (*The supply curve shifts to the left, the price of crude oil increases and the amount of crude oil bought and sold decreases. See graph below.*) Point out that if world demand for crude oil is increasing at the same time that world supply is decreasing, the crude oil price will rise.



Assessment

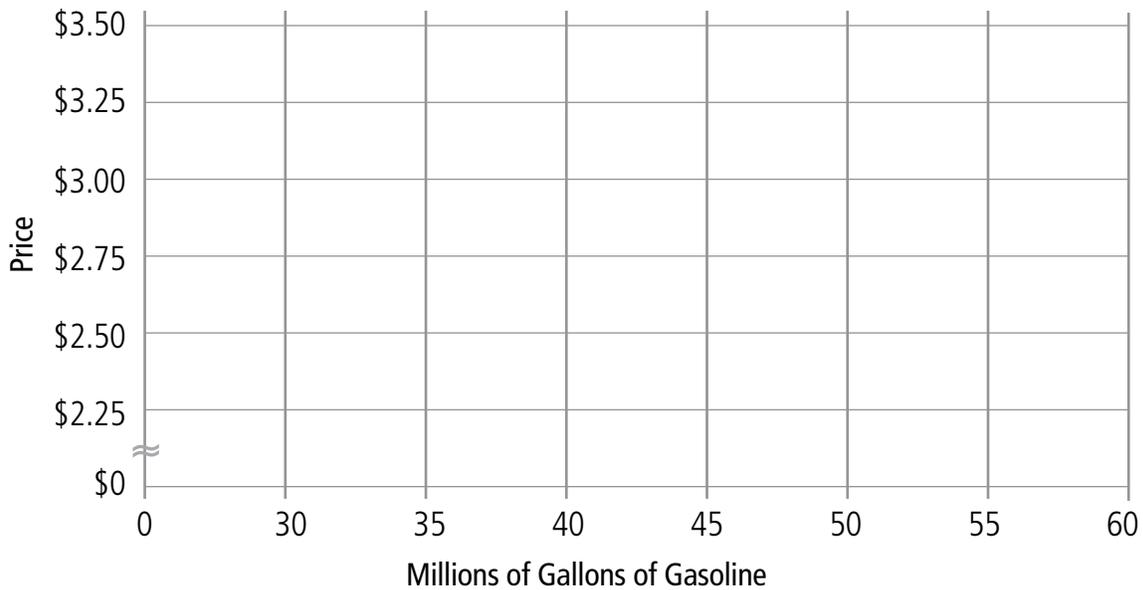
14. Distribute a copy of *Handout 6: Analyzing Shifts in Demand and Supply*. Allow time for students to work. Review their answers by using *Handout 6: Analyzing Shifts in Demand and Supply Answer Key*.

Handout 1: Demand for and Supply of Gasoline

The table below contains data about the gasoline market.

If the price of a gallon of gasoline was:	Consumers would be willing to buy (millions of gallons per day):	Producers would be willing to sell (millions of gallons per day):
\$2.25	60	30
\$2.50	55	35
\$2.75	50	40
\$3.00	45	45
\$3.25	40	50
\$3.50	35	55

Directions: Use the data above and the space below to graph the demand and supply curves for gasoline.



Handout 2: Which Determinant of Demand Is This?

Use the information in Visual 1 to categorize the statements below as definitions, descriptions or examples of one of the five determinants of demand, by writing the correct determinant of demand on the blank line.

- Change in consumer income
- Change in consumer tastes and preferences
- Change in prices of related goods
- Change in number of buyers in the market
- Change in consumer expectations

1. For most goods, referred to as “normal goods,” an increase in consumer income will cause demand to increase, which shifts the demand curve to the right. This shift indicates that at all prices for which the good is offered for sale, a greater quantity will be demanded due to the increase in income. Normal goods include most products, such as gasoline, coffee and clothing.

2. If consumers like a product less based on their experience with the product or negative reports about the product, the demand will decrease, shifting the entire demand curve to the left.

3. If personal income tax rates increase, consumers will have less money to spend, and the demand for most normal goods will decrease.

4. If a report states that a particular product causes cancer, consumers’ tastes and preferences for the product will change, and the demand for the product will decrease. If a report states that a product reduces the risk of cancer, consumers’ tastes and preferences for the product will change, and the demand for that product will increase.

