Exam ECON3820/4820 Spring 2024

Instructions: This exam consists of five questions, all weighted equally towards the final grade on the exam. Please apportion your allotted time so that you are able to answer all questions. Show all your work for the mathematical problems, as partial credit may be awarded. You have three hours to complete this exam.

Question 1 – Differentiated goods versus homogeneous goods

Discuss the models of price and quantity competition in differentiated product markets. How do these models differ from the homogeneous product case, and what are the implications for market outcomes? No mathematical modelling is required for a perfect score on this question, as long as you explain well. You may support your explanations with figures as you see fit.

Question 2 – Subgame-perfect equilibrium

Explain the concept of subgame perfect equilibrium in the context of capacity pre-commitment before price competition. How does it alter the strategic behavior of firms compared to simultaneous price setting without capacity constraints? No mathematical modelling is required for a perfect score on this question, as long as you explain well. You may support your explanations with figures as you see fit.

Question 3 – Monopolistic pricing

A monopolist firm faces a linear demand curve given by $P = 100 - Q$, where P is the price and Q is the quantity demanded. The firm's marginal cost is constant at $20 per unit. Determine the optimal profit the firm can obtain under

a. uniform pricing and
b. perfect price discrimination.

Question 4 - Auctions

In an auction for a single item, there are three bidders with valuations of $100, $80, and $60, respectively. Assume that the bidders are risk-neutral and have independent private valuations.

a. Determine and explain the optimal bidding strategy for each bidder in a second-price sealed-bid auction (Vickrey auction).
b. Who do we expect will end up with the item, and at what price?
c. If the bidders’ valuations were common knowledge and this was a first-price auction, who do you expect would have ended up with the item, and at what price?

Question 5 – UPP in mergers

Consider the following expression for the Upward Pricing Pressure test used by competition authorities to screen mergers:

$$e_1 < (p_2 - c_2)\frac{\frac{\partial q_2}{\partial p_1}}{\frac{-\partial q_1}{\partial p_1}},$$

where p_i is the pre-merger price of good i, c_i is the pre-merger marginal cost of producing good i, q_i is the demand for good i and e_i is the reduction in the marginal cost of producing good i due to the merger.

Explain the terms and why a competition authority might be concerned about a merger if the inequality is satisfied.