Review Notes – Oligopoly

• The Market Environment
  ▪ Define
  ▪ Types of Markets
  ▪ For oligopoly markets?
    • Why must oligopoly firms react to competitors but in other markets firms do not care about competitors behavior?

• Traditional Oligopoly models
  ▪ Assume a duopoly (what’s that?)
  ▪ Four types of models that we will consider (lots more possible)
    1. Price leader/follower
    2. Quantity leader/follower
    3. Collusion
    4. No followers but simultaneous decisions
  ▪ First define
    • Cournot model = each firm chooses output given belief about output of competing firm; equilibrium occurs where each firm’s expectations about competitors behavior is met.
    • Stackelberg model = Q leader/follower, with leader = dominant (smart) firm and follower = stupid firm (why?)
  ▪ What is a reaction function?
    • Definition
    • Graphically?
    • In which direction does profit go?
    • Make sure you know how reaction functions work.

• Stackelberg model
  ▪ Sequential Game
  ▪ Stupid (follower) firm always on reaction function.
  ▪ Dominant (smart) firm maximizes profit given that follower always on reaction function => leads to what conclusion?
  ▪ Make sure you know the equilibrium concept and result (i.e., where the firms end up graphically). Who ends up producing the monopoly output?
  ▪ Is this a Nash equilibrium?

• Cournot Model
  ▪ Simultaneous Game
  ▪ Both parties always on their reaction function
  ▪ Make sure you know the equilibrium concept and result (i.e., where the firms end up graphically).
  ▪ How does Cournot equilibrium compare to Stackelberg?
  ▪ If at Stackelberg equilibrium initially how do they get to Cournot equilibrium?
- Is this a Nash equilibrium?
- What is a Stackelberg bluff model?
- Collusion
  - Cooperative game
  - Total output is monopoly output
  - Be able to show graphically why collusion leads to incentives to cheat.
- Bertrand Model
  - Price leader/follower, with leader = dominant (smart) firm and follower = stupid firm (why?)
  - Assuming that P=MC => Bertrand leads to zero profits and price equal to the competitive price. Make sure you understand the logic for why this is true.

- Game theory and Oligopoly
  - What is game theory?
    - Definitions: Players, strategies, payoffs, payoff matrix, cooperative solution, non-cooperative solution.
    - Know how to set up a game given the initial conditions
  - Equilibrium concepts in game theory
    - Dominant strategy game = both parties always choose the same regardless of other party.
    - If no dominant strategy => what is the equilibrium concept?
    - Nash equilibrium = both chooses one strategy assuming the other party makes the best choice possible.
  - Prisoner’s Dilemma
    - Each party’s dominant strategy is to confess
    - Nash Equilibrium has both parties confessing => both worse off than if neither confessed.
    - Conundrum of Prisoner’s dilemma is that the cooperative solution is better but not chosen because (a) don’t trust the other party and (b) dominant strategy given payoffs is to confess.
    - What is the solution to the dilemma?
  - Mixed vs. Pure Strategy
    - Definition of both strategies – did pure strategy games previously
    - Do pure strategy games always have a Nash equilibrium?
    - What is a Nash equilibrium with mixed strategies? Make sure you can solve for mixed strategy equilibriums given a game.
  - Prisoner’s Dilemma in a Cartel (Collusion)
    - How is the game set up – choices = cheat or don’t cheat.
    - Same basic structure and solutions.
  - Repeated Games
    - What is a tit for tat strategy?
• How does repeating the game change the results, for example, with cartels’ prisoner’s dilemma game?

• Sequential Games
  • Previously had done simultaneous games. How do these differ from sequential games?
  • Does the order of decisions affect the outcome? How?
  • Make sure that you can set up a sequential game and find the equilibrium.