Answers to
Homework #1
Due: 6-18-07
APEC 3001
Applied Microeconomics:
Consumers, Producers, and Markets
(Summer 2007)
Instructor: Hurley

Please show all the work you do to solve a problem.

1. What do economists mean when they say someone is rational? What do they mean when they say someone is rationally self-interested?

   Answer: People who choose an activity when the benefit from engaging in the activity outweighs the cost are called rational. People who make decisions in this fashion, but only care about the costs and benefits to themselves and not others are called rationally self-interested.

2. What is the difference between a positive and normative economic analysis?

   Answer:
   Positive economic analysis is retrospective or predictive. It tries to explain why something happened or what will happen in the future. It is objective.

   Normative economic analysis tries to say how things should be. Ultimately the analysis is subjective because it depends on how we define what is good and bad, which may differ depending on who you ask.

3. What are consumer and producer surplus and what do they tell us?

   Answer:
   Consumer surplus is the difference between what buyers are willing to pay (the demand curve) and what they actually pay (the price). It tells us how much buyers' benefit from trade

   Producer surplus is the difference between what sellers are willing to accept (the supply curve) and what the actually receive (the price). It tells us how much sellers' benefit from trade.

4. What is the difference between a unit tax and Ad Valorem tax?

   Answer: For a unit tax, sellers or buyers pay the same tax per unit of a good purchased regardless of the price. For an Ad Valorem tax, the amount of the tax paid per unit is proportional to the price.

5. Mason has decided to earn a little extra money over the summer by mowing lawns for his neighbors. He determines that his total cost of mowing is $7.50 per lawn regardless of how many lawns he mows. One neighbor is willing to pay Mason $15 to mow. A second neighbor is willing to pay Mason $10. A third neighbor is willing to pay Mason $5, while a fourth neighbor is willing to pay $4. How many lawns should Mason mow?
   a. One.
   b. Two.
   c. Three.
   d. Four.

   Answer: b. Should Mason mow one lawn instead of none? For the first lawn Mason earns $15 and it only costs him $7.50, so yes. Should Mason mow two lawns instead of one? For the second lawn Mason earns $10 and it only costs him $7.50, so yes. Should Mason mow three lawns instead of two? For the third lawn Mason earns $5, but it costs him $7.50, so no.

6. Which of the following is true about the two demand functions (i) $Q_D = 1{,}000 - 20P$ and (ii) $P = 50 - 0.05Q_D$?
   a. For any price, the quantity demanded for (i) is lower than for (ii).
   b. For any price, the quantity demanded for (i) is higher than for (ii).
   c. For any price, the quantity demanded for (i) is the same as for (ii).
   d. For some prices, the quantity demanded for (i) is higher than for (ii), while for other prices, the quantity demanded for (i) is lower than for (ii).

   Answer: c. There are two different approaches to this problem. You could graph both functions and you will see they are the same.

   Alternatively, you could take (ii) and rearrange it. For example, $P = 50 - 0.05Q_D \Leftrightarrow P + 0.05Q_D = 50 - 0.05Q_D + 0.05Q_D \Leftrightarrow P + 0.05Q_D = 50 \Leftrightarrow P - P + 0.05Q_D = 50 - P \Leftrightarrow 20 \times 0.05Q_D = 20 \times 50 - 20P \Leftrightarrow Q_D = 1{,}000 - 20P$, which is exactly the same as (i). Therefore, for any given price the quantity demanded will be the same.

