Econ 22060, Section 004 - Principles of Microeconomics
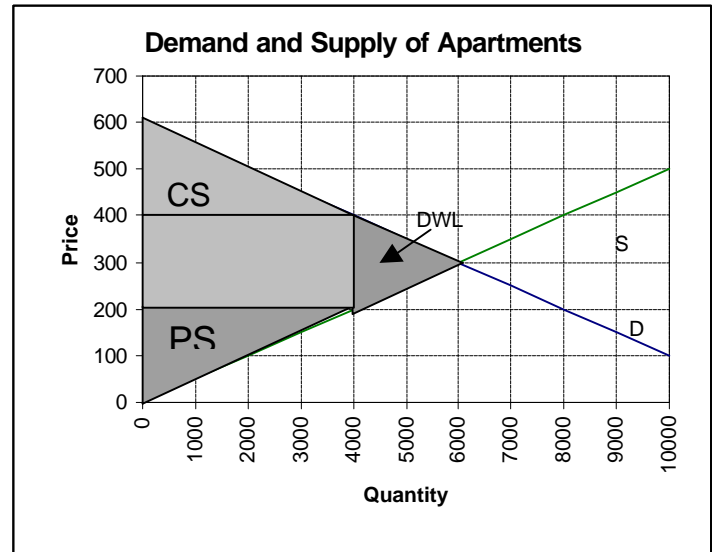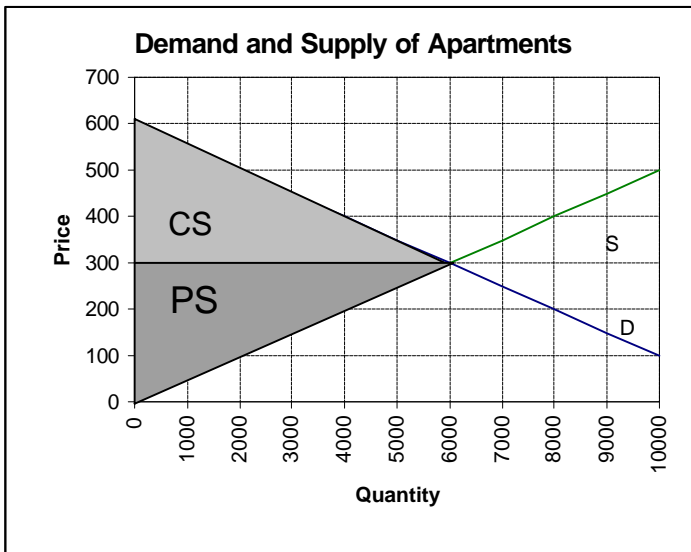Fall, 2001
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Homework #2 – Answer Key

1. Use the following graphs in answering this question.

a. What is the equilibrium rent and quantity of apartments rented in Kent? **The equilibrium is where the demand curve crosses the supply curve. The price is $300 and quantity is 6,000 apartments.**

b. Show on graph 1 the consumer surplus, producer surplus, and deadweight loss (if there is any). **see graph (there is no deadweight loss)**

c. Assume the city of Kent imposes rent control of $200. With this price ceiling, what will be the rent and quantity of apartments rented in Kent? **With a price ceiling of $200, landlords cannot charge a price higher than $200. At a price of $200, they are only willing to supply 4,000 apartments; the price will be $200 and quantity = 4,000.**

d. Show on graph 2 the consumer surplus, producer surplus, and deadweight loss (if there is any). **see graph**

e. Are consumers better off or worse off with rent control? Are landlords (producers) better off or worse off with rent control? **Consumers are better off with the rent control (their consumer surplus is higher). This is because those consumers who rent an apartment do so at a lower price; some of what used to be producer surplus is now consumer surplus. Note, though, that there is some consumer surplus that is lost because some people want to rent apartments and could if the price were $300 but cannot at a price of $200. Producers are worse off. Those still renting apartments are doing so for a lower price so some of what used to be producer surplus becomes consumer surplus. In addition, some landlords would rent apartments with a price of $300 but will not with a price of $200. That producer surplus is lost. (see graph)**

