Economics 101

Spring 2022

Homework #2

Due 2/24/2022

**S&D: Basic Problems**

1. Analyze each of the following scenarios and provide a graph to illustrate your answer. Use (Qo, Po) to designate the initial equilibrium price and quantity, and (Q', P') to designate the new equilibrium price and quantity. Illustrate in your graph any shifts that occur in the demand and/or supply curves.

a. Consider the market for coffee mugs that is initially in equilibrium. Suppose that the price of coffee decreases. Analyze the impact of this change on the equilibrium price and quantity of coffee mugs. Use a graph to illustrate your answer.

b. Return to the coffee mug market that is initially in equilibrium. Suppose that the price of coffee decreases while at the same time, clay, an input in coffee mugs, has a price increase. Analyze the impact of this change on the equilibrium price and quantity of coffee mugs. Use a graph to illustrate your answer.

c. Consider the market for televisions that is initially in equilibrium. New technology makes it possible to view visual content not only on televisions, but also on smart phones, laptops, and a variety of other types of smart devices. Given these developments what do you predict is going to happen to the equilibrium price and quantity of televisions? Use a graph to illustrate your answer.

d. Consider the market for traditional cars: that is, gasoline-powered cars. Younger Americans are choosing to live in more urban locations; take advantage of car services like Uber, Lyfe, and Zipcar; and even, in some cases, choosing to not get a driver's license (and maybe not even bother to learn to drive). At the same time, Google and Uber are pioneering new technology that will replace gasoline-powered and human-driven cars with driverless, electric cars. Given these changes, what do you predict will happen to the equilibrium price and equilibrium quantity of gasoline-powered cars over the next two decades (think about this in a longer time frame than just what is happening in this twenty-four hour period of time)? Use a graph to illustrate your answer.

e. Consider the market for ice cream that is initially in equilibrium. Suppose that people's income increase and that you know that the income elasticity of demand for ice cream is .5. From this information, analyze what happens to the equilibrium price and equilibrium quantity of ice cream. Illustrate your answer with a graph.

2. Answer each of the following questions by drawing a graph that represents the initial situation and the new situation. Label these graphs completely and carefully. Provide a verbal explanation as well.

a. Consider the market for soda pop in New York City. The mayor in NYC has engaged in a campaign to try to discourage people from drinking soda pop due to health concerns about the dangers of obesity and diets high in sugar. At the same time, the price of corn syrup, a major ingredient in soda pop, decreases. Depict the market for soda pop in New York City initially and label the initial equilibrium price, P1; the initial equilibrium quantity, Q1; and the initial supply and demand curves, S1 and D1. Then, illustrate the effect of the described changes on this market: be careful and thorough in your labeling. Finally provide a verbal statement of your prediction about how these changes will impact the equilibrium price and quantity in this market. Explain your answer verbally.

b. Consider the market for college education in the U.S. and assume that this market is initially in equilibrium at P1 and Q1. Suppose that there is an increase in the number of foreign-born students seeking a college education in the U.S. Illustrate this market’s initial equilibrium as well as its new equilibrium (Q2, P2) in a well labeled graph. Make sure you indicate the direction of any shift that occurs in this market. Explain your answer verbally.

c. Consider the market for leather boots and assume that this market is initially in equilibrium at P1 and Q1. Suppose that there is a decrease in income and that leather boots are a normal good. Illustrate this market’s initial equilibrium as well as its new equilibrium (Q2, P2) in a well labeled graph. Make sure you indicate the direction of any shift that occurs in this market. Explain your answer verbally.

d. Consider the market for smartphones and assume that this market is initially in equilibrium at P1 and Q1. Suppose that there is a decrease in the price of labor used to manufacture the smartphones and, at the same time, there is an increase in the tastes and preferences for smartphones. Illustrate this market’s initial equilibrium as well as its new equilibrium (Q2, P2) in a well labeled graph. Make sure you indicate the direction of any shift that occurs in this market. Explain your answer verbally.

