INTERMEDIATE MICROECONOMICS

ECO 3101 Spring 2023

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Assignment 5

Due: April 18

1.- There are 10 consumers in the market for Corn, 5 of them have income \$20 and 5 have income \$40. Each of them has preferences over corn (C) and Barley (B), the only two goods they consume, represented by the utility function $U(C,B) = C \times B$. (The price of Barley, is \$1.)

There are 10 firms that produce Corn using labor L and land K, with the production function $C = L^{\frac{1}{2}}K^{\frac{1}{2}}$. Each firm has a lease on a plot of land of size 10 (acres). The --rental-- price for K is r = 0.5 and the wage rate is w = 3. In the short run (this problem refers to the short run), K is then fixed for each firm. Obtain the (individual and then market) demand and the supply functions of C, and then compute the equilibrium price and quantity in this market.

2.- The tables (below) show the willingness to pay by three (competitive) consumers for additional units of some good, and the marginal costs of three (competitive) firms that produce that good.

UNITS	FIRM 1	FIRM 2	FIRM 3
1	\$3	\$1	\$2
2	\$4	\$3	\$4
3	\$5	\$4	\$6
4	\$6	\$7	\$8
5	\$8	\$9	\$9
6	\$9	\$10	\$10
7	\$10	\$11	\$12

UNITS	MR A	MS B	MS C
1	\$15	\$11	\$18
2	\$12	\$9	\$13
3	\$10	\$8	\$11
4	\$9	\$7	\$9
5	\$8	\$5	\$8
6	\$5	\$3	\$5
7	\$4	\$2	\$4

a) Compute the competitive equilibrium quantity and price for this market. Also, compute each consumer's surplus and each firm's profits.

b) Now suppose that you have access to the same technology (and competitive input markets) as that of Firm 3. Entering the market (that is, launching a fourth firm) means a fixed (yes, sunk too) cost of \$10. Would you decide to enter? (Entry has effects on the market, of course.)

3.- You are going to obtain the supply function of one firm, which as you know has a lot to do with the marginal cost function for that firm. Thus, suppose that the firm has access to a technology represented by the production function $f(K,L) = L^{\frac{1}{2}}(K-10)^{\frac{1}{2}}$ (you may notice that you need at least 10 units of input K to even begin producing). We are in the long run, so all inputs are variable. The price on input K is $40 and the price of input L is $5 per unit.

a) Obtain the cost function of this firm.

b) Obtain the average and the marginal cost of this firm, and so obtain the supply function, when it is competitive. At what price will the firm shut down (in the long run)?

4.-With the same data as in problem 2, suppose that all three firms merge. That is, now a single corporation controls (and decides on output for) all three firms (now, plants of one single firm). Obtain the output (or, equivalently, the price) that this monopolistic corporation will choose, and evaluate the consequences for the consumers (that is, the effect on the consumer surplus) and for the profits of the industry.

5.- A monopolistic firm faces a demand for its product given by $P(Q) = 10 - 2Q$ and a cost function $C(Q) = 2Q + Q^2$.

a) Compute the optimal (for the monopolist) output and price. Also, compute the profits and the consumer surplus resulting from this monopolistic market.

b) Now suppose that the monopolist has a cost function $C(Q) = 6$. That is, only fixed costs. This monopolist is a local NFL franchise, and those fixed costs are simply the cost of paying the team and the maintenance of a stadium with capacity for 5 (thousand) spectators (Q measures the number of tickets sold, in thousands). Solve this new problem. Does it make sense to leave part of the stadium empt3.-With the same data as in problem 2, suppose that all three firms merge. That is, now a single corporation controls (and decides on output for) all three firms (now, plants of one single firm). Obtain the output (or, equivalently, the price) that this monopolistic corporation will choose, and evaluate the consequences for the consumers (that is, the effect on the consumer surplus) and for the profits of the industry.