Lecture Note 6. Predatory Pricing

1. Overview

• Definition of predatory pricing
  – Lower the price in order to drive rivals out of business

• Is it bad?
  – A firm engages in predatory pricing to become a monopolist in the market. Assuming that a monopoly creates less social welfare, predatory pricing may decrease the social welfare.
  – We have to compare the present benefit to the cost in the future.

• When can we say that a firm engages in predatory pricing?
  – The above definition is not applicable as itself since it is not possible to prove firms’ intention.
  – One way is to conclude if rivals go out of business and the existing firm really increases the price again. A potential problem with this? Can we conclude before rivals exit?
  – An alternative definition is to lower the price below the level which would have been optimal if firms compete normally.

• Practical issues
  – What is normal competition?
  – $P < MC$ is certainly suboptimal. But $MC$ is usually private information.
  – $AC$ is easier to see, but $P < AC$ can happen in short term.
  – Data and calculation
2. Simple Model

- Consider two identical firms.
  - Suppose one firm wants to drive its rival out of business.
  - The firm has to set the price below the average cost, so that its rival suffers from loss.
  - But this would harm the firm itself.

- What if one firm has an advantage?
  - A cost advantage
  - A long-term contract
  - Strongly affiliated relationship with buyers
  - Firm’s ability to afford losses for a long time

- Suppose a firm has a lower MC than the other firms.
  - Simply setting the price below the other firm’s MC would make the other firm exit.
  - Consider \( P = 10 - Q \). Firm 1 has \( MC_1 = 3 \) and Firm 2 has \( MC_2 = 5 \). Both must pay a fixed cost 1 to operate. If they compete a la Cournot,

So each firm produces \( q_1 = 3 \) and \( q_2 = 1 \), which yields \( \pi_1 = 8 \) and \( \pi_2 = 0 \). If Firm 1 sets the price at \( P = 5 \), then Firm 2 would exit so Firm 1 produces \( q_1 = 5 \) and earns 9.

- In the above case, the social surplus increases by Firm 1's low pricing strategy.

- But in many cases, the firm may not do this without a monopoly profit in the future. For example, suppose \( P = 20 - Q \), \( MC_1 = 4 \), \( MC_2 = 6 \), and the fixed cost 10.
3. Multiperiod Model

- Suppose firms produce in 2 periods.
  - There is no interest rate, so the future payoffs are not discounted.
  - In each period, the demand is given by \( P = 20 - Q \). \( MC_1 = 4 \), \( MC_2 = 6 \), and the fixed cost is 10 in each period.
  - Firm 2 has two choices. One is to operate in both periods, and the other is to exit in the first period.
  - Firm 1 has two choices in each period. One is price war, and the other is accommodation. Firm 2 follows Firm 1’s competition scheme if it stays in the market. Accommodation means that Firm 1 competes a la Cournot if there is a competing firm, and uses monopoly pricing otherwise. If Firm 2 exits, Firm 1 uses monopoly pricing in the second period.

- What would be an equilibrium?
• Would the social surplus be higher at the equilibrium?
  – Yes.

At the equilibrium, the social surplus is 202 in total, while it is only 164 if low pricing is prohibited. A big increase in the consumer surplus in the second period surpasses a moderate loss in the second period. Sometimes such an action increases the social welfare.

– However, we can also see the cases where such a behavior decreases the social welfare. Especially, the consumer surplus would eventually decrease if the number of periods considered is long enough.

• Critiques on the model

  – The consumer surplus in total may be higher. What if an interest rate is positive? Suppose $2 in the second period is worth only $1 in the first period.

So whether the social surplus or the consumer surplus decreases depends on the structure of the market, the interest rate and other factors.

