

Answers to the Problems – Chapter 6

1.
 - a. The equilibrium rent is \$450 a month and the equilibrium quantity is 20,000 housing units.
 - b. The quantity rented is 10,000 housing units.
The quantity of housing rented is equal to the quantity supplied at the rent ceiling.
 - c. The shortage of housing is 20,000 housing units.
At the rent ceiling, the quantity of housing demanded is 30,000, but the quantity supplied is 10,000, so there is a shortage of 20,000 housing units.
 - d. The maximum price that someone is willing to pay for the 10,000th unit available is \$600 a month.
The demand curve tells us the maximum price that someone is willing to pay for the 10,000th unit.
 - e. The quantity of housing rented is equal to 20,000 units.
If the rent ceiling is set at \$600 per month, it is above the equilibrium rent and so is ineffective. The rent stays at \$450 per month and the quantity rented remains at 20,000 housing units
 - f. There is no shortage of housing units.
Because the rent ceiling is ineffective, the market remains at its equilibrium so there is no shortage of housing units.
 - g. The maximum price that someone is willing to pay for the 20,000th unit available is \$450 a month.
The demand curve tells us the maximum price that someone is willing to pay for the 20,000th unit.
2.
 - a. The equilibrium wage rate is \$6 an hour, and employment is 2,000 hours a month.
 - b. Unemployment is zero. Everyone who wants to work for \$6 an hour is employed.
 - c. They work 2,000 hours a month.
A minimum wage rate is the lowest wage rate that a person can be paid for an hour of work. Because the equilibrium wage rate exceeds the minimum wage rate, the minimum wage is ineffective. The wage rate will be \$6 an hour and employment is 2,000 hours.
 - d. There is no unemployment
The wage rate rises to the equilibrium wage—the quantity of labor demanded equals the quantity of labor supplied. So there is no unemployment.
 - e. At \$7 an hour, 1,500 hours a month are employed and 1,000 hours a month are unemployed.
The quantity of labor employed equals the quantity demanded at \$7 an hour. Unemployment is equal to the quantity of labor supplied at \$7 an hour minus the quantity of labor demanded at \$7 an hour. The quantity supplied is 2,500 hours a month, and the quantity demanded is 1,500 hours a month. So 1,000 hours a month are unemployed.
 - f. The wage rate is \$7 an hour, and unemployment is 500 hours a month.
At the minimum wage of \$7 an hour, the quantity demanded is 2,000 hours a month and the quantity supplied is 2,500 hours a month. So 500 hours a month are unemployed.
3.
 - a. With no tax on brownies, the price is 60 cents a brownie and 4 million a day are consumed.
 - b. The price, including the tax, is 70 cents a brownie, and 3 million brownies a day are consumed. The price, excluding the tax, is 50 cents a brownie. Consumers and producers each pay 10 cents of the tax on a brownie.
The tax decreases the supply of brownies and raises the price of a brownie. With no tax, producers are willing to sell 3 million brownies a day at 50 cents a brownie. But with a 20 cent tax, they are willing to sell 3 million brownies a day only if the price is 20 cents higher at 70 cents a brownie.

- c. The price, excluding the tax, is 50 cents a brownie, and 3 million brownies a day are consumed. The price, including the tax, is 70 cents a brownie. Consumers and producers each pay 10 cents of the tax on a brownie.
The tax decreases the demand for brownies and lowers the price of a brownie. With no tax, consumers are willing to buy 3 million brownies a day at 70 cents a brownie. But with a 20 cent tax, they are willing to buy 3 million brownies a day only if the price, excluding the tax, is 20 cents lower at 50 cents a brownie.
5. a. With a subsidy on rice, the price is \$1.20 a box, the marginal cost \$1.50 a box, and the quantity produced is 3,000 boxes a week.
The subsidy of \$0.30 lowers the price at which each quantity in the table is supplied. For example, rice farmers will supply 3,000 boxes a week if the price is \$1.50 minus \$0.30, which is \$1.20. With a subsidy, the market equilibrium occurs at \$1.20 a box. At this price, the quantity demanded is 3,000 boxes and the quantity supplied is 3,000 boxes. The marginal cost of producing rice is given by the supply schedule. The marginal cost of supplying 3,000 boxes a week is \$1.50 a box.
- b. With a quota of 2,000 boxes a week, the price is \$1.60 a box, the marginal cost \$1.30 a box, and the quantity produced is 2,000 boxes a week.
The quota decreases the quantity supplied to 2,000 boxes a week. The price willingly paid for 2,000 boxes a week is \$1.60 (given by the demand schedule). The marginal cost of producing 2,000 boxes of rice is given by the supply schedule. The marginal cost of supplying 2,000 boxes a week is \$1.30 a box.
6. a. With a penalty of \$20 a unit on sellers, the price is \$70 a unit and the quantity is 100 units.
The \$20 penalty on sellers decreases the supply. The supply curve shifts leftward so that the vertical distance between the initial supply curve and the new supply curve is \$20. With this new supply curve, the equilibrium price is \$70 a unit and the equilibrium quantity is 100 units.
- b. With a penalty of \$20 a unit on buyers, the price is \$50 a unit and the quantity is 100 units.
The \$20 penalty on buyers decreases the demand. The demand curve shifts leftward so that the vertical distance between the initial demand curve and the new demand curve is \$20. With this new demand curve, the equilibrium price is \$50 a unit and the equilibrium quantity is 100 units.
- c. With a penalty of \$20 a unit on sellers and on buyers, the price is \$60 a unit and the quantity is 90 units.
The \$20 penalty on sellers decreases the supply. The supply curve shifts leftward so that the vertical distance between the initial supply curve and the new supply curve is \$20. The \$20 penalty on buyers decreases the demand. The demand curve shifts leftward so that the vertical distance between the initial demand curve and the new demand curve is \$20. With these new supply and demands curve, the equilibrium price is \$60 a unit and the equilibrium quantity is 90 units.

