Competition and Market Structure

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Industry

Industry (market) – a collection of firms, each of which is supplying products that have some degree of substitutability, to the same potential buyers

- Common buyers for sellers
- Common sellers for buyers
- Relatively homogeneous product

Market Structure

Market Structure – those characteristics of the market that significantly affect the behavior and interaction of buyers and sellers

MARKET STRUCTURE-

- Basis for classification of Market:
  - number and size of sellers and buyers
  - type of the product
  - conditions of entry and exit
  - transparency of information

MARKET STRUCTURE

- There are Four market structures
  - Perfect competition
  - Monopoly
  - Monopolistic competition
  - Oligopoly

Perfect Competition - Market structure

- Many and small sellers, so that no one can affect the market
- Homogeneous product
- Free entry to and exit from the industry
- Transparent and free information

Pure Monopoly- market structure

- Only one producer in the industry
- The product does not have close substitutes
- Blocked entry

Monopolistic competition - structure

- Many and small sellers
- Differentiated product
- Free entry and exit
- Transparent and free information

Oligopoly – market structure

- An **oligopoly** is a market structure characterized by:
  - Few firms
  - Either standardized or differentiated products
  - Difficult entry

Interdependence

A key characteristic of oligopolies is that each firm **can** affect the market, making each firm's choices dependent on the choices of the other firms. They are **interdependent**.

Features /Characteristics of Oligopoly

- There are Few sellers in the market
- Firms are interdependent
  any one's Firm action directly affect other rivals.
- Products are identical or differentiated
- Price in oligopoly tend to be sticky/rigid.

  - Once price is set remains unchanged for relatively longer period of time.
- Barrier to entry is difficult

  - it is difficult for new firms to enter

Types of Oligopoly

- Collusive Oligopoly

  VS

  Non-Collusive Oligopoly

Collusive Oligopoly

- Firms collude/make agreement so as to determine their Output and price.
- The agreement can be either:

  Open or Tacit/secret Agreement
- Why do they Collude?

- to avoids uncertainty that may arise from interdependence of firms

  i.e. to adopt strategic cooperation

Types of Collusive Oligopoly

- The two main types of Collusive Oligopoly are:

  Cartels and Price Leadership

- Cartels

  - it is a cooperation of firms whose objective is to limit/reduce the scope of competition among Firms and to act as a Monopoly. Eg OPEC Countries

Collusive Oligopoly

- Price Leadership

  - One Firm will set the Market Price and

    others followed/adopt it.

- It is more common than cartel
- Eg. IBM Computer Manufacturer

Non-Collusive Oligopoly

- Firms do not enter into collusive agreement.
- That is, there is no cooperation among the rivals Firms
- Therefore, each Firm develops an expectation about what the other Firms are likely to do, Since Firms are interdependence.

Non-Collusive Oligopoly

- For example, when a Firm decrease its Price, it expect some reaction from the rivals, a decrease in price.
- There are a number of non-Collusive Oligopoly Models that give us Stable solution to the Oligopoly Problem that may arise.