– Why would it not allowed for Firm 2 to re-enter the market in the second period? If there is such a possibility, Firm 1 would not be able to increase its price in the second period up to the level of monopoly price.
4. Reputation Model

- A firm may engage in predatory pricing to obtain a reputation.
  - If the firm is known to engage in predatory pricing when there is an entrant, no potential competitor would enter the market. Recall the following model.

```
Incumbent
      Hostile
         Enter (0, -2)
          \          |
     N/E   Enter (9, 0)
     Friendly
          \          |
     N/E   Enter (4, 2)
```

Would the entrant think that the incumbent is crazy? Even if it is not sure 100%, it may believe the probability is 75% that the incumbent is crazy.

```
Incumbent
    75%
    Hostile
      Enter (1, -1)
          \          |
     N/E   Enter (9, 0)
     Friendly
          \          |
     N/E   Enter (4, 2)
```

- But how does the firm build a reputation? If the firm just announces that it prefers price war, potential entrants would not believe. This is incredible threat. If there is a history that the firm has engaged in price war many times, others may believe.
- There is a model that justifies such a result.

  * Almost all firms are rational, so would choose a better option by comparing payoffs. There are small number of crazy firms who prefer price war in any case. Suppose such firms account for 10% of all firms.
  * Consider a rational incumbent. Without any history, others initially have a prior belief that the incumbent is hostile with probability 10%. If the incumbent does not start price war in any case, others would believe that the firm choosing price war is certainly crazy. If one price war immediately makes others stay out of the market, the incumbent would always engage in price war.
  * The above argument suggests that the incumbent may engage in predatory pricing to confuse others by mimicking crazy firms. If it successfully ensures others to believe that it may be crazy with probability more than 50%, it obtains a reputation and never faces an entrant any more.
• Mix the features of the two models.

  – The demand is $P = 18 - Q$. Firms may want to build a reputation. But there are efficient firms with $MC = 0$, and less efficient firms with $MC = 6$. The entrant is a less efficient firm. All the firms face a fixed cost $5$. If the entrant has perfect information on the cost structure of the incumbent, the game is as follows.

  Of course, this game is not realistic since the incumbent would not have a choice between low cost and high cost. The low cost firm would always engage in predatory pricing since otherwise it would earn 59 only.

  – Consider the two-period game. In each period, a potential competitor may enter the market. The incumbent has $MC = 6$. Suppose that entrants do not have perfect information, but believe that the incumbent has $MC = 6$. If the incumbent mimics the low cost firm in the first period, Entrant 1 would exit and save some of the fixed cost, and entrants believe that the incumbent may have $MC = 0$ with probability $x$. Assume that the incumbent accommodates in the second period when Entrant 2 enters.

  What is the equilibrium?

  – If Entrant 1 had a choice whether to enter or not, $x$ would have affected its choice as well.

• What about the social surplus and the consumer surplus?

• A similar reasoning can be applied to the case where the incumbent is a chain store that operates many branches at different locations, and faces local potential entrants in every location.
5. Other Model

- Merger model
  - Firms may engage in predatory pricing to lower its rival firm’s value and attempt a merger.
  - Example: The Standard Oil Co. in the late 19th century, and the Tobacco Trust in the early 20th century.
- Limit pricing
  - Firms set price so low and quantity so high that there is not enough demand left for potential competitors to enter the market and earn positive profit.
  - Dynamic limit pricing.

6. Legal Standards

- There are several economic and legal standards suggested by the literature.
  - Many adopted a rule proposed by Areeda and Turner (1975).
  - A firm’s pricing is predatory if its price is less than its short-run marginal cost.
- The price less than short-run average cost may happen even under normal competition.
- Alternatively, the price less than its short-run average variable cost can be deemed predatory.
- All these have the same problem.
  - The cost data is usually hard to obtain.
  - Low price strategies may be adopted for other purposes.
    - * Promotion
    - * Signal
    - * Learning by doing
  - Lawsuit may be misused by some firms to lessen competition.
- Should we always ban predatory pricing?
  - The more firms, the better? No. All the policies should be performed considering the social welfare, not simply the number of firms.
  - Even if monopoly is bad itself, the low price during the competition stage may increase the consumer surplus as well as the social surplus.
  - If predatory pricing builds a reputation which prevents potential firms entering and protects the monopolist for a long time, this behavior may have to be banned.
- Critiques on the word “predatory pricing” exist.