TOPIC TWO The Market Mechanism in a Closed Economy

TOPIC TWO: KEY LEARNING OBJECTIVES

- **18.** Specify how scarcity affects price. Specify how *price* and *quantity demanded* are related. Identify the *independent variable* and *dependent variable* in this relationship.
- **19.** Diagram a *demand curve* explaining what this curve represents. Specify the variable that causes movement along a given demand curve. Explain why the *ceteris paribus* assumption is necessary in drawing a demand curve.
- **20.** Specify how price and *quantity supplied* are related. Identify the independent variable and dependent variable in this relationship. Explain what motive underlies this relationship.
- **21.** Diagram a *supply curve* explaining what this curve represents. Specify the variable that causes movement along a given supply curve. Explain why the *ceteris paribus* assumption is necessary in drawing a supply curve.
- **22.** Identify the economic actor who sets prices for goods and services in a market system. Explain what is significant about the *equilibrium price and quantity*. Explain why market equilibrium is seldom achieved.
- **23.** Identify (diagram) the *disequilibrium* condition that results when the price of a good or service is set too high relative to market conditions. Explain how sellers and buyers respond to this disequilibrium.
- **24.** Identify (diagram) the disequilibrium condition that results when the price of a good or service is set too low relative to market conditions. Explain how sellers and buyers respond to this disequilibrium.
- **25.** Explain the concepts of *consumer surplus, producer surplus,* and *societal surplus.* Identify each of these areas on a supply and demand model as well as where societal surplus is maximized.
- **26.** Identify the *non-price factors* that shift the market demand curve. Specify how the equilibrium price and quantity are affected in the case of a rightward demand shift and in the case of a leftward demand shift.

- **27.** Identify the non-price factors that shift the market supply curve. Specify how the equilibrium price and quantity are affected in the case of a rightward supply shift and in the case of a leftward supply shift.
- **28.** Explain with diagrams how *price ceilings* and *price floors* affect markets. Give an example of each. Identify the winners and losers from these price controls.

RESPONSES TO KEY LEARNING OBJECTIVES

18. Specify how scarcity affects price. Specify how price and quantity *demanded* are related. Identify the *independent* variable and *dependent* variable in this relationship.

The degree of scarcity is reflected in the price of a product. For instance, if oil becomes scarcer, then the price of oil will rise. If oil becomes less scarce, then the price of oil will fall. The relationship between scarcity and price is specified below:



So price sends a signal to market actors telling them how scarce a good, service, or resource is. But price is more than a just a signal. It is a motivator. An increase in the price of a product causes a decrease in the quantity of that product demanded, *ceteris paribus*. A decrease in the price of a product causes an increase in the quantity of that product demanded, *ceteris paribus*. In a world of scarcity, this is exactly how buyers should behave.

The Law of Demand

The relationship between price and quantity demanded is called the "law of demand." The law of demand is specified below:



It is assumed that those factors affecting buyers besides price, for example, taste, income, and population are being held constant. It is also assumed that the buyer is rational. Whereas buyers of bananas freely choose the quantity of bananas purchased at various prices, buyers of heroin do not enjoy the same liberty. Hence, an increase in the price of heroin does not necessarily decrease the quantity of heroin demanded, because heroin is a highly addictive product. The relationship between price and quantity demanded is an inverse relationship meaning the two variables move in opposite directions. Price is the independent variable meaning it is the "cause" in this relationship. The quantity demanded is the dependent variable meaning it is the "effect" in this relationship.

19. Diagram a *demand curve* explaining what this curve represents. Specify the variable that causes movement along a given demand curve. Explain why the *ceteris paribus* assumption is necessary in drawing a demand curve.

A demand curve is a picture of the inverse relationship between the price of a product and its demanded quantity. The movement along the milk demand curve shown below coincides with an increase in price and a decrease in the quantity demanded.



The preceding graph is properly read: "The increase in price from \$2.00 to \$3.50 per gallon causes the quantity demanded to decrease from 150 million to 125 million gallons per month, *ceteris paribus.*" The above graph is improperly read: "The decrease in the quantity demanded causes the increase in price." This statement makes no sense, as cause and effect are reversed.

Had the movement been down the demand curve, the opposite would be true: "The decrease in price from \$3.50 to \$2.00 per gallon causes the quantity demanded to increase from 125 million to 150 million gallons per month, *ceteris paribus*." It is important to remember that the independent variable—price—is represented by the vertical axis and that the dependent variable—quantity demanded—is represented by the horizontal axis. Typically, in mathematics, the independent variable (or "x" variable) is shown as the horizontal axis and the dependent variable (or "y" variable) is shown as the vertical axis.