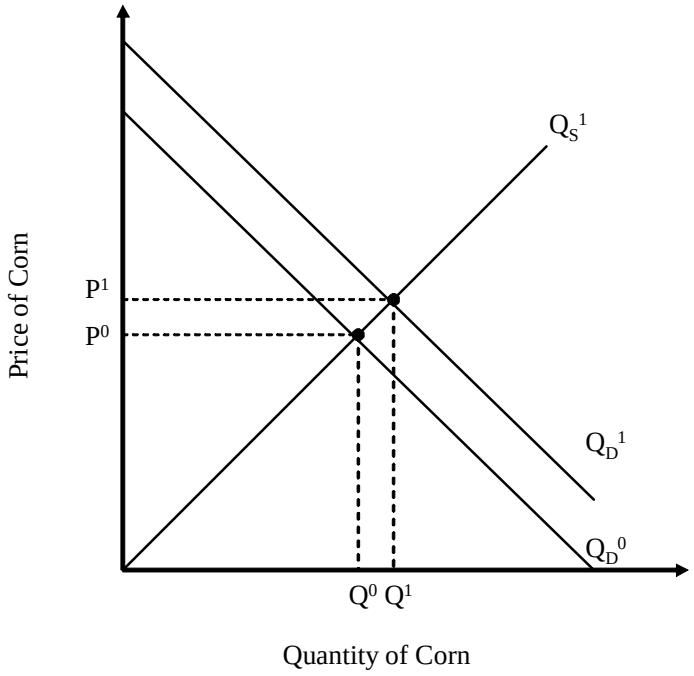
7. The demand for tickets to Valley Fair Amusement Park is $Q_D = 5{,}000 - 120P$, while the supply of tickets is $Q_S = 80P$. What is the equilibrium price, P*, and quantity, Q*, for tickets to Valley Fair?
   a. P* = 25 and Q* = 2,000
   b. P* = 30 and Q* = 2,400
   c. P* = 2,000 and Q* = 25
   d. P* = 2,400 and Q* = 30

   Answer: a. To find the equilibrium price, P*, we need to set the quantity demanded equal to the quantity supplied: $Q_D = Q_S = Q^* \Rightarrow 5{,}000 - 120P^* = 80P^*$. We then need to solve for the equilibrium price: $5{,}000 - 120P^* = 80P^* \Rightarrow 5{,}000 - 120P^* + 120P^* = 80P^* + 120P^* \Rightarrow 5{,}000 = 200P^* \Rightarrow P = 25$.

   To find the equilibrium quantity, we need to plug the equilibrium price into demand or supply or both if we want to check our answer: $Q^* = 5{,}000 - 120P^* \Rightarrow Q^* = 5{,}000 - 120 \times 25 \Rightarrow Q^* = 5{,}000 - 3{,}000 \Rightarrow Q^* = 2{,}000$ or $Q^* = 80P^* \Rightarrow Q^* = 80 \times 25 \Rightarrow Q^* = 2{,}000$.

8. Increases in the demand for oil have driven up the price of oil. This increase in the price of oil has driven up the demand for ethanol made from corn. How will this increased demand for corn ethanol affect the equilibrium price and quantity of corn?
   a. The equilibrium price and quantity of corn will decrease.
   b. The equilibrium price and quantity of corn will increase.
   c. The equilibrium price of corn will increase, while the equilibrium quantity decreases.
   d. The equilibrium price of corn will decrease, while the equilibrium quantity increases.

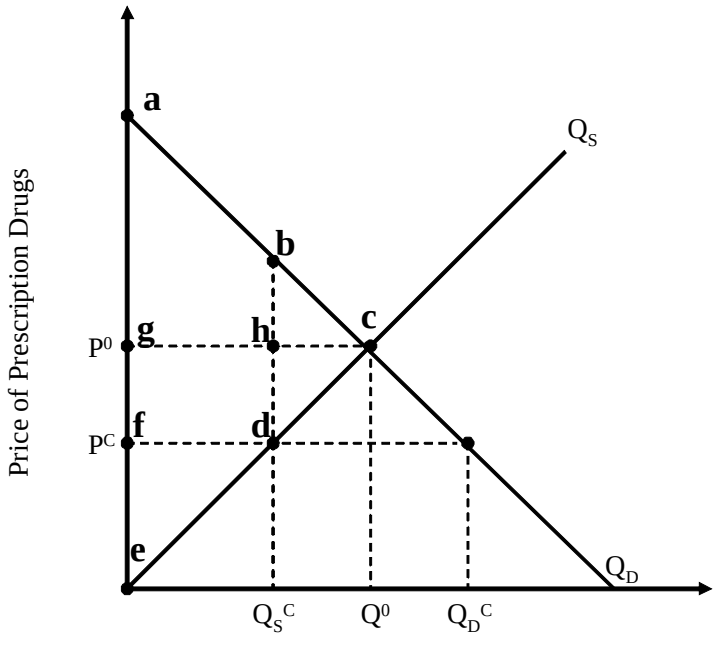
   Answer: b. An increase in the demand for corn ethanol due to an increase in the price of oil will shift the demand for corn out: from Q_D^0 to Q_D^1 on the figure below. This shift out in the demand for corn will result in a new higher equilibrium price (P^1 instead of P^0) and new higher equilibrium quantity (Q^1 instead of Q^0).