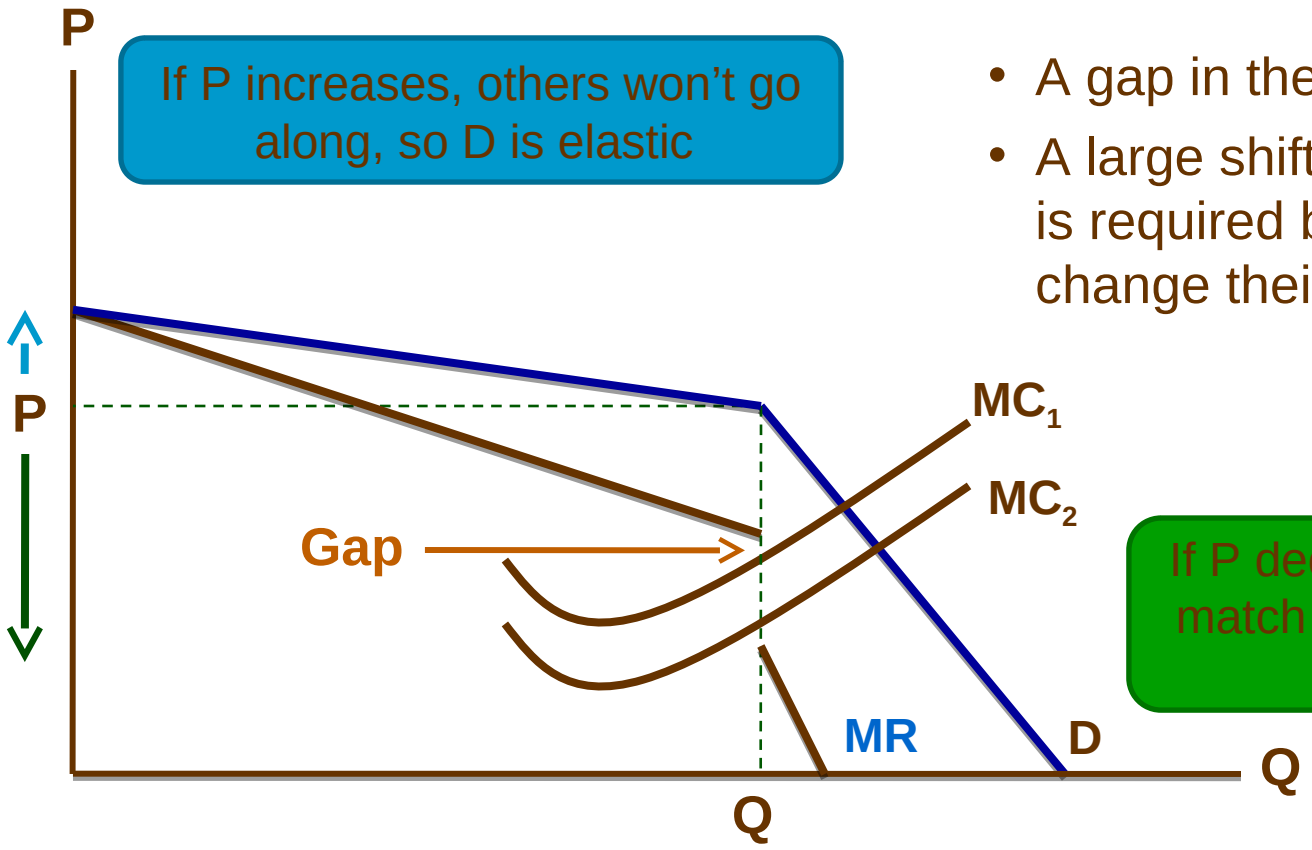
Non-Collusive Oligopoly Models

- The Kinked Demand(Sweezy) Model
- The Cournot Duopoly Model
- Etc.

Kinked Demand Curve

- The Kinked Demand(Sweezy) Model:
  - If a firm increases price, others won't go along, so demand is very elastic for price increases
  - If a firm lowers price, other firms match the decrease, so demand is inelastic for price decreases

The Kinked Demand Curve Graph



- A gap in the MR curve exists
- A large shift in marginal cost is required before firms will change their price

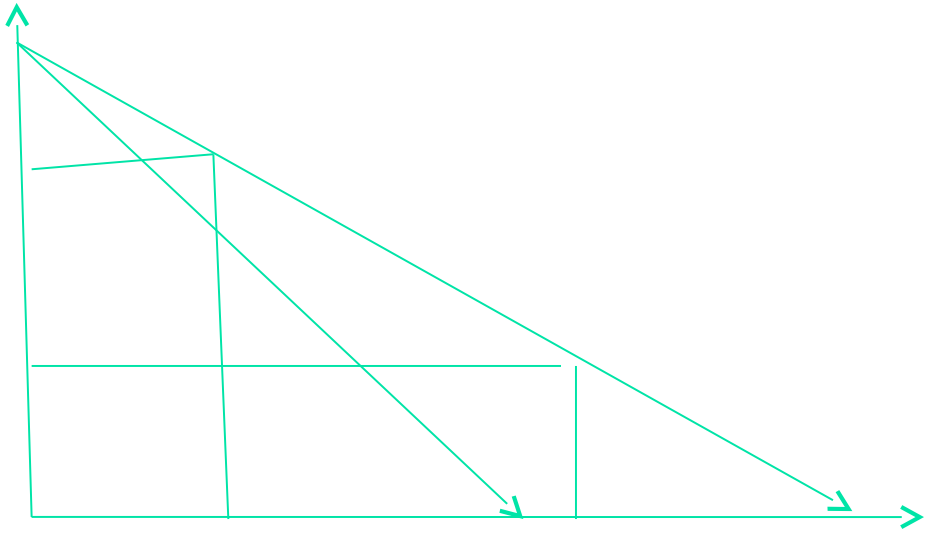
If P decreases, other firms match the decrease, so D is inelastic