f. Is the market efficient with no rent control? Is the market efficient with rent control? Explain. **With no rent control the market is efficient. The marginal benefit of the last apartment rented (the 6,000th apartment) is $300. We know this by looking at demand – someone was willing to pay $300. The marginal cost of the last apartment rented (the 6,000th apartment) is also $300. We know this by looking at supply – a producer was willing to rent the apartment for $300. Since the marginal benefit to society equals the marginal cost to society, it is efficient.**

With rent control the market is not efficient. The marginal benefit of the last apartment rented (the 4,000th apartment) is $400. (Looking at demand we see someone is willing to pay $400). The marginal cost of the last apartment rented is $200. (Looking at supply we see someone is willing to rent for $200). The marginal benefit is greater than the marginal cost but we stopped producing. This means we are not producing enough apartments.

Another way to look at this inefficiency is by looking at the 5,000th apartment. That apartment is worth $350 to someone (from demand) and only costs us $250 to provide (from supply). As society, we have a way to spend $250 that gives us a return of $350 but we are not renting the apartment. This is true for all apartments from 4,000 to 6,000. This is the deadweight loss.

2. The demand curve and supply curve for textbooks are given on the graph below.
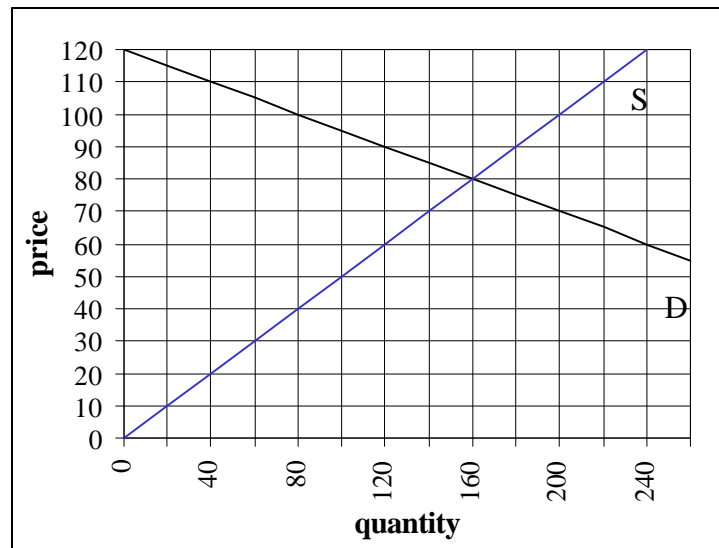
a. Suppose the Board of Regents wants to keep education costs down so a price ceiling of $60 is set on textbooks. Would this result in a shortage or a surplus of textbooks? What would be the shortage or surplus (how many texts)? **There would be a shortage of 120 textbooks. For a price of $60, consumers want to buy 240 textbooks (I get this number from looking at the demand curve); for a price of $60, producers are only willing to sell 120 textbook (I get this number from looking at the supply curve). This leaves a shortage of 240 – 120 = 120 textbooks.**

b. What would be the result of a price ceiling of $100? **A price ceiling of $100 would have no effect in this market because the equilibrium price is $80, lower than the price ceiling. The price would be $80 and the quantity of textbooks sold would be 160.**

