Econ 301E Spring, 1998

Assignment due March 19.

1. "The defense contracting business is perfectly competitive. In the long run equilibrium, the price just covers average costs, and every contractor earns zero profit. Thus, if the price goes down, even a little bit, all contractors will go out of business". Comment on this statement.

2. Let the total cost of a representative firm in a perfectly competitive industry be

$$C_i = 0.1q_i^3 - 2q_i^2 + 15q_i + 10$$

a. Find the supply function.
b. What is the shut-down point for this representative firm?
c. Assuming that the industry consists of 100 identical firms, what will be the aggregate supply?

3. Assume that there are two distinct types of firms: high-cost firms and low-cost firms. The total cost functions of representative firms in the two categories are:

$$C_{1i} = 0.04q_{1i}^3 - 0.8q_{1i}^2 + 10q_{1i}$$

$$C_{2i} = 0.04q_{2i}^3 - 0.8q_{2i}^2 + 20q_{2i}$$

a. Solve for the minimum points (p and q) of the respective average cost curves.
b. Derive the supply function for an individual firm in the two categories.
c. Assume that there are fifty firms in each category, derive the aggregate supply function. (Hint: the aggregate supply function is described by three equations).
d. Assume that the market demand is given by

$$D = -100_p + 2050$$

Using the relevant segment of the supply function, solve for the equilibrium price and quantity.
How many units will each low-cost firm produce? How many units will each high-cost produce?
How much profit does each firm make?

4. Now, assume that fifty of the one hundred firms supplying commodity Q are at location 1 and the other fifty are at location II. It costs $6 to transport to the market a unit of Q from I and $10 from II. All firms have the same production cost functions, and the total costs of representative firms are

$$C_1 = 0.5q_1^2 + 6q_1$$

$$C_2 = 0.5q_2^2 + 10q_2$$

where 1 and 2 denote firms at locations I and II, respectively.

a. Derive the supply functions for representative firms at each location.
b. What is the aggregate supply function for the central market?
c. Assume that the market demand function is

$$D = -20p + 1{,}600$$

What is the equilibrium price and quantity? How many units does a producer at I supply? How about a producer at II? How much profit does each make?

5. Again, assume that the industry consists of 100 firms with identical cost functions

$$C_i = 0.1q_i^2 + q_i + 10$$

a. What is the supply function for a representative firm?
b. What is the aggregate supply function?
c. Assume that the market demand function is

$$D = -400p + 4{,}000$$

What is the equilibrium price and quantity?

d. Now, assume that the government imposes a sales tax (an excise tax) of $\$t$ per unit of output. Repeat parts a - c above.