Solutions for Understanding Economics 8th Edition by Lovewell

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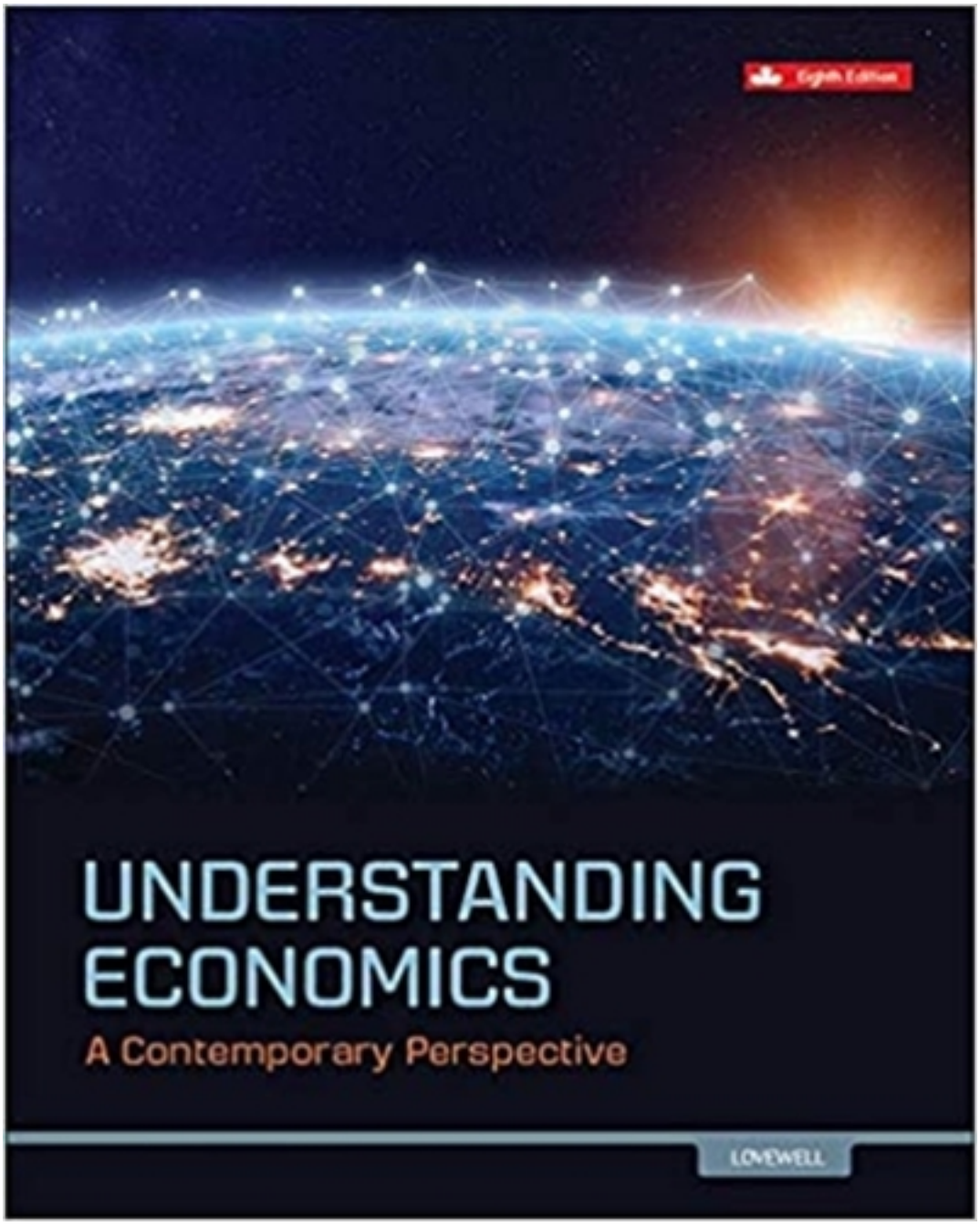


Solutions

Chapter 2
Teaching Tips

The Graphical Properties of Demand and Supply

Students' comfort in using demand and supply may be aided by having them review the mathematical properties of straight lines outlined in the Connect resource's Graphing Module. Through a review of the algebraic notions of slope and axis intercepts, the module helps students appreciate the differences between negatively sloped demand curves and positively sloped supply curves so essential in understanding the graphical explanations outlined in this chapter.

Demand and Supply Shifts

Changes in demand are easier to visualize than changes in supply. This is because of the graphical properties of demand curves. An increase in demand, for example, is graphed as a rightward (when seen horizontally) or upward (when seen vertically) shift. Similarly a decrease in demand is graphed as a leftward or downward shift. Shifts in demand therefore look the same whether viewed horizontally or vertically. Still, it is best to refer to an increase in demand as a rightward shift, rather than an upward shift. Similarly, refer to a decrease in demand as a leftward shift. Doing so helps circumvent confusion when students come to study supply. For in this case a rightward shift of the curve appears downward when viewed vertically. Meanwhile a leftward shift appears to be vertically upward. As with demand, always refer to supply changes in horizontal terms, so that a supply increase is described as a rightward not downward shift, while a decrease is described as a leftward not upward shift.

Demand Factors

In presenting this material, you may find students perplexed over the workings of two factors − prices of other products and consumer expectations. If so, extend your treatment with the following points.

Prices of Other Products The easiest way to recall the negative relationship between quantity demanded and price of a complement is by remembering that this relationship parallels that between quantity demanded and the product's own price. If two products are complements, the direction of the movement in quantity demanded is the same regardless of which product's price changes, the product's own price or the price of its complement. In contrast, with a change in a substitute's price, the direction of the movement in quantity demanded is opposite to the impact of a change in the product's own price.

Consumer Expectations Consumer expectations about future prices on the one hand and incomes on the other are best covered separately. For expected changes in price, the effect on quantity demanded is opposite to what would happen if it were the current price that were changing. That's because, if consumers are affected by expected price changes, they view future purchases and current purchases of the same item as substitute options. For example, an expected rise in price causes current quantity demanded to increase, since consumers are choosing to purchase now rather than in the future. Now let's consider the impact of consumer expectations about future income. Here the key point is whether the product in question is normal or inferior. In either case, the effect of an expected change in income is in the same direction as the effect if it were current income that were changing. For example, an expected rise in future income raises quantity demanded for normal products, just as a rise in current income does. That's because expected changes in income, just like current income changes, tend to affect how well off consumers feel at the present moment.

Supply Factors

As in the case of demand factors, two supply factors may prove particularly challenging to students: prices of related products and producer expectations. If necessary, supplement your explanations with the following points.

Prices of Related Products It is crucial to be clear on whether the price of another product that is changing is affecting consumers or producers. (Note the difference in the names of the two factors: prices of *other* products for the demand factor, prices of *related* products for the supply factor.) In the case of supply, quantity always moves in the opposite direction to the change in the price of a related product. That's because producers are choosing to substitute the supply of one product for another.

Producer Expectations The impact on quantity of producer expectations concerning future prices is always in an opposite direction to the way the price is expected to move. That's because producers are viewing current sales and future sales of their product as substitute options. For example, an expected rise in the price of an item causes its producers to decrease current quantity supplied so they can gain the extra revenue from selling it after the expected price rise.