c. What would you recommend to the Board of Regents about a price ceiling? Should they impose a price ceiling? What factors should they take into consideration in deciding? (Think about our discussion of the minimum wage when you answer this question. How would the issues of efficiency and equity apply in this case?) **Similar to the minimum wage example, there are both efficiency and equity considerations. From an efficiency perspective, we know that a price ceiling of $60 would result in deadweight loss. For the 121st to 160th textbook, the marginal benefit of the textbook (shown by the demand curve) is greater than the marginal cost of the textbook (shown by the supply curve), but these books are not being sold. In other words, we have a way to make textbooks that are worth more to someone than it would cost us to make them, and thus increase total surplus to society (some of it producer surplus, some of it consumer surplus). However, with the price ceiling these books are not being made and sold. Thus surplus to society is lower than it could be. The other side of the argument, though, is that it isn't fair to have students paying so much for books. If the price were lowered to $60, consumer surplus would increase for those who are able to buy books. Notice, though, that not all consumers are made better off. Those consumers who used to buy books 121 to 160 no longer buy the books and lose consumer surplus. The bottom line, then, is that a price ceiling on books would help some consumers but harm others. Producers would definitely be harmed, and there would be inefficiency in the market. Should the price ceiling be enacted? It depends on how you personally weigh these tradeoffs – some may feel yes, the gain to the students is worth it while others may feel no, the cost imposed on producers, other students, and lost surplus is not worth it.**

3. Kent Cinemas increases the price of movies from $3.00 to $5.00. The number of movie tickets bought increases from 200 to 300. What is the price elasticity of demand? Is this elastic or inelastic? Show your calculations. **Note: I made a typing mistake on this question. It should have read the number of tickets bought decreases from 300 to 200.**

$$E_D = \dfrac{\dfrac{(Q_2 - Q_1)}{\dfrac{(Q_1+Q_2)}{2}}}{\dfrac{(P_2 - P_1)}{\dfrac{(P_1+P_2)}{2}}} = \dfrac{\dfrac{(200-300)}{\dfrac{(200+300)}{2}}}{\dfrac{(5-3)}{\dfrac{(5+3)}{2}}} = \dfrac{\dfrac{-100}{\dfrac{500}{2}}}{\dfrac{2}{\dfrac{8}{2}}} = \dfrac{\dfrac{-100}{250}}{\dfrac{2}{4}} = \dfrac{-.4}{.5} = -.8$$

Price elasticity is inelastic since it is less than 1 in absolute value (without the negative sign)

Based on the information above, does Kent Cinema want to raise their price from $3 to $5? Defend your answer. **Kent Cinema wants to raise their price from $3 to $5 because since demand is inelastic their total revenue will increase.   With low price Total Revenue = P*Q = $3*300 = $900. With high price Total Revenue = P*Q = $5*200 = $1000. With inelastic demand, when Kent Cinema increases the price, they lose some customers but not a lot compared to how much the price increased.**

4. What is the cross price elasticity of demand if a price decrease from $2 to $1.80 for a McDonald's Big Mac decreases the quantity demanded of Burger King Whoppers from 1,000 to 500? Show your calculations.

$$E_C = \dfrac{\dfrac{(Q_2 - Q_1)}{\dfrac{(Q_1+Q_2)}{2}}}{\dfrac{(P_2 - P_1)}{\dfrac{(P_1+P_2)}{2}}} = \dfrac{\dfrac{(500-1000)}{\dfrac{(500+1000)}{2}}}{\dfrac{(1.80-2)}{\dfrac{(1.80+2)}{2}}} = \dfrac{\dfrac{-500}{\dfrac{1500}{2}}}{\dfrac{-.20}{\dfrac{3.80}{2}}} = \dfrac{\dfrac{-500}{750}}{\dfrac{-.20}{1.90}} = \dfrac{-.667}{-.105} = 6.35$$

Are these two goods substitutes or complements? While I made up the numbers in this example, do you think this is a reasonable real-world elasticity for these two products (does it pass the sniff test)? Why?

Big Macs and Whoppers are substitutes. We know this because the cross-price elasticity is positive. When the price of Big Macs fall, people substitute Big Macs for Whoppers and the demand for Whoppers falls. While it seems reasonable to expect these goods to be substitutes, I don't think this elasticity is reasonable because it is such a large number. This suggests that Whoppers are REALLY responsive to the price of Big Macs. A small change in the price of Big Macs brings a large reduction in the quantity of Whoppers purchased. I would expect to have the elasticity be positive, but inelastic (less than 1). There is room to disagree on this, though, and if you support your case for why you think it is reasonable, you will still get credit.

