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’ \textit{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?