Written Exam for the M.Sc. in Economics 2009-II

Advanced Industrial Organization

Final Exam

August, 2009

(4-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

ALL QUESTIONS BELOW SHOULD BE ANSWERED

1. (a) Both Green and Porter (1984) and Rotemberg and Saloner (1986) model collusion in repeated games. Compare and contrast the two models. Be sure to describe the information structure, as well as the role that exogeneous demand shocks play in each model.

   (b) How might you empirically distinguish these two models? Describe the data you would like to have and intuitively how one could test which of the two models fit the data best? (think about the models' predictions)

2. The Danish competition authority has published a chapter on trade assoications' dissemination of information in order to give guidance. The DCA summarizes the implications of the competition law as follows (my translation, CS):

   Price Information

   i. Any form of advice on prices, discounts etc. from trade associations are prohibited.

   ii. Industry Associations' announcement of maximum prices are in most cases prohibited.

   iii. Trade associations' dissemination of information about future prices are in most cases prohibited.

   iv. Trade associations' dissemination of information on current prices is normally prohibited. An exception to this may be some forms of price portals for consumers.

   v. Industry Associations announcement of historical prices can be legal if the information is sufficiently old and aggregated.

   vi. When collecting individual price information associations should ensure full confidentiality of the information.

   Sales and marketing information

   vii. Trade associations' dissemination of information, revealing single corporate future sales and production, are generally prohibited.

   viii. Industry Associations' announcement of historical sales and production information can be legitimate if the information is sufficiently old and aggregated.

ix. When collecting individual sales and marketing information, trade associations must ensure confidentiality of information.

Cost Information

x. Industry Associations' dissimination of cost information is prohibited if it in any way can be perceived as a price recommendation.

xi. Trade associations should normally not publish information on individual costs, unless there is demonstrable efficiency gains, and the information is made anonymous.

General criteria

xii. Recommendations on matters that may pose significant competition parameters will usually be prohibited.

xiii. Whether information is prohibited, depends in particular on the type and age of the information, aggregation and concentration of the market, and how information is disclosed and to whom.

Discuss whether these rules are sensible or not from a competition policy perspective.

3. An incumbent monopolist has private information about his marginal cost. His marginal cost is high, $c_H = 4$, with probability $1/2$ and low, $c_L = 1$, with probability $1/2$. A potential entrant does not know the marginal cost of the incumbent. In the first period the monopolist is alone in the market. He faces the inverse demand curve

$$p = 10 - q$$

where q is sales and p the price. The monopolist chooses a production in the first period. This and the price is observed by the entrant, who then decides whether to enter the market. The entrant has cost $c_E = 4$. If the entrant enters the market, Cournot competition prevails and both firms set quantities. For simplicity we assume there is no discounting, so the monopolist weighs profits in the first and second periods equally high. ($\delta = 1$ if you want). The time line is as follows. In the first period, the incumbent chooses production. This is obeserved by the entrant, who then decides whether to enter or not. If he enters, he pays an entry cost equal to 2 and there is a Cournot doupoly in the market in the second period. If he does not enter, there is no entry

cost paid, and the incumbent contunues as monopolist in the second period.

(a) Find the monopoly profits to the incumbent if he just maximizes period 1 profit, not thinking about potential entry consequences. Call the profit level for the high and low cost monopolist π_H^m and π_L^m, respectively.

(b) Assume that the entrant has entered the market, and has learned the incumbent's cost and solve for the Cournot equilibrium both when the incumbent has high cost and when he has low cost. Find the profits of the firms in both cases. (Hint, to avoid making essentially the same calculations twice call the cost levels c_1 and c_2, solve for the Cournot eq and insert the values $c_{1H} = 4$ and $c_{1L} = 2$ respectively and $c_2 = 4$.). Please use the notation π_{1H} and π_{1L} for the incumbent's profits when he has high and low profits respectively and π_{2H} and π_{2L} for the entrant's profits when he faces a high cost incumbent and low cost incumbent respectively.

(c) Now consider the first period, where the incumbent shall chose production taking into account the possible entry responses to his choice and the profit consequences in the furture from this. Define (either formally or just words) what a Perfect Bayesian Equilibrium of this game is. Describe (or define) what a separating equilibrium is.

(d) Is there a separating equilibrium where the low cost incumbent chooses the one period optimal production, $q_L^m = 9/2$?.

(e) Show that there is separating equilibrium. Find the one which is best for the low cost incumbent.

(A little service information: When comparing profits, you are welcome to use the rough approximation $\sqrt{5} \approx 2.2$)