

Microeconomics for Management - Yossi Spiegel

Problem set 9

Remark: Problem 1 and part (a) of Problem 2 are straightforward applications of what we did in class. Parts (b) and (c) of Problem 2 require you to think about taxation - again this is an easy application of what we did. Problem 3 requires you to be a bit more creative but if you followed our discussion in class about firm behavior in perfectly competitive markets then you should have no special problems answering this question.

Problem 1

Consider a perfectly competitive industry with identical firms, each of which has a cost function $C(q) = F + q^2$, where $F > 0$ is avoidable fixed cost. The demand function in this industry is $Q = A/p$, where $A > 0$.

- (a) Compute the long-run competitive equilibrium in this industry.
- (b) How do changes in A and F affect the equilibrium? Explain the intuition for your answer.

Problem 2

Consider an industry with n identical firms, each of which has a cost function $C(q) = 8 + q^2/2$. Assume that the demand function is $Q = A - P$, where $A > 0$.

- (a) Compute the long-run competitive equilibrium (quantity of each firm, price, and number of firms).
- (b) Now suppose that the government imposes a tax t on the revenue of each firm (the net revenue of firm i then is $(1-t)Pq_i$). Compute the new long-run competitive equilibrium. What is the impact of the tax on the number of firms, input per firm, and equilibrium price? Explain the intuition for your result.
- (c) How will your answers to (b) change if the government were to impose a tax t on the profit of each firm instead on its revenue?

Problem 3

A farmer gets the right to use a corn field. The price of corn is p dollars per bushel and if the farmer grows q bushels of corn, his cost is q^2 dollars.

- (a) Suppose that the landowner asks the farmer to pay him a percentage t of the farmer's revenue. Compute how many bushels of corn the farmer will decide to grow and show your answer in a diagram.
- (b) Now suppose that the landowner asks the farmer to pay him a percentage r of the farmer's profit. Compute again how many bushels of corn the farmer will decide to grow and show your answer in a diagram.
- (c) Suppose that r is chosen such that the landowner will make as much money in (b) as he makes in (a). What should be the value of r ? (Note: you'll get an expression that will depend on t). Given this value of r , how much money does the farmer make? Is the farmer better-off or worse-off in (a) than in (b)? Carefully explain the reason for your conclusion and illustrate it in a diagram.
- (d) Now suppose that the landowner asks the farmer to pay him a lump sum equal to the amount that the farmer paid in part (a). Is the farmer better-off or worse-off under this arrangement than he was under the arrangement in (a)? Is the farmer better-off or worse-off under this arrangement than he was under the arrangement in (b)? Carefully explain the reason for your conclusion and illustrate it with a diagram.