**MANAGERIAL ECONOMICS AND INDUSTRIAL ORGANIZATION**

**July 2022**

1. Nintendo must decide if entering the market for videogames, in which there is only Sony. Sony is actually satisfying the market demand P = 200−2X. Marginal costs are equal to 10. Sony has also to decide if investing 2000 in an advertising campaign. If Nintendo enters, he has to invest 2000 as well, only in the case in which Sony has invested. Assume that if there is a “fight” after entry the Bertrand price is applied. In the case of Accomodation, profits are equal to 1500 for both firms (not including the investment).

Add the payoffs to the following sequential game and find the subgame perfect equilibrium

Fight **-2000**,-2000

S

Enter Accomodate **-500**, -500

Invest N Does not enter **2512.5, 0**

**S** Does not Invest N Enter Fight **0**,0

S

Does not enter Accomodate **1500**,1500

4512.5, 0

If Nintendo does not enter, Sony charges the monopoly price: 200-4X=10; X=47.5, P=105, πS=4512.5 in the case of no investment and 2512.5 in the case of investment in advertising.

In the case of entry, accomodation profits are 1500 (no investment) or -500 (investment). In the case of fight, price is equal to the marginal costs, so profits are equal to zero in the case of no investment and equal to -2000 in the case of investment.

The subgame perfect equilibrium foresees that Sony makes the investment and that Nintendo stays out of the market.

2) Consider a television network broadcasting three different channels: and entertainment channel E, a sports channel S and a news channel N. Consumers are grouped into four categories, A, B, C, and D. The following tables reports the willingness to pay for each group of consumers. Marginal costs for each subscription are equal to 0.5

- Compute the profits in the case of separate sale of the subscription to the three channels

- Compute the profits in the case of pure bundling

- Compute the profits in the case of mixed bundling

|  |  |  |  |
| --- | --- | --- | --- |
|  | Channel S | Channel E | Channel N |
| A | 10 | 1 | 1 |
| B | 9 | 1 | 5 |
| C | 1 | 10 | 1 |
| D | 1 | 9 | 5 |

In the case of separate sale, the subscription to channels S and E is offered at 9, and the subscription of channel N is offered at 5. Profits will be equal to 18+18+10 – 0.5x6=43.

In the case of pure bundling, the subscription to the three channels is offered at 12, and profits will be 48-0.5x12=42.

In the case of mixed bundling, one possibility is to offer the separate subscription to channels S and E at a price equal to 10, and the bundle of the three channels at 15, gaining 50-0.5x10=45.

However, it is possible also to offer the bundle E+S at price 10 and channel N at price 5. Profits will be equal to 40+10-10x0.5=45.

But there is a better choice: offering S+E at 11, S+N at 14, E+N at 14. Profits will be 22+14+14-8x0.5=46.

Finally, the best choice: offering S+E at 11 and S+E+N at 15, with profits: 22+30-10x0.5=47.

3) Firm A is a monopolist. In order to prevent the entry of a potential rival, he can invest in capacity K. The demand function is p = 4000 – 200 (qA+qB) (if entry occurs). For simplicity, there are not production costs but only entry costs equal to E for the entrant. Compute:

- Firm A’s optimal choice if entry is blockaded

- The amount of entry costs E that make entry blockaded, in the event that, after entry, firm A is a Stackelberg’s leader (i.e. moves as first by choosing the quantity)

- If fixed costs of entry are equal to 2000, it is better to impede entry or to accomodate it?

(**Hint: To compute the quantity that impedes entry, express the entrant’s profits as a function of the quantity of the Stackelberg leader, and set them equal to zero)**

If entry is blockaded, there is a normal monopoly. By equating marginal revenue and marginal cost, one gets 4000-400 q = 0 that is q=10; p=2000 and profits equal to 20.000.

In the case of entry, we have to solve for a Stackelberg model. The entrant maximizes his profit:

πB= [4000 – 200 (qA+qB)] qB - E. By equating marginal revenue and marginal costs one gets the entrant’s reaction function: 4000 – 400 qB – 200 qA =0, from which qB= 10 – ½ qA. The incumbent internalizes the reaction function in his profit function:

πA= [4000 – 200 qA – 200 (10-1/2 qA)] qA.

By making the first derivative and setting it equal to zero: 2000 – 200 qA = 0, from which qA= 10, qB=5, p=1000, πB=5000-E and πA=10000.

If entry costs E are greater than 5000, entry is blockaded and the incumbent can act as a monopolist.

If fixed costs are equal to 2000, instead, one has to evaluate two strategies: accomodating entry or deterring entry. In the case of accomodation, the entrant will gain πB=5000-2000=3000 and the incumbent πA=10000.

In the case of entry deterrence, the incumbent must produce the limit quantity, i.e., the quantity that induces the entrant to stay out of the market. The entrant’s profits (expressed as a function of the incumbent’s quantity qA) are equal to

πB= [4000 – 200 qA – 200 (10-1/2 qA)] [10-1/2 qA]-2000. By imposing πB=0, after some computation, one gets the condition (20-qA)2=40, therefore qA=13.675. By producing that quantity, the entrant will react by producing qB = 3.1625, the price would be 632.5 and profits would be equal to zero. The incumbent will therefore succeed in deterring entry, the price will therefore be p=4000-200 (13.675)=1265 and profits will be equal to 17299, much greater than 10000 (accommodation). It is therefore worth to impede entry by producing the limit quantity 13.675.

1. Two firms operate in a market in which there is price competition and products are homogenous. Knowing that the future demand (for the next year and for all the subsequent years) will be twice as big as the actual demand, find the discount factor above which collusion is possible.

For each firm, collusive profits today are , while from tomorrow onwards they will be 2

, therefore collusion emerges if 

**5)** Assume the following demand function for a monopolist: Q = (10 – P/4) √S, where S represents advertising expenditures. The marginal cost is constant and equal to 10 while the cost of advertising is equal to S.

- check that the demand function has a constant elasticity with respect to S.

- compute the optimal levels of Q and S and the corresponding profit

- verify that the Dorfman-Steiner condition is met.

The elasticity with respect to S is

(dQ\dS)x(S\Q) = 1/(2√S) x (10-P/4) x S/[√S (10-P/4)] = 1/2.

The optimal levels of Q and S are obtained by making the first derivative of profit with respect to P and S, respectively.

Π = (P-10) [(10 – P/4)√S] – S

dΠ/dP = 0 from which one gets (12.5-1/2 P)√S =0, i.e. P=25

d Π /dS = 0 from which ½ (P-10)(10-P/4) = √S. By substituting P=25 one gets S=791.

Quantity is equal to 105.45 and profits are (25-10) x 105.45 – 791= 791

The ratio between advertising expenditures and sales is 791/2636.25 = 0.3

The demand elasticity with respect to price is (dQ\dP)x(P\Q)= -1/4 √S x 25/105.45 = -1.666.

The Dorfman-Steiner condition is, therefore, confirmed, since the ratio between elasticities (in absolute value) is equal to 0.3 (0.5/1.666).

1. Predation and predatory pricing: myth or reality?