

# Problem Set 4

## Market Power and Public Policy

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### 1. Cartel Question

Suppose that we have  $N$  firms in a cartel. The industry that has the demand curve:

$$Q^D = 10 - \frac{P}{2}$$

These firms have cost curves given by  $C(Q) = 4Q$ . Firms compete in prices, NOT quantities. Firms have discount rate  $\delta = 0.5$ . Firms use grim trigger strategies to punish their rivals.

- For how many firms will this cartel be stable?
- Now suppose that there are only  $N = 2$  firms in the industry. Firm 1 has a discount rate of  $\delta = 0.4$ , whereas firm 2 has a discount rate of  $\delta = 0.8$ . Which firm will want to defect and why? Discuss.
- Suppose that instead of allocating market shares 50/50 between cartel members, the cartel can allocate different market shares to different members. How could it allocate  $s$  (market share going to firm 1,  $1 - s$  goes to firm 2), in such a way as to make the cartel stable? Who gets a larger market share?

### 2. Bertrand and Cartels

The DOJ is investigating allegation of collusion in the snowplow industry. Demand for snowplows is given by the inverse demand curve:

$$P = 35 - 5Q$$

While firms have cost curves given by:

$$C(Q) = 5Q$$

There are 3 firms in the snowplow industry. Each firm has a discount rate of  $\delta = \frac{3}{5} = 0.6$ .

- (3 points) Suppose that these firms compete a la Bertrand in this market (simultaneous price setting). What will prices and quantities be?
  - (5 points) Suppose that these firms act as a Monopoly Cartel, with grim trigger punishments after defection. What will be the cartel price, and is this Cartel stable?
  - (5 points) Now suppose that two firms, Snowking and Mr. Plow, merge. What is the effect of this merger, both if firms do not collude, and if they might?
  - (2 points) Now suppose, that as before, there are 3 firms in the industry. However, these firms also operate in two cities — call these A and B. Will collusion be sustainable with this multi-market contact?
3. (5 points) In the Apple Ebooks Case, how did the collusive mechanism work. How does it link into the models in the previous two questions.