Introduction to Industrial Organization
Professor: Caixia Shen Fall 2014
Lecture Note 4

Part 2: Monopoly (Ch. 6)-continue

3. Dominant firms

- A firm with a big share (50%-100%) in a market with a set of (relative) small firms.
- Situation created by some competitive advantage:
  - ✓ Cost or demand advantages (Campbell, Gilette, Kodak, Microsoft…)
  - ✓ Situation post regulation: AT&T, MCI and Sprint
- If small firms are price takers and have total capacity K, dominant firm maximizes on residual demand

$$Q = 1 - K - p$$

Price is lower and total quantity bigger than in the monopoly case.

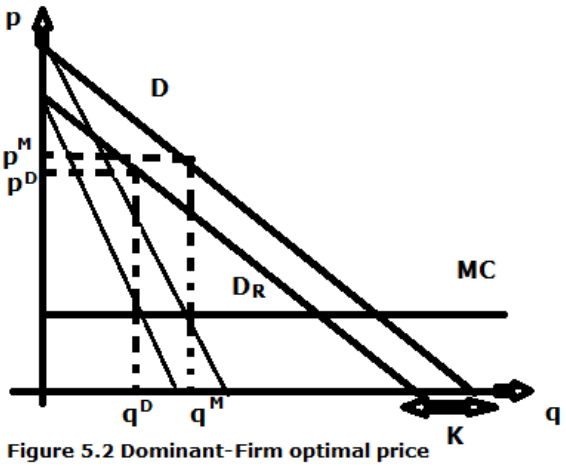

Figure 5.2 Dominant-Firm optimal price

Example: The Microsoft Case VS the USDOJ (case on page 74)

- ✓ Microsoft has 80% market share
- ✓ In court, operation manager of HO stated that "there is absolutely no choice" what it comes to selecting an operating system.
- ✓ Microsoft's claim: "cannot charge a monopoly price because it faces competition from rival operating systems, potential entrants, and patented software".
- ✓ Richard Schmalensee (MIT economist) claimed that if Microsoft were a true monopolist it could charge a price between \$900 and \$2,000. But cost of windows only \$100. He observed estimates of MC and ϵ and claimed the p* that solves $\frac{p^*-MC}{p^*} = \frac{1}{\epsilon}$ lies between \$900 and \$2000.

Model of monopolist who's price constrained by threat of entry.

Setup:

1. Dominant firm Microsoft chooses price, has MC function $MC^M(q)$
2. Potential entrants
   - ✓ Act as perfect competitors
   - ✓ Pay fixed cost F to develop product, (suppose it can develop an operating system nearly identical to Microsoft), then have MC function $MC^E(q)$.
3. Demand given by $Q^D(p)$.

If there are no threats of entry, see figure 5.e4.

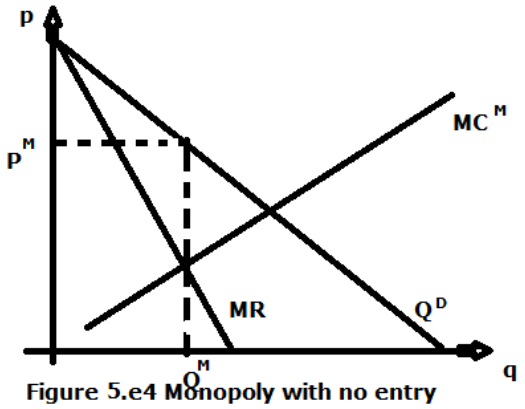

Figure 5.e4 Monopoly with no entry

With threat of entry,

1) first consider entrants behavior

- They behave like perfectly competitive firms (since Microsoft is leader, the have to accept that price Microsoft sets). Upon entry, choose q^E such that q^E solves

$$\max(pq^E - C^E(q) - F)$$

  FOC: $P=MC^E(q)$
- If firm will enter. Choose q such that $MC^E(q^E)=p$.
- Firm will enter if $p>AC(q^E)$.