Cournot Duopoly Model

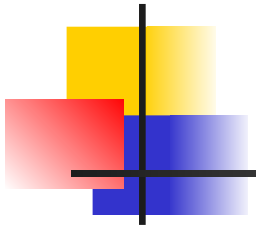
- Cournot – is the name of the Economist that formulated the Model
- Duopoly – two Firm competing with each other
- Cournot Duopoly Model Assumption
  - Only two Firms(Duopoly)
  - Two Firms producing identical Products
  - Two Firms have identical cost curves
  - The two Firms cannot collude.

Perfectly Competitive and Monopoly Outcome

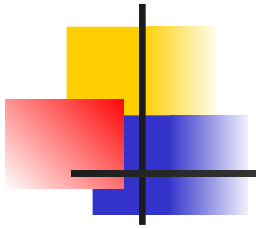
- Consider the foll fig.



- For simplicity assume MC=ATC is constant
- Recall that under perfectly competitive , the long-run profit will be zero. The perfectly competitive outcome will occur where the demand curve interesects the marginal cost curve. Quantitity produced will will be 4000 units and the price will be $2. Note that this output total revenue will be $8,000 while total cost is also $8,000 leaving zero profit. The monopolist outcome will be where MR=MC. At this point the quantity produced will be 2000units and the price will be $4.



- The problem for the duopolist is that the firm when choosing their output levels must take into acount the actions of the other firm.
- For example , if Firm A and Firm B are in a duopoly, Firm A’s output decision will depend on how much Firm B produces. The quantity that Firm A can sell is based on the total quantity demanded in the market minus the quantity supplied by Firm B.
- To analyze duopoly behavior we need to examine the reaction functions for each Firms. The reaction function shows the Firm’s optimal, profit maximizing output decision given what the other firm has decided to produce.



- What is Firm A’s optimal output if Firm B decides to produce nothing? If Firm B produces nothing, then Firm A becomes the only Firm in the industry and will thus produce at the monopolist output level. That is Firm A will produce 2,000units of output. Thus, one point in Firm A’s reaction function is (0, 2000).
- What will be Firm A’s optimal output level if Firm B decides to produce 4,000units. If Firm B produces 4,000units then Firm B will be producing at the perfectly competitive outcome. At that output level there will be zero economic profits. If Firm A tries to produce anything beyond that level,then MC will exceed MR and Firm A will lose money. The optimal solution will be for Firm A to produce 0 units. Another point on Firm A’s reaction function will be (4,000,0).

Reaction Curves for Firm A and B.

- Connecting these points will yield us the reaction curve for Firm A. Similarly we can derive the reaction function for B. Notice that the two reaction curves intersect. The point of intersection is called the best response equilibrium.
- Given the other firm’s output production, both firms will do best to produce at the best response equilibrium. In this case both firms will produce 1333.33 units of output. The duopoly total outcome is more than the monopoly outcome of 2,000units but less than the perfectly competitive of 4,000 units.

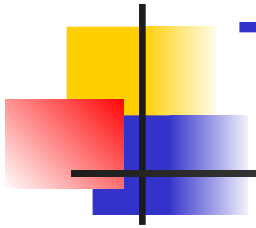


Non-collusive Oligopoly &The Game Theory

- Each oligopolist is uncertain about its rival's behavior.
- The collective interests of the oligopoly are protected if no one cuts the market price.
- But an individual oligopolistic could lose if it holds the line on price when rivals reduce price.
- The payoff to an oligopolist's price cut depends on how its rivals respond.