The Importance of Ceteris Paribus

Movement along a demand curve is caused by a change in the independent variable—price. A demand curve cannot be identified unless all non-price factors affecting buyers are held constant. For instance, if milk prices were to increase by 25% while the average income of milk buyers were to increase by 40%, then the quantity of milk demanded might actually increase. In this case, both price and quantity demanded have increased.

The law of demand is still in effect, but the effect of the increase in income has "overwhelmed" the effect of the increase in price; hence, the quantity demanded has increased. Again, to relate price and quantity demanded or to draw a demand curve, all factors affecting buyers besides price must be held constant.

20. Specify how price and *quantity supplied* are related. Identify the independent variable and dependent variable in this relationship. Explain what motive underlies this relationship.

Again, greater scarcity causes prices to rise. Lesser scarcity causes prices to fall. These price movements motivate sellers to change their behavior. An increase in the price of a product causes an increase in the quantity of that product supplied, *ceteris paribus*. A decrease in the price of a product causes a decrease in the quantity of that product supplied, *ceteris paribus*. In a world of scarcity, the producer's response to price is exactly what is needed.

The Law of Supply

This relationship is called the "Law of Supply." It is specified below:



It is assumed that the factors affecting sellers besides price, such as cost of production, technology, and the number of firms are being held constant. It is also assumed that the seller's basic motive is to maximize total profit. The connection between the profit motive and the Law of Supply is explained with the example below regarding the supply of milk:



Data for milk is tabulated at two time points. The price of milk per gallon is the amount the buyer pays for milk. "Cost" in this case refers to what the seller has to pay to bring each gallon of milk to market. "Profit" is the difference between price and cost. As the price of milk increased, the cost of milk remained constant (*ceteris paribus*). Therefore, the profit margin increased.

Given that shelf space is scarce, sellers strive to stock goods that are relatively profitable. As the profitability of selling milk increases, it is reasonable to expect that milk sellers will bring a greater number of gallons to market, *ceteris paribus*.

The relationship between price and quantity supplied is a direct relationship, meaning the two variables move in the same direction. Price is the independent variable in this relationship, and quantity supplied is the dependent variable in this relationship.

21. Diagram a *supply curve* explaining what this curve represents. Specify the variable that causes movement along a given supply curve. Explain why the *ceteris paribus* assumption is necessary in drawing a supply curve.

A supply curve is a picture of the direct relationship between the price of a product and the quantity of it supplied. Movement along the milk supply curve below coincides with an increase in the price and an increase in the quantity supplied.



The preceding graph is properly read: "The increase in price from \$2.00 to \$3.50 per gallon causes the quantity supplied to increase from 100 million to 125 gallons per month, *ceteris paribus.*" The above graph is improperly read: "The increase in the quantity supplied causes the increase in price." This statement makes no sense, as cause and effect are reversed.

Had the movement been down the supply curve, the opposite would be true. "The decrease in price from \$3.50 to \$2.00 per gallon causes the quantity supplied to decrease from 125 million to 100 gallons per month, ceteris paribus." Again, it is important to remember that the independent variable—price—is represented by the vertical axis and that the dependent variable—quantity supplied—is represented by the horizontal axis.

The Importance of Ceteris Paribus

Movement along a supply curve is caused by a change in the independent variable—price. A supply curve cannot be identified unless all non-price factors affecting sellers are held constant. For instance, if milk prices were to increase by 75% while the cost of milk were to increase by 150%, then the quantity of milk supplied would decrease, as the profit margin decreases. In this case, the price increase is associated with a decrease in the quantity supplied. See the milk example below:



The Law of Supply is still in effect, but the effect of the increase in cost has "overwhelmed" the effect of the increase in price; hence, the quantity supplied decreased as the profit margin fell. Again, to relate price and quantity supplied or to draw a supply curve, all factors affecting sellers besides price must be held constant.

22. Identify the economic actor who sets prices for goods and services in a market system. Explain what is significant about the *equilibrium price and quantity*. Explain why market equilibrium is seldom achieved.

A market is the process by which one or more buyers and one or more sellers exchange economic goods, services, or resources. Every market has at least one potential buyer and at least one potential seller; therefore, every market has a demand curve and a supply curve. The equilibrium price is the one price where supply equals demand.