5. Market demand is derived from individual demands, so the demand for a product increases as the number of consumers in the market for a product increases. As the number of consumers in the market for a product decreases, the demand for the product decreases.

6. For inferior goods, an increase in income will cause a decrease in demand, shifting the demand curve to the left. Inferior goods include products that consumers purchase less of as their incomes increase. For example, as your income increases, you might purchase more steaks but fewer bologna sandwiches, or more SUVs and fewer subcompact cars or more MP3 players and fewer CD players. In these examples, the bologna sandwiches, subcompact cars and CD players are inferior goods because an increase in consumers' income would cause the demand for those goods to decrease. At all prices at which those goods are offered for sale, fewer would be demanded as a result of an increase in consumer incomes.
-

7. Complements are goods that "work" together. An increase in the price of one of these goods will cause a decrease in the quantity demanded for that good. As a result, there will be a decrease in the demand for the complementary good. Ice cream and ice cream cones are goods that "work" or go together. An increase in the price of ice cream will cause consumers to buy fewer gallons of ice cream. This is a decrease in the quantity demanded of ice cream due to a price change. As a result, however, the demand for ice cream cones will decrease. The change in quantity demanded for ice cream was due to price, but the change in demand, or "total demand," for ice cream cones was due to a non-price factor, i.e., a change in the price of a complementary good.
-

8. If the product is a type of clothing and a famous athlete or actor advertises the product, the advertisement may change consumer tastes and preferences for the product, and the demand for the product may increase.
-

9. As the population ages, the number of people in the market for nursing home care increases and the demand for nursing home care increases.
-

10. People's expectations about the future may affect the demand for a good or service today. If people expect the price of coffee to rise in the future, they may buy more cans/bags of coffee today and store it.
-

11. As the birth rate decreases, the number of people in the market for diapers and other baby items decreases so the demand for these products decreases.
-

12. If consumers like a product more based on their experience with the product or based on advertising of the product, demand will increase, and cause the entire demand curve to shift to the right.
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Handout 2: Which Determinant of Demand Is This? Answer Key

Use the information in Visual 1 to categorize the statements below as definitions, descriptions or examples of one of the five determinants of demand, by writing the correct determinant of demand on the blank line.

- Change in consumer income
- Change in consumer tastes and preferences
- Change in prices of related goods
- Change in number of buyers in the market
- Change in consumer expectations

1. For most goods, referred to as “normal goods,” an increase in consumers’ income will cause demand to increase, which shifts the demand curve to the right. This shift indicates that at all prices for which the good is offered for sale, a greater quantity will be demanded due to the increase in income. Normal goods include most products such as gasoline, coffee and clothing.

Change in consumer income

2. If consumers like a product less based on experience with the product or negative reports about the product, the demand will decrease, shifting the entire demand curve to the left.

Change in consumer tastes and preferences

3. If personal income tax rates increase, it will reduce the amount of income consumers have to spend, and the demand for most normal goods will decrease.

Change in consumer income

4. If a report states that a particular product causes cancer, consumers’ tastes and preferences for the product will change, and the demand for the product will decrease. If a report states that a product reduces the risk of cancer, consumers’ tastes and preferences for the product will change, and the demand for that product will increase.

Change in consumer tastes and preferences

5. Market demand is derived from individual demands, so the demand for a product increases as the number of consumers in the market for a product increases. As the number of consumers in the market for a product decreases, the demand for the product decreases.

Change in number of buyers in the market

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6. For inferior goods, an increase in income will cause a decrease in demand, shifting the demand curve to the left. Inferior goods include products that consumers purchase less of as their incomes increase. For example, as your income increases, you might purchase more steaks but fewer bologna sandwiches, or more SUVs and fewer subcompact cars or more MP3 players and fewer CD players. In these examples, the bologna sandwiches, subcompact cars and CD players are inferior goods because an increase in consumers' income would cause the demand for those goods to decrease. At all prices at which those goods are offered for sale, fewer would be demanded as a result of an increase in consumer incomes.

