Midterm Test

ECON 4114 Industrial Organization and Competitive Strategies 2020

Part 1

Time allowed: 38 minutes **Total points: 50 points**

1. (10 marks) Consider a homogeneous-good Bertrand model with 2 firms; let's call them Firm A and Firm B. The market demand is $Q = 10 - P$. Firm A has a constant marginal cost of 3, whereas Firm B has a constant marginal cost of 4. Both firms do not face any capacity constraint.

   The two firms choose their respective prices p_A and p_B simultaneously. Whichever firm charges a lower price grabs the whole market demand. If there is a tie, all consumers buy from Firm A. What is/are the Nash equilibrium(s) of this pricing game? Explain.

2. (40 marks) There are two and only two firms in the industry, selling differentiated products; let's call them Firm A and Firm B. The system of demands is given by

$$\begin{aligned} q_A &= 50 - 3p_A + 2p_B; \\ q_B &= 20 - 2p_B + p_A. \end{aligned}$$

   Both firms have the same cost function $C(q) = q^2$.

   In each firm, the owner delegates the pricing decision to a manager. To align the manager's incentive with that of the owner, the owner can offer a reward scheme based on the firm's profit. Suppose initially, both managers have their reward tied proportionally to the profit of the firm they are working in.

   One day, Firm A's owner hires you as a consultant to work on reformulating its managerial compensation scheme. She tells you that she is contemplating which one of the following four reward schemes should be used.

   - *Status quo*: reward proportional to Firm A's own profit.
   - *Relative performance evaluation*: reward proportional to the amount by which Firm A's profit exceeds Firm B's profit.
   - *Conquering market share:* reward proportional to the market share acquired.
   - *Lerner index*: reward proportional to Firm A's Lerner index.

   The choice of the reward scheme is publicly known to both managers before they choose their respective prices simultaneously.

For simplicity, assume the monetary cost of managerial compensation is negligible, so the firm owner cares only about the profit from the sales of goods. Also, Firm B's owner has already fixed and thus is **not** going to change the compensation scheme of her manager in any case.

Which reward scheme(s) above would you recommend to Firm A's owner? Explain **without using any calculation**. (Hint: In evaluating the reward schemes above, highlight the implications on the competitor's pricing. You may or may not use reaction-function diagrams to assist your presentation.)

End of Part 1