e. Consider the market for noodles and assume that this market is initially in equilibrium at P1 and Q1. Suppose that there is an increase in income and that noodles are an inferior good. At the same time there is a decrease in the number of noodle making firms. Illustrate this market’s initial equilibrium as well as its new equilibrium (Q2, P2) in a well labeled graph. Make sure you indicate the direction of any shift that occurs in this market. Explain your answer verbally.

f. Consider the market for candy and assume that this market is initially in equilibrium at P1 and Q1. Suppose that there is a decrease in the price of sugar which is a major input in the production of candy. At the same time, there is a decrease in the number of firms producing candy. Illustrate this market’s initial equilibrium as well as its new equilibrium (Q2, P2) in a well labeled graph. Make sure you indicate the direction of any shift that occurs in this market. Explain your answer verbally.

3. (Do not use a calculator on this problem: you are working to grow stronger computational kills and to do that I need you to stop turning to your calculator so quickly! Also, work this with the fractions (no decimals) but think about how you can "get rid of" the fractions. This is another aspect that I am working on with respect to growing your numerical literacy.) Suppose there are two firms in a market, Good Enterprises and Products Unlimited. You are told the following information about this market. Good Enterprises supplies 200 units of the product sold in this market when the price is $10 per unit. When the price in this market increases to $20, the quantity of the product supplied by Good Enterprises increases by 100 units. Good Enterprises supply curve is linear. Products Unlimited supplies 150 units of the product sold in this market when the price is $15 per unit. When the price increases to $30, the quantity of the product supplied by Products Unlimited increases to 300 units. Products Unlimited's supply curve is also linear.

a. From the above information write the equation for the supply curve for Good Enterprises.

b. From the above information write the equation for the supply curve for Products Unlimited.

c. Assuming that these two firms are the only producers of this product, draw a graph that illustrates the market supply curve for this product. Then, provide an algebraic expression for the market supply curve. If you need more than one equation please be sure to note what the relevant range of prices is for each equation.

Now, suppose that Products Unlimited discovers a new technology (that they patent and therefore do not share with any of their competitors) that allows them to double their output at every price level. [Hint: you might find it helpful to draw a graph of Products Unlimited's initial supply curve and then from this graph draw their new supply curve.]

d. Given this new information write the equation for Products Unlimited's new supply curve.

e. Given this new information, provide an algebraic expression for the market supply curve. If you need more than one equation please be sure to note what the relevant range of prices is for each equation.

4. Consider the market for paintbrushes. The market demand and supply curves are given by the following equations where Q is the quantity of paintbrushes and P is the price per paintbrush:

Demand: Q = 50 – (1/2)P

Supply: Q = (1/8)P –(20/8)

a. Given the above information, find the equilibrium quantity of paintbrushes and the equilibrium price for a paintbrush. Show your work.

b. Given the above information, find the value of consumer surplus (CS), producer surplus (PS), and total surplus (TS). Show your work.

c. Draw a well labeled graph of the market for paintbrushes. In your graph indicate the equilibrium price and the equilibrium quantity. Also, identify the area that corresponds to CS and the area that corresponds to PS.

d. Suppose that the market demand curve changes to the following:

New Market Demand: P = 100 -8Q

Given this new market demand curve and holding everything else constant, fill in the following table with your prediction of what will happen to each of the items listed in the table.

|  |  |
| --- | --- |
| Item | Prediction of direction of change relative to initial values that were calculated (predictions should be no change, increase or decrease) |
| New equilibrium price, Pe’ |  |
| New equilibrium quantity, Qe’ |  |
| New CS’ |  |
| New PS’ |  |
| New TS’ |  |

e. Calculate the values of Pe’, Qe’, CS’, PS’, and TS’. Show your work.

**S&D: Price Floors**

5. Suppose the market for peanuts is described by the following market demand and supply curves where P is the price per unit of peanuts and Q is the quantity of units of peanuts:

Demand: P = 100 – 2Q

Supply: P = 20 + 8Q

a. Suppose a price floor of $70 is implemented in the peanut market. Describe the impact of this price floor on this market.

b. Suppose a price floor of $92 is implemented in the peanut market. Describe the impact of this price floor on this market. Which side of the market is the “short” side of the market?

c. Given the price floor described in (b), calculate the value of consumer surplus (CS), producer surplus (PS), total surplus (TS), and deadweight loss (DWL). Show your work. Include a graph depicting this market, the price floor and the various areas mentioned.