Change in consumer income

7. Complements are goods that "work" together. An increase in the price of one of these goods will cause a decrease in the quantity demanded for that good. As a result, demand will decrease for the complementary good. Ice cream and ice cream cones are goods that "work" or go together. An increase in the price of ice cream will cause consumers to buy fewer gallons of ice cream. This is a decrease in the quantity demanded of ice cream due to a price change. As a result, however, the demand for ice cream cones will decrease. The change in quantity demanded for ice cream was due to price, but the change in demand, or "total demand," for ice cream cones was due to a non-price factor, i.e., a change in the price of a complementary good.

Change in prices of related goods

8. If the product is a type of clothing and a famous athlete or actor advertises the product, the advertisement may change consumer tastes and preferences for the product, and the demand for the product may increase.

Change in tastes and preferences

9. As the population ages, the number of people in the market for nursing home care increases and the demand for nursing home care increases.

Change in number of buyers

10. People's expectations about the future may affect the demand for a good or service today. If people expect the price of coffee to rise in the future, they may buy more cans/bags of coffee today and store it.

Change in expectations

11. As the birth rate decreases, the number of people in the market for diapers and other baby items decreases so the demand for these products decreases.

Change in number of buyers

12. If consumers like a product based on their experience with the product or based on advertising of the product, demand will increase and cause the entire demand curve to shift to the right.

Change in tastes and preferences

Handout 3: Demand Changes

Assume that hybrid cars become very popular. Because consumers buy hybrid cars and buy fewer non-hybrid cars, they buy 20 million fewer gallons of gasoline per day at every price at which gasoline is offered for sale in the table on Handout 1. For example, at \$2.25 per gallon, people are willing and able to buy 40 million gallons rather than 60 million gallons. Use Column 2 from Handout 1 in order to complete Column 2 in the table below and use the data to draw a new demand curve on Handout 1. Label the new demand curve "D1." Looking at S and D1 on Handout 1, answer the questions that follow the table below.

If the price of a gallon of gasoline was:	Consumers would be willing to buy (millions of gallons per day):	Producers would be willing to sell (millions of gallons per day):
\$2.25		30
\$2.50		35
\$2.75		40
\$3.00		45
\$3.25		50
\$3.50		55

- Does this represent an increase or a decrease in demand for gasoline?
- Is this a shift of the demand curve to the right or to the left?
- What is the new market-clearing price?
- What amount of gasoline will be bought and sold at this price?
- Is the new market-clearing price higher or lower than the original market-clearing price?

Handout 3: Demand Changes Answer Key

Assume that hybrid cars become very popular. Because consumers buy hybrid cars and buy fewer non-hybrid cars, they buy 20 million fewer gallons of gasoline per day at every price at which gasoline is offered for sale in the table on Handout 1. For example, at \$2.25 per gallon, people are willing and able to buy 40 million gallons rather than 60 million gallons. Use Column 2 from Handout 1 in order to complete Column 2 in the table below and use the data to draw a new demand curve on Handout 1. Label the new demand curve “D1.” Looking at S and D1 on Handout 1, answer the questions that follow the table below.

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\$2.25	40	30
\$2.50	35	35
\$2.75	30	40
\$3.00	25	45
\$3.25	20	50
\$3.50	15	55

- Does this represent an increase or a decrease in gasoline?
(decrease)
- Is this a shift of the demand curve to the right or to the left?
(left)
- What is the new market-clearing price?
(\$2.50)
- What amount of gasoline will be bought and sold at this price? *(35 million gallons per day)*
- Is the new market-clearing price higher or lower than the original market-clearing price? *(lower)*

Handout 4: Which Determinant of Supply Is This?

Use the information in Visual 2 to categorize the statements below as definitions, descriptions or examples of one of the five determinants of supply by writing the correct determinant of supply on the blank line.

- Change in input prices
- Change in technology
- Change in expectations
- Change in number of sellers
- Change in taxes or subsidies

1. To produce chocolate chip cookies, firms use various inputs, such as eggs, sugar, chocolate, ovens, machines, buildings and workers. The prices of these inputs play an important part in developing the supply curve. If the prices of these inputs increase, producing the cookies is less profitable, and the firm will supply fewer cookies. If the prices of these inputs decrease, producing the cookies is more profitable, and the firm is willing and able to supply more cookies.

2. If an oven is developed that allows cookie producers to bake cookies in half the time, the cookie supply will increase.