At the equilibrium price (P_e), the quantity demanded (Q_D) equals the quantity supplied (Q_s). This condition is optimal, an outcome that will be proven later in KLO 25. In equilibrium, sellers neither run out of stock too soon, thereby frustrating customers. Nor do sellers find themselves stuck with excess stock that might perish or "go out of style."

The equilibrium condition is illustrated below:



Sellers set prices in a market system. The reaction of buyers, however, to a given price certainly influences seller behavior. Sellers do not know what the equilibrium price is, so it is likely that the actual price charged will be either above or below the equilibrium price. When the actual price is above or below the equilibrium price, the market is said to be in a state of "disequilibrium." Disequilibrium motivates sellers to change their prices, and these price changes actually move the market toward a state of equilibrium.

While economics students are taught to see supply curves and demand curves, business people see customers, inventory, income statements, and so on. To accurately identify a demand curve for a good like bananas, a produce manager of a supermarket would need to know who all the potential banana buyers in the relevant banana market are. Moreover, a produce manager would need to know how each of these buyers responds to a whole list of possible banana prices.

To accurately identify a supply curve for bananas, a produce manager would have to carefully determine how she and all other produce managers in the relevant banana market would respond to this whole list of possible banana prices. Of course, no produce manager is omniscient. No banana price setter can possibly possess the information needed to identify the equilibrium price of bananas at any given moment.

Price Equilibrium—An Invisible, Moving Target

Despite the fact that price setters do not see demand curves and supply curves, they exist. Hence, equilibrium prices exist. But not only are equilibrium prices "invisible" to price setters, they are always moving. (More on this in KLOs 26 and 27.) In other words, price setters are shooting at an invisible, moving target, which means equilibrium is seldom achieved.

The question arises then: why study equilibrium if real life is really disequilibrium? The answer is simple. Markets move from disequilibrium toward equilibrium in a predictable way. Hence, if market observers know where the market is relative to market equilibrium, then observers can accurately predict where the market will be moving.

23. Identify (diagram) the *disequilibrium* condition that results when the price of a good or service is set too high relative to market conditions. Explain how sellers and buyers respond to this disequilibrium.

Because price setters do not see the invisible, moving equilibrium price, a price set above the equilibrium price is a real possibility. This case is illustrated below:



In the case of a "high" price (P_{hi}), the quantity supplied (Q_S) is greater than the quantity demanded (Q_D). This type of disequilibrium is known as a "surplus." From the standpoint of a produce manager, brown bananas and a surplus of fruit flies characterize a surplus of bananas. The supermarket does not maximize total profits by rotting bananas on the shelves.

So in response to a surplus, the price setter is motivated to lower the price of the product and to reduce the quantity supplied. (This is shown as movement down the supply curve.) In response to the lower price, buyers desire to buy more of the product. (This is shown as movement down the demand curve.)

Disequilibrium to Equilibrium

It is important to note at this point that the price change is brought about by the disequilibrium condition, the surplus. Markets that are in disequilibrium move toward equilibrium unless they are somehow prevented from doing so. In this case, the price setter has an incentive to keep lowering the price until the quantity demanded equals the quantity supplied, equilibrium. This logic is outlined below.



Note that price is both a signal and a motivator. It signals to economic actors that the market is experiencing a surplus. It motivates buyers and sellers to change their behavior. In response to the price change, sellers and buyers move in opposite directions, but they are moving closer together, toward an unseen equilibrium point.

24. Identify (diagram) the disequilibrium condition that results when the price of a good or service is set too low relative to market conditions. Explain how sellers and buyers respond to this disequilibrium.

Because price setters do not see the invisible, moving equilibrium price, a price set below the equilibrium price is a real possibility. In the case of a "low" price (P_{lo}), the quantity demanded (Q_D) is greater than the quantity supplied (Q_S). This type of disequilibrium is known as a "shortage." This case is shown below:



Empty shelves and frustrated customers characterize a shortage of bananas. Suppose that bananas are ordered every seven days. At the "low" price, the supermarket is running out of bananas in perhaps four days. Total profits are not maximized when potential customers leave the store empty handed.

