

Problem Set 1

1. [Cabral, Exercise 5.5] After spending 10 years and \$1.5 billion, you have finally gotten Food and Drug Administration (FDA) approval to sell your new patented wonder drug, which reduces the aches and pains associated with doing IO homework. You will market this drug under the brand name Nopro. Market research indicates that the price elasticity of demand for Nopro is constant along the relevant portion of the demand curve and is -1.25. You estimate the marginal cost of manufacturing and selling one additions does of Nopro is \$1.
 - a. What is the profit-maximizing price per dose?
 - b. Would you expect the elasticity of demand you face for Nopro to rise or fall when your patent expires?
2. Imagine a market with demand given by $Q_D = 20 - 2P$ and supply given by $Q_S = P$.
 - a. Calculate the equilibrium outcome under an assumption that supply is controlled by a pure monopolist. Construct a diagram that illustrates your solution.
 - b. Calculate the equilibrium outcome under an assumption that demand is controlled by a pure monoposonist. Modify your diagram to illustrate this part of your solution.
3. Suppose that the market demand for zonkers is $Q_T = 800 - 3P$, where $Q_T = Q_F + Q_D$ and Q_T is the total quantity, Q_F is the quantity supplied by fringe firms, and Q_D is the quantity supply by the dominant firm. The dominant firm's total costs are given by $TC_D = 80Q_D$ and the competitive fringe's supply curve is given by $Q_F = -200 + 2P$.
 - a. Graph the market demand curve and the fringe firms' supply curve. Label the vertical intercepts of each.
 - b. Find the dominant firm's marginal and average costs. Show these costs on the diagram.
 - c. Find the price at which the fringe firms will supply the entire quantity demanded by the market. Label this price P_1 .
 - d. Find the price at which the fringe firms will choose to drop out of the market (supply no output). Label this price P_2 .
 - e. Find the dominant firm's residual demand curve for prices between P_1 and P_2 . Add this residual demand curve to the diagram.
 - f. Find the dominant firm's profit-maximizing quantity of output.
 - g. Find the price level the dominant firm would set.
 - h. Find the profits of the dominant firm.
4. Assume that the manufacturing of cellular phones is a perfectly competitive industry. The market demand for cellular phones is described by a linear demand function $Q_D = (6,000 - 50P)/9$. There are fifty manufacturers of cellular phones. Each manufacturer has the same production costs, which are described by the long-run total cost function $TC(q) = 100 + q^2 + 10q$. Note that $Q = \sum_{i=1}^{50} q_i$.
 - a. Write out the inverse demand function.
 - b. Write out the representative firm's marginal cost function.

- c. Show that a firm in this industry maximizes profit by producing $q = (P - 10)/2$.
 - d. Write out the industry supply curve.
 - e. Find the market price and aggregate quantity at equilibrium.
 - f. How much output does each firm produce at market equilibrium? Show that this is a normal profit equilibrium.
5. Suppose a competitive market consists of identical firms with a constant long-run marginal cost of \$10. (Assume that fixed costs are zero.) Suppose the demand curve at any price, P , is given by $Q = 1,000 - P$.
- a. Calculate P and Q at the long-run competitive equilibrium.
 - b. Suppose one new firm enters that is different from the existing firms. The new firm has constant marginal cost of \$9 and no fixed costs, but can only produce 10 units of output (or fewer). What are the price and quantity consumed in the long-run competitive equilibrium? Are these the same as in part (a)? Explain.
 - c. Are positive economic profits inconsistent with a long-run competitive equilibrium?
 - d. Identify the marginal cost of the last unit sold in (b). Is it \$10 or \$9? That is, if demand fell by 1 unit, would the new entrant or the other firms reduce output?
 - e. How much profit do the less efficient firms in (b) earn?
 - f. In the long-run competitive equilibrium, must the profit of the marginal entrant (the next firm to enter the market if demand expands or, alternatively, the next firm to leave the market if demand contracts) be zero?
6. Suppose that the market shares for prescription antidepressants are as follows:

Brand	Market Shares
Prozac	40%
Paxil	25%
Zoloft	25%
Others	10%

- a. Calculate the approximate Herfindahl-Hirschman Index (HHI) for the U.S. prescription antidepressant market based upon these market share numbers.
 - b. Calculate the approximate Herfindahl-Hirschman Index (HHI) for the U.S. prescription antidepressant market under the assumption that the makers of Prozac and Zoloft merge.
 - c. Be prepared to argue the following:
 - “The proposed merger of the makers of Prozac and Zoloft is dangerously anti-competitive, and poses a serious threat to consumer welfare in the market for prescription antidepressants.”
 - “The proposed merger of the makers of Prozac and Zoloft will not significantly alter the competitive conditions in the market for prescription antidepressants, and poses no real threat to consumer welfare.”
7. [Cabral, Exercise 9.3] Based on monthly data for Portuguese commercial banks, the following relation was estimated:

$$r_t = 0.098 + 0.814m_t$$

where r_t is the interest rate charged by commercial banks and m_t is the money market rate, that is, the interest rate that banks must pay to borrow in the short term. The standard deviation of the second coefficient estimate is 0.078. Knowing that the money market interest rate is highly correlated with the marginal cost of giving out loans, and knowing that H is approximately 0.125, what can you say about market power in this sector?

8. Suppose that a monopoly manufacturer sells his or her product through a downstream distribution channel that is also characterized by monopoly power. If downstream market demand is $P = 400 - 2Q$, and the manufacturer has constant marginal costs of 40, show that vertical integration of manufacturing and distribution would be an efficiency-improving change. Specifically, address the following:
 - a. What quantity will be made available to the market prior to vertical integration?
 - b. What price will be charged to the retailers by the manufacturer prior to vertical integration?
 - c. What will be the ultimate consumer price prior to vertical integration?
 - d. If the manufacturer vertically integrates into its distribution channel, what quantity will be made available to the market and what will be the consumer price?
 - e. In general, what is the term used to describe this phenomenon, and besides vertical integration, what are some possible resolutions to the problem?
9. Cabral, Exercise 11.1
10. Cabral, Exercise 15.6