3. Banana producers obviously might not be able to stockpile their bananas, but producers of medical equipment might be able to withhold their equipment from the market if they think prices will increase in the future. In this case, a short-term decrease in the supply of medical equipment occurs.

4. An expected increase in corn prices might cause some farmers to plant corn rather than soybeans, thus increasing the corn supply.

5. If Nabisco stopped producing chocolate chip cookies, the supply of chocolate chip cookies would decrease because the number of producers in the market would have decreased.

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6. If a famous chef decides to produce and sell her signature chocolate chip cookies, the cookie supply would increase because the number of sellers in the market has increased.

7. The government gives tax subsidies to big-box stores in counties where the unemployment rate is more than 7 percent. The government's rationale is that big box stores provide jobs in a community. The supply of big-box stores increases.

8. Buddy Toys Inc., notices that the plastic piping for its production of hula-hoops has almost doubled in price. Therefore, it decreases its production of hula-hoops.

9. Keep It Sharp Inc., has developed a laser cutter for textile production. This has cut production time per pair of jeans from three minutes to 90 seconds. Many jeans manufacturers are using the new laser cutter. The result is an increase in the jeans supply.

10. The price of oil has increased and the supply of gasoline has decreased.

11. Cattle ranchers anticipate that prices for beef will fall because a highly influential celebrity makes public statements questioning the practice of eating beef. Cattle ranchers hurry to sell their cattle, which increases the beef supply.

12. The use of 360-degree, zero-turn lawn mowers allows lawn-service providers to mow twice as many lawns in a given day. The supply of lawn service has increased.

Handout 4: Which Determinant of Supply Is This? *Answer Key*

Use the information in Visual 2 to categorize the statements below as definitions, descriptions or examples of one of the five determinants of supply by writing the correct determinant of supply on the blank line.

- Change in input prices
- Change in technology
- Change in expectations
- Change in number of sellers
- Change in taxes or subsidies

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Change in input prices

2. If an oven is developed that allows cookie producers to bake cookies in half the time, the cookie supply would increase.

Change in technology

3. Banana producers obviously might not be able to stockpile their bananas, but producers of medical equipment might be able to withhold their equipment from the market if they think prices will increase in the future. In this case, a short-term decrease in the supply of medical equipment occurs.

Change in expectations

4. An expected increase in corn prices might cause some farmers to plant corn rather than soybeans, thus increasing the corn supply.

Change in expectations

5. If Nabisco stopped producing chocolate chip cookies, the supply of chocolate chip cookies would decrease because the number of producers in the market would have decreased.

Change in number of sellers

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6. If a famous chef decides to produce and sell her signature chocolate chip cookies, the cookie supply would increase because the number of sellers in the market has increased.

Change in number of sellers

7. The government gives tax subsidies to big-box stores in counties where the unemployment rate is more than 7 percent. The government's rationale is that big-box stores provide jobs in a community. The supply of big-box stores increases.

Change in taxes or subsidies

8. Buddy Toys Inc., notices that the plastic piping for its production of hula-hoops has almost doubled in price. Therefore, it decreases its production of hula-hoops.

Change in input prices

9. Keep It Sharp Inc., has developed a laser cutter for textile production. This has cut production time per pair of jeans from three minutes to 90 seconds. Many jeans manufacturers are using the new laser cutter. The result is an increase in the jeans supply.

Change in technology

10. The price of oil has increased and the supply of gasoline has decreased.

Change in price of inputs

11. Cattle ranchers anticipate that prices for beef will fall because a highly influential celebrity makes public statements questioning the practice of eating beef. Cattle ranchers hurry to sell their cattle, which increases the beef supply.

Change in expectations

12. The use of 360-degree, zero-turn lawn mowers allows lawn-service providers to mow twice as many lawns in a given day. The supply of lawn service has increased.

Change in technology

Handout 5: Supply Changes

Assume that natural disasters strike Mexico. These events reduce the amount of crude oil available in the world market. As a result, 20 million fewer gallons of gasoline are available per day at all prices at which it is offered for sale on Handout 1. At \$3.50 per gallon of gasoline, for example, 35 million gallons are now available for sale instead of 55 million gallons. Use column 3 from Handout 1 in order to complete Column 3 in the table below, and use the data to draw a new supply curve on Handout 1. Label the new supply curve "S1." Looking at curves D1 and S1 on Handout 1, answer the questions that follow the table below.

