Economics 101
Spring 2019
Homework #2
Due Thursday, February 21, 2019

Directions:
- The homework will be collected in a box labeled with your TA's name **before** the lecture.
- Please place **your name, TA name, and section number** on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade.
- Please **staple** your homework: we expect you to take care of this prior to coming to the large lecture. You do not need to turn in the homework questions, but your homework should be neat, orderly, and easy for the TAs to see the answers to each question.
- Late homework will not be accepted so make plans ahead of time.
- Show your work. Good luck!

Part I: Demand and Supply

1. For the following scenarios assume the market is in equilibrium.

   a. Assume that popcorn and movie tickets are complements. How would an increase in the price of popcorn at movie theaters and an increase in the price of ink used to print movie tickets affect the equilibrium price and the equilibrium quantity of movie tickets?

   b. How would an increase in the price of cotton used to make scarves affect the equilibrium price and the equilibrium quantity of scarves?

   c. A new study has shown that chocolate is healthier than originally thought. How would this result affect the equilibrium price and the equilibrium quantity of chocolate?

   d. Due to word of mouth Game of Thrones has become more and more popular. Furthermore, the production cost for producing a new episode of Game of Thrones has fallen since for future productions the producers can reuse old costumes and props. How will these changes affect the equilibrium price and the equilibrium quantity of episodes of Game of Thrones?

   e. Suppose Netflix and Hulu are complements. (If this surprises you as it did your Professor, then you might want to google "Are Hulu and Netflix complements or substitutes" and read some of the articles that appear…I found this really, really interesting! And, you might find it interesting as well!) Suppose Netflix develops a new technology that enhances their ability to produce their product. At the same time, the price of Hulu decreases significantly. How will these changes affect the equilibrium price and the equilibrium quantity of Netflix relative to the initial equilbrium price and equilibrium quantity in this market?

2. Consider the market for Kobe Beef. This market can be described by the following information. The quantity supplied of Kobe Beef is always equal to three times the price per unit of Kobe Beef. The quantity of Kobe Beef demanded decreases by one unit of Kobe Beef every time the price per unit of Kobe beef increases by one dollar. When the price of Kobe Beef is equal to one dollar, the quantity demanded of Kobe beef is equal to 7 units of Kobe Beef. Both the demand curve and the supply curve in the market for Kobe beef are linear.

    a. What is the equation for the demand curve for Kobe Beef? In your equation use Q as the symbol for the quantity of Kobe Beef units and P as the price per unit of Kobe Beef.

    b. What is the equation for the supply curve for Kobe Beef? In your equation use Q as the symbol for the quantity of Kobe Beef units and P as the price per unit of Kobe Beef.

    c. Find the equilibrium price and quantity, (Q, P), in the market for Kobe Beef. To find the equilibrium, you have to find where the supply and demand curves intersect. In this case you need to set them equal to each other to solve for P.

Part II: Price Controls

3. Consider the market for apartment rentals in Madison. The market is described by the following supply and demand system of equations where P is the price of an apartment (the monthly leasing fee let's assume) and Q is the quantity of apartments:

    Demand Curve for Apartments: $P = 100 - 2Q_d$
    Supply Curve for Apartments: $P = 3Q_s + 50$

  a. What is the equilibrium price and quantity in the market for apartment rentals?

  b. Suppose the government tries to control the rent prices through a price ceiling of \$56. Given this price ceiling and holding everything else constant:

    i. What is the new quantity demanded and quantity supplied in this market with the implementation of this price ceiling?
    ii. Is there a shortage or a surplus in this market when the price ceiling is implemented? Quantify the size of the shortage or surplus if it exists with the implementation of this price ceiling.
    iii. What is the deadweight loss due to the implementation of this price ceiling?
    iv. Provide a well labeled and complete graph that illustrates this price ceiling, the quantity demanded with this price ceiling, the quantity supplied with this price ceiling, and the deadweight loss due to the implementation of this price ceiling.

Now, suppose a big tech company called Legendary moves to Madison. Assume that with the inflow of new employees from Legendary, the new market demand for apartment rentals is given by the following equation:

New Market Demand for Apartments: $P = 200 - 2Qd$

c. At the original price ceiling of $56, Given this price ceiling and holding everything else constant:

    i.   What is the new quantity demanded and quantity supplied in this market with the implementation of this price ceiling?
    ii. Is there a shortage or a surplus in this market when the price ceiling is implemented? Quantify the size of the shortage or surplus if it exists with the implementation of this price ceiling.
    iii. What is the deadweight loss due to the implementation of this price ceiling?
    iv. Provide a well labeled and complete graph that illustrates this price ceiling, the quantity demanded with this price ceiling, the quantity supplied with this price ceiling, and the deadweight loss due to the implementation of this price ceiling.