The Game Theory

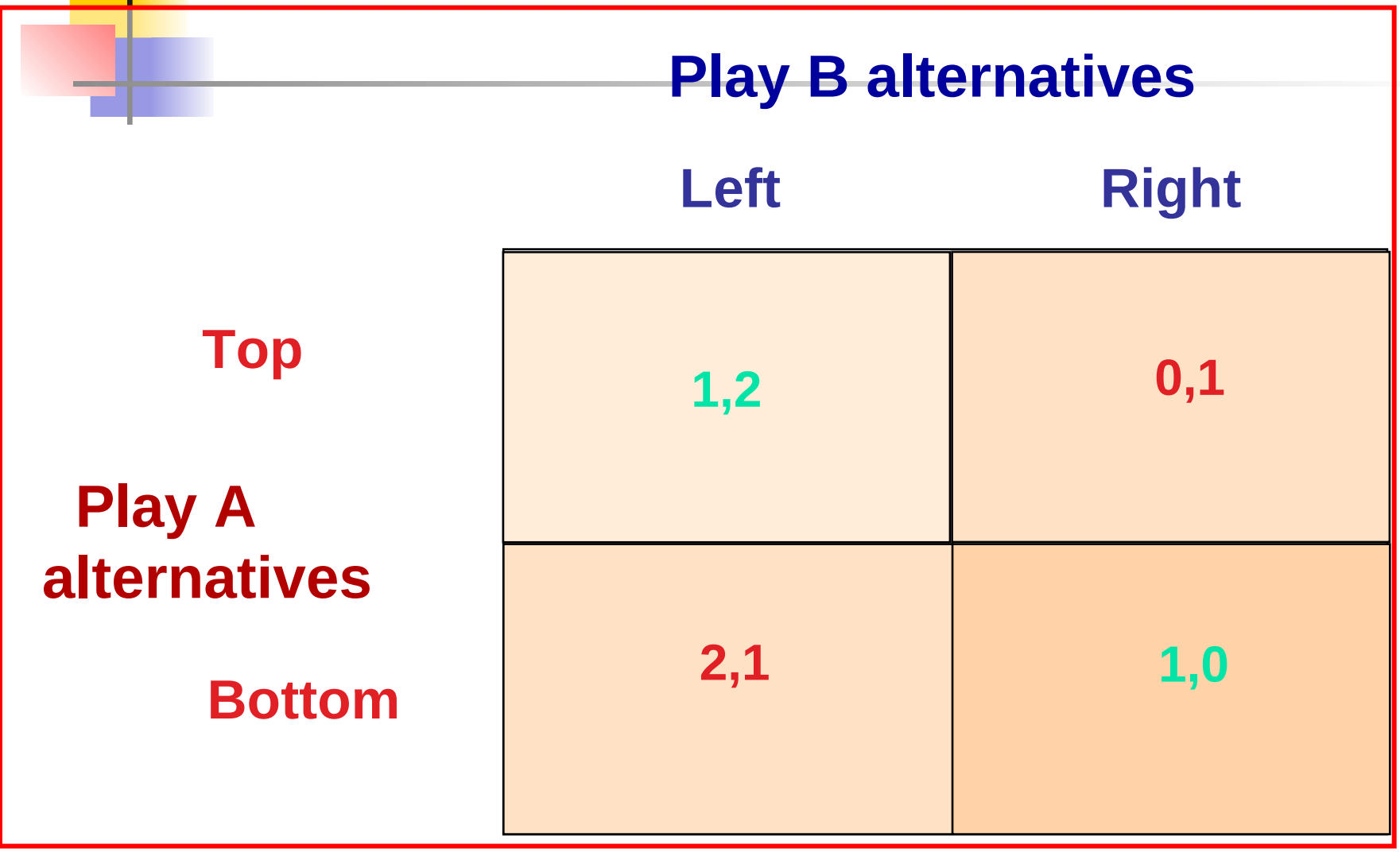
- Game theory – the study of multi-person decision problems (the reactions of a few interdependent decision makers)
- Game - any situation that involves well-defined rules and outcomes, where outcomes are dependent on players' strategic decisions
- Strategy – a complete plan, specifying the game under ***any*** possible circumstances



Two play Game

- Suppose that only two person(A and B) are playing a simple game, and each has two strategies to play
- How can we decide the best strategy for playing a game?
- How can we determine the most likely outcome? How can we get the equilibrium solution?