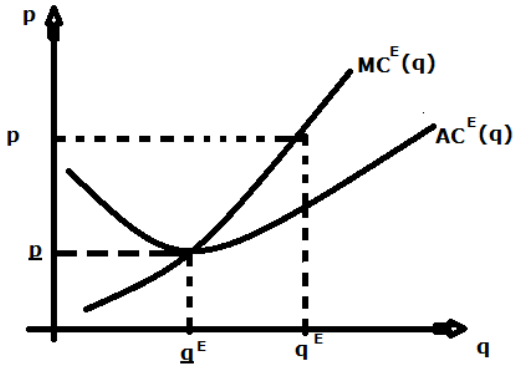

Figure 5.e5 Entry condition in monopoly market

If Microsoft chooses $p>\underline{p}$, other firms enter and produce q^E. If Microsoft chooses $p<\underline{p}$, profits upon entry are less than zero, so firms will not enter operating system market.

- If there are N potential entrants, aggregate entrants' supply curve given by

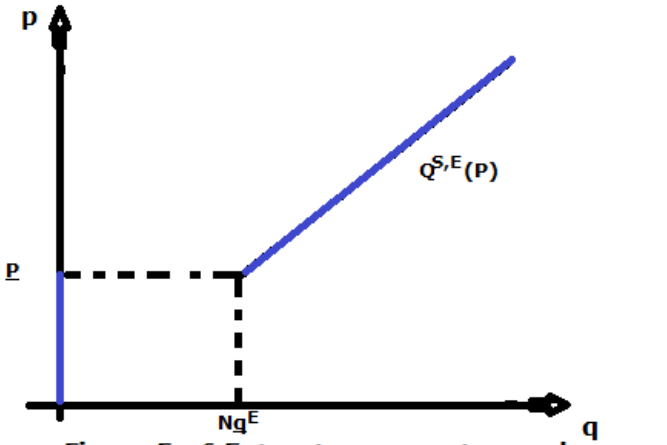

Figure 5.e6 Entrants aggregate supply curve

2) Now, Microsoft chooses p, taking into account $Q^{S,E}(p)$. Microsoft's residual demand curve is given by $Q^D(p)$- $Q^{S,E}(p)$. If Microsoft choose p, consumers will demand $Q^D(p)$. The Fringe will produce $Q^{S,E}(p)$, leaving Microsoft with $Q^D(p)$- $Q^{S,E}(p)$ consumers. Then Microsoft's residual demand curve:

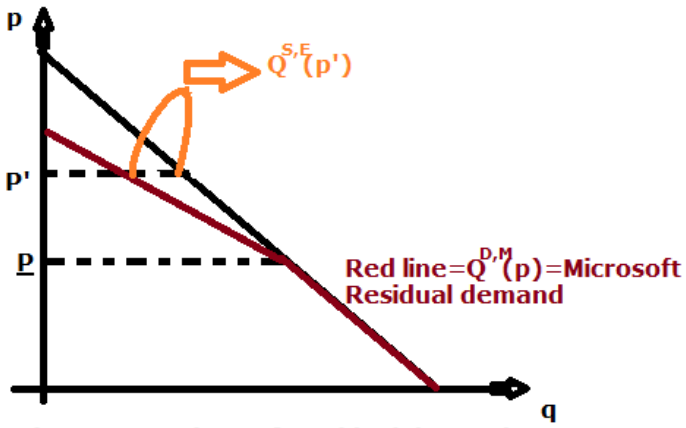

Figure 5.e7 Microsoft residual demand

When choosing which price to set, or what level of output to produce, Microsoft takes into account $Q^{D,M}(p)$, not $Q^D(p)$.

$$max\{Q^{D,M}(p)p - C^M(Q^{D,M}(p))\}$$

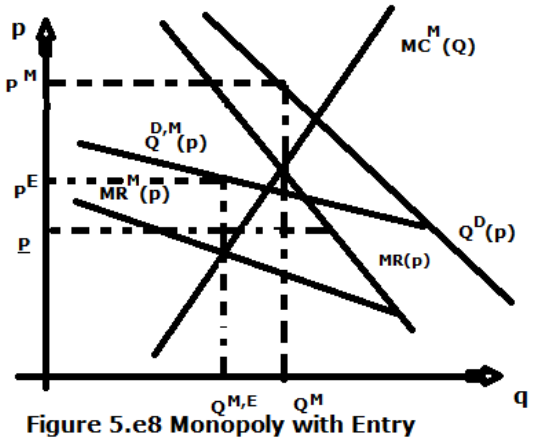

Figure 5.e8 Monopoly with Entry

- Without the threat of entry, Microsoft produces Q^M and charge a price p^M (=900-2000 according to economist Schmalensee). With threat, Microsoft produces Q^{ME} and charges a price p^E (=100, observe in data).
- Moral of story: markets that appear to be monopolies may be competitive.

