

Microeconomics, Module 13, "Market Power"

*Homework*

(The attached PDF file has better formatting.)

This homework assignment compares a competitive market with a monopolistic market. The market demand curve is  $P = 122 - \frac{1}{4}Q$ . For each firm, marginal costs are  $20 + q/50$  and fixed costs are 100. We assume first that the market is competitive.

Module 8 explains the competitive pricing procedure. We derive the long-run price from the firms' cost curve: competitive firms price at long-run minimum average costs.

*Question:* Why is this relation true?

*Answer:* Decreasing marginal utility implies an upward sloping marginal cost curve in the short run; the absence of barriers to entry implies that new entrants take market share away from any firm that prices above the minimum.

- A. What is the total cost curve for each firm? (Integrate the marginal cost curve to get the total variable cost curve. Variable costs are zero at an output of zero, so the constant of integration is zero. Add the fixed costs to get total costs.)
- B. What is the average cost curve for each firm? (Divide by quantity.)
- C. What quantity minimizes the average cost? (Set the partial derivative with respect to quantity equal to zero.)
- D. What is the price of the good? (The average total cost at that quantity, which equals the marginal cost at that quantity.)
- E. What is the industry quantity at this price? (Use the market demand curve.)
- F. How many firms compete in this industry? (Divide the industry quantity by each firm's quantity.)

Suppose the firms merge into a profit-maximizing monopoly with a marginal cost of  $20 + q/200$ . The marginal costs are the same as before, with a slight adjustment for discrete numbers. If four firms produced one unit each before the merger, the marginal cost for each unit was  $20 + 1/50$ . Now one firm produces four units, and the marginal cost is  $20 + 4/200 = 20 + 1/50$ . The merger creates no synergies or cost reductions; the only effect is market power.

- G. What is the total revenue curve? (Total revenue is  $P \times Q$ . Express total revenue as a function of  $Q$  alone, by writing  $P$  as a function of  $Q$ ; use the demand curve for this.)
- H. What is the marginal revenue curve? (Marginal revenue is the partial derivative of total revenue with respect to quantity.)
- I. What is the monopoly quantity? (Equate marginal revenue and marginal cost.)
- J. What is the monopoly price? (Use the demand curve, not the marginal cost curve or the marginal revenue curve. The monopolist asks how much consumers will pay for this output, not how much the output costs to produce.)
- K. How might one decide if the monopolization is socially beneficial? (Did quantity increase or decrease?)