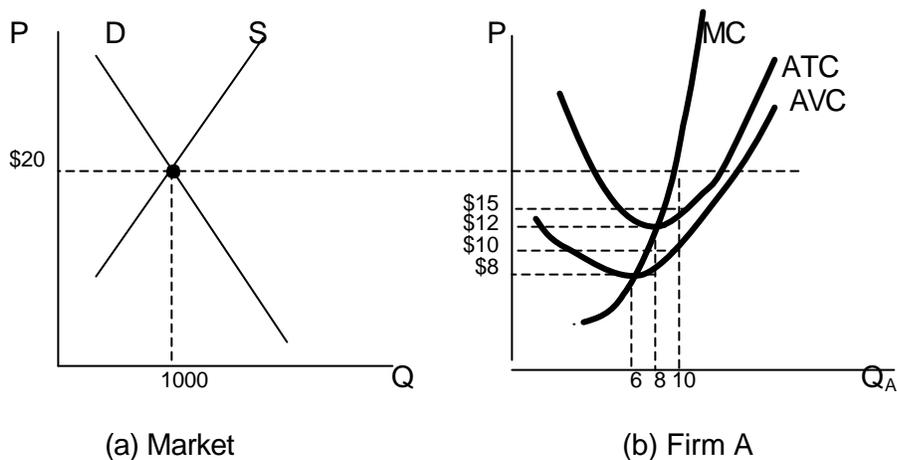


Economics 101  
 Fall 2000  
 Practice Questions #4

Goal:

- Learn how competitive firms decide what is the profit-maximizing output level and how much is the economic profit.
- Examine how competitive firms decide when to shut down the business or when to enter the market.
- Inspect how the competitive market and individual firms in a competitive market operate in the short run and in the long run.

1.



In the above figure, panel (a) shows the equilibrium in a competitive market and panel (b) shows the cost structure of a representative competitive firm A.

Answer the following questions.

- What is the profit-maximizing output level for firm A?
- At the output level you got in a., calculate the following numbers:  
 Total revenue (TR) = \_\_\_\_\_, Total cost (TC) = \_\_\_\_\_, TVC = \_\_\_\_\_,  
 TFC = \_\_\_\_\_, AVC = \_\_\_\_\_, AFC = \_\_\_\_\_, total economic profit = \_\_\_\_\_.
- What is the shutdown price? \_\_\_\_\_ What is the break-even price? \_\_\_\_\_
- In the short run, will firm A stay in this market? Show what happens to panel (a) and (b) when other firms enter into the market. What happens to the total economic profit of

firm A and the total number of firms in this market in the long run? Mark the long-run market supply curve.

2. In a perfectly competitive market, the demand and supply function are as follows:

$$\text{Supply: } P = 0.03Q$$

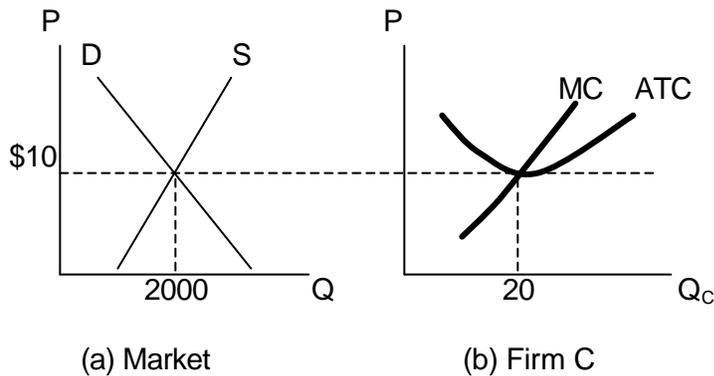
$$\text{Demand: } P = 50 - 0.02Q$$

Look at a representative competitive firm B. The total cost (TC) when firm B produces  $Q_B$  is  $TC = 5Q_B^2 + 3$  and thus the marginal cost (MC) is  $MC = 10Q_B$  (Check it if you've learned Calculus).

Answer the following questions.

- What is the demand function facing firm B?
- Use the MR and MC approach to determine the profit-maximizing output level for firm B.
- What is the average total cost (ATC) function? What is the average variable cost (AVC) function? How much is the fixed cost?
- Compute the profit (or loss) per unit and the total economic profit at the profit-maximizing output level.
- Should firm B shut down the business in the short run? What is the shut down price?

3. Suppose the market for coffee is perfectly competitive and is presently in long-run equilibrium, as shown in the following figure.



Firm C is a typical firm in this market and we assume that presently all firms in this market are identical (i.e. they have the same cost function). Assume this is a constant-cost industry.

Analyze the impact, *both in the short run and in the long run*, on the market equilibrium as well as firm C's profit-maximizing output level and total economic profit, due to the following respective changes.

- a. Demand for coffee increases due to the growth of income.
  - b. A new technology which can reduce average total cost by \$1 per pound is developed by firm C.
  - c. An (permanent) excise tax of \$1 per pound is imposed on every producer of coffee.
  - d. A (permanent) price ceiling of \$9 per pound is established in this market.
  - e. Demand for coffee decreases because more tea products are introduced.
4. Suppose there are two types of competitive firms in an industry. Both provide standardized products, but firms of type D have shared a technology to save costs and this technology is protected in a way that it is not available for firms of type E in the short run. We assume there are many firms of either type inside and outside the market. The following table is the information of their cost structures.

Type D					Type E				
Q <sub>D</sub>	TC	ATC	AVC	MC	Q <sub>E</sub>	TC	ATC	AVC	MC
0	6	-	-	-	0	12	-	-	-
1	12				1	30			
2	22				2	46			
3	36				3	60			
4	56				4	84			
5	80				5	110			
6	114				6	144			

- a. Finish all the blanks in table. Sketch the ATC, AVC, and MC curves of type D and type E separately.
- b. In the short run, when the market price is \$24, firms of which type will stay in the market? Compute the profit-maximizing output level and total economic profit of those firms staying in the market.
- c. In the short run, when the market price is \$14, firms of which type will stay in the market? Compute the profit-maximizing output level and total economic profit of those firms staying in the market.
- d. In the short run, when the market price is \$10, firms of which type will stay in the market? Compute the profit-maximizing output level and total economic profit of those firms staying in the market.
- e. Approximately, what will be the long-run equilibrium price?