**S&D: Price Ceilings**

6. You are the new manager at Starbucks. Suppose that the demand and supply curves for coffee is given by the following two equations where P is the price per cup in Mexican Pesos (13 pesos is a dollar) and Q is the quantity of cups:

Market Demand: P = 60 – Q

Market Supply: P = 40 +Q

1. Given this information, what is the equilibrium price and the equilibrium quantity?
2. Given this information, what is the value of consumer surplus (CS) in this market? What is the value of producer surplus (PS) in this market? Illustrate your answer with a graph that is well labeled and complete.
3. Suppose that the mayor in Mexico City decides that the current price of Starbucks is too high. The government sets a price ceiling, the price of Starbucks’ coffee now is set at 44 pesos per cup. Given this price ceiling, how many cups will be demanded? Given this price ceiling, how many cups will be supplied? Who represents the short side of the market?
4. What is the value of consumer surplus (CS’) with the price ceiling described (c)? What is the value of producer surplus (PS’) with this price ceiling? Provide a well labeled graph to illustrate your answer.

e. What is the value of the deadweight loss due to the implementation of this program? The deadweight loss will be equal to the total loss in (consumer surplus and producer surplus) due to the implementation of this program. Provide a graph to illustrate the deadweight loss (DWL) due to the program.

**Quantity Controls**

7. Consider the market for new automobiles that can be described by the following equations where P is the price per car and Q is the number of new cars:

Market Demand: P = 500 – 2Q

Market Supply: P = 100 + 3Q

Suppose the government determines that too many cars are being purchased and they decide to limit new car consumption to 40 cars. Answer the following questions using this information and holding everything else constant.

a. Suppose the government decides to limit the purchase of new cars by imposing an excise tax on each new car purchased. Determine how large an excise tax the government will need to impose for the government to reach their goal of decreasing consumption of new cars to 40 cars. Explain how you found your answer.

b. Suppose that the government simply decrees that no more than 40 new cars can be sold (there is no excise tax). What is the value of the deadweight loss that occurs because of the imposition of this policy. Explain your answer.

**S&D: Agricultural Market Interventions**

8. Consider a market for an agricultural product that can be described by the following two equations where P is the price per unit of the good and Q is the number of units of the good:

Market Demand: P = 500 – 5Q

Market Supply: P = 20 + 3Q

Suppose that the government decides to implement a price support program in this market where the government will set a price floor and then purchase any surplus that is produced at this price floor. The government sets the price floor at $215 per unit.

a. Given the program described, how many units of the good will farmers produce?

b. Given the program described, how many will consumers spend on the good?

c. Given the program described, how much did farmer revenue increase by relative to when this market had no price floor program?

Instead of the government price support program, the government decides to implement a price guarantee program. With the program the government guarantees that farmers will receive a price of $215 per unit. Farmers are told to produce the good with this price guarantee and then go out and sell the good at whatever price they must in order to sell all that they have produced. The government will then make up the difference between the guaranteed price and the price consumers paid.

d. Given this price guarantee program, what is the subsidy per unit?

**S&D: Excise Taxes**

9. Consider a market that can be described by the following demand and supply curves where P is the price per unit and Q is the number of units of the good:

Market Demand: Q = 100 – (1/5)P

Market Supply: Q = (1/3)P – (20/3)

Suppose that the government implements an excise tax of $80 per unit on producers.

Given this information find the new equilibrium with the tax (Qet), the new equilibrium price with the tax (pet), the net price that firms receive once the tax is implemented (Pnet), the value of consumer tax incidence (CTI), the value of producer tax incidence (PTI), the amount of tax revenue the government gets with the implementation of the excise tax (Tax revenue), and the value of the deadweight loss with the imposition of this tax. Show how you found your answers for full credit on this problem.

