

Measuring Market Power

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Consider diagnose whether imperfectly competitive practices may be a problem in a market?

A threshold question is how much market power do firms have?

How many firms are enough to "approximate" perfect competition?

- Static Bertrand: $N = 2$
- Static Cournot (linear demand):
 - 1 With $N = 3$, loss from market power is 6% of social surplus under perfect competition
 - 2 With $N = 7$, 1.5%.
- With collusion?

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Many economists use concentration indices for quick assessment:

- (a form of) Lerner index: $L = \sum_{i=1}^N s_i \frac{p_i - MC_i}{p_i}$ (share weighted average markup)
- N firm concentration ratio: $C_N = \sum_{i=1}^N s_i$
- Herfindahl index: $HHI = \sum_{i=1}^N s_i^2$

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Claim: Under general Cournot with N firms, with general (firm-specific) cost functions: $L = \frac{HHI}{-\varepsilon}$ where ε is the price elasticity of demand at market price

Proof: Under Cournot, the first order conditions are:

$$P(Q) + q_i \frac{dP}{dq_i} = MC_i$$

Which gives (after rearranging, and dividing both sides by P)

$$\begin{aligned} \frac{P - MC_i}{P} &= -q_i \frac{dP}{dq_i} \frac{1}{P} \\ &= \frac{-q_i}{Q} \frac{dP}{dq_i} \frac{Q}{P} = \frac{s_i}{-\varepsilon} \end{aligned}$$

Hence

$$L = \sum_{i=1}^N s_i \frac{P - MC_i}{P} = \sum_{i=1}^N \frac{s_i^2}{-\varepsilon}$$

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Empirical problems (even with the above)

- To measure L , you have to know MC .
- If we can measure MC , than we are almost there
- What if we can't measure MC ?
- Can try to use $L = \frac{HHI}{-\epsilon}$
- Can measure HHI easily
- Issues with this:
 - 1 The equivalence holds only under static Cournot

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- What happens to $L = \frac{HHI}{-\varepsilon}$ when there is collusion?
 - Claim: $L = \frac{1}{-\varepsilon}$ when collusion leads to firms acting as if they are a joint monopoly
 - "Intermediate" case: $L = \theta \frac{H}{-\varepsilon}$
 - $\theta = 1$: for static Cournot oligopoly
 - $\theta > 1$: for collusion
 - $\theta = \frac{1}{H}$: for joint monopoly collusion
 - $\theta = 0$: perfect competition
 - Can ask: $0 < \theta < 1$?
- Even if assume we observe θ , what about ε ?
- How do you estimate a demand function if what you observe are a series of $\{p, Q\}$ points (in different periods, in different markets)?
Simultaneity problem.

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Measuring demand / elasticity & HHI's

Problems and Examples: See Handout (US-AMR Merger & coffee example)