

### **Third Handout: Current handout topics in Bold**

#### **Topics**

1. Product Differentiation, Quality, Advertising, Asymmetric Information  
Problem Set 1
2. Imperfect information and Search models
3. Repeated Games  
Problem Set 2
- 4. Strategic Non-cooperative Behavior**
5. Vertical Relationships, Theory of the Firm  
Problem Set 3 (empirical part last question)

Please see Course Outline at: <http://are.berkeley.edu/~sberto/are202.html>

#### **Empirical Analyzes:**

1. Stata and matlab code to estimate Salop and Stiglitz.
2. Strategic Interactions, Dynamic Collusion Models, Stata Code and Files  
Data sources

main data page

<http://research.chicagogsb.edu/marketing/databases/index.aspx>

movement (store total sales by week) data files

<http://research.chicagogsb.edu/marketing/databases/dominicks/download.aspx>

3. Estimation of Structural Demand Model, recovery of Margins and Empirical  
Analysis of Margins, Stata Code

#### **Main References:**

1. 1 . Carlton and Perloff (2000): Modern Industrial Organization, Dennis W. Carlton and Jeffrey Perloff, 3rd Edition, Reading, MA: Addison-Wesley. [Book web-page](http://occawlonline.pearsoned.com/bookbind/pubbooks/carlton_awl/): [http://occawlonline.pearsoned.com/bookbind/pubbooks/carlton\\_awl/](http://occawlonline.pearsoned.com/bookbind/pubbooks/carlton_awl/)
2. Tirole (1989) : The Theory of Industrial Organization, Jean Tirole, 1989, The MIT Press.

### STACKELBERG-SPENCE( 1977)- DIXIT (1980) MODEL

When will a firm chose to deter or accommodate entry?  
When is entry blockaded, so firm has no need to worry about entry?

Model:

Stackelberg game, firm 1 chooses capacity  $k_1$  and given  $k_1$  firm 2 (the entrant) chooses capacity  $k_2$ .

Profits:

$$\pi_i(k_i, k_j) = k_i(1 - k_i - k_j), \text{ where}$$

$$\frac{\partial \pi_i}{\partial k_j} < 0, \text{ and}$$

$$\frac{\partial(\partial \pi_i / \partial k_i)}{\partial k_j} < 0.$$

Firm 2: RF2:  $k_2 = (1 - k_1)/2$

Firm 1: Max  $(1 - k_1 - k_2(k_1))k_1 \dots \dots k_1^* = 1/2$

Profits: firm 1:  $1/8$  firm 2:  $1/16$

If  $f$ , entry costs

$f > 1/16 \dots$  entry is blockaded

$f < 1/16 \dots$  deter or accommodate?

Firm 1: knowing that maximum profits of firm 2, given  $k_1$  are  $(1 - k_1 - (1 - k_1)/2)(1 - k_1)/2 - f$

then  $k_1$  such that profits 2 are negative  $k_1 \text{ _deter} = 1 - 2\sqrt{f}$

Prefers deter if profits deter =  $(1 - 2\sqrt{f})(1 - 1 - 2\sqrt{f} - 0) >$  profits accommodate =  $1/8$ .

$f < 0.00562$  accommodate,  $0.00562 < f < 1/16$  deter,  $f > 1/16$  entry is blockaded.

Discuss Burns (JPE) ATC.

### **PREDATION AND ANTITRUST LAW**

- It is illegal to charge  $P < MC$  to drive out competition
- In practice, it is hard to evaluate and hard to prove
- Antitrust authorities don't want to mistake predation for intense competition (Easterbrook, 1981 – only consider a suit if a firm had been driven out of business and predator has again raised market price. Otherwise law is protecting less efficient firms from lower prices)
- Predation in Tobacco markets:
  - American Tobacco (1881-1906) engaged in predatory pricing (price below production costs) to acquire cheaply the rivals who were driven out of business
  - From violation of antitrust laws, in 1911 the Tobacco Trust was dissolved and broken into 3 companies. Later these three firms were also charged with collusion and predation to drive rivals out of business (in 1946)

### **Predation and Acquisition costs of rivals**

- Saloner (1987) . Model of predatory pricing where the incumbent predares against another company to acquire its assets at a cheap price
- Burns (1986), tests Saloner's model :
  - Classical empirical paper
  - Measures if the acquisition price is lower in geographical markets where American Tobacco engaged in predatory pricing
  - For the firms that were subject of predation the acquisition price was 60% lower
  - For the firms that were not directly subject of predation but were American Tobacco competitors, the acquisition price was also lower, 25%, that is the reputation effect was also strong

## More on Non-cooperative strategic behavior, optional.

Encompasses actions of one firm that wants to increase its profits by improving its “position” relative to its rivals.

