Economics of Industrial Organization

Lecture 1: Introduction, Market Structure, Technology

산업조직이론이란?

산업조직이론은 기업과 산업에 대하여 공부하는 것.
다음과 같은 질문에 대한 논의를 한다:

- Why do we coordinate activities in firms?
- How do firms act, and why?
- How and why does this vary across industries?
- Why are industries organized the way that they are?
- Under what policies will firms behave most efficiently?

산업조직이론의 略史

- Origins: antitrust. Sherman Act 1890 makes collusion and monopolies illegal.
- Structure-Conduct-Performance (SCP paradigm): Industry structure determines conduct and performance. Cross-sectional industry analysis.
- Chicago school critique (Feedback critique): questioning causality. Large firms and profits.
  Contestable markets.
  Strategic behavior: conduct causes structure.

미시경제학을 기초로 하여..

- Basic models of perfect competition, monopoly.
- Basic calculus and maximization.
- Discounting and arithmetic progressions.
- Welfare analysis: consumer surplus, producer surplus.

시장구조의 측정 (1) : 집중도 (CR)

- SCP paradigm starts with structure. How do we measure structure? And how do we define a market?
- Concentration curves: Plot Cumulative market share against Rank.
- Definition: Concentration Ratio
  The concentration ratio (size n) for industry *i* is the percent of industry sales revenue accruing to the largest n firms in industry *i*.
- Disadvantages: An industry may seem more or less concentrated depending on which n is chosen. Ignores any firms beyond n.

시장구조의 측정 (2) : 허핀달-허쉬만지수 (HHI)

- 개념: For an industry with N firms, the HHI for that industry is defined as:

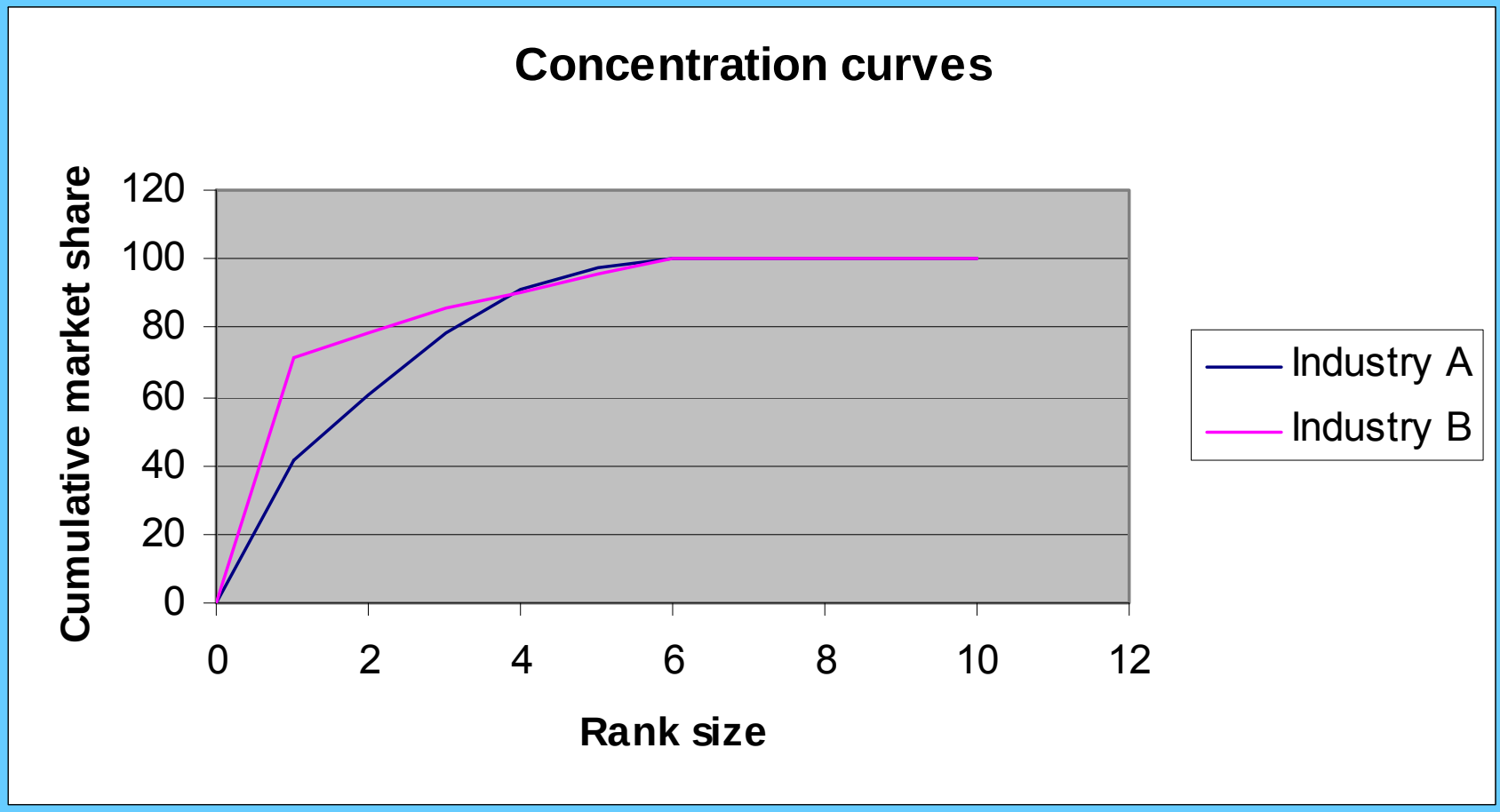
$$HHI = \sum_{i=1}^{N} s_i^2$$

- Advantage: Encapsulates entire concentration curve in a single number, rather than just a single point.