Effects of Demand and Supply Shifts on Equilibrium

There are several shorthand methods for quickly ascertaining the impact of demand and supply shifts on equilibrium price and quantity. If only demand is shifting, the results on price and quantity are straightforward since both values move in the same direction as the demand change.

For example, if demand increases then so do equilibrium price and quantity. If only supply is shifting, then the change in equilibrium quantity is in the same direction as the supply change, while the change in equilibrium price is in the opposite direction. For example, if supply increases then so does equilibrium quantity, while equilibrium price decreases. If both curves shift simultaneously, then the most straightforward cases are if both curves increase or decrease simultaneously. Then quantity moves in the same direction as demand and supply while the change in price is indeterminate. On the other hand, if demand is shifting one way and supply the other, then it is the direction of the price change that can be ascertained, while the change in quantity is indeterminate. In these cases, it is the vertical movements in demand and supply that determine the direction of the price change. If both shift vertically upwards, price rises; in the case of simultaneous downward shifts, price falls.

Answers to Thinking about Economics Questions

TAE I, Section 2.1: Rolex watches are a specific example of such a product, since their high price is one of this product's attractive features to those consumers who can afford to buy them.

TAE II, Section 2.2: As e-commerce increases competition by giving consumers a greater opportunity to purchase these products wherever in the world where price is lowest, the spreads that currently exist when comparing US dollar prices of the same products in various countries should gradually fall.

TAE III, Section 2.3: The appearance of the surge multiplier that accompanies the increase in demand represents an increase in price which causes a reduction in quantity demanded by riders and an increase in quantity supplied by drivers. Because it takes time for drivers longer to reach areas where surge pricing is relevant their reaction will tend to be slower than the reaction of riders.

Answers to Chapter Problems

2.1 Practice Problems

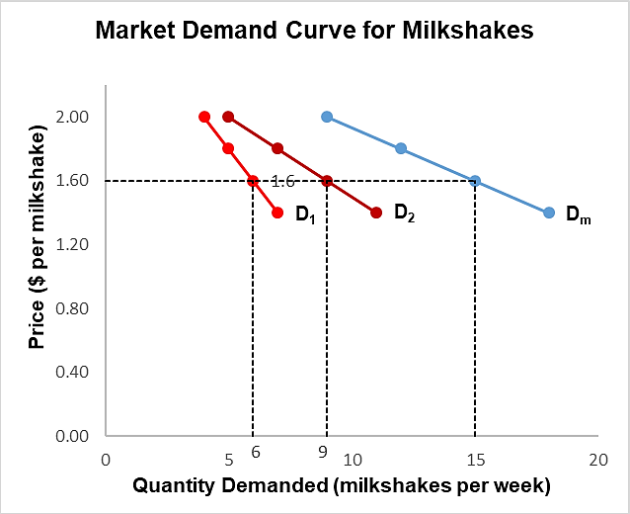
1.

a) D_1 and D_2 both satisfy the law of demand since both illustrate an inverse relationship between price and quantity demanded. As the price of milkshakes falls, as from $2 to $1.80, for example, the quantity demanded for Student 1 rises from 4 to 5 milkshakes, and the quantity demanded for Student 2 rises from 5 to 7 milkshakes.

b) The market demand curve is found by adding together the quantities demanded by Student 1 and Student 2 at each possible price.

c) At a price of $2, quantity demanded in the market is 9 (= 5 + 4) milkshakes; at a price $1.80 it is 12 (= 7 + 5) milkshakes, at $1.60 it is 15 (= 9 + 6) milkshakes, and at $1.40 it is 18 (= 11 + 7) milkshakes.

d)



In this graph the quantities demanded by Student 1 and Student 2 and in the market are highlighted at a price of $1.60.

2.

a) Because ebooks are a normal product, demand increases due to higher incomes.

b) Ebooks and ebook readers are complementary products, so a drop in the price of readers increases not just the quantity demanded of readers but also the demand for ebooks.

c) A sudden expectation by consumers of a fall in ebook prices means they will delay ebook purchases, decreasing current demand.

d) Because ebooks and print books are substitute products, a rise in the price of print books increases the demand for ebooks.

3.

a) A decrease in the price of coffee, which raises the quantity demanded of coffee, is associated with a movement along the demand curve for coffee and is categorized as an increase in quantity demanded.

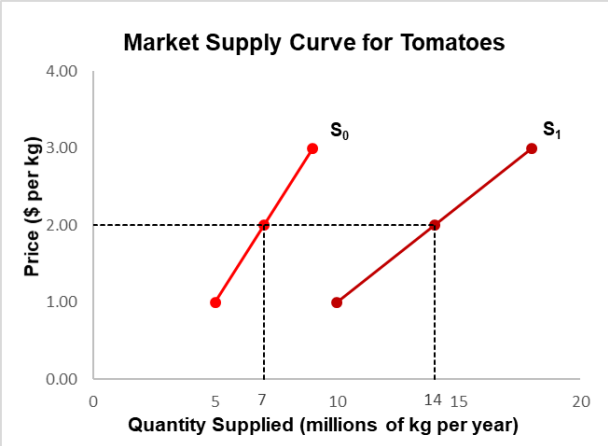
b) Because coffee and tea are substitute products, a drop in the price of coffee decreases the entire demand curve for tea. This occurs because the quantity of tea is reduced at every possible price of tea. This is therefore, categorized as a decrease in demand.

2.2 Practice Problems

1.

a) The law of supply is satisfied, since a rise in the price of tomatoes (from $1 to $2, and then from $2 to $3) increases quantity supplied (from 5 to 7 million kgs, and then from 7 to 9 million kgs).

b)



In this graph the quantities supplied before and after the shift in supply are highlighted at a price of $2.

c) In each of the cases the following occurs:

- As wages rise, the supply of tomatoes decreases, shifting the curve to the left.
- Because tomatoes and corn are supply-related products, a drop in the price of corn will increase the supply of tomatoes, shifting the curve to the right.
- An early frost decreases the supply of tomatoes, shifting the curve to the left.
- Technological progress in tomato cultivation increases the supply of tomatoes, shifting the curve to the right.
- An expected fall in the price of tomatoes increases the current supply, as producers try to get today's high price, shifting the curve to the right.

d) A doubling of quantity supplied at each price means that quantity supplied is now 10 million (= 2 × 5 million) kgs at a price of $1, 14 million (= 2 × 7 million) kgs at $2 and 18 million (= 2 × 9 million) kgs at $3. The new market supply curve S_1 shifts out to the right. Because of the curve's rightward shift this is known as an increase in supply.