The Pay Off Matrix of A game



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...Cont.

- From the viewpoint of Player A, it is always better for him to play Bottom. Since his payoff from this choice (2 or 1) are always greater than their corresponding entries in top(1 or 0).
- Similarly, it is always better for player B to play left. Since his payoff (2 or 1) dominate (1 or 0).
- Thus, we would expect that the equilibrium strategy for A is to play bottom and B to play left.

Dominant strategy

- Dominant Strategy:-is the optimal(best) choice of strategy for each player no matter what the other player does.
- Whatever choice B makes, player A will get a higher payoff if he plays bottom, so it make sense for A to play bottom. And whatever choice A makes, B will get a higher payoff if he plays left. Hence, bottom and left dominates the alternatives and we have equilibrium in dominant strategy.

Dominant strategy

- If there is a dominant strategy for each player, in some game, then we would predict that it would be the equilibrium outcome of the game.
- In this example, we would expect an equilibrium outcome in which A plays bottom, receiving an equilibrium payoff 2, and B plays left, receiving an equilibrium payoff 1.

Nash Equilibrium

- Dominate strategy equilibrium are nice when they happen, but don't happen all the time. This is because we may not have a dominant strategy equilibrium when the optimal(best) choice of one depends on what he thinks the other will do. If this is the case, we call the equilibrium Nash Equilibrium.

Nash Equilibrium

- Consider the following two player game again.
- In this case dominate strategy don’t happen

The Pay Off Matrix -Nash EQulibrium

Play A alternatives	Play B alternatives: Left	Play B alternatives: Right
Top	1,2	0,0
Bottom	0,0	1,2

fig

Nash Equilibrium

- Here when B chooses right, the payoff to A are 0 or 1.
- This means that when B chooses left, A would want to choose top, and when B choose right, A would want to choose bottom. Thus, A’s optional choice depends on what he thinks B will do and vice versa.

Nash Equilibrium

- Thus, we will say that a pair of strategies is a Nash equilibrium if A's choice is optimal given B's choice, and B's choice is optimal given A's choice.
- Remember that neither person knows what the other players will do when he has to make his own choice of strategy. But each person may have some expectation about choice of the other person

The Prisoners' dilemma

Two suspects, Valio and Georgy, are arrested by the police. The police have insufficient evidence for a conviction, and, having separated both prisoners, visit each of them to offer the same deal: if one testifies for the prosecution against the other and the other remains silent, the betrayer gets 3 months and the silent accomplice receives the full 10-year sentence. If both stay silent, both prisoners are sentenced to only 1 year in jail for a minor charge. If each betrays the other, each receives a three-year sentence. Each prisoner must make the choice of whether to betray the other or to remain silent. However, neither prisoner knows for sure what choice the other prisoner will make. So this dilemma poses the question: How should the prisoners act?

Pay Off Matrix -The Prisoners' dilemma

Geremew's alterantives	Bekele's alternatives: Does not confess	Bekele's alternatives: Confesses
Does not confess	Everyone gets 1 year	Geremew - 10 years Bekele - 3 months
Confesses	Geremew - 3 months Bekele- 10 years	Everyone gets 3 years

fig

Nash Equilibrium

- Thus, Gremew is better of confessing. The same is true for Bekele- he is better of confessing.
- Thus, the unique Nash Equilibrium for this game is for both to Confess.
- In fact, both player's confessing is not only a Nash Equilibrium, it is dominant strategy.

Features of the four market structures

Type of market	Number of firms	Freedom of entry	Nature of product	Examples	Implications for demand curve faced by firm
Perfect competition	Very many	Unrestricted	Homogeneous (undifferentiated)	Cabbages, carrots (approximately)	Horizontal: firm is a price taker
Monopolistic competition	Very Many	Unrestricted	Differentiated	Builders, convenience stores	Downward sloping, but relatively elastic
Oligopoly	Few	Restricted	Undifferentiated or differentiated	Cement cars, electrical appliances	Downward sloping. Relatively inelastic (shape depends on reactions of rivals)
Pure Monopoly	One	Restricted or completely blocked	Unique	Local water company	Downward sloping: more inelastic than oligopoly. Firm has considerable control over price