Disequilibrium to Equilibrium

In response to a shortage, the price setter is motivated to raise the price of the product and to increase the quantity supplied. (This is shown as movement up the supply curve.) In response to the higher price, buyers desire to buy less. (This is shown as movement up the demand curve.) In this case, the price setter has an incentive to keep raising the price until the quantity demanded equals the quantity supplied, equilibrium. This logic is outlined below:



Again, price is both a signal and a motivator. It signals to economic actors that the market is experiencing a shortage. It motivates buyers and sellers to change their behavior. In response to the price change, sellers and buyers move in opposite directions, but they are moving closer together, toward an unseen equilibrium point.

25. Explain the concepts of consumer surplus, producer surplus, and societal surplus. Identify each of these areas on a supply and demand model as well as where societal surplus is maximized.

Suppose that a buyer would pay as much as \$10.00 for a product. Suppose that the actual price is \$6.00. If the buyer purchases the product, she would be getting a deal because she is receiving \$4.00 of value that she didn't pay for. This is called "consumer surplus."

Suppose that a seller would be willing to bring this product to market for as little as \$2.00. The seller is also getting a deal because he is getting \$4.00 of value above what is required to bring the product to market. This is called "producer surplus." The consumer surplus of \$4.00 added to producer surplus of \$4.00 equals societal surplus of \$8.00.

These concepts can be illustrated graphically using the supply and demand curve model. Consumer surplus equals the area below the demand curve but above the price line. It represents the value that consumers receive but do not pay for. Producer surplus equals the area above the supply curve but below the price line. It represents the value that producers receive over and above what is required to bring the product to market.

> Ρ \$10 \$9 \$8 \$7 \$6 \$5 D \$4 \$3 \$2 2 3 4 Q 1 5

The first unit on the graph below represents the transaction described above:

Consumer surplus (CS) + producer surplus (PS) = societal surplus (SS). Therefore, the area below the demand curve but above the supply curve represents societal surplus. Total societal surplus is maximized at the output level where the supply curve meets the demand curve.

In the case of the model shown above, the area above the equilibrium price (P_e) of \$6 and below the demand curve is consumer surplus (CS). This area is represented by . Consumer surplus is \$10 - \$6 = \$4 on the first unit. The consumer is willing to pay as much as \$10 for unit one, but only has to pay \$6. The consumer receives \$4 of value above what is paid. Using the same reasoning, consumer surplus is \$9 - \$6 = \$3 on the second unit, \$8 - \$6 = \$2 on the third unit, \$7 - \$6 = \$1 on the fourth unit, and \$6 - \$6 = \$0 on the fifth unit.

The area below the equilibrium price (P_e) of \$6 and above the supply curve is producer surplus (PS). This area is represented by \square . Producer surplus is 6-\$2=\$4 on the first unit. The producer is willing to bring the first unit to market for as little as \$2, but receives \$6. The producer receives \$4 of value above what is required. Using the same reasoning, producer surplus is 6-\$3=\$3 on the second unit, 6-\$4=\$2 on the third unit, 6-\$5=\$1 on the fourth unit, and 6-\$6=\$0 on the fifth unit.

The table below summarizes these results:

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Unit	1	2	3	4	5	Total
CS	\$4	\$3	\$2	\$1	\$0	\$10
<u>PS</u>	<u>\$4</u>	<u>\$3</u>	<u>\$2</u>	<u>\$1</u>	<u>\$0</u>	<u>\$10</u>
SS	\$8	\$6	\$4	\$2	\$0	\$20

Consumer surplus (CS) plus producer surplus (PS) equals societal surplus (SS). Total societal surplus is maximized when the market operates at its equilibrium quantity which is five (5) in this case.

If the market were somehow prevented from operating all the way out to the equilibrium quantity, then societal surplus would be lost. For instance, if the market could not produce beyond two (2) units, then \$6 of societal surplus would be lost, the \$4 earned on unit three and the \$2 earned on unit four.

26. Identify the *non-price factors* that shift the market demand curve. Specify how the equilibrium price and quantity are affected in the case of a rightward demand shift and in the case of a leftward demand shift.

The price of a good or service is an important factor affecting the behavior of buyers. But factors besides price affect the behavior of a product's buyers as well. For instance, buyer income is an essential "non-price" factor affecting buyer behavior. Buyer "taste or preference" is another essential "non-price" factor determining buyer behavior. "Taste or preference" is the subjective value that buyers place on a good or service.

