Homework #2

1. What would be the effect of the following on the demand curve, the supply curve, equilibrium price, and equilibrium quantity of high definition televisions? [note: you don’t need any numbers – just describe why the curve would shift (or why it would not shift), how the curve would shift (in or out), and what would happen to equilibrium price and quantity (price go up or down; quantity go up or down)].

   a. more television shows are broadcast in high definition
   Demand curve would shift out because tv shows and televisions are complement goods. Supply would not change. Quantity would go up and price would go up.

   b. a technology breakthrough makes it less expensive to build high definition televisions
   Supply curve would shift out because the price of an input has gone down. Demand curve would not shift. Price would go down and quantity would go up.

   c. the surgeon general issues a report stating that watching high definition television increases your chances of going blind
   Demand curve would shift in because of change in preference. Supply curve would not shift. Price would go down and quantity would go down.

   d. the expectation is that next spring the price of high definition televisions will be lower
   Both the supply curve and demand curve would shift. Demand curve would shift in since people would rather wait until next spring to buy it. Supply curve would shift out since suppliers would want to sell more televisions before the lower price next spring. The price will definitely go down. The quantity will either increase or decrease depending on if the supply or demand shift is larger.

2. Kent State Athletic Department increases the student price of KSU football games from $10 to $12. The number of football tickets bought decreases from 14,000 to 10,000. What is the price elasticity of demand? Is this elastic or inelastic? Show your calculations. (As a side note, the price of KSU football games for students is $0 – you can go for free so get your gold on and show up at a game!!)

   % change quantity = (10,000 – 14,000) ÷ [(10,000+14,000)/2] = -0.33
   % change price = ($12 - $10) ÷ [($12+$10)/2] = 0.18
   elasticity = % change quantity / % change price = -0.33 / 0.18 = -1.83
   demand is elastic since the absolute value of the elasticity is greater than 1.

   Does the athletic department want to raise their price from $10 to $12? Defend your answer.
   The athletic department does not want to raise their price. Since demand is elastic (which we just found to be the case in the part above), if they raise their price they will lose a lot of customers and total revenue will go down.

3. What is the cross price elasticity of demand if a price decrease from $6 to $4 for a burrito decreases the quantity demanded of sandwiches at Quiznos from 6000 to 5000? Are the goods substitutes or complements? Is the cross price elasticity elastic or inelastic? Show your calculations.

   % change quantity = (50000 – 6000) ÷ [(5000+6000)/2] = - 0.18
   % change price = ($4 - $6) ÷ [($4 + $6)/2] = - 0.4
   elasticity = % change quantity / % change price = -0.18 / -0.4 = 0.45
   The goods are substitutes since the cross price elasticity is negative. The cross price elasticity is inelastic since the elasticity is less than one.
4. Use the concept of elasticity to explain why the war on drugs could increase the total revenue of drug dealers. (You can draw a graph to help explain if you want, but make sure you explain the graph.)

The war on drugs tries to shift in the supply curve for drugs by targeting drug dealers. However, we think the demand curve for drugs is very inelastic and thus drug users are not price sensitive. A shift in the supply curve will raise price a lot but have very little effect on quantity. The result will be total revenue for drug dealers will go up (because the price is higher but there are not many fewer customers).

5. Which of the following seems like a potentially reasonable income elasticity of demand for gasoline (in the short run): 5.2, -5.2, 0.4, -0.4? Explain why. (Hint: Think about how demand for gasoline changes as income increases.)

Gasoline is a normal good, so the income elasticity of demand must be positive. This leaves 5.2 and 0.4 as viable alternatives. However, people don’t change their consumption of gas by a lot when income goes up, so it must be inelastic. This means 0.4 is the only viable option. (If it were 5.2 then when your income goes up a little you would buy a lot more gasoline – this doesn’t seem to reflect what really happens.)

6. The demand curve and supply curve for fast food jobs are given on the graph below.

![Supply and Demand for Fast Food Workers](image)

a. Suppose the government imposes a minimum wage of $8 per hour. Is there a shortage or surplus of workers? How many workers? How many workers are working with a minimum wage of $8 compared to if there were no minimum wage? There would be a surplus of 3000 workers. For a wage of $8, the supply of workers is 8,000 and the demand for workers is 5,000 resulting in a surplus of 8,000 – 5,000.

b. On the graph draw the consumer surplus, producer surplus, and deadweight loss (if there is any) for a minimum wage of $8. In the space below calculate the amount of consumer surplus, producer surplus, and deadweight loss. Is the minimum wage efficient? Explain. See the graph above.
Consumer surplus = $\frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 5,000 \times 10 = $25,000
To find producer surplus, divide the area into a rectangle and a triangle (like we did in class).
Producer surplus = $\frac{1}{2} \times 5000 \times 5 + 5000 \times 3 = $12,500 + $15,000 = $27,500
Deadweight loss = $\frac{1}{2} \times 1,000 \times 3 = $1,500
The minimum wage is not efficient. Because of the minimum wage we have $1,500 of deadweight loss.
The marginal benefit to society of the 5,000th worker = $8 (from the demand curve); the marginal cost to society of the 5,000th worker = $5 (from the supply curve). We have a worker that is worth $8 and would be willing to work for $5, but with the minimum wage that worker is not working.

