

**Problem Set #2**  
**PAI 723**  
**Professor David Popp**  
**Fall 2022**

**Solutions Available Wednesday, September 28**

1. Prince Edward Island is considering raising the fare for the ferry connecting the island to the mainland of Canada by 20%. You have been asked to project whether the fare increase will lead to an increase or decrease in revenues. You have been given the following data pertaining to the last time that fares were increased:

	<b>before increase</b>	<b>after increase</b>
riders per day:	3,000	2,650
fare:	\$10	\$12.50

- a) Based on the figures provided, calculate the price elasticity of demand for trips on Prince Edward Island's ferry.
- b) Based on your calculation above, would you expect revenues to increase or decrease if the fare rose by another 20 percent? Why?
2. Concerned about the high cost of housing in their city, officials in Busytown solicited ideas to help residents afford new homes. Note that Busytown is a densely populated urban city. It is surrounded by a lake on one side, and mountains on the other, so there is little room to expand. The following suggestions were received:
- Councilman Humperdink notes that the lack of space is a problem. He proposes easing zoning restrictions, so that lots can be subdivided to allow more housing units on existing lots.
  - Sergeant Murphy argues that Humperdink's plan will benefit developers, rather than homebuyers. He suggests providing a \$10,000 housing subsidy to all Busytown residents, arguing that this extra cash will help them cope with the high cost of housing.

You have been asked by city leaders to evaluate these two proposals.

- a) Using a supply and demand diagram, illustrate the effect of Councilman Humperdink's plan to ease zoning restrictions. Be sure to show both the initial equilibrium and what changes occur after the law is changed. Briefly explain why you have drawn the curves as you did.
- b) Using a second supply and demand diagram, illustrate the effect of Sergeant Murphy's proposed subsidy. Again, be sure to show both the initial equilibrium and what changes occur after the law is changed. Briefly explain why you have drawn the curves as you did.
- c) Based on your analysis, which policy would you recommend? Why?

3. 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.
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?