4. Monopoly and monopoly power

- The importance of the market of operation:
  - ✓ Possibility to raise prices is linked to elasticity of demand
  - ✓ Many factors: substitute products, entry conditions
- The share, more than a given number, is the result of the relevant market: the problem of market definition
- Public policy considers "monopoly power" more than shares
  - ✓ EU: Article 86 Treaty of Rome declares illegal the "abuse of dominant position" not the position.
  - ✓ US: Mergers to be challenged decided according to the power to raise prices non-transitorily.

5. Regulation

5.1. The formation of a monopoly

The deadweight loss is the cost of allowing a market to be monopolized.
Benefits of allowing a monopoly? They cannot be captured in a static model because product characteristics are fixed. In dynamic models with R&D investments, firms are more likely to try to develop new products and technologies if they will be able to act as a monopolist once the product is introduced to consumers. This is also the main justification for patent laws.

So government should be more flexible in markets where there is lots of innovation/R&D required to develop new products.

How do monopolies come into existence?
1). Through mergers.

- Firms in competitive markets often argue that they are earning negative profits, and therefore should be allowed to merge. The resulting market power will allow for higher prices and positive profits.
- This logic does not entirely make sense. If competitive profits are negative, it must be because of short run sunk costs. If a merger occurs, these sunk costs still exist. Surplus will go down because of p !=MC pricing.
- Mergers should be allowed only when the merging firms convincingly show that by merging, they will realize cost efficiencies. Under competition, $p=MC_1$. Under monopoly, $p=MC_2(\frac{\epsilon}{1-\epsilon})$. So monopolist will charge a lower price than high cost perfect competition when $MC_1 > MC_2(\frac{\epsilon}{1-\epsilon})$. As demand become more elastic, $(\frac{\epsilon}{1-\epsilon})$ moves close to 1, and the deadweight loss from monopolization decreases. So fewer cost efficiencies necessary to justify merger.

2) Knowledge advantage.
   - Firm might have secret knowledge about how to produce a good. So no one else can enter the market.
   - Or firm might have secret knowledge about a cheap production technique. Other firms can produce the good, but not as efficiently. So they never enter the market.

3) Government created monopolies.
   - Through patent or other intellectual property law
   - Postal service
   - Television networks

4) Natural monopoly.
   - In some markets, production technologies are such that it makes sense to monopolize. At any level of output total costs are lower if everything is produced by one firm instead of multiple firms. This is true when fixed costs are large or there are other reasons for economies of scale.

5.2.Natural monopoly

A firm is a natural monopoly if it can produce a quantity Q at a lower cost than two or more firms. Let firms 1,2,….., k each produce q1, q2,…., 1k units of output so that Q=q1+q2+….+qk. The market is a natural monopoly if C(Q)<C(q1)+C(q2)+….+C(qk).

In natural monopolies, average costs are falling. Let C(q)=F+cq where F is fixed cost of production and c is the constant marginal cost. Note that AC(q)>MC(q) for all output levels. Figure 5.e9 illustrates this.

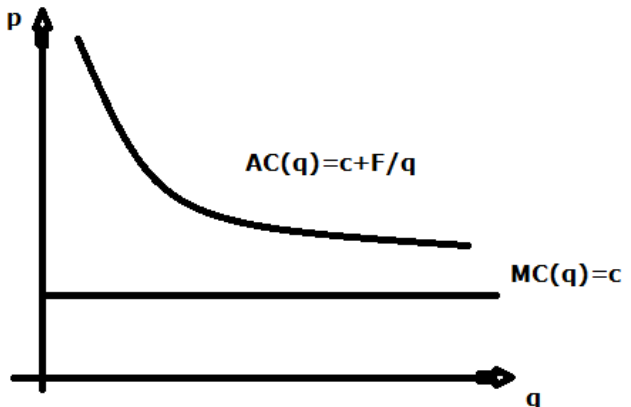

Figure 5.e9 Natural monopoly-falling average cost

- Thus, a competitive market will not survive. Marginal cost pricing will always lead to negative profits.
- The monopolist, however, will solve $\max\{p(Q)Q - cQ - F\}$.
- Price>constant cost c, therefore a DWL. But the government cannot encourage competition because of it is unsustainable.