If the price of a gallon of gasoline was:	Consumers would be willing to buy (millions of gallons per day):	Producers would be willing to sell (millions of gallons per day):
\$2.25	40	
\$2.50	35	
\$2.75	30	
\$3.00	25	
\$3.25	20	
\$3.50	15	

- Does this represent an increase or a decrease in the gasoline supply?
- Is this a shift of the supply curve to the right or to the left?
- What is the new market-clearing price?
- How much gasoline will be bought and sold at this price?
- Is the new market-clearing price higher or lower than the market-clearing price determined on Handout 3?

Handout 5: Supply Changes Answer Key

Assume that natural disasters strike Mexico. These events reduce the amount of crude oil available in the world market. As a result, 20 million fewer gallons of gasoline are available per day at all prices at which it is offered for sale on Handout 1. At \$3.50 per gallon of gasoline, for example, 35 million gallons are now available for sale instead of 55 million gallons. Use column 3 from Handout 1 in order to complete Column 3 in the table below, and use the data to draw a new supply curve on Handout 1. Label the new supply curve "S1." Looking at curves D1 and S1 on Handout 1, answer the questions that follow the table below.

If the price of a gallon of gasoline was:	Consumers would be willing to buy (millions of gallons per day):	Producers would be willing to sell (millions of gallons per day):
\$2.25	40	10
\$2.50	35	15
\$2.75	30	20
\$3.00	25	25
\$3.25	20	30
\$3.50	15	35

- Does this represent an increase or a decrease in the gasoline supply?
(decrease)
- Is this a shift of the supply curve to the right or to the left?
(left)
- What is the new market-clearing price?
(\$3.00)
- How much gasoline will be bought and sold at this price? *(25 million gallons per day)*
- Is the new market-clearing price higher or lower than the market-clearing price determined on Handout 3? *(lower)*

Handout 6: Analyzing Shifts in Demand and Supply

For each scenario below, identify whether there has been an increase in demand, a decrease in demand, an increase in supply or a decrease in supply and state which determinant accounts for the shift. An example is below.

Example: Corporate income tax rates for businesses increase. How will this affect the market for most goods and services?

Decrease in supply

Change in taxes or subsidies

1. A popular late-night talk show host discusses the health benefits of not smoking and has several celebrity guests promote this idea with entertaining anti-smoking skits. This has convinced a significant number of people to quit smoking. How will this affect the market for cigarettes?
2. The price of computer chips decreases significantly, enabling manufacturers of hard drives to produce more hard drives. How will this affect the market for hard drives?
3. A national prescription lens association engages in a major ad campaign to convince people that glasses that automatically darken with exposure to sunlight are much healthier for your eyes than glasses that do not. The campaign has been very effective. How will this affect the market for prescription lens that automatically darken?
4. The price of fertilizer has increased. How will this affect soybean production?
5. Swimming pool service providers can service more pools this year than last year due to an advanced sweeper that automatically adjusts chemicals in the water while sweeping the pool. How will this affect the market for pool-cleaning services?
6. A news report recently announced that baby boomers planned to sell their homes in the suburbs and buy condos in the city sometime in the next three years. How will this affect the demand for condos in the city?

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7. To encourage energy conservation, the government will give companies a \$10 credit on each residential solar panel that they produce. Companies can deduct the credit from their taxes. How will this affect the market for solar panels?

8. Consumers learn that tap water is healthier than bottled water. How will this affect the bottled-water market?

9. The price of movie tickets has increased significantly. How will this affect the market for DVD rentals?

10. Laptop computer sales have doubled over the past ten months. How will this affect the market for wireless Internet service?

Handout 6: Analyzing Shifts in Demand and Supply *Answer Key*

For each scenario below, identify whether there has been an increase in demand, a decrease in demand, an increase in supply or a decrease in supply, and state which determinant accounts for the shift. An example is below.

Example: Corporate income tax rates for businesses increase. How will this affect the market for most goods and services?