- To harm its rivals
- To benefit itself

These actions aim at manipulating the market environment:

- Other existing firms or by possible entrants
- Beliefs of consumers and of existing and potential rivals
- Technology and costs of firms and entry costs

– Must meet two conditions to be successful:

- Advantage/Asymmetry: The firm must have an advantage over the rivals (like acting before them, or some other asymmetry between firms)
- Commitment: It must be credible that the firm will follow its strategy regardless of the actions of its rivals => Credible Threat

Lets assume there are barriers to quick entry and exit so that other identical firms cannot use such strategies (this assumption provides the Asymmetry needed for “Condition 1. Advantage” to be met and the courts need to show that the threat was credible)

Firms (Incumbents) can engage in

- Predatory Pricing
- Limit Pricing
- Excess Capacity as barrier to entry
- Investments to lower own costs, or Raising rivals’ costs

### PREDATORY PRICING

The incumbent firm lowers its price first, such that rivals are driven out of business or to scare off potential entrants and then raises the price when rivals exit the market.

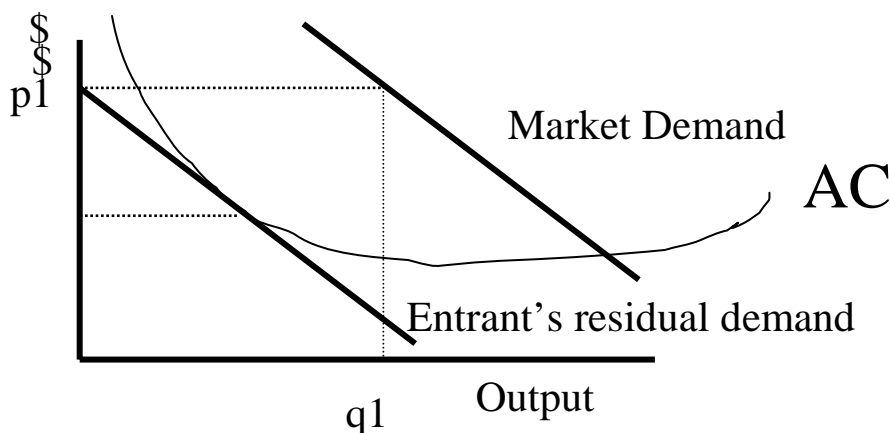
In particular, the incumbent lowers price below some measure of costs, engaging in short run losses. The benefits are the long-run gains of being alone in the market.

- It is essential that the incumbent can survive lower prices (short-run losses) longer than its rivals, so that predation is a credible threat
- One way to prevent entry is to sign long-term contracts with buyers to limit entry of lower cost firms (Aghion and Bolton, 1987). However, entrants could also sign long-term contracts when incumbent threatens predation. The buyers would accept to sign such contracts if price is lower than the incumbent’s monopoly price. When the incumbent engages in predation the cut in price would not hurt the entrant.

- As mentioned before, with identical firms, predation may not be successful, because the incumbent cannot make a credible threat of predation.
- A credible threat can happen if the incumbent firm has some advantage (large, low cost firm) or has acquired a certain reputation (rivals believe given past pricing strategies of firm it is going to set low prices and fight if faced with entry of rivals)
- After the rivals are driven out of business the predator has to be able to prevent the rivals' assets from being bought by another firm that enters when the price rises again

## LIMIT PRICING

- A firm sets its price and output such that there is not enough demand left over for another firm to enter the market profitably
- To be credible this entry-detering strategy must satisfy two criteria:
  1. Leave the incumbent with higher profits as a monopolist (net of the cost of the entry deterring strategy) than he would earn competing with the entrant.
  2. Change the entrants' expectations about post-entry profits. The potential entrant believes that the incumbent will not change its output after the new firm enters.
- Bain(1956), Modigliani(1958), Sylos-Labini (1962)
- Can a low price deter entry?
  - With identical firms... no
  - Graphically...



- With identical firms will not work!
- The incumbent has to pursue a strategy in which the limit price  $p_{limit}$  and a quantity of  $q_{limit}$  is the optimal pricing strategy after entry.

## LIMIT PRICING – ASYMMETRIC FIRMS

- Low prices can be a *signal* of:
  - Incumbent with low costs.
  - Low market demand.
- If the entrant has imperfect information about these things, limit pricing can be an effective entry deterring strategy.
- Milgrom-Roberts model of limit pricing (1982, see Tirole chapter 9 on Information and Strategic Behavior, for a simplified version if you are interested - *optional*)