4. Consider the market for oranges in a small, closed economy. The domestic demand curve and the domestic supply curve for oranges are given by the following equations where P is the price per orange in dollars and Q is the quantity of oranges:

Domestic Demand Curve for Oranges: $P = 10 - 0.1Q$
Domestic Supply Curve for Oranges: $P = 2 + 0.4Q$

a. Given the above information and holding everything else constant, what is the equilibrium quantity and price in this market for oranges?

b. Suppose the government decides to implement a price support program with a price floor of $9.60 per orange. The government agrees to buy any surplus in this market due to the implementation of this price floor. Given this program and the above information:

    i. How many units of oranges will the government have to buy given the implementation of this price support program?
    ii. What is the cost to the government of this price support program? Assume that the storage costs to the government are $0.50 per orange.

c. Now suppose that instead of a price support program in this market that the government decides to implement a price guarantee program in this market. Recall that the price guarantee program guarantees producers a price for their product with the government paying a subsidy per unit that is equal to the guaranteed price minus the price that the producers sell the product for in the market. Suppose the government has a limited budget of $28.50. Given this information and holding everything else constant, what is the maximum price that the government can guarantee in this market?

Part III: Excise Taxes

5. Consider the market for winter hats. Demand and Supply are given by the following equations, where quantity, Q, is measured in number of hats and the price, P, is measured in dollars:

Demand: $P = 50 - \frac{1}{2}Q_D$

Supply: $P = 20 + \frac{1}{2}Q_S$

a. Find the equilibrium price and quantity in the market for winter hats. Demonstrate the equilibrium graphically.

b. Find consumer surplus and producer surplus in the market for winter hats.

c. Suppose the government decides to impose an excise tax on producers. More precisely, they impose an excise tax of $10 per unit of winter hats. Find the new supply equation.

d. Find the new equilibrium price and quantity in the market for winter hats. Demonstrate this new equilibrium graphically.

e. Find the new consumer surplus and producer surplus in the market for winter hats with the specified excise tax.

f. Find the tax revenue that the government gets from imposing this excise tax, as well as the consumer tax incidence and the producer tax incidence of this excise tax.

g. Find the deadweight loss from imposing the tax.

Part IV: Market Demand and Market Supply

6. Suppose there are two consumers in the market for bagels and their individual demand curves are given by the following equations where P is the price per bagel and Q is the quantity of bagels:

Glenn's demand for bagels: P = 40 – 2Q

Betsy's demand for bagels: P = 30 – (1/2)Q

a. Draw two different graphs: in the first graph draw Glenn's demand for bagels and in the second graph draw Betsy's demand for bagels. Make sure you label all axes and all intercepts clearly.

b. In a third graph draw the market demand curve for bagels. Make sure you label this demand curve carefully and completely; if there is a "kink" point label the coordinates of this point.

c. Based on your graph in (b), write the equation(s) for the market demand curve. Provide a range of price for any demand curve equation you provide. When writing these equations, use the slope-intercept form and also retain fractions rather than decimals if necessary.

Suppose that Paul, a third consumer, enters this market and has the following demand for bagels:

Paul's demand for bagels: $P = 10 - Q$

d. Draw a fourth graph that represents the market demand curve for bagels when the market includes Glenn, Betsy, and Paul. Label all intercepts, all axes, and all "kink" points clearly and carefully.

e. Based on your graph in (d), write the equation(s) for the market demand curve. Provide a range of prices for any demand curve equation you provide. When writing these equations, use the slope-intercept form and also retain fractions rather than decimals when necessary. Check that your answers are correct and that your math is accurate!!

f. Suppose that the market supply curve is given by the following equation:

Market Supply Curve: $P = 18 + Q$

Given this information and your answer in (e) find the equilibrium price and quantity in this market and then determine how many units of the good Glenn, Betsy and Paul will each consume.

7. Suppose that there are two firms that produce bagels and their individual firm supply curves are given as follows where P is the price per bagel and Q is the quantity of bagels:

Supply curve for Firm A: $P = 1 + (2/83)Q$
Supply curve for Firm B: $P = 1 + (2/83)Q$

HINT: In this problem you will find it helpful to retain your fractions as fractions. You will also find it helpful to use a calculator for some of the multiplication and division that is required. Do NOT despair-you can do this set of problems!

a. If there are just these two firms in the market, what is the market supply curve? Show how you found this answer.

b. Given the market demand curve you found in question 6e, and this new information about the firms that produce bagels, calculate the equilibrium price and quantity in the market for bagels.

c. Given your answer in (b), how many bagels will Glenn consume? How many bagels will Betsy consume? How many bagels will Paul consume? Show how you found your answer.