Economics 101
Fall 2018
Homework #2
Due Thursday, October 11, 2018

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: PPF

1. Paul, Noel, and Sandi work in a bakery where they make pies and cakes. In one day, Paul can make 30 pies or 10 cakes or any combination of these two goods that lie on the line containing these two production points. Noel can make 5 pies or 5 cakes or any combination of these two goods that lie on the line containing these two production points. Sandi can make 12 pies or 6 cakes or any combination of these two goods that lie on the line containing these two production points. Assume that PPF of each person is a straight line.

   a. With cakes measured on the horizontal axis, draw the PPF for each person on separate graphs and then find the equations for each individual's PPF.

   b. What are the opportunity costs of producing 1 pie in terms of the number of cakes for Paul, Noel, and Sandi? Who has the comparative advantage in the production of cakes?

   c. Plot the joint PPF and find the equations of each segment of the joint PPF. Provide the relevant domain for each of these equations.

d. If 36 pies and 8 cakes are produced in the bakery, what does Paul produce? What do Noel and Sandi produce, respectively? If 18 cakes and 9 pies are produced, what do Paul, Noel, Sandi produce, respectively?

Part II: Demand and Supply

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

   a. Assume that Coke and Pepsi are substitute goods. How would an increase in the price of Coke affect the equilibrium price and the equilibrium quantity of Pepsi?

   b. Suppose there is an increase in the price of lemons, which are an input in the production of lemonade. What will happen to the equilibrium price and equilibrium quantity of Lemonade?

   c. At the Union Terrace, beer and popcorn are complements. Suppose that there is an increase in the price of beer and an increase in the price of corn, an input in the production of popcorn. How would these changes affect the equilibrium quantity and equilibrium price in the market for popcorn?

   d. What would happen to the equilibrium quantity and the equilibrium price of public transportation, an inferior good, if at the same time income increases and the price of gas decreases? Assume for this question that gasoline is an input in the supply of public transportation.

   e. What happens to the equilibrium price and equilibrium quantity in the market for baby food if there are technological advances in the production of baby food and at the same time a baby boom happens? Assume that a baby boom means that a greater than normal number of babies are born during a period of time?

3. This is a two-part question. For parts A and B refer to the following scenario.

The quantity supplied of cheese curds is always equal to twice the price per unit of cheese curds. The quantity of cheese curds demanded decreases by one unit of cheese curds every time the price per unit of cheese curds increases by one dollar. When the price of cheese curds is equal to one dollar, the quantity demanded of cheese curds is equal to 8 units of cheese curds.

Part A:

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

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

c. Find the equilibrium price and quantity in the market for cheese curds.

d. Calculate the value of consumer surplus in the market for cheese curds.

e. Calculate the value of producer surplus in the market for cheese curds.

f. Calculate the value of total surplus in the market for cheese curds.

Part B:

Now assume that the demand for cheese curds decreases by 3 cheese curds at every price. The supply curve does not change for part B.

a. Given this new information, what is the equation for the new demand curve for cheese curds?

b. Find the new equilibrium price and the new equilibrium quantity.

g. Calculate the new value of consumer surplus.

h. Calculate the new value of producer surplus.

c. Calculate the new value of total surplus.

Part III: Consumer Surplus, Producer Surplus, Deadweight Loss

4. Consider the market for electricity in an island country. The price (P) is given in dollars per kilowatt hour (kWh) and the quantity (Q) is measured in kilowatt hours (kWh). Demand and Supply equations for the electricity are as follows:

   Market Demand: $P = 10 - Q_d$
   Market Supply: $P = 2 + Q_s$

a. Find the equilibrium price and equilibrium quantity in the market for electricity. Plot a graph to describe the equilibrium. Be sure your graph is completely and clearly labeled (label all intercepts, label the axis, label the equilibrium price and the equilibrium quantity, label any curves that your draw).

b. What is the value of consumer surplus and producer surplus at the equilibrium? Use a graph to illustrate your work and find the numerical values for both the consumer and the producer surplus.

c. Assume that during the past summer, because of the record-breaking heat, the government set a price ceiling in the market for electricity at 7 dollars per kWh. Is there a shortage or a surplus in the market once the price ceiling is set? Calculate the value of consumer surplus, producer surplus, and deadweight loss due to the implementation of this price ceiling.

4

d. Assume that the government sets a price ceiling at 5 dollars per kWh. With this new price ceiling is there a shortage or a surplus in the market once the price ceiling is implemented? Calculate the value of consumer surplus, producer surplus, and deadweight loss due to the implementation of this price ceiling.

e. Suppose the government wants to find out the impact of a price floor in the electricity market. If the price floor is set at 8 dollars per kWh, would there be a shortage or a surplus in the market? Calculate the value of consumer surplus, producer surplus, and deadweight loss in this scenario.

5. Consider the market for tomatoes. The demand and the supply equations for tomatoes are given by the following equations where P is the price per box of tomatoes and Q is the number of tomato boxes.

   Market Demand: $P = 42 - 2Q_d$
   Market Supply: $P = 6 + Q_s$

a. Find the equilibrium price and the equilibrium quantity in the market for tomatoes.

b. Suppose the government starts a price support program to help tomato farmers. Suppose the price of a box of tomatoes is set at $24, and the government promises to purchase any excess quantity of tomatoes at that price. If this program is implemented, what will be the quantity supplied by producers? What will be the quantity purchased by consumers? How much do consumers spend on tomatoes with this program? What is the cost for the government to implement the program? Assume that the government's costs are only the costs associated with buying any surplus boxes of tomatoes.

c. Instead of the program described in part (b), the government chooses to implement an alternative program called the price guarantee program. With this program the government wants to ensure that the consumers will buy the quantity of tomatoes that producers are willing to produce if the producers are guaranteed a price of $24 per box of tomatoes. To reach this goal the government promises to pay any difference between the price consumers are willing to pay and the guaranteed price of $24 to the producers of the tomatoes. Given this program, what will be the quantity purchased by consumers? What price will consumers pay for a box of tomatoes? How much do consumers spend on tomatoes? What is the cost to the government to implement this program?