

Problem Set #2
PAI 897
Professor David Popp
Fall 2021

Solutions Available Wednesday, September 29

1. Muse, the local art museum, is considering raising its admission fee by 10 percent. Muse last raised their fee three years ago. You have been asked to project whether the new admission fee increase will lead to an increase or decrease in revenues. For the analysis, you have been given data pertaining to the previous fee increase:

	before increase	after increase
visitors per day:	2,000	1,400
average price paid:	\$8.00	\$10.00

- a) Based on the figures provided, calculate the price elasticity of demand for visits to Muse.
- b) Based on your calculation above, would you expect revenues to increase or decrease if tolls increase by another 10 percent? Why?
2. Due to concerns about the health of young children, the state of Minnesota proposes a subsidy for vitamins. You are given the following information:
- Production of vitamins is very competitive and the price is set in a global market. Thus, the price of vitamins in Minnesota can be considered perfectly elastic. Currently, a bottle of vitamins sells for \$5 in the state.
 - 400,000 bottles of vitamins are sold in Minnesota each year.
 - The price elasticity of demand for vitamins is -0.15.
 - The subsidy would lower the price of vitamins to \$3 per bottle.
- a) How many more bottles of vitamins would be sold in Minnesota if the proposed subsidy was approved?
- b) Illustrate on a graph. Calculate the change in consumer surplus that would result from this policy
- c) How well does the proposal meet the state's goal of increasing vitamin consumption among children? Would you recommend approval of the subsidy? Please be sure to explain both why the policy does or does not meet the state's goal *and* your recommendation.

3. Suppose that after graduation you take a position in the Department of Health, Education, and Welfare. You are asked to show what will happen in the market for college education after the enactment of a new \$1,000 tax credit for college tuition. You are given the following information:

- 15.3 million students are enrolled in college, either at private or public institutions. (This does not include enrollments in graduate programs).
- The average tuition paid by these students is \$5,192 per year.
- Assume that, overall, colleges are operating near capacity, so the possibility of expanding enrollments is minimal.

Use a supply and demand diagram to show the initial equilibrium **and** the effect of the tax credit. Who is the major beneficiary of the tax credit – students or colleges? Explain intuitively why this is the case. How would your answer change if we did not assume that colleges are operating near capacity?

4. The government is considering taxing one of two goods: milk or caviar. Milk, being a necessity, has a relatively inelastic demand curve. Caviar, being a luxury, has a very elastic demand curve. The same size tax is being considered for each good. The government wants to choose the good to tax based on which tax will bring in the most revenue. You are hired to tell them which good will best meet this goal.

- a) Draw two supply and demand diagrams, one for milk and one for caviar (for simplicity, assume that the supply curve looks similar for each). Use the graphs to illustrate the revenue raised by a tax on each good. Which tax brings in more revenue? Can you explain the intuition behind this result?
- b) Can you tell which tax produces the least deadweight loss? What is the intuition behind this result?
- c) Given your results, does maximizing revenue seem like a good goal for the government to use when setting taxes? Why or why not?

5. Suppose the market for cell phones has a supply curve of $P = 13 + 2Q$, and a demand curve of $P = 85 - 4Q$. Assume that the market is perfectly competitive.

- a) What will the equilibrium price and quantity of cell phones be?
- b) Calculate the producer and consumer surplus associated with the equilibrium found in part (a). Illustrate on a graph.
- c) Now, suppose the government levies a tax of \$6 per cell phone sold, to be levied on consumers. What is the quantity of cell phones sold? What price do consumers pay? What price do producers receive? Illustrate on a graph.
- d) Find the new producer and consumer surplus associated with your answer to part (c).
- e) How much revenue does the government raise from the tax?
- f) How does the sum of consumer surplus, producer surplus, and revenue after the tax (your answers to (d) and (e)) compare to the sum of producer and consumer surplus found before the tax (your answer to (b))? What does the difference between the two represent?