Example

Industry A					
Firm	Revenue ($millions)	Market share (%)	Market share squared		
1	243	41.2	1,696		
2	113	19.2	367		
3	107	18.1	329		
4	72	12.2	149		
5	38	6.4	41		
6	17	2.9	8		
Total	590	100			
CR2 = 60.3					
CR4 = 90.7		**HHI = 2591**			
Industry B					
Firm	Revenue ($millions)	Market share (%)	Market share squared		
1	599	71.2	5,073		
2	61	7.3	53		
3	58	6.9	48		
4	43	5.1	26		
5	41	4.9	24		
6	39	4.6	22		
Total	841	100			
CR2 = 78.5					
CR4 = 90.5		**HHI = 5245**			

Cumulative Curves



시장이란 무엇인가?

- Whatever the measure of a market structure, we must have a definition of a market. This is not trivial.
- Consider the automobile industry. Is the market for passenger cars? Should we include motorbikes, vans, or SUVs?
- Consider the beverage industry. Does Coke compete against only carbonated beverages like Pepsi, or also against fruit juices, iced teas, flavored milk, bottled water or alcoholic beverages like beer?
- There are formal "market classifications" measured by statistical agencies (the Census Bureau in the US) for statistics generating purposes.
  Standard Industrial Classification (SIC) codes, North American Industrial Classification System (NAICS).
- 소주와 맥주, 운동화와 신사화, 양복과 등산복 등 상품에 따른 구분
- But these need not be the "true" markets.

대체성 Substitutability

- Key aspect: Two goods *i* and *j* could be considered to be in the same market if they are strong substitutes, as measured by the cross price elasticity of demand.

$$\eta_{ij} = \frac{\partial q_i}{\partial p_j}\frac{p_j}{q_i}$$

- We interpret this as the percent change in demand for good *i* that occurs when there is a 1 percent change in the price of good *j*.
- If the elasticity is large and positive, then *i* and *j* are reasonably close substitutes and could be considered to be in the same market.
- If the elasticity is positive but small, then *i* and *j* are not strong substitutes.
- If the elasticity is negative, then the good are complements. 이들을 이용한 판매전략은?

Market definition complications

- Geographic definitions; local markets regional markets, national markets.
- Stages of production process; markets in intermediate goods. Vertical relationships; franchising agreements, long-term contracts, restrictive trading practices.

시장지배력의 측정

- Moving from market structure to market performance: does high concentration necessarily mean poor efficiency?
- The Lerner Index: How close are outcomes to industry ideal?

$$LI = \frac{P - MC}{P}$$

- Measures “markup price” over marginal cost.
- For pure monopolist, Lerner Index is inverse of elasticity of demand. Less elastic demand means larger markups over marginal cost.
- Recall that for a perfectly competitive firm, the elasticity of demand for a single firm is infinite -> markup = 0.

수학적 접근

- Monopolist solves:

$$Max_Q: \pi(Q) = P(Q)Q - C(Q)$$

$$\frac{d\pi}{dQ} = P(Q) + QP'(Q) - C'(Q) = 0$$

$$P(Q) - C'(Q) = -QP'(Q)$$

$$\frac{P(Q) - C'(Q)}{P(Q)} = -\frac{QP'(Q)}{P(Q)} = \frac{1}{\eta}$$

Recalling that elasticity of demand is defined as:

$$\eta = \frac{P(Q)}{Q}\frac{1}{P'(Q)}$$

- For an industry of more than one firm (with potentially different prices and costs), calculating a Lerner Index is slightly more complicated:

$$LI = \frac{P - \sum_{i=1}^{N} s_i MC_i}{P}$$

where s_i is the market share of firm i, and N is the number of firms.

- LI is a summary measure of market outcomes; the larger the Index, the further we are from the competitive case, and so the larger is the exploitation of market power – and the larger is the associated welfare loss (review DWL in monopoly).

- LI can be difficult to estimate in practice; firm numbers and market shares are easy, but measuring demand elasticity or marginal cost are hard. Even measuring prices (except in an "average price" sense) can be difficult in some industries. Different research methodologies can give wildly varying results in the same industry. Error in estimating elasticity can give very different results.
- LI can be slightly misleading. Remember that in a long-run equilibrium, we need price to cover ATC, not just AVC. So in a high fixed cost industry, we would expect to see P > MC even in a fairly competitive industry.
- Consider many utilities, like electricity generation. There are very large fixed costs in building a plant, and low MC.

Estimating welfare loss

- How big are the welfare losses from monopoly power? Big question for policy.
- Goal; try to empirically measure the size of the deadweight loss triangle.
- Recall that DWL = ½(P – MC)(Q^c – Q)
  Express as proportion of sales revenue:

$$WL' = \frac{WL}{PQ} = \frac{1}{2}\frac{(P - MC)}{P}\frac{(Q^c - Q)}{Q}$$

- Recall that elasticity of demand tells us proportional increase in output to given decrease in price. If price were to fall from current P to competitive level, then output would rise to competitive level.

$$\eta = \frac{(Q^c - Q)/Q}{(P - MC)/P} \rightarrow\rightarrow \frac{(Q^c - Q)}{Q} = \eta\frac{(P - MC)}{P}$$

Estimating welfare loss 2

- Recall the definition of the LI = (P – MC)/P. Combining this with the line above gives:

$$WL' = \frac{WL}{PQ} = \frac{1}{2}\eta(LI)^2$$

- For a pure monopolist, recall that LI = 1/η, giving:

$$WL' = \frac{WL}{PQ} = \frac{1}{2}\frac{1}{\eta}$$

- Ie for a perfect monopoly case, DWL as fraction of current industry sales is 1 over twice demand elasticity.
- If we estimate η = 1.5, welfare loss is 33% of revenue. If we estimate η = 2, welfare loss is 20% of revenue.