

Economics 101 – Section 5

Lecture #23 – April 15, 2004

Oligopoly
Game Theory

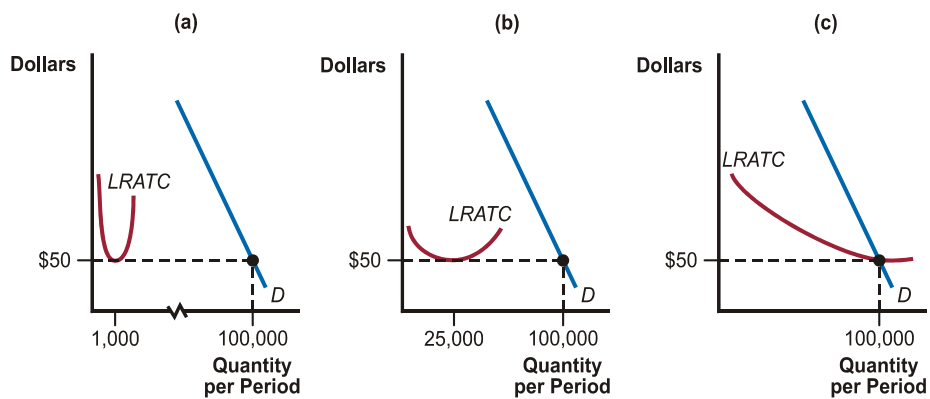
Oligopoly

- An oligopoly is a market dominated by a small number of strategically inter-dependent firms
 - Strategic here since the firms actions directly affect those of the other firms
 - Since there are a small number of firms, they realize the interaction amongst themselves
 - This creates an incentive to act strategically since:
 - “They know that I know that they know that I know that...”
- Under monopolistic competition and perfect competition there were so many buyers and sellