Industrial Organization

Problem Set #4

Universidade Nova de Lisboa
Faculty of Economics
Fall 2008

Instructor: Vasco Santos
Grader: David Henriques

Instructions

1. Due date: November 22, 11:00 a.m. in room 223 (*Anf. 223*).
2. This is **individual work**. Each student has to deliver a solution. The best, and perhaps the only, way to ensure that you understand the material taught in class is to solve these exercises under "exam conditions". One of the advantages of solving these exercises is that they provide a good preparation for the exams.
3. PLEASE **write on the front and back** of each sheet of paper that you use to solve this problem set. It's a waste of paper to write only on one side.

---

1 Dynamic Price Competition and Tacit Collusion

Exercise 1. Consider a homogeneous good market with n symmetric firms competing in prices over an infinite number of periods. The firms have constant marginal cost c. The demand function at data t is $q_t = \mu^t D(p_t)$, where $\mu\delta < 1$ and δ is the discount factor. Derive the set of discount factors such that full collusion (i.e., the monopoly solution) is sustainable. What would this model predict about the relative ease of sustaining collusion in expanding and declining industries?

Exercise 2. Consider two firms interacting in two identical and independent markets. The markets differ in that in market 1 a firm's price at time t is observed at $t+1$, whereas in market 2 it is learned only at $t+2$. Thus, although each of the markets meets every period, market 2 has longer information lags.

a) Derive the set of discount factors such that in the absence of multimarket contact (i.e. firms in market 1 are different from firms in markets 2), collusion in market 2 would be sustainable.
b) Compute the minimum threshold value for the discount factor such that under multimarket contact (i.e. firms are the same in both markets), collusion in both markets is sustainable.