Decrease in supply

Change in taxes or subsidies

1. A popular late-night talk show host discusses the health benefits of not smoking and has several celebrity guests promote this idea with entertaining anti-smoking skits. This has convinced a significant number of people to quit smoking. How will this affect the market for cigarettes?

Decrease in demand

Change in consumer tastes or preferences

2. The price of computer chips decreases significantly, enabling hard drive manufacturers to produce more hard drives. How will this affect the hard drive market?

Increase in supply

Change in input prices

3. A national prescription lens association engages in a major ad campaign to convince people that glasses that automatically darken with exposure to sunlight are much healthier for your eyes than glasses that do not. The campaign has been very effective. How will this affect the market for prescription lens that automatically darken?

Increase in demand

Change in consumer tastes or preferences

4. The price of fertilizer has increased. How will this affect soybean production?

Decrease in supply

Change in input prices

5. Swimming pool service providers can service more pools this year than last year due to an advanced sweeper that automatically adjusts chemicals in the water while sweeping the pool. How will this affect the market for pool-cleaning services?

Increase in supply

Change in technology

6. A news report recently announced that baby boomers planned to sell their homes in the suburbs and buy condos in the city sometime in the next three years. How will this affect the demand for condos in the city?

Increase in demand

Number of buyers in the market

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7. To encourage energy conservation, the government will give companies a \$10 credit on each residential solar panel that they produce. Companies can deduct the credit from their taxes. How will this affect the market for solar panels?

Increase in supply

Change in taxes or subsidies

8. Consumers learn that tap water is healthier than bottled water. How will this affect the bottled-water market?

Decrease in demand

Change in consumer tastes or preferences

9. The price of movie tickets has increased significantly. How will this affect the market for DVD rentals?

Increase in demand

Change in the price of a related (substitute) good

10. Laptop computer sales have doubled over the past ten months. How will this affect the market for wireless Internet service?

Increase in demand

Change in the price of a related (complementary) good

Visual 1: Determinants of Demand

The demand curve can shift to the right or left as conditions in the market change. If the demand curve shifts to the right, demand increases. If the demand curve shifts to the left, demand decreases.

Change in consumer income

Normal goods are goods for which, other things being equal, an increase in income leads to an increase in demand and a decrease in income leads to a decrease in demand.

Inferior goods are goods for which, other things being equal, an increase in income leads to an increase in demand and a decrease in income leads to a decrease in demand.

Change in consumer tastes and preferences

If consumers like a product based on their experience with the product or based on advertisements or reports about the product, consumers' tastes and preferences for the product will change, causing the demand for the product to increase.

If consumers don't like a product because they had a bad experience with it or because they read a negative report about it, consumers' tastes and preferences for the product will change causing the demand for the product to decrease.

Change in the prices of related goods

Complements are two goods that "work" together. An increase in the price of one of these goods will cause a decrease in the demand for the complementary good.

Substitutes are two goods that can be used in place of one another. An increase in the price of one of these goods leads to an increase in the demand for the substitute good.

Change in number of buyers in the market

Market demand is derived from individual demands. As the number of consumers in the market for a product increases, the demand for the product increases. As the number of consumers in the market for a product decreases, the demand for the product decreases.

Change in consumer expectations

People's expectations about the future may affect the demand for a good or service today.

Visual 2: Determinants of Supply

The supply curve can shift to the right or left as market conditions change. A shift of the supply curve to the right represents an increase in supply. A shift of the supply curve to the left represents a decrease in supply.

Change in input prices

To produce a product, sellers use various inputs. Input prices are negatively related to supply. If the price of inputs rises, the supply of the product will decrease, and vice versa.

Change in taxes or subsidies

Businesses treat most taxes as costs. Therefore, an increase in taxes such as sales or property taxes will increase costs and reduce supply. Conversely, subsidies are “taxes in reverse.” If the government subsidizes the production of a good, in effect it lowers production costs and increases supply.

Change in technology

The technology that turns inputs (or resources) into products is another determinant of supply. Technology reduces firms’ costs and increases the product supply.

Change in expectations

Producers’ expectations about the future may affect the supply of a good or service today.

Change in the number of sellers

Market supply depends on the factors that influence the supply of individual sellers. As the number of product sellers increases, the product supply increases. As the number of sellers in the market decreases, the supply decreases.