5. What is the income elasticity of demand if income decreasing from \$20,000 to \$16,000 causes the quantity demanded for White Castle hamburgers to increase from 500 to 600? Show calculations. Are White Castle hamburgers a normal or inferior good? How do you know? Who would you expect to see buying more, rich people or people without much money?

$$E_Y = \dfrac{\dfrac{(Q_2 - Q_1)}{(Q_1+Q_2)}}{\dfrac{(Inc_2 - Inc_1)}{(Inc_1+Inc_2)}} = \dfrac{\dfrac{(16,000-20,000)}{(16,000+20,000)}}{\dfrac{(600-500)}{(600+500)}} = \dfrac{\dfrac{-4000}{36,000}}{\dfrac{100}{1100}} = \dfrac{\dfrac{-4,000}{18,000}}{\dfrac{100}{550}} = \dfrac{-.222}{.182} = -1.2$$

White Castle hamburgers are an inferior good since the $E_Y < 0$. When income goes down, demand for White Castle hamburgers increases.

6. If I buy a soda at the movies, I have to pay \$2.75. If I buy a soda at a gas station, I only have to pay about \$1. Use the idea of elasticity and the factors that determine elasticity of demand to explain why the movie theater can charge so much higher of a price. Use the idea of elasticity and total revenue to explain why the movie theater doesn't raise the price even higher, like to \$4? **We know one of the factors that determines the elasticity of demand for a product is the availability of substitutes. In a movie theater, there are not many substitutes – it is not like I can just run next store and buy my soda if I think the movie theater price is too high. At gas stations, there are many more substitutes available – there are other beverages and it is easy to go to a different gas station. Thus, since there are fewer substitutes at the movie theater, demand is more inelastic and the theater can get away with charging a higher price. There is a limit, though, to how high the theater wants to raise its price. As price increases (as we move up the demand curve), demand becomes more elastic so that a point will be reached where if the theater raised its price higher, it would start losing many more customers and its total revenue would decrease.**

7. Kristine is buying IBC rootbeer and Diet Coke. As she stands in line to pay, she knows the price of the rootbeer is \$3 and the price of the Diet Coke is \$2. If her marginal utility of the last pack of rootbeer is 30 and her marginal utility of the last pack of Diet Coke is 10, what should she do? (Should she buy what she has, put back some rootbeer and instead get more Diet Coke, or put back some Diet Coke and instead get more rootbeer?) **We must calculate how much marginal utility she received from the last dollar spent on rootbeer and how much utility from the last dollar spent on Diet Coke. To do this, we use the calculate MU/P (marginal utility divided by price).**
Rootbeer: MU = 30, Price = \$3 so MU÷P=30/\$3=10
Diet Coke: MU = 10, Price = \$2 so MU ÷ P = 10/\$2 = 5
The last dollar spent on rootbeer brings her more utility than the last dollar spent on Diet Coke. Kristine should put back some Diet Coke and instead get more rootbeer until the marginal utility for the last dollar is equal for rootbeer and Diet Coke.

8. Explain in words why if a person is maximizing their utility if he/she is consuming where

$MU_A \div P_A = MU_b \div P_b$ **This means that the last dollar spent on good A gives the person the same amount of extra utility (marginal utility) as the last dollar spent on good B. Notice that this is measuring the extra utility of the last dollar spent, NOT the marginal utility of the last unit of good A or good B. If one side of the equation is bigger than the other, then the person gets more utility for money spent on that good. For example if $MU_A \div P_A$ is greater than for B, then the last dollar spent on A brought more utility than the last dollar spent on B. In this case, the person should buy more A (which gives higher utility) and less B. Doing so can mean that with the same amount spent, the person can have higher utility.**