For example, some people place a high value on coffee because they like its flavor and effects. Others hate its taste and could care less that it is a mild stimulant. Research indicating that coffee consumption is hazardous to a coffee drinker's health would reduce the overall taste or preference for coffee. Research indicating that coffee consumption increases the average lifespan of drinkers would probably have the opposite effect. So taste, high or low or somewhere in between, is an important factor affecting buyer behavior.

Movements Along versus Shifts in the Demand Curve

Changes in the price of a product are shown as movement along a given demand curve. It is assumed that when movement along a given demand curve takes place, non-price factors such as income and taste are being held constant (*ceteris paribus*). Changes in non-price factors are reflected as a shift in the demand curve. These concepts are illustrated below:



The diagram on the left shows upward movement along a demand curve. This movement is caused by an increase in price. As the increase in price does not shift the demand curve, it is said that an increase in price causes a decrease in the "quantity demanded" but no "change in demand." The words "change in demand" refer to a shift in the demand curve to either the left or the right.

The diagram on the right shows a leftward shift in the demand curve or a decrease in the quantity demanded that had nothing to do with the price of the product. This shift is caused by a decrease in taste assuming that the price is held constant. Changes in non-price factors affecting buyers shift the demand curve to either the left or the right.

An Increase in Demand

An increase in income or taste shifts the demand curve to the right causing the equilibrium price and quantity to increase. This rightward shift is called an "increase in demand." Such a shift is illustrated below.



The above increase in demand increases the quantity demanded. The increase in the quantity demanded causes a shortage of the product at the original price, P_{e-1} , which becomes P_{lo} . The shortage increases the price, which decreases the quantity demanded and increases the quantity supplied, until the market reaches a new equilibrium price, P_{e-2} , and a new equilibrium quantity, Q_{e-2} .

These adjustments are summarized in the following logic sequence:



Notice that there are two effects on the demand side. The two non-price factors change in such a way that the quantity demanded increases (at a given price.) The increase in quantity demanded causes a shortage, which pushes the price of the product up. But the higher price decreases the quantity demanded. So the quantity demanded first increases, then decreases. Nevertheless, it remains higher than it was before the shift in demand.

A Decrease in Demand

A decrease in income or taste shifts the demand curve to the left causing the equilibrium price and quantity to decrease. This leftward shift is called a "decrease in demand." Such a shift is illustrated below.



The above decrease in demand decreases the quantity demanded. This causes a surplus of the product at the original price, P_{e-1} , which becomes Phi. The surplus decreases the price, which increases the quantity demanded and decreases the quantity supplied, until the market reaches a new equilibrium price, P_{e-2} , and a new equilibrium quantity, Q_{e-2} .

These adjustments are summarized in the following logic sequence:



Again, notice that there are two effects on the demand side. The two non-price factors change in such a way that the quantity demanded decreases (at a given price). The decrease in quantity demanded causes a surplus, which pushes the price of the product down. But the lower price increases the quantity demanded. So the quantity demanded first decreases, then increases. Nevertheless, it remains lower than it was before the shift in demand.

The table below summarizes these relationships.

Change in Demand	Direction of Shift	Equilibrium Price Change	Equilibrium Quantity Change
Increase	Rightward	Increase	Increase
Decrease	Leftward	Decrease	Decrease

Notice that a change in demand causes the equilibrium price and the equilibrium quantity to move in the same direction. An increase in demand increases P_e and Q_e . A decrease in demand decreases P_e and Q_e .

In each of the above cases, changes in non-price factors cause disequilibrium. Disequilibrium causes a price change, and the price change causes the market to return to equilibrium. This pattern is basic supply and demand logic.

27. Identify the non-price factors that shift the market supply curve. Specify how the equilibrium price and quantity are affected in the case of a rightward supply shift and in the case of a leftward supply shift.

The price of a good or service is also an important factor affecting the behavior of sellers. But factors other than price affect the behavior of a product's sellers. For instance, the cost of bringing the product to market is an essential "non-price" factor affecting seller behavior. "Cost" in this case refers to what the seller must pay to bring the product to market.

For instance, if the price of oranges decreases, the cost of bringing orange juice to market decreases. The price of oranges, an "input price," is a cost of making orange juice. It is very important to remember here that the price of oranges (an input) and the price of orange juice (the output) are entirely separate economic variables, although they are related to one another.

COW SECRETIONS



Technological innovation is another essential "non-price" factor determining the amount sellers will offer for sale at a given price. Technological improvements allow firms to bring more output to market with the same amount of resources. For instance, if Michigan apple growers were to apply a better pesticide (bug killer) to their trees, then they would enjoy a greater yield of "marketable" apples from every acre of land committed to apple production.