10. Consider a market that can be described by the following demand and supply curves where P is the price per unit and Q is the number of units of the good:

Market Demand: Q = 100 – (1/5)P

Market Supply: Q = (1/3)P – (20/3)

a. Suppose the government determines that the optimal amount of the good to be consumed in this market is 40 units. How large an excise tax will the government need to put on producers to reach this goal? Explain how you found your answer.

b. Suppose that the government implements an excise tax in this market and it results in tax revenue equal to $4000. What was the excise tax per unit given this information and holding everything else constant? Show your work.

**Market Demand and Market Supply:**

11. Suppose in a market there are three types of consumers: Consumer Group A, Consumer Group B, and Consumer Group C. The demand curves for each of these groups is given below where P is the price of the good and Q is the quantity of the good demanded.

Consumer Group A: Qa=30-P

Consumer Group B: Qb=20-0.5P

Consume Group C: Qc=40-2P

1. Draw the three individual demand curves in separate graphs measuring the quantity (Q) of the good on the horizontal axis and the price (P) on the vertical axis.
2. In a new graph find the market demand curve for this Good assuming that the only demanders of this product are these three consumer groups.. After you draw the graph find the slope of each linear segment of the demand curve, the coordinates of each “kink point”, and the equation for each linear segment of the market demand curve. Make sure you identify the range of prices for each linear segment of the market demand curve.

12. Suppose we are still working with the market described in problem 11. On the supply side in this market suppose there are two producers of the product, Firm I and Firm II. These firms’ supply curves are given below where Q1 is the quantity of supplied by Firm I, Q2 is the quantity of supplied by Firm II, and P is the price per unit of the good:

Firm I: Q1 = P - 15

Firm II: Q2 = 0.5P - 5

1. Draw each firm’s supply curves in separate graphs and then construct the market supply curve in a new graph assuming that Firm I and FirmII are the only firms that are authorized to produce this good. Measure P on the vertical axis and Q on the horizontal axis for each graph. In the market supply curve identify the coordinates (Q, P) for any “kink points”.
2. Based on the market demand curve in question 8, what is the equilibrium price and quantity in this market? Explain how you found your answer and how you decided which segments of the demand curve and the supply curve were the relevant segments to consider.
3. Suppose both firms are able to use new technology that reduces the cost of producing this good. Given this information and holding everything else constant, make a prediction about how this new technology will affect the equilibrium price and quantity in this market.

**S&D: International Trade: Tariffs and Quotas**

11. Suppose that a small, closed economy manufactures pencils. There are five domestic manufacturers of these pencils and they have identical supply curves. Suppose the supply curve for a single manufacturer of these pencils is given by the equation P = Q + 20. Additionally you know that the domestic demand for pencils in this small, closed economy is given by the equation P = 50 – (1/10)Q.

a. What is the domestic supply curve for pencils in this economy?

b. Given the domestic supply curve and the domestic demand curve, what is the equilibrium price and quantity of pencils in this economy if the economy is closed?

c. Calculate the value of consumer surplus, producer surplus, and total surplus if the domestic economy is a closed economy with regard to the pencil market.

d. Suppose that this economy decides to open this market to trade. Analyze what happens in this market if the world price of pencils is $45 per pencil. In your answer identify the level of imports or exports, the new level of consumer surplus, the new level of producer surplus, the new level of total surplus, and identify the distributional consequences of opening this market to trade.

e. Suppose that this economy decides to open this market to trade. Analyze what happens in this market if the world price of pencils is $30 per pencil. In your answer identify the level of imports or exports, the new level of consumer surplus, the new level of producer surplus, the new level of total surplus, and identify the distributional consequences of opening this market to trade.

f. Suppose that this market for pencils is opened to world trade and the world price is $30 per pencil. Furthermore, suppose that the government of this economy decides to implement a tariff so that the price of pencils in the small open economy is equal to $35 per pencil. Analyze the effect of this tariff on imports or exports, consumer surplus, producer surplus, total surplus, government tariff revenue and deadweight loss relative to the results you got when the market was open to trade and there was no tariff.