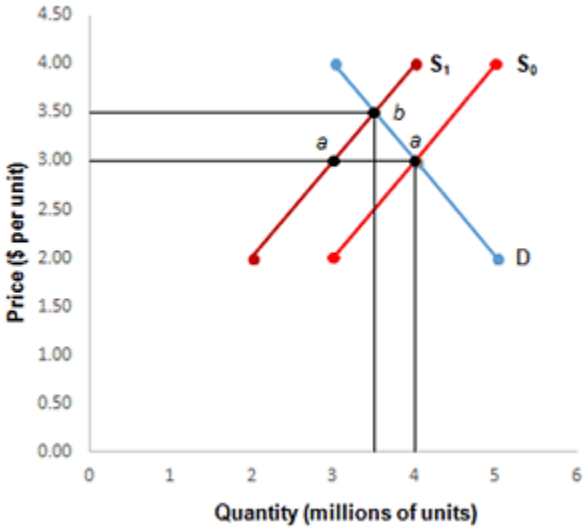
2.

a) A drop in the price of corn, which reduces the quantity supplied of corn, is associated with a movement along the supply curve for corn and is classified as a decrease in quantity supplied.

b) Because corn and tomatoes are supply-related products, a drop in the price of corn causes a rightward shift in the entire supply curve for tomatoes. This happens because some farmers will respond by moving from corn to tomato production. The result is classified as an increase in supply.

2.3 Practice Problems

1.

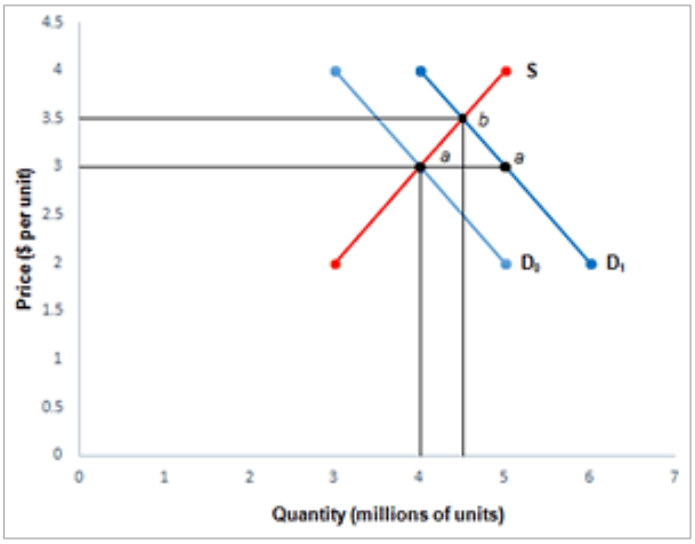


a) Supply has decreased, which is shown as a leftward shift in the curve in the graph shown above.

b) With a decrease in supply, equilibrium quantity decreases.

c) The rise in equilibrium price and fall in equilibrium quantity are accompanied by a temporary shortage that occurs immediately after the decrease in supply, as illustrated in the graph, where after the shift in supply from S_0 to S_1, there is a shortage (as seen by the points labelled *a* in the graph), which pushes price upwards to its equilibrium value (point *b* in the graph).

2.



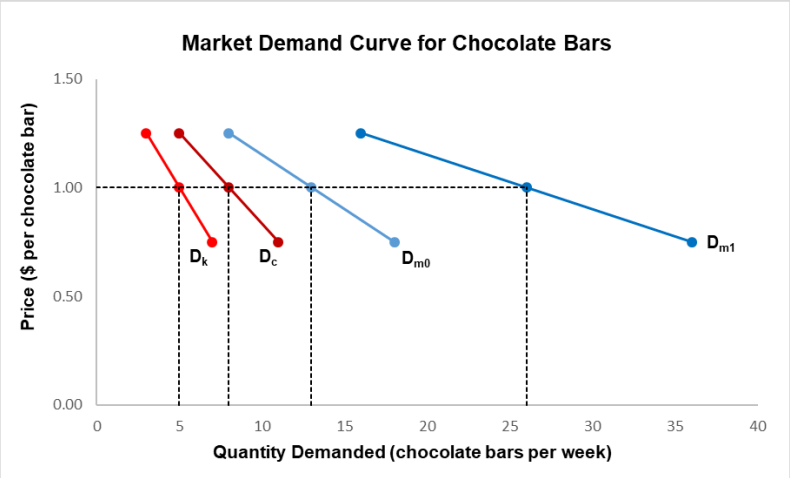
a) Demand has increased, which is associated with rightward shift of the curve in the graph shown above.
b) With an increase in demand, equilibrium quantity increases.
c) The rise in equilibrium price and quantity are accompanied by a temporary shortage that occurs immediately after the increase in demand, as illustrated in the graph, where after the shift in demand from D_0 to D_1, there is a shortage (points *a* in the graph), which pushes price upwards to its equilibrium value (point *b* in the graph).

End of Chapter Problems

1.

a) The three points are 8 (= 3 + 5) chocolate bars at a price of $1.25, 13 (= 5 + 8) chocolate bars at a price of $1, and 18 (= 7 + 11) at a price of 75 cents.
b) The law of demand is satisfied, because a fall in the price of chocolate bars (from $1.25 to $1, or from $1 to 75 cents) increases quantity demanded (from 8 to 13 chocolate bars, or again from 13 to 18 chocolate bars).

c)



In this graph the quantities demanded by Kate and Carlo, and in the market before and after the change in market demand, are highlighted at a price of $1.

d) Kate now buys 6 and Carlo 10 chocolate bars at a price of $1.25; Kate buys 10 and Carlo 16 chocolate bars at a price of $1; and Kate buys 14 and Carlo 22 at a price of 75 cents. Therefore the three points are 16 (= 6 + 10) at $1.25, 26 (= 10 + 16) at $1, and 36 (= 14 + 22) at 75 cents. Because the entire market demand curve shifts rightward this is an increase in demand.

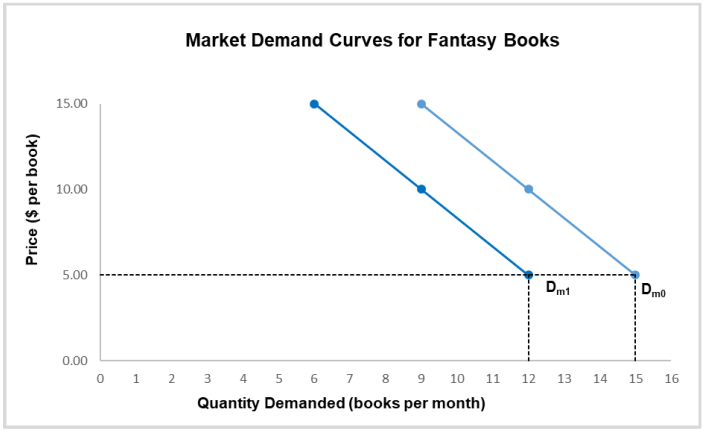
2.

a)

Price ($ per book)	Shanice's Quantity Demanded (books per month)	Nick's Quantity Demanded (books per month)	Priya's Quantity Demanded (books per month)	Quantity Demanded in Market (books per month)
$15.00	2	3	4	9
$10.00	3	4	5	12
5.00	4	5	6	15

The three quantities demanded in the market are 9 (= 2 + 3 + 4) books at a price of $15, 12 (= 3 + 4 + 5) books at a price of $10, and 15 (= 4 + 5 + 6) at a price of $5.

b)



c) The law of demand is met for D_{m0}. This is because price and quantity demand move in opposite directions. For example, a fall in the price of books from $15 to $10 increases quantity demanded on the curve from 9 to 12 books.

d) At a price of $15 Shanice now buys 1 book, Nick buys 2 and Priya 3. At a price of $10 Shanice now buys 2 books, Nick buys 3 and Priya 4. At a price of $5 Shanice now buys 3, Nick buys 4 and Priya buys 5. Therefore, the three points on the new market demand curve D_{m1} are 6 (= 1 + 2 + 3) at $15, 9 (= 2 + 3 + 4) at $10, and 12 (= 3 + 4 + 5) at $5. This is a decrease in demand. See part b for the graph of D_{m0}.

