Economics 701

Problem Set 10

1. Consider a perfectly competitive constant cost industry. Each firm has an identical cost structure such that long–run average cost is minimized at an output of 20 units, with an associated minimum average cost of $10. Total market demand is given by: $Q = 1{,}500 - 50P$.
a) What is the function describing the industry's long–run supply curve? Explain.
b) What is: i) the long–run equilibrium price, ii) industry output, iii) firm output iv) number of firms and v) firm profit?
c) The short-run cost curve for each firm is given by: $C(Q) = 0.5q^2 - 10q + 200$. Calculate the short-run average and marginal cost curves. At what output does short-run average cost reach a minimum?
d) Calculate the short-run supply curve for each firm and the industry short-run supply curve.
e) Suppose now that the market demand shifts upward to $Q = 2000 - 50P$. Calculate the following *short- run* values: i) the equilibrium price, ii) industry output, iii) firm output iv) number of firms and v) firm profit.
f) Continuing with part e), now calculate the new long-run values asked for in part b).

2. Consider the market for vacations in Bermuda.
a) Using demand and supply curves, sketch the market for Bermuda vacations and depict the equilibrium price and quantity with P^* and Q^*, respectively.
b) Suppose the price of vacations in Florida (a substitute for vacations in Bermuda) increases. What will happen to the demand curve for vacations in Bermuda? On your graph from part a), draw a new demand curve and indicate the new equilibrium price and quantity with P^{**} and Q^{**}, respectively.

Next, you will perform some comparative statics for the move from (P^*, Q^*) to (P^{**}, Q^{**}) using the following formula given in the textbook (and in class):

$$e_{P,\alpha} = \frac{e_{Q,,\alpha}}{e_{S,P} - e_{Q,P,}}$$

where the terms (all pertaining to the demand and supply of Bermuda vacations) are defined in the text. Let α be the price of Florida vacations, which is a Bermuda vacation demand shifter.

c) Let the elasticity of demand for Bermuda vacations with respect to the price of Florida vacations be 0.5. Suppose the price of Florida vacations goes up by 10 percent while the price of Bermuda vacations remains unchanged. By what percent will the quantity demanded of Bermuda vacations change?
d) On your graph from parts a and b, indicate with Q' the new quantity demanded, assuming the price of Bermuda vacations does not change (i.e., remains at P^*).

e) Obviously, the price will not remain at P^*. So we need to find out by how much the equilibrium price will change and how that change affects quantity demanded as well. Suppose the supply elasticity of Bermuda vacations is 1 and the elasticity of demand for Bermuda vacations is -1. By what percent will the price of Bermuda vacations change if the price of Florida vacations increases by: i) 5 percent and ii) 10 percent?
f) Suppose $P^* = \$1{,}000$. If the price of Florida vacations goes up by 10 percent, what will the value of P^{**} be?
g) Still assuming a 10 percent increase in the price of Florida vacations, compute the percentage change in the equilibrium quantity of Bermuda vacations. Hint: starting from the original equilibrum, the higher price of Bermuda vacations you found in parts e and f induce a movement along the supply curve and you can use an appropriate elasticity to answer this question.
h) Continuing with question g, If $Q^* = \$10{,}000$, what is Q^{**}?
i) On your graph, or a new one, show the numerical values for P^*, Q^*, Q' P^{**}, and Q^{**}.