



ECO 650: Innovation-Exercices

1 A merger that boosts the incentives to innovate

Assumptions: Consider that consumers are uniformly distributed along the Hotelling line $[0, 1]$. Two firms 1 and 2 are located at the extreme. Consumers incur a quadratic transportation cost and the utility is of the form : $V - td^2 - p$ where $d = |x_i - x|$ is the distance to firm i . We apply the model of Federico, Angus & Valletti (2017) (in class) and thus look for the profit that firm obtains in all cases, i.e. Π_1, π_2 and Π_2 .

Questions:

1. Determine Π_1 , i.e. the profit when only firm 1 is active, firm 1 say.
 - a) Determine the demand of firm 1 for $V > 3t$.
 - b) Write down the profit of firm 1 and determine its optimal price and the value of Π_1 .
2. Determine the profit π_2 when the two firms are active on the market.

3. Determine the profit Π_2 that a merged entity would have from a second innovation.
4. Is there more or less innovation after the merger?

2 Exercice 2: R&D Cooperation

Assumptions: Demand is linear, $p = 2 - Q$ and two firms $i \in \{1, 2\}$ compete à la Cournot. The cost of firm i is a function $c_i(w_i, x_j) = 1 - x_i - \beta x_j$ with $0 < \beta < 1$ representing a spillover, i.e. a benefit that a firm obtains from its rival's discovery (public part). We denote $\phi(x_i) = \frac{x_i^2}{2}$ the innovation cost. The timing we consider is :

1. Investment stage which can be either non cooperative or cooperative;
2. Competition stage.

Questions:

1. Determine the Cournot equilibrium in stage 2
2. Non Cooperative *R&D*: firms in stage 1 choose x_i and x_j . What is the equilibrium profit and quantity ?
3. Cooperative *R&D*: firms in stage 1 choose x_i and x_j that maximizes their joint profit. What is the equilibrium profit and quantity ?
4. Compare the outcomes in the two cases.