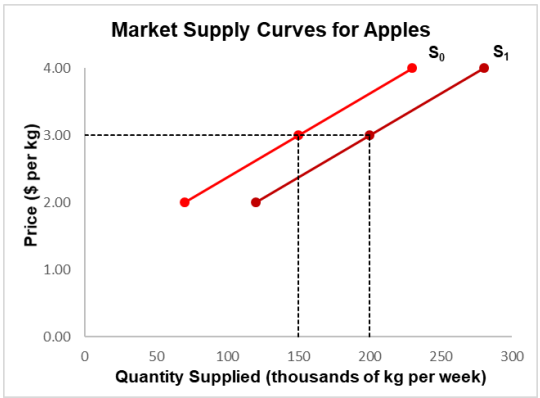
3.

a) S_0 satisfies the law of supply since it has an upward slope, showing that as the price of apples rises, as from $2 to $3, so does the quantity supplied of apples, as from 70,000 to 150,000 apples.

b) With an increase in the amount of apples offered for sale at each price, the supply curve shifts to the right, which illustrates an increase in supply.

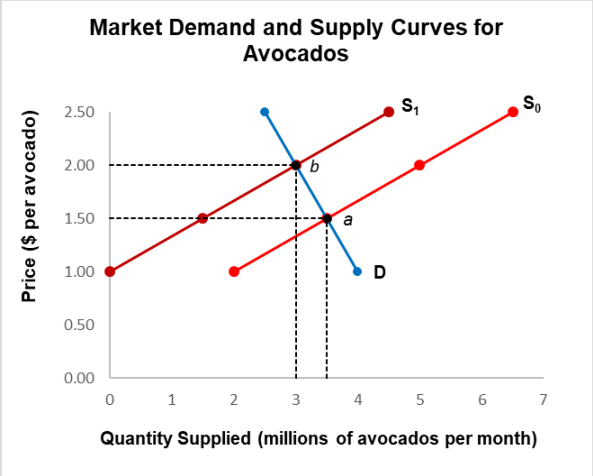
c) At a price of $2, the new quantity supplied is 130,000 (= 70,000 + 50,000) kg, at $3 it is 200,000 (= 150,000 + 50,000) kg and at $4 it is 280,000 (= 230,000 + 50,000) kg.

d) In this graph the quantities supplied for both of the supply curves are highlighted at a price of $3.



4.

a)



The equilibrium price and quantity are $1.50 an 3.5 million, found at the intersection of D_0 and S_0 (point *a* in the graph).

b) D_0 is negatively sloped, because from left to right, the curve falls. S_0 is positively sloped, because from left to right, the curve rises. D_0 satisfies the law of demand since as the price of avocados rises, as from $1 to $1.50, the quantity demanded of avocados moves in the opposite direction, from 4 million to 3.5 million. S_0 satisfies the law of supply since as the price of avocados rises, as from $1 to $1.50, so does the quantity supplied of avocados, from 2 million to 3.5 million.

c) At $2.50 the new quantity supplied is 4.5 million (= 6.5 million − 2 million). at $2 it is 3 million (= 5 million − 2 million); at $1.50 it is 1.5 million (= 3.5 million − 2 million), at $1 price it is 0 (= 2 million − 2 million).

d) There is a decrease in supply, since at each price of the product quantity supplied falls. The new equilibrium price is $2 and the new equilibrium quantity is 3 million, found at the intersection of D_0 and S_1 (point *b* in the graph). Compared with their initial equilibrium values, quantity has decreased and price has increased. This is what we would expect with a decrease in supply.

5.

Demand Factors	Supply Factors
number of buyers income price of another product consumer preferences consumer expectations	number of producers resource price state of technology change in nature price of related product producer expectations

a) Demand increases, since this discovery changes consumer perceptions of the medical benefits of blueberries, making them more likely to prefer this product at each possible price. This causes the demand curve for blueberries to shift to the right.
b) Supply increases, because the new automated equipment increases how much tea growers can produce at each possible price. This causes the supply curve for tea to shift to the right.
c) Demand decreases, since game consoles and computer games are complementary goods and a rise in the price of consoles makes games less attractive to consumers at each possible price for games. This causes the demand curve for computer games to shift to the left.
d) Supply decreases, because a rise in the price of grazing land reduces how much wool suppliers can produce at each possible price of wool. This causes the supply curve for wool to shift to the left.

6.

a) As the cable TV provider’s subscription rate falls, there will be an increase in quantity demanded, shown by a movement down and to the right along the demand curve.
b) With the drop in consumer incomes, there will be an increase in demand for an inferior product such as canned milk, associated with a rightward shift in the demand curve.
c) The rise in the price of this brand of perfume causes a decrease in quantity demanded for this item, shown by a movement up and to the left along the demand curve.
d) The increased popularity of online games will cause a decrease in demand for computer games purchased, since these two products are substitutes. This is associated with a leftward shift in the demand curve for computer games.

7.

a) With a higher price of tomatoes, there will be an increase in quantity supplied for this product, shown by a movement up and to the right along the supply curve.

b) Due to the oil spill, there is a decrease in supply of salmon, accompanied by a leftward shift in the supply curve.

c) As the price of cranberries falls, there will be a decrease in quantity supplied, shown by a movement down and to the left along the supply curve.

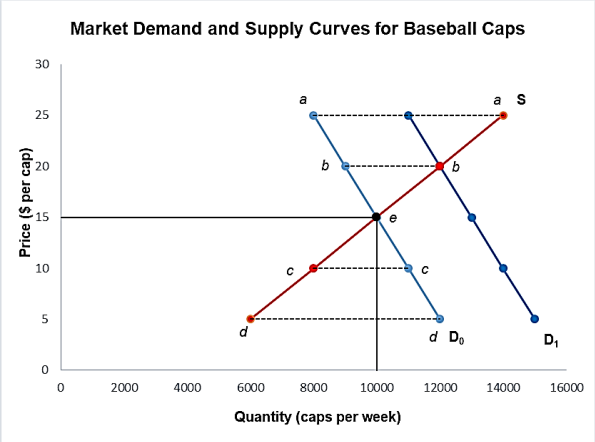
d) With the introduction of more sophisticated mining equipment, there is an increase in supply for iron, shown by a rightward shift in the supply curve.

8.