Movements Along versus Shifts in the Supply Curve

Changes in the price of a product are reflected in movement along a given supply curve. It is assumed that when movement along a given supply curve occurs, non-price factors such as cost and technology are being held constant

(*ceteris paribus*). Changes in non-price factors are illustrated with a shift in the supply curve. These concepts are shown below:



The diagram on the left shows upward movement along a supply curve. This movement is caused by an increase in price. As the increase in price does not move the supply curve, it is said that an increase in price causes an increase in the "quantity supplied" but not a "change in supply."

The words "change in supply" refer to a shift in the supply curve to either the left or the right. The preceding diagram (on the right) shows a rightward shift in the supply curve. This movement is caused by a decrease in cost while holding the price of the final output constant. Decreasing cost while holding the price constant increases profit and thereby motivates firms to increase the quantity supplied.

An Increase in Supply

Changes in non-price factors affecting sellers shift the supply curve to either the left or the right. A decrease in cost or an increase in technology shifts the supply curve to the right causing a decrease in the equilibrium price and an increase in the equilibrium quantity. This rightward shift is called an "increase in supply." This is illustrated below:



The above increase in supply increases the quantity supplied. This causes a surplus of the product at the original price, P_{e-1} , which becomes P_{hi} . The surplus decreases the price, which decreases the quantity supplied and increases the quantity demanded until the market reaches a new equilibrium price, P_{e-2} , and a new equilibrium quantity, Q_{e-2} .

These adjustments are summarized in the following logic sequence:



Notice that there are two effects on the supply side. The two non-price factors change in such a way that the quantity supplied increases (at a given price.) The increase in quantity supplied causes a surplus, which pushes the price of the product down. But the lower price decreases the quantity supplied. So the quantity supplied first increases, then decreases. Nevertheless, it remains higher than it was before the shift in supply.

A Decrease in Supply

An increase in cost or a decrease in technology shifts the supply curve to the left causing an increase in the equilibrium price and a decrease in the equilibrium quantity. (A decrease in technology could occur if the government were to ban a certain type of technology, say for



environmental reasons.) This leftward shift is called a "decrease in supply." This is illustrated below:

The decrease in supply decreases the quantity supplied. This causes a shortage of the product at the original price, P_{e-1} , which becomes P_{lo} . The shortage increases the price, which increases the quantity supplied and decreases the quantity demanded, until the market reaches a new equilibrium price, P_{e-2} , and a new equilibrium quantity, Q_{e-2} .

These adjustments are summarized in the following logic sequence:



Again, notice that there are two effects on the supply side. The two non-price factors change in such a way that the quantity supplied decreases (at a given price). The decrease in quantity supplied causes a shortage, which pushes the price of the product up. But the higher price increases the quantity supplied. So the quantity supplied first decreases, then increases. Nevertheless, it remains lower than it was before the shift in supply.

The table below summarizes these relationships:

Change in Supply	Direction of Shift	Equilibrium Price Change	Equilibrium Quantity Change
Increase	Rightward	Decrease	Increase
Decrease Leftward Incre		Increase	Decrease

Notice that a change in supply causes the equilibrium price and the equilibrium quantity to move in opposite directions. An increase in supply decreases P_e and increases Q_e . A decrease in supply increases P_e and decreases Q_e .

In each of the above cases, changes in non-price factors cause disequilibrium. Disequilibrium causes a price change, and the price change causes the market to return to equilibrium. This pattern is basic supply and demand logic.

28. Explain with diagrams how price ceilings and price floors affect markets. Give an example of each. Identify the winners and losers from these price controls.

When a market is in disequilibrium, experiencing either a surplus or shortage, price setters have an incentive to manipulate the existing price and move it toward the equilibrium price. As proven earlier, market equilibrium is optimal for both sellers and buyers. Thus, total societal surplus is maximized.

But in attempting to control prices, and distort the market outcome, the government may pass laws that prevent prices from reaching their equilibrium level. By doing so, the government creates long-term disequilibrium in the marketplace. Price ceilings and price floors are cases of government price fixing, which prevent affected markets from reaching equilibrium.

A Price Ceiling

A price ceiling is a government-imposed price above which the market may not legally operate. Rent controls are a good example of a price ceiling. Cities pass rent control ordinances to make housing more affordable and available for the poor. The irony is that rent control laws actually make housing less available for the poor.