What are the government's regulatory options?

- 1) First Optimum. The government can FORCE monopolist to charge p=c. This

would require the government to subside F'>=F. But,

- ✓ Government will have to raise F' via taxation. This causes other distortions.
- ✓ Gives monopolist incentives to waste resources on lobbing for higher subsidies.

➢ 2) Rate of return or Average Cost Pricing

The DWL from monopoly pricing is drawn below (figure 5.e10)

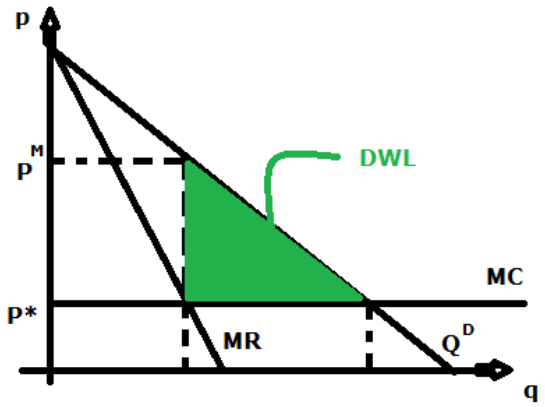

Figure 5.e10 DWL in Monopoly

There exist prices above the AC but below the monopolist's unregulated price that allow the monopolist to earn positive profits but expend output (and therefore induce a decrease in DWL) beyond Q^M.

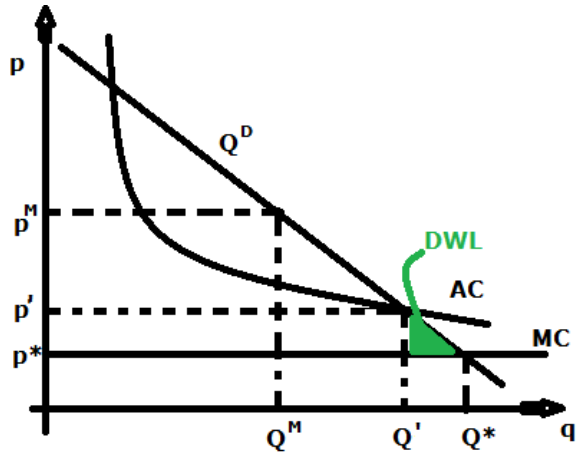

Figure 5.e11 Monopoly regulated price

If monopolist is forced to charge p', it sells Q' units of output and earns

$$\pi = Q'\left(p' - AC(Q')\right) = 0$$

The deadweight loss under average cost pricing is much lower under monopoly pricing.

Similarly, government can allow positive rate or return. It allows the monopolist to charge p" and sell Q" such that p"=(1+r) AC(Q"). But this type of pricing gives monopolist little incentive to try and minimize cost. Could fixed the regulated price at some level for a long period of time, say 5 years. The monopolist could then benefit from cost reductions for a while. But still, monopolist knows, that cost reductions will eventually lead government to

impose lower prices.

Examples: Utilities, post office, telecommunication, cable. All because of high infrastructure requirements.

5.3.Incentive regulation

- Suppose government is commissioning a new project from a firm
- Const uncertain but can be affected by the firm effort
- Two extreme contracts: fixed price, cost plus

Cotract	Govt. Risk	Incentive to min cost	Allocative result
Fixed price	NO	YES	p>c
Cost plus	YES	NO	p=c

Trade-off between productive and allocative efficiency: incentive regulation uses the incentive properties of these schedules.

5.4.Price caps

- Proposed in the 80's in connection with regulation of AT&T and British Telecom
- Only constraint prices, in a way that gives incentives.
- Specify a maximum price adjusted at a given frequency according to a predetermined formula
- Formula will include inflation factor, X factor anticipating increases in productivity
- Important expansion of this type of regulation: eg state telecommunication regulation.

6. Essential facilities and access pricing
   - Natural monopoly may happen in a part of the industry: basic network in electricity, infrastructure in railways, local loop in telecoms.
   - Industry can be divided in natural monopoly and competitive pasts but competition cannot exist independently: monopolist sells services to the competitive firms:
     - ✓ Monopolist is an "upstream bottleneck"
     - ✓ Monopolist's assets are an "essential facility"
- Complication: sometimes the monopolist also competes in the "downstream" market and can look for market power.

7. **Homework #1**