Critical Thinking

1. a. Efficiency requires that the marginal (social) benefit equal the marginal (social) cost. On the one hand, once the music is created, the marginal cost of another person listening to it is zero, so efficiency requires that the marginal (social) benefit also be equal to zero. This situation is what occurs with downloads, From this perspective, the optimal tax is no tax. But on the other hand, with downloads the price is zero so the creator gets no revenue from creating music. Because the marginal cost of creating music is positive, if there is no revenue

from creating music, the amount of new music created would fall drastically. The quantity of new music would be less than the efficient quantity, which is the amount that sets the marginal social benefit of new music equal to the marginal social cost. So the optimal tax must equal the marginal social cost of creating new music at the efficient quantity and should be distributed to the creators of new music. In other words, the tax should serve as the means by which music artists receive revenue from their efforts.

- b. The market for illegal downloads would disappear. The price of a (legal) download would rise. If consumers believe that downloading music and buying music on CDs are perfect substitutes, the difference in the price between CDs and downloads would equal the difference in the marginal cost of CDs and downloads.
 - c. The new technology would benefit music suppliers, both the artists and the firms that distribute their songs. The cost of the new technology would fall primarily upon customers who illegally downloaded music. If the price of legal downloads rises, some of the cost would fall upon customers who legally downloaded music.
 - d. As sketched in the answer to part (a), the new technology essentially gives the creators of music a property right for their creation. This property right will help insure that new music is created. However, it also gives the artists a monopoly over their creation and a monopoly creates a deadweight loss. In particular, the new technology insures that the price of music will be positive, but once the music is created, efficiency requires that the price be zero because the marginal social cost of a download is zero.
2.
 - a. The wage controls are price ceilings. They might have been introduced because the wages being paid to carpenters and tailors were considered “too high,” possibly because of an increase in demand for their services or possibly because all prices and wages were rising and these wages were rising the fastest.
 - b. If the wage controls are effective, there would be a shortage of carpenters and tailors.
 3.
 - a. If the rents do not increase, there will be a persistent shortage of apartments. The quality of the available apartments will decrease as owners do not have an incentive to keep up the maintenance.
 - b. The rent controls are helpful to middle-class New Yorkers who already have a rent controlled apartment. They definitely are not helpful to middle-class new Yorkers who are looking for an apartment.
 - c. The increase in the rent ceiling will increase the quantity of apartments supplied. Over time, it might increase the supply of apartments or, perhaps more realistically, either prevent or slow a decrease in the supply of apartments.

Web Exercises

1.
 - a. Though the Harvard Living Wage Campaign has other goals, the primary goal, from the web page, is to force Harvard to “... implement a living wage with benefits for all Harvard workers, whether directly-employed or hired through outside firms. Studies of the local cost of living, such as those conducted by the Economic Policy Institute and Wider Opportunities for Women, suggest a living wage standard of at least \$12 per hour plus benefits. The wage standard must be adjusted annually for inflation, and at the very minimum should exceed the wage standard set by the Cambridge living wage ordinance: currently \$11.11 per hour.”
 - b. A minimum wage and a living wage are similar. They differ in two key respects. First, the minimum wage is changed only infrequently. The Harvard Campaign for a Living Wage wants the wage adjusted annually for inflation. Second, the minimum wage is set at a level

determined by political considerations. The Harvard Campaign for a Living Wage wants the “living wage” set at a level that depends on the cost of living.

- c. The quantity of labor demanded decreases. The quantity of labor supplied increases. The unemployment rate increases because there is a surplus of labor.
 - d. A living wage above the equilibrium wage would be inefficient because at the level of employment that results, the marginal benefit received by Harvard exceeds the marginal cost of workers.
 - e. Workers who receive wage hikes gain from a living wage. Harvard, as well as workers who lose their jobs and workers who must extensively search for a job lose from the living wage.
 - f. A living wage is unfair. From the “fair results” approach, some workers lose their jobs and their incomes plummet while other workers have a higher income. From a “fair rules” approach, a living wage prevents some voluntary transactions.
2. European nations assign production quotas for sugar to help keep the price of sugar high because of lobbying by sugar producers. The sugar producers benefit from the quotas; sugar consumers are harmed by the quotas.