(1) Price ($ per cap)	(2) Quantity Demanded (caps per week)	(3) Quantity Supplied (caps per week)	(4) Surplus (+) or Shortage (-)	(5) Effect on Price	(6) New Quantity Demanded (caps per week)	(7) New Surplus (+) or Shortage (-)	(8) New Effect on Price
$25.00	8,000	14,000	[*6,000*]	down	11,000	[*3,000*]	down
20.00	9,000	12,000	[*3,000*]	down	12,000	[*0*]	stay the same
15.00	10,000	10,000	[*0*]	stay the same	13,000	[*-3,000*]	up
10.00	11,000	8,000	[*-3,000*]	up	14,000	[*-6,000*]	up
5.00	12,000	6,000	[*-6,000*]	up	15,000	[*-9,000*]	up

a) The values in column (4) are found by subtracting the relevant quantity demanded in column (2) from the associated quantity supplied in column (3). For example, there is a surplus of 6,000 (= 14,000 − 8,000) at a price of $25. The descriptions in column (5) follow from whether or not there is a surplus or shortage. With a surplus, price is pushed down; with a shortage, price is pushed up; and when there is no discrepancy between quantities demanded and supplied there is no change in price.

b)



c) Equilibrium price is $15, associated with a quantity of 10,000 caps per week. At any other price besides $15, there is a discrepancy between the quantities demanded and supplied. At prices above $15, there is a surplus which causes price to fall (in the graph above, the points labelled *a* at a price of $25 and the points labelled *b* at a price of $20), while at prices below $15 a shortage which causes price to rise fall (in the graph above, the points labelled *c* at a price of $10 and the points labelled *d* at a price of $5). Only at $15 are quantities demanded and supplied identical at 10,000 caps.

d) This represents an increase in demand, since buyers raise the amounts of baseball caps they purchase at every price. It would be shown by a rightward shift in the demand curve.

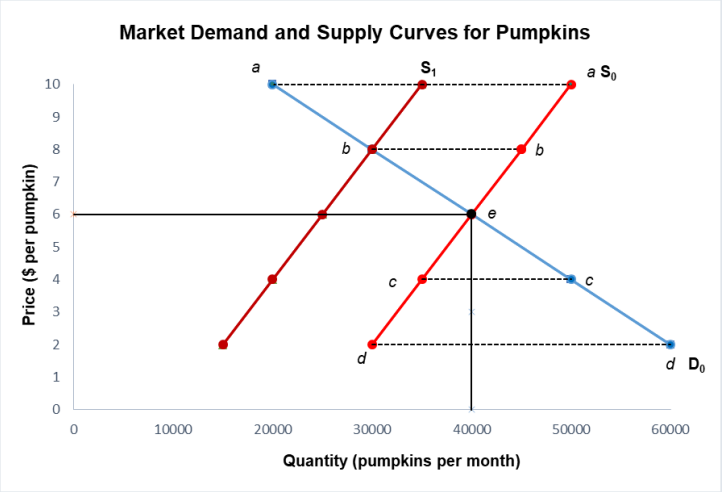
e) The new values in columns (7) and (8) are found using the same methods used in part a: the surplus or shortage in column (7) is derived by subtracting quantity demanded from quantity supplied and the description of the change in price in column (8) follows from whether there is a surplus, in which case price is pushed down, or a shortage, in which case price is pushed up. As before, when there is no discrepancy between quantities demanded and supplied there is no change in price.

9.

(1) Price ($ per cap)	(2) Quantity Demanded (pumpkins per month)	(3) Quantity Supplied (pumpkins per month)	(4) Surplus (+) or Shortage (-)	(5) New Quantity Supplied (pumpkins per month)	(6) New Surplus (+) or Shortage (-)
$10.00	20,000	[*50,000*]	30,000	35,000	[*15,000*]
8.00	30,000	[*45,000*]	15,000	30,000	[*0*]
6.00	40,000	[*40,000*]	0	25,000	[*-15,000*]
4.00	50,000	[*35,000*]	-15,000	20,000	[*-30,000*]
2.00	60,000	[*30,000*]	-30,000	15,000	[*-45,000*]

a) The values in column (3) are found by adding the relevant surplus or subtracting the relevant shortage in column (4) from the associated quantity demanded in column (1). For example, at a price of $10 quantity supplied is 50,000 (= 20,000 + 30,000).

b)



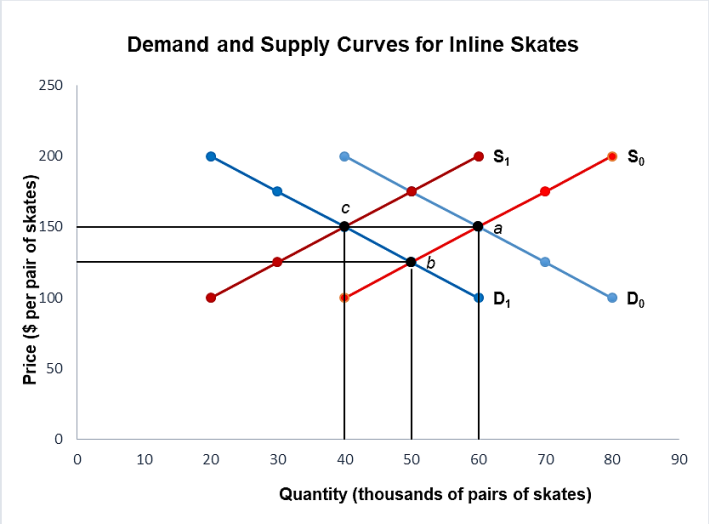
c) Equilibrium price is $6, associated with a quantity of 40,000 pumpkins per month. At any other price besides $6, there is a discrepancy between the quantities demanded and supplied. At prices above $6, there is a surplus which causes price to fall (in the graph above, the points labelled *a* at a price of $10 and the points labelled *b* at a price of $8), while at prices below $6 a shortage which causes price to rise (in the graph above, the points labelled *c* at a price of $4 and the points labelled *d* at a price of $2). Only at $6 are quantities demanded and supplied identical at 40,000 pumpkins.

d) This represents a decrease in supply, since buyers reduce the amounts of pumpkins they offer for sale at every price. It would be shown by a leftward shift in the supply curve.

e) The new equilibrium price and quantity are $8 and 30,000 pumpkins per month. These are found as the point at the intersection of D_0 and S_1.

10.

a)



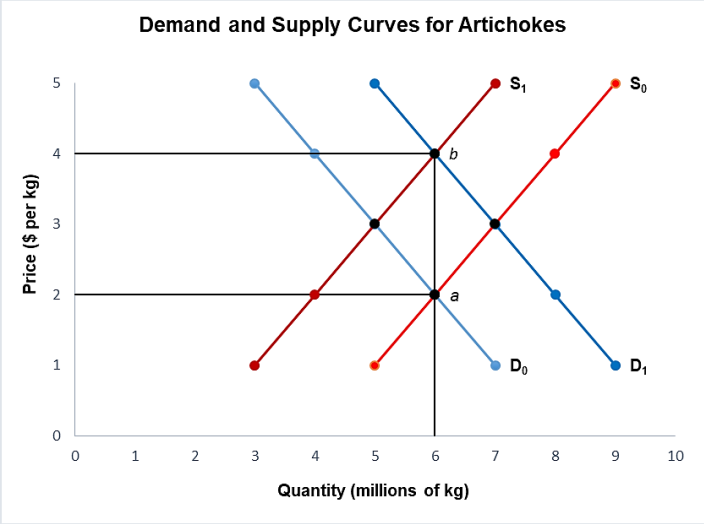
b) The initial equilibrium price and quantity are found at the intersection of D_0 and S_0 (the point labelled *a* in the graph).

c) This new equilibrium price and quantity are found at the intersection of curves D_1 and S_0 (point *b* in the graph). When compared with the initial equilibrium point, the values for both price and quantity have fallen.

d) Equilibrium price and quantity are now at the intersection of D_1 and S_1 (point *c* in the graph). When compared with the equilibrium point in part c, equilibrium price has risen and equilibrium quantity has fallen.

