

# CH 13 - Oligopoly and Strategic Behavior



# Oligopoly

- **Oligopoly**
  - A market situation in which there are only a few sellers
  - Each seller knows that the other sellers will react to its changes in prices and quantities
  - Strategic dependence
  - Firms must decide whether to **collude** or **compete**!

# Two Conflicting Tendencies

- What is best for the individual firm often conflicts with what is best for the industry (or what is best for you and me!)
- P and Q will depend on whether the firms collude or compete.
  - Pattern #1: Collusive agreements breakdown, this spurs intense price competition that, in turn, sow the seeds of another collusive effort, and the cycle repeats.
  - Pattern #2: Collusive agreements tend to be stable because all parties recognize that it is in their best interest to maintain a higher price structure.

# Game Theory

- Game theory
  - Branch of mathematics that economists use to analyze the strategic behavior of decision makers
  - Can help us determine the best course of action among players in a game
- Basic components of a game
  - Players
  - Strategies
  - Payoffs

# Prisoner's Dilemma

- You and your partner rob a bank and get caught.
- The District Attorney offers to go easy on you if you confess to the crime.
- What would you do, what should you do?

# The Prisoner's Dilemma

*Study the following payoff matrix for a Prisoner's Dilemma game. Both partners agree never to rat on each other (Don't Confess to the authorities). But they are interrogated separately.*

		Tony	
		Confess	Don't Confess
Manny	Confess	10 years in jail 10 years in jail	25 years in jail goes free
	Don't Confess	goes free 25 years in jail	1 year in jail 1 year in jail

# Analyzing the Prisoner's Dilemma—1

		Tony	
		Confess	Don't Confess
Manny	Confess	10 years in jail	25 years in jail
	Don't Confess	25 years in jail	1 year in jail

# Analyzing the Prisoner's Dilemma—2

		Tony	
		Confess	Don't Confess
Manny	Confess	10 years in jail 10 years in jail	goes free 25 years in jail
	Don't Confess	25 years in jail goes free	1 year in jail 1 year in jail

**Dominant strategy equilibrium  
Nash equilibrium**

**Cooperative outcome**



# Game Theory

- Dominant strategy
  - A best response for a player to choose no matter what the other player chooses
  - Not all games or players in a game have a dominant strategy
- Nash equilibrium implications?
  - If *both* players have a dominant strategy, the intersection of those dominant strategies will be the Nash equilibrium.
  - Neither player will want to unilaterally deviate.

# The Nash Equilibrium

- A **Nash Equilibrium** is characterized as: *a point at which neither player can do better by changing his strategy while the other player's strategy remains unchanged.*

# Advertising and the Prisoner's Dilemma

		Coca-Cola	
		Advertises	Does Not Advertise
PepsiCo	Advertises	\$100 M \$100 M	\$75 M \$150 M
	Does Not Advertise	\$75 M \$150 M	\$125 M \$125 M

**Nash equilibrium**

**Cooperative outcome**

# Intuition of Advertising Prisoner's Dilemma

- Advertising
  - If both firms advertise, costs go up, but each firm's campaign cancels out the other.
  - Both firms would be better off NOT advertising.
  - But, if one firm agrees to not advertise, the other firm would.



# Payoff Matrix

PLAYER 2

A

B

C

PLAYER 1

A

B

C

1	2	3
8	1	6
4	5	6
3	5	7
7	8	9
4	9	2

equilibrium

# Multiple Equilibria

PLAYER 2

A

B

C

PLAYER 1

A	1 8	2 1	3 6
B	4 3	5 5	6 7 equilibrium
C	7 4	8 9 equilibrium	0 2

# Conclusion

- Oligopoly
  - A market structure in which there are a small number of firms
  - Firms interact strategically
  - Can be competitive
  - Can be collusive
- Game Theory
  - How to model the strategic interaction between firms
  - Dominant Strategy
  - Nash Equilibrium