Suppose that the government of "Progressville" has passed a law preventing landlords from charging more than \$200 per month for two-bedroom apartments. This rent control is illustrated below:



By keeping rental rates artificially low (P_c), the government reduces the number of apartments supplied by 4,000 units (6,000–2,000). Landlords, after all, would not find it as

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profitable to rent as many apartments at \$200 per month as they would at \$600. This is the law of supply in action. Consequently, some landlords would convert their property to other uses.

The price ceiling of \$200 also increases the number of apartments demanded by 4,000 units (10,000–6,000). Some people who would not be interested in renting at \$600 per month are attracted into the market at \$200 per month. Imagine older children living at home with their parent(s) when rents are high but moving out when rents decrease to a more manageable level. Imagine roommates who tolerate each other at \$600 per month but who split up at \$200 per month. The point is that the government-imposed price changes the behavior of economic actors.

Winners and Losers

The price ceiling of \$200 creates a long-term shortage of 8,000 units in "Progressville." People (2,000) who find an apartment at the price ceiling ($P_c = 200) benefit from the rent control law, as they pay less than what they would have paid in a freely operating market. But these folks are unlikely to be poor people. After all, in a world of shortages, the poor and disconnected lack the information and connections needed to secure an apartment in an exceedingly tight housing market.

In addition, it is not uncommon for some landlords who are being forced to charge a submarket rate for rental units to devise ingenious schemes to circumvent these price controls. Unscrupulous landlords may charge "key money" to their tenants. In other words, the renter must pay an upfront fee equal to thousands of dollars to secure the keys to the unit. A welfare mother with two small children would not be able to afford the keys to such "cheap and affordable" housing.

People ($Q_e - Q_s = 4,000$) who would have found an apartment at the market rental rate but who do not find one at the controlled rental rate lose. Honest landlords also lose from the policy, for they rent fewer units at a lower rent and, thereby, earn lower profits. Those landlords who stay in business will probably allow the quality of their units to slide, as they cannot afford to keep them up. Tenants will inevitably find it harder to get their landlords to fix a broken toilet or to plow a snow-filled driveway. If a tenant doesn't like the poor service, there are always other tenants waiting in line to rent the "cheap" units.

Secondary Effect: Housing Discrimination

Ironically, those who were to be helped most by the price ceiling are actually those who are hurt most. Because only 2,000 units are available to the 10,000 prospective renters in

"Progressville" at the controlled price, landlords must now select tenants on the basis of non-economic criteria. In a rent control world, it is actually easier for landlords to discriminate on the basis of race, ethnicity, or sexual orientation. When a housing market is in equilibrium ($Q_D = Q_S$), landlords have an incentive to lay aside their biases and to rent to anyone who promises to pay the rent on time and to take care of the rental property.

Contrary to the intent of policy makers, keeping rental rates artificially low does not make quality housing more available to the poor. Hence, rent controls are poor policy. Giving poor people housing vouchers (like food stamps) and letting them rent apartments at the going market rate would help the poor without distorting the housing market.

Price ceilings (in this case, rent controls) have no effect on the market if they are set above the equilibrium price (the monthly rental rate). For instance, a rent control law preventing landlords from charging more than \$1,000,000 per month for a two-bedroom apartment would have no effect in Progressville, because no landlord is charging that rate.

A Price Floor

A price floor is a government-imposed price below which the market may not legally operate. The minimum wage law is an example of a price floor. The following diagram illustrates the effect of a minimum wage (price floor) on an unskilled teenage labor market in a small town named "Podunk".



Assume that the government requires employers in Podunk to pay all workers at least \$10.00 per hour regardless of how unskilled a worker might be. This law doesn't affect most of Podunk's workers, as most of its labor force earns an hourly rate greater than \$10 per hour. The law does, however, have a devastating effect on the least skilled and most disadvantaged workers. Under this law, employers in Podunk hire 2,000 (5,000–3,000) fewer workers than would otherwise be hired ($L_e - L_D$) in the market for unskilled, teenage labor.

On the other side of the market, the artificially high wage attracts more people into the labor market ($L_s - L_e$). Under this law, 2,000 (7,000–5,000) more people would want to work than would without this law. The minimum wage of \$10.00 creates a surplus of labor

 $(L_{\text{S}}-L_{\text{D}})$ equal to 4,000 (7,000–3,000) people. This surplus of labor can be termed "teenage unemployment."