c. Explain who are the winners and the losers of having a minimum wage of $8. (Refer back to your answer to question b to help you answer this.)
The winners are those 5,000 workers (suppliers of labor) who still have a job but now get paid a higher wage. Their producer surplus is higher than it would have been without the minimum wage. The losers are those workers who would have been working without a minimum wage but now are not working (workers 5,001 to 6,000); also those consumers of workers (the businesses that hire workers) are losers since they now much pay a higher wage and their consumer surplus is lower.

d. What would be the result of a minimum wage of $4 per hour? Explain.
There would be no effect. We would just stay at the equilibrium price of $6 an hour and 6,000 workers. Since a minimum wage of $4 would be less than the actual wage, there would be no reason for companies to move away from the $6 equilibrium wage.

7. Provide a short answer for each of the following questions.
a. If the tax on cigarettes doubles from 50 cents a pack to $1 a pack what will happen to the amount of deadweight loss? (Will it stay the same, increase by less than double, exactly double, increase by more than double?) Explain. It will increase by more than double. We know that when the size of a tax increases, the deadweight loss increases exponentially. A doubling of the tax would result in 4 times as much deadweight loss. (Take a look at the handout from class with the 30 cent tax, 60 cent tax, and 90 cent tax to confirm this.)

b. Will the deadweight loss from a tax on a good be greater if the demand for the good is elastic or inelastic? Explain? The deadweight loss comes from when a tax causes people to change their behavior. If demand for a good is elastic, then the tax will cause a big change in quantity (since elastic demand means people are price sensitive) and more deadweight loss.

c. Suppose we are considering taxing two goods, one with a price elasticity of demand of –0.5 and another with a price elasticity of demand of –2.3. Which good would you tax more? Would you expect to put all of the tax on that good? Why? You would want to tax the good that is more inelastic (see point b above). Thus you would put more of the tax on the good with elasticity of –0.5. However, we know that as you increase the size of the tax, deadweight loss increases dramatically (see point a above) so you may not want to put all the tax on one good – it may be better to have a large tax on the good with elasticity of -0.5 and a small tax on the good with elasticity –2.3.

d. What might be a reason not to put large taxes on goods that have inelastic demand? (think about what types of goods have inelastic demand) Goods that have inelastic demand are usually necessities. Even though it might be more efficient to put the tax on necessities, we may not want to do it for equity reasons (fairness). Imagine being the politician that proposes that to reduce deadweight loss we will not have any taxes on goods that are luxuries but will have huge taxes on goods that are necessities!
8. The graph below shows the demand and supply curves for hybrid cars.

To find the equilibrium price and quantity, we must draw a new demand curve that reflects the $6000 tax. The demand curve with the tax is $6000 lower than the regular demand curve at every quantity. The equilibrium is where the new demand curve crosses supply. The price consumers pay to suppliers will be $10,000 and the quantity will be 14,000. The total price paid by consumers will be $16,000 (the $10,000 they pay to suppliers plus the $6,000 tax).

b. How would your answer to part (a.) be different if the tax had been on the sellers of hybrid cars (producers) instead of the buyers (consumers)?

There would be no difference in the outcome. Consumers would still pay $16,000, suppliers would still get to keep $10,000 and the quantity would still be 14,000 cars. The only change is it would be suppliers rather than consumers giving the money to the government. The basic point, though, is that it does not matter if a tax is on consumers or on producers – we get the same outcome regardless.

c. Who has the larger tax burden of the tax, producers or consumers? Explain how you know this. What can you conclude about the elasticity of demand and elasticity of supply for hybrid cars based on this?

If there were no tax, we would find our equilibrium by looking at the normal supply and demand curve – the price would be $12,000. With the tax consumers pay $16,000, and increase of $4,000 compared to no tax. With the tax producers keep $10,000, a decrease of $2,000 compared to no tax. Thus, $4,000 of the tax is paid by consumers and $2,000 by producers – consumers have the higher tax incidence. Based on this we know that demand must be more inelastic than supply since whoever is more inelastic has more of the tax incidences.
d. How much deadweight loss is there with the tax? How much tax revenue was raised with the tax?

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\text{Deadweight loss} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 4000 \times 6000 = 12,000,000
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\text{Tax revenue} = 6,000 \times 14,000 = 84,000,000
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e. Suppose instead of a tax the government gave a $6000 subsidy to each consumer who buys a hybrid car. What would be the price of hybrid cars and the quantity sold? (You can do this, just think through it. A subsidy works opposite of a tax – if you buy a car you get an extra $6000 from the government.)

Instead of shifting the demand curve down by $6,000 we would shift it up by $6,000. For example, for the 10,000th car someone is willing to pay $20,000 (from looking at the demand curve). With the subsidy they would be willing to pay $26,000 since the government will give them $6,000 for buying a car. There would be more cars sold (22,000 cars) and the price of cars would be $14,000 (this is the price paid to suppliers, but since consumers get $6,000 in subsidy the price they actually pay is only $8,000).