9. The figure below illustrates the supply, Q_S, and demand, Q_D, for prescription drugs.
   a. Illustrate the equilibrium market price and quantity. Label the equilibrium market price P^0 and the equilibrium market quantity Q^0.
   b. Illustrate the consumer and producer surplus for the equilibrium market price and quantity.
   c. Suppose the government has decided that the price of prescriptions drugs is too high, so it passes a law imposing a price ceiling P^C that is below the market equilibrium price. Illustrate this price ceiling on the figure below.
   d. Show the quantity of drugs supplied under this price ceiling and label it Q_S^C. Show the quantity of drugs demanded under this price ceiling and label it Q_D^C. What quantity of drugs will be traded? Does this price ceiling result in a surplus or shortage of drugs?
   e. Explain why this price ceiling is inefficient.

Answer:

a. See below.
b. Consumer surplus is denoted by area **acg** on the figure below, while producer surplus is denoted by the area **ceg**. Total surplus is area **ace**.
c. See below.
d. See below. The quantity traded is Q_S^C. There will be a shortage of prescription drugs.
e. With the price ceiling, consumer surplus is area **abdf**, while producer surplus is area **fde**. Total surplus is area **abde**, which is less than without the price ceiling by area **bcd**, so the surplus in inefficient. Producers of prescription drugs are unequivocally worse off by area **cdfg**. Consumers are better off by area **dfgh**, but worse off by area **bch**, so the net benefit to consumers is unclear.



10. Suppose the demand for prescription drugs is $Q_D = 1{,}000 - 20P_D$ and supply is $Q_S = 30P_S$.
    a. Find the equilibrium price and quantity for prescription drugs.
    b. Suppose the government has decided the price of prescription drugs is too high, so it passes a law that pays the buyer of prescription drugs $10 for each prescription purchased. What is the legal incidence of this subsidy?
    c. With this $10 subsidy, what in the equilibrium price received by prescription drug sellers? What is the equilibrium price paid by prescription drug buyers? What is the equilibrium quantity?
    d. What is the total cost of this program to the government? What is the economic incidence of this subsidy?

Answer:

a. Set $Q_D = Q_S = Q^*$, $P = P^*$, and solve for P^*: $1{,}000 - 20P^* = 30P^* \Rightarrow 1{,}000 - 20P^* + 20P^* = 30P + 20P^* \Rightarrow 1{,}000 = 50P^* \Rightarrow P^* = 20$. $Q^* = 1{,}000 - 20P^* \Rightarrow Q^* = 1{,}000 - 20\times20 = 1{,}000 - 400 = 600$ or $Q^* = 30P^* = 30\times20 = 600$.

b. The legal incidence of this subsidy is $10 paid to the prescription drug buyer for each prescription that is purchased.

c. With this subsidy, $P_S = P_D + 10$. In equilibrium, $Q_S = Q_D = Q$, which implies $30P_S = 1{,}000 - 20P_D$ or $30(P_D + 10) = 1{,}000 - 20P_D$. Solving for P_D, $30P_D + 30\times10 = 1{,}000 - 20P_D \Rightarrow 30P_D + 300 = 1{,}000 - 20P_D \Rightarrow 30P_D + 20P_D + 300 - 300 = 1{,}000 - 300 - 20P_D + 20P_D \Rightarrow 50P_D = 700 \Rightarrow P_D = 700/50 = 70/5 = 14$. $P_S = P_D + 10 = 14 + 10 = 24$. $Q_D = 1{,}000 - 20P_D = 1{,}000 - 20\times14 = 1{,}000 - 280 = 720$ or $Q_S = 30P_S = 30\times24 = 720$.

   To summarize, $P_S = 24$, $P_D = 14$, and $Q_D = Q_S = Q = 720$.

d. The total cost of the program to the government is $\$10\times720 = \$7{,}200$. The economic incidence of the subsidy is that prescription drug buyers get an added $6 for every prescription and prescription drug sellers get an added $4 for every prescription. Buyers are better off because they are buyer more for a lower price. Sellers are better off because they are selling more and receiving a higher price. The government is worse off. Note that in the end it can be shown that the government pays more than buyers and sellers benefit, so the subsidy is inefficient. Trying drawing a graph that shows this result.