

Oligopoly Lecture 2

Economics 121

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(Briefly) The Midterm

- Most people did well, as I intended
 - What if you're an exception?
- Jenny will discuss in section
- Office hours
- Pick up your exam at *end* of lecture
- Friday is drop/add date
- Enrollment bureaucracy

Recall Cournot model

- When the assumptions make sense
 - Capacity that's cheap to use once built
 - Expecting price responses that preserve rivals' planned output levels
 - “Conjectural variation”
- How we solved it
 - Residual demand elasticity is e/s
 - Then easy algebra

Cournot: Intuitive Results

- Continuum between competition and monopoly
 - High concentration close to monopoly
 - Symmetric case: high concentration = small N
 - Low concentration close to perfect competition
 - Decreasing returns to decreases in concentration
 - Of course depends on measuring scale...

Cournot and Concentration

- Herfindahl index of concentration
 - Relates to weighted average gross margin
 - “industry average profit rate on sales” H/e
- Predict concentrated industries more profitable on average (comparing industries)
 - Expect cleaner results if allow for e as well as H
- Inside an industry, predict larger firms more profitable
 - High shares go with low MC
 - general formula
 - linear-demand case

Other Simple Oligopoly Models

- Other conjectural variations in prices?
 - Price-setting oligopoly
 - Price-matching
- Other conjectural variations in quantity?

Price-setting, static models

- Eschew conjectural variation
 - Game-theoretic purity
 - Is this sensible?

Undifferentiated Bertrand

- Two firms; each sets a price
 - One-shot (static) game...
- Lower price gets whole market
 - Split it if equal
 - Examples? Near-examples?
- Analysis with constant unit costs
 - Perhaps differing between firms
 - Drastic and non-drastic cost differences

Undifferentiated Bertrand, II

- Analysis with economies of scale
 - Average cost or marginal cost?
 - How fixed costs affect price, contrary to the Econ 101 slogan
 - Recall free-entry equilibrium (CP page 76)
- Capacity limits?

Concentration and Competition

- Cournot: High concentration may *signal that there's* little competition
- Causes of high concentration in Cournot:
 - Few firms: high concentration by definition
 - Asymmetric MCs: most-efficient firms face little competition, so dominate market
- Undifferentiated Bertrand: Fierce competition may *causally increase* concentration!

Stackelberg Model

- CP: “Stackelberg in quantity”
- First-mover advantage
 - Commit to being aggressive: rival backs off
 - Why would a firm “move first”?
- Contrast “Stackelberg in price”
- Extensive-form games
 - Simultaneous-move games in extensive form
 - CP Figure 6.9
 - Would it matter for the PD?

Differentiated products

- Examples—most goods?
- Differentiation makes a firm’s residual demand curve less elastic
 - Hard to lose all your sales, even if your price is high
 - Hard to attract all rival’s customers, even if your price is great
- Softens competition

Various Oligopoly Models

- Static (one-period) price-setting game
- Differentiated products
- Various approaches to differentiation
 - Space metaphor
- (Roughly) CP chapter 7

Measures of differentiation

- How much consumers care about which product, versus about price
- (Inverse measure) cross-elasticity of demand
 - Given rival's price, this contributes to your residual demand elasticity

Differentiated-product demand

- Demand (*quantity*) for good 1 *decreases* in price 1, *increases* in prices 2,...,n
- Inverse demand: *price* for good 1 *decreases* in *all* goods' *quantities*, but by more in good 1's
 - Difference in coefficients reflects differentiation
 - CP equations (7.4), (7.8)

For next time

- Read CP chapter 7 to page 220
 - “representative consumer model”

Hotelling Model

- Model of location given price $p > c$
 - Special case—no differentiation
 - Remember model of TV programming choice
 - Changes if prices also variable
 - Not so clear what happens then...
 - What if three firms rather than two

Hotelling Model

- Prices given locations
- Locations at ends of line segment
 - Could be away from ends—see problem set
- Each consumer wants just one unit
 - Could have own demand curve instead
- Firms set prices; Nash equilibrium in prices
 - Ignoring price *dynamics*, as discussed

Solving Hotelling Model

- Can calculate each firm's best-response function, e.g. $p_0(p_1)$
- Solve the simultaneous linear equations
 - What are we doing by doing that?
- Result: $p = c + t$
 - Makes sense qualitatively

Solving with Residual Demand

- Another way of solving the Hotelling price model
- Uses familiar concept of residual demand
- Calculated *slope* of residual demand:
 - It is $1/(2t)$
- In symmetric equilibrium, each firm's *quantity* = $\frac{1}{2}$
- Hence Lerner equation implies answer

Group (central) purchasing

- Already discussed idea, examples
- Let's see how it works in (otherwise) Hotelling model of differentiation, pricing
- If everyone else joined, would you?
 - Price if you join
 - Price if you don't?
 - “Transportation” cost if you do, if don't

Monopolistic Competition

- Free entry but soft competition
 - “Monopolistic competition”
 - Too many brands of toothpaste?
- How does residual demand elasticity vary with entry?
 - Entry increases competition: most models
 - Entry just shares demand: this model
 - Examples?

Bresnahan-Reiss

- CP page 78
- Entry against a monopoly or duopoly lowers price very noticeably
- Entry into oligopoly with 3+ firms doesn't do nearly so much
- "Workable competition" with 3+ firms?
- Is subsequent entry wasteful?

What makes competition monopolistic?

- Something about behavior?
 - Just don't rock the boat—keep price where it was
- Or something about product differentiation?
 - Then, entry may not be wasteful even if it doesn't affect price

Some announcements

- Problem set 2
 - Due
 - Correction
 - Fair warning
- My office hours today, next Tuesday
- Midterm next Thursday
- Reading: CP chapter 8, to page 267

SCP studies

- CP describe many difficulties in profit regressions
- What econometrics says about this
- Publication biases?