Winners and Losers

Unskilled teenagers who find work at \$10.00 per hour certainly benefit from the law $(L_D = 3,000)$. They would have been paid \$6.00 per hour without the minimum wage law but are paid \$10.00 with it. These workers are likely to be people who have connections in town, as there are far more people seeking work than jobs actually available. They are not likely to be the poor and otherwise disadvantaged.

People who would work at the market wage rate but who cannot find work at the minimum wage rate are losers ($L_e - L_S = 2,000$). Obviously, employers also lose from such a policy. They hire fewer workers at a higher hourly wage rate and are encouraged to substitute capital (machines) for workers in the long run. Consumers may pay higher prices for the output of higher-paid, unskilled workers.

Secondary Effect: Employment Discrimination

The minimum wage law invites job discrimination based on race, religion, and ethnic origin, because employers must use non-economic criteria to allocate relatively few jobs (3,000) among the much larger pool of workers (7,000). Those job seekers lacking connections and work experience are least likely to find a job in this type of environment.

Ironically, the minimum wage law has its most devastating effect in those areas of the country that are most economically depressed. Where economic conditions are relatively weak, the demand for labor is relatively weak. This means that the labor market demand curve is pushed to the left causing the equilibrium wage to be relatively low. The lower the equilibrium wage relative to the minimum wage, the greater the size of the surplus created by the minimum wage law.

Price floors (in this case, the minimum wage law) have no effect on a market when they are set below the equilibrium price (wage rate). For instance, a minimum wage law requiring every employer to pay every worker at least \$0.10 per hour would have no effect on the labor market in Podunk, because no one is paying a wage that low.

Good Intentions Don't Equal Good Results

The U.S. minimum wage law was instituted in the late 1930s to help U.S. workers achieve a minimum income level. Ironically, the minimum wage law reduces the income of certain workers by preventing them from finding employment, and it penalizes the most needy members of the labor force by making it harder for them to find work. Here, government's good intentions do not produce good results.

When government fixes prices artificially high (price floors) or low (price ceilings), it is generally trying to benefit a particular group within the economy for political reasons. Price floors are designed to benefit producers at the expense of consumers. Price ceilings are designed to benefit consumers at the expense of producers. In either case, the government is resorting to command and distorting the market mechanism. In either case, there will be unintended secondary effects. Government price controls will always produce such winners and losers. And, overall, the market will not operate at equilibrium. Therefore, societal surplus will not be maximized. In the case of a rent control (a price ceiling), those buyers who find apartments at the artificially low price will experience greater consumer surplus. Landlords will earn less producer surplus. The apartment market will operate at an output rate below equilibrium, so societal surplus will be lost.

In the case of the minimum wage (a price floor), those workers who find employment will experience greater producer surplus. (Remember, in a labor market, the worker is the producer.) The employers or buyers of labor will enjoy less consumer surplus. (The employer is the consumer.) The labor market will operate at an employment rate below equilibrium, so societal surplus will be lost. In both cases, the winners win less than the losers lose and society is worse off as a result.

SELF-ASSESSMENT: UNIT ONE, TOPIC TWO

- Tara is willing to pay as much as \$18.00 for a steak dinner. The restaurant is willing to sell the steak dinner for as little as \$7.00. The price of the steak dinner is actually \$12.00. Consumer surplus is \$_____ and societal surplus is \$_____ in Tara's case.
- 2. Suppose that the taste for vodka decreases.
 - **a.** Show how P_{e} , Q_{e} , Q_{S} , and Q_{D} are affected.



b. Write the logic for the changes in the vodka market.



c. Briefly explain how you know this product has become less scarce.

- **3.** A rent control is an example of a price (*ceiling <u>or</u> floor*). This policy causes a (*shortage* <u>or surplus</u>) of housing by (*increasing <u>or</u> decreasing*) the quantity of housing supplied and by (*increasing <u>or</u> decreasing*) the quantity of housing demanded.
- **4.** If the price of apples is too high, the apple market experiences a *(shortage <u>or</u> surplus)* until the price *(decreases <u>or</u> increases)*.
- 5. Identify consumer surplus and producer surplus below:



- **a.** Consumer surplus equals area(s)
- **b.** Producer surplus equals area(s) _
- c. Societal surplus equals area(s) _
- **d.** Briefly explain why P_e/Q_e is considered an optimal outcome.

(Check your answers on page 106.)