

***Economics 121***  
**MIDTERM EXAM**

**GENERAL INSTRUCTIONS:** Write your name and your TA's name on the front cover of each of **TWO BLUE BOOKS**. The exam has 3 parts. Put Part I and Question II.1 in one blue book, and Question II.2 and Part III in a second. The exam is worth 100 points. Point assignments are given in the instructions for each part. Check your calculations on scratch paper but be certain to put all of your answers in the bluebooks.

**I. TRUE or FALSE or UNCERTAIN and EXPLAIN:** For each of the following 4 statements, decide whether each is true or false or uncertain, and then explain the reasoning behind your answer in a few sentences; if appropriate, provide a diagram. Each question is worth 7 points for a total of 28 points.

1. The two-product cost function  $C(q_1, q_2) = 100 + q_1 + q_2 + q_1q_2$  exhibits falling ray average cost when two units of  $q_2$  are produced for each unit of  $q_1$ .
2. In an industry composed of two equal-sized firms, if a new firm enters at the same time that the two incumbent firms merge, the change in the HHI will indicate that the industry is more concentrated.
3. An airline may find it profitable to offer an "express service" that allows a passenger paying an additional \$100 per ticket to go through separate security check-in lines even though those lines are no different than existing ones.
4. In the Hotelling model with one store located in the middle of Main Street, a monopolist's price does not change as consumers' transportation cost increases.

**II. MULTI-PART QUESTIONS:** Answer all parts of the following two questions. The point assignment for each subpart is given in [square brackets]. In total there are 46 points.

1. MonoAir is the only U.S. airline providing service from city A to city B and the reverse direction. It does not serve any other route. MonoAir's marginal cost of a passenger between the two cities is 10. Assume that demand for air travel between A and B by domestic travelers is given by the (inverse) demand curve:  $P_d(q_d) = 70 - q_d$ . There are also foreign travelers who originate in cities outside the U.S. who wish to travel between these two cities. Their (inverse) derived demand for A-B service is given by:  $P_f(q_f) = 110 - q_f$ .
  - a) [3] Suppose that MonoAir cannot distinguish domestic and foreign travelers so that it must charge them the same fare on its route. Find an expression for aggregate demand that MonoAir faces for A-B service and graph it.
  - b) [8] Find the profit-maximizing fare charged by MonoAir for A-B service.

Now assume that MonoAir forms a joint venture with ForAir, a foreign airline that uses city A as its “gateway,” i.e., it runs an international flight into and out of city A. As part of their agreement, ForAir provides MonoAir with a list of its passengers arriving into and departing from A.

- c) [7] Find the fare MonoAir will charge the two types of passengers now that it can distinguish between domestic and foreign travelers.
- d) [4] Calculate the Lerner Index, and then use it to find the price elasticity for each of the two groups.
- e) [6] Drawing on your knowledge of actual conditions for the supply of airline services, give two examples of cost efficiencies that MonoAir and ForAir could realize in providing air service to foreign travelers.

+++++ **Start Your Second Blue Book**

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2. Suppose a dominant firm resides in an industry with (inverse) market demand of  $P(Q) = 100 - Q$ . Each of 10 competitive fringe firms has marginal cost of:  $MC(q_f) = 80 + 10q_f$ .
  - a) [3] Show that the supply curve of the competitive fringe is given by:  $S_f(P) = P - 80$ .
  - b) [2] Draw a large diagram with industry demand and competitive fringe supply.
  - c) [4] On a second diagram, draw in the residual demand of the dominant firm and clearly label it.
  - d) [3] Add the dominant firm’s marginal revenue into the second diagram and clearly label it.
  - e) [6] Draw two Marginal Cost Curves in your second diagram that reflect the following conditions:
    - $MC_1$ : The dominant firm chooses the same price and quantity as a monopolist.
    - $MC_2$ : The fringe produces a positive amount.

### III. **INDUSTRY STUDIES**: Choose either the beer or the steel industry and then answer the two questions below for the chosen industry. Point assignment is given in [square brackets]. This section has a total of 26 points.

#### 1. BEER INDUSTRY

- a) [16] Using the SSNIP test for market definition, describe briefly how you would go about defining the economic market that includes lager beer.
- b) [10] Give two sources of scale economies in beer production.

#### 2. STEEL INDUSTRY

- a) [16] Describe two prominent trends that have contributed to structural change in the U.S. steel industry over the past 50 years. Be sure to include the sources of structure change.
- b) [10] Compare integrated mills and mini-mills in terms of their technology, products and scale.