11.

a)



b) The initial equilibrium price and quantity are \$2 and 6 million, found at the intersection of D_0 and S_0 (the point labelled *a* in the graph).

c) This new equilibrium price and quantity are \$4 and 6 million, found at the intersection of curves D_1 and S_1 (point *b* in the graph). When compared with their initial equilibrium values, equilibrium price has risen from \$2 to \$4 and equilibrium quantity has stayed the same at 6 million.

d) Because only price has increased and equilibrium quantity has stayed the same, the shifts in the demand and supply curves have been of equal size though in opposite direction.

12.

a) Equilibrium price and quantity both fall. Because dry cleaning is a normal product, a drop in consumer incomes shifts the demand curve to the left, which causes the equilibrium point to move down and to the left along the supply curve.

b) Equilibrium price rises and equilibrium quantity falls. A decline in the number of law school graduates shifts the supply curve of legal services to the left, which causes the equilibrium point to move up and to the left along the demand curve.
c) Equilibrium price and quantity both rise. With consumer expectations that turkey prices will soon rise, the demand curve for turkeys shifts to the right, which causes the equilibrium point to move up and to the right along the supply curve.
d) Equilibrium price falls and equilibrium quantity rises. A cost-saving technological innovation shifts the supply curve of rice to the right, which causes the equilibrium point to move down and to the right along a stationary demand curve.

13.

a) As consumer incomes fall, there is a decrease in demand for a normal product such as wheat. Meanwhile the drop in the price of combine harvesters leads to an increase in supply for wheat. With a leftward shift in demand and a rightward shift in supply, equilibrium price falls while equilibrium quantity may rise, fall or stay the same.
b) With a particularly severe flu season there is an increase in demand for this herbal remedy. Meanwhile the rise in the price of ingredients causes a decrease in supply. With a rightward shift in demand and a leftward shift in supply, equilibrium price rises while equilibrium quantity may rise, fall or stay the same.
c) Due to the rise in consumer preferences for spicy food, there is an increase in demand for jalapeno peppers. Meanwhile, the fall in wages paid to farmworkers leads to an increase in supply. With a rightward shift in both demand and supply, equilibrium price may rise, fall or stay the same while equilibrium quantity rises.
d) Given consumer expectations that the price of tuna will rise, there is an increase in the current demand for tuna. Meanwhile, as the number of tuna fishers drops there is a decrease in supply. With a rightward shift in demand and a leftward shift in supply, equilibrium price increases while equilibrium quantity may rise, fall or stay the same.

14. (Essay)

a) Public education causes demand for the product to fall reducing equilibrium quantity while equilibrium price as seen by consumers drops. Legal restrictions or taxes shift the supply vertically upwards (ie. cause a drop in supply) reducing equilibrium quantity while equilibrium price as seen by consumers rises.
b) Public education that reduces demand is likely to have more long-term success than legal restrictions or taxes that affect supply. This is because the impact of public education on consumption is much more likely to be permanent, whereas the reduced consumption caused by restrictions or taxes lasts only as long as the policy remains in effect.

Advancing Economic Thought Problems

1.

Consumption of A (price = $2)				Consumption of B (price = $4)			
Units of A	**Total Utility (utils)**	**Marginal Utility (utils)**	**Marginal Utility per $ (utils per $)**	**Units of B**	**Total Utility (utils)**	**Marginal Utility (utils)**	**Marginal Utility per $ (utils per $)**
0	0			0	0		
1	22	[*22*]	[*11*] per $	1	20	[*20*]	[*5*] per $
2	40	[*18*]	[*9*] per $	2	36	[*16*]	[*4*] per $
3	54	[*14*]	[*7*] per $	3	48	[*12*]	[*3*] per $
4	64	[*10*]	[*5*] per $	4	56	[*8*]	[*2*] per $
5	70	[*6*]	[*3*] per $	5	60	[*4*]	[*1*] per $

a) The marginal utility for each new unit of A or B is found by subtracting the relevant total utilities. For good A, the marginal utility of the first unit is 22 (= 22 − 0) utils, the second unit 18 (= 40 − 22), the third unit 14 (= 54 − 40), the fourth unit 10 (= 64 − 54) and the fifth unit 6 (= 70 − 64). The marginal utility per dollar for each unit of A is then found by dividing each of these marginal utilities by A's price of $2: 11 (= 22 / 2), 9 (= 18 / 2), 7 (= 14 / 2), 5 (= 10 / 2), 3 (= 6 / 2). For good B the marginal utility of the first unit is 20 (= 20 − 0) utils, the second unit 16 (= 36 − 20), the third unit 12 (= 48 − 36), the fourth unit 8 (= 56 − 48) and the fifth unit 4 (= 60 − 56). The marginal utility per dollar for each unit of B is then found by dividing each of these marginal utilities by B's price of $4: 5 (= 20 / 4), 4 (= 16 / 4), 3 (= 12 / 4), 2 (= 8 / 4), 1 (= 4 / 4).

b) Consumer × first purchases 3 units of A (with MUs per $ of 11, 9, and 7), the 4th unit of A and the 1st unit of B (each with an MU per $ of 5), the 2nd unit of B (with an MU per $ of 4), and the 5th unit of A and the 3rd unit of B (each with an MU per $ of 3). Her $22 income is then exhausted at a consumption level where the marginal utilities per dollar spent on A and B are both equal, at a value of 3.

c) Consumer × first purchases 3 units of A (with MUs per $ of 11, 9, and 7), then the 4th unit of A and the 1st unit of B (each with an MU per $ of 5). Her $12 income is then exhausted at a consumption level where the marginal utilities per dollar spent on A and B are both equal, at a value of 5.

2. Given the utility-maximizing rule, the ratio of marginal utility to price will be the same for rootbeer consumed at the party and rootbeer consumed at home. Because the effective price of rootbeer at the party is close to zero, you will try to reach a lower marginal utility on the last unit consumed than you would if you were consuming rootbeer at home. Given the law of diminishing marginal utility, a lower than usual marginal utility for the last unit of rootbeer can only be reached by consuming a higher than usual number of units. To reach this lower level of marginal utility, you therefore consume more rootbeer at the party than you would at home.

In-class Activities

I. Introductory Information

Time:

Approximately an hour for Parts A and B. Parts A and B each have a 25 minute time limit.

Materials:

1) An identical number of red and blue cars (in the form of images, toys or coloured labels) that add up to the total number of students in the class less two.
2) Six motorcycles (again in the form of images, toys or coloured labels).
3) A sum of play money for each buyer in small denominations. Perhaps $20 in one dollar Monopoly money bills, or slips of paper, for each student acting as a buyer. Do not tell the sellers how much money each buyer has.
4) A note for each buyer with an instruction regarding which car to buy, blue or red. Notes to purchase blue cars should be created for half the number of buyers plus 5, and notes with instructions for red cars to be purchased should be created for the remaining buyers – i.e. if there are 22 students, 2 will be sellers and the remaining 20 will be buyers, then create 15 notes instructing buyers to purchase a blue car and 5 to purchase a red car. (Note: Purchases of the other colour car, which they are not instructed to buy, are allowed but only as a last resort.)

Set-up:

1) If there are a large number of students have them work in pairs, with only one student in each pair assigned to do the negotiations (they should switch for Part B).
2) Select two students to be sellers, all other students will be buyers. The goal of each car seller is to amass the largest amount of money at the end of the simulation while the goal of each buyer is to purchase their car at the lowest price.
3) Place two large tables at the front of the room. All other desks should be separate and facing the front two tables.

4) Blue cars will be sold at one table and red cars at the other table. Place the blue cars (i.e. images, toys, or whatever is representing blue cars) on one table at the front of the room and red cars on the other table such that the number of cars available are visible to the students buying the cars.

Key Concepts Covered:
change in demand
change in quantity demanded
change in quantity supplied
change in supply
demand
demand curve
demand factors
market equilibrium
substitute product
supply
supply curve
shortage
surplus

Learning Objectives:

Part A:

- Analyze and evaluate the role of demand, supply, and market equilibrium in a competitive setting, while demonstrating an ability to act as participants in a simulated marketplace.
- Become proficient at graphing demand curves and supply curves while evaluating how price changes can be caused by a change in demand or a change in supply.
- Explain how a change in price can cause a change in quantity demanded or a change in quantity supplied, as shown by movements along demand and supply curves.
- Analyze the impact of a product shortage or surplus in a simulated market.

Part B:

- Assess the effect of a substitute product on the price of an existing product.
- Extend this analysis to the entire range of demand factors.

Part A Exercise

Recall that the class has been divided into sellers and buyers, sellers do not know how much money each buyer has, and both buyers and sellers are trying to get the best deal for themselves.

Student A: sells blue cars. The goal of the car sellers is to make as much money as possible.

Student B: sells red cars. The goal of the car sellers is to make as much money as possible.

Other Students: all other students are car buyers. The goal of each buyer is to pay the lowest price possible for the car they purchase. Each buyer is given one of the notes stating which color car they need to purchase. Purchases of the other type of car is allowed, but only as a last resort.

Timekeeper: students will be given 20 minutes to negotiate for their car purchases (if needed increase the time limit for negotiations). If sellers are in teams allow each team 5 minutes to decide on a strategy prior to negotiation.

Procedure: If not already done, students are given one of the two notes telling them to buy either a blue or red car. Once time begins the students negotiating the purchase of a car (i.e. the car buyers) will rush to the front of the room to the tables with the cars and car sellers. Sellers will negotiate their purchase, and its price, at the sellers' tables. It will eventually look like a small auction in front of each table with the sellers of red and blue cars.

Were blue cars or red cars more expensive? Why?

The average price of blue cars was $[*fill in appropriate value*] and the average price of a red car was $[*fill in appropriate value*]. The average price of blue cars does not equal the average price of red cars because

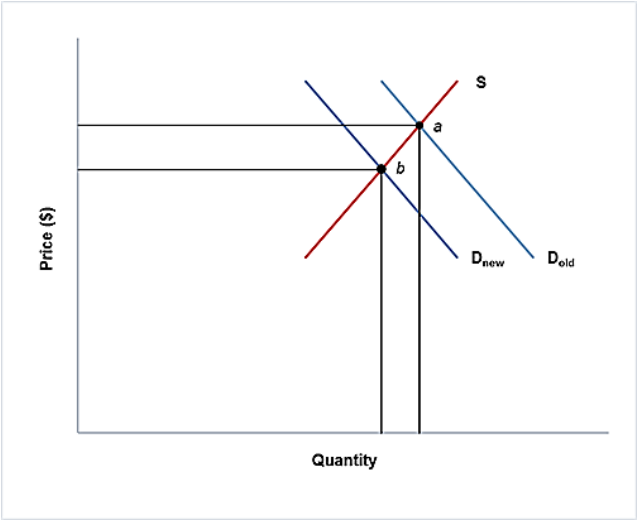
There was more demand for blue cars.*

There was more demand for red cars.

There was equal demand for both types of cars.

Each buyer of one type of car had more money than each buyer for the other type of car.

In the graph below draw the demand curve for blue cars as compared to the demand curve for red cars assuming there were more buyers of blue cars (i.e. assume that more students were instructed to buy a blue car than were instructed to buy a red car).



Given the identical supply curves for each car the price of [*blue*; red*] cars will be higher.

Explanation:

Unlike a classic competitive market, red cars and blue cars will each be sold at a range of prices. The average price of blue cars will be higher than the average price of red cars because of the greater demand for blue cars. There will not be enough blue cars for everyone who wishes to purchase one. Those students told to buy blue cars who are not able to do so will either choose not to make a purchase or will purchase a red car. Those in this situation who buy a red car will be dissatisfied because they have not been able to make their preferred purchase. Students told to purchase red cars will, on average, pay a lower price than buyers of blue cars, and will get the type of car they want.

After the simulation is ended, if the students are not already aware, the instructor should inform the students about the discrepancy in the number of notes handed out to buyers. The average prices for blue cars will be higher than for red cars. This is because demand is higher for blue cars (i.e. there were more notes telling buyers they wanted a blue car) than for red cars. With a stationary supply curve this implies the price of blue cars will be higher.

Follow-up areas of learning:

- Discuss the different positions of the demand curves for blue cars and red cars, and how these different positions affect the average prices of each type of car, given the identical (vertical) supply curves for both.

2. Part B Exercise

Choose another two students to be the new sellers of red and blue cars, as well as motorcycles. The sellers from Part A become buyers. Return all the cars purchased in Part A back to their tables at the front of the class. Add the 6 motorcycles to the table of blue cars.

Student A: sells blue cars and motorcycles. The goal of the sellers is to make as much money as possible.

Student B: sells red cars. The goal of the car sellers is to make as much money as possible.

Other Students: all other students are car, or motorcycle, buyers. The goal of each buyer is to pay the lowest price possible for the vehicle they purchase. Each buyer is given one of the notes stating which color car they need to purchase. Purchases of the other type of car is allowed, but only as a last resort. Now, students with notes to buy blue cars may choose, instead, to buy a motorcycle (consider making a third set of notes that state the student may buy a blue car or a motorcycle to use for this part).

Timekeeper: students will be given 20 minutes to negotiate for their purchases (if needed increase the time limit for negotiations). If sellers are in teams allow each team 5 minutes to decide on a strategy prior to negotiation.

Procedure: If not already done students are given one of the two notes telling them to buy either a red car, or a blue car or motorcycle. Once time begins the students negotiating their purchases (i.e. the buyers) will rush to the front of the room to the tables with the cars and sellers. Sellers will negotiate their purchase, and its price, at the sellers' tables. It will eventually look like a small auction in front of each table with the sellers of red and blue cars.

Were blue cars or red cars more expensive? Why?

The average price of blue cars was $[*fill in appropriate value*], and the average price of a red car was $[*fill in appropriate value*]. The average price of blue cars changed from Part A because

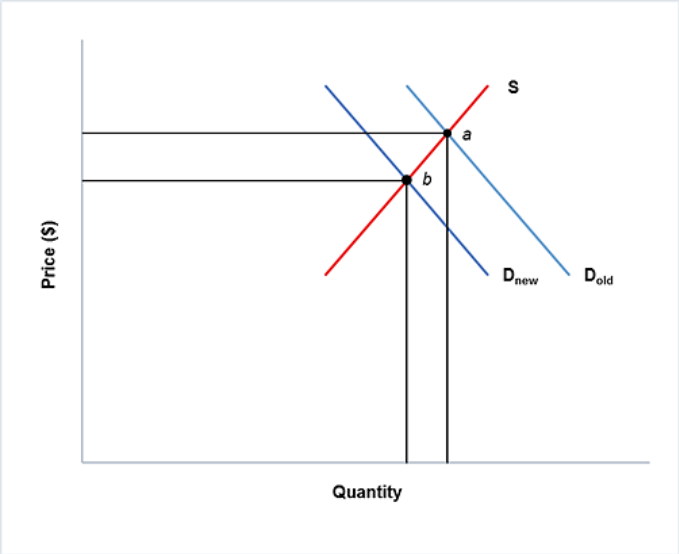
buyers who could not obtain a red car could get a motorcycle.

all buyers have more choice in Part B.

some buyers of blue cars chose to buy a motorcycle instead.*

motorcycles and cars are complements.

In the graph below move the appropriate curve to show the outcome if buyers have less income on average. For example how would the curves below change if there was a mass lay-off that affected buyers in the simulation.



If there was less money in the economy the price of cars would be [*higher; lower**].

Explanation:

In this simulation motorcycles and blue cars are substitute products. Some motorcycles will be purchased instead of blue cars. The price of blue cars will be reduced because of the availability of the substitute product. Meanwhile, the price of red cars may also drop because fewer unsuccessful buyers of blue cars will end up shifting their demand to red cars.

Cars and motorcycles are normal products. In the case where income drops, the demand for both all three products will therefore decrease, pushing down the price of cars.

Follow-up areas of learning:

- Extend this discussion to all demand factors: number of buyers, income (not just normal products but also inferior products), prices of other products (not just substitute products but also

complementary products), consumer preferences and consumer expectations. This can be done by suggesting different scenarios that could take place.

- Explore what would happen if there was a recall on the red cars or the motorcycles were known to be defective.

3. Discussion Questions

1.

a) In Part A, what would have happened to the prices of both red and blue cars if more notes had been handed out to buy blue cars and fewer notes had been handed out to buy red cars?

The average price of red cars would have risen and the average price of blue cars would have fallen

The average price of blue cars would have risen and the average price of red cars would have fallen.*

The average price of both blue and red cars would have fallen.

The average price of both red and blue cars would have risen.

b) How can your answer be shown using demand and supply graphs for both the market for blue cars and the market for red cars?

The demand curve for both blue and red cars would have shifted rightward.

The demand curve for blue cars would have shifted rightward and the demand curve for red cars would have shifted leftward.*

The demand curve for blue cars would have shifted leftward and the demand curve for red cars would have shifted rightward.

The demand curve for both red and blue cars would have shifted leftward.

2. In Part B, blue cars and motorcycles are substitute products. Referring to a demand and supply graph, explain how the introduction of this new product affected the average price for blue cars.

The availability of a new substitute product leads to a leftward shift in the demand for blue cars and a rise in their price.

The availability of a new substitute product leads to a rightward shift in the demand for blue cars and a fall in their price.

The availability of a new substitute product leads to a leftward shift in the demand for blue cars and a fall in their price.*

The availability of a new substitute product leads to a rightward shift in the demand for blue cars and a rise in their price.

3. Think of a product that would be a complementary product for motorcycles and explain why sales of this product would increase **if** the demand for motorcycles increased.

   leather chaps; the demand for such a product would increase as the demand for motorcycles expanded since it is required by law.

   helmet; the demand for such a product would increase as the demand for motorcycles expanded since it is required by law.*

   handlebars; the demand for such a product would increase as the demand for motorcycles expanded since it is part of the motorcycle.

   leather coat; the demand for such a product would increase as the demand for motorcycles expanded since it is a classic pairing.

Explanation:

1.

   a) Because this represents an increase in the demand for blue cars and a decrease in the demand for red cars the average price of blue cars would have risen and the average price of red cars would have fallen.

   b) In terms of demand and supply graphs, the demand curve for blue cars would have shifted rightward and the demand curve for red cars would have shifted leftward. These demand shifts would cause a rise in the price of blue cars and a fall in the price of red cars.

2. The availability of this new substitute product leads to a leftward shift in the demand for blue cars and a fall in their price.

3. The demand for a complementary product such as helmets would increase or shift to the right as the demand for motorcycles expanded.

4. Multiple Choice Questions

1. In Part A, there were more buyers demanding blue cars than there were blue cars for sale. This situation created a(n)
   a) immediate equilibrium.
   b) temporary shortage of blue cars.*
   c) temporary surplus of blue cars.
   d) scenario in which the prices of blue and red cars were unable to change.
   e) temporary shortage of red cars.

2. In Part B, the introduction of motorcycles as a possible substitute for blue cars caused the following change:
   a) Equilibrium price in this market was unaffected.
   b) The demand of blue cars increased.
   c) The quantity demanded of blue cars increased.
   d) The quantity demanded of blue cars decreased.
   e) The demand of blue cars decreased.*

3. If the quantity of red cars bought and sold suddenly decreased, what would be the impact in the market for blue cars?
   a) The supply of blue cars would shift leftward.
   b) Equilibrium price in this market would be unaffected.
   c) The demand of blue cars would shift leftward.
   d) The supply of blue cars would shift rightward.
   e) The demand of blue cars would shift rightward.*

4. If the price of blue cars was expected to drop in the near future, what would be the impact on the market for blue cars right now?
   a) Equilibrium price in this market would be unaffected.
   b) The demand of blue cars would shift rightward.
   c) The supply of blue cars would shift rightward.
   d) The demand of blue cars would shift leftward.*
   e) The supply of blue cars would shift leftward

5. If the price of motorcycles suddenly increased, what would be the impact in the market for blue cars?
   a) The quantity demanded of blue cars would decrease.
   b) The supply of blue cars would increase.
   c) The demand of blue cars would increase.*
   d) The quantity supplied of blue cars would decrease.
   e) The demand of blue cars would decrease.

Explanation:

1. Because the quantity demanded of blue cars exceeds the quantity supplied this represented a temporary shortage of blue cars.

2. With some of the demand for blue cars being replaced by the demand for motorcycles the demand of blue cars decreased.

3. With a drop in the demand for red cars some buyers would switch to blue cars so that the demand of blue cars would shift rightward.

4. With the expectation of a lower price of blue cars in the near future some buyers would put off purchases of this product so that the demand of blue cars would shift leftward.

5. Because motorcycles and blue cars are substitutes a sudden rise in the price of motorcycles would cause some buyers to switch to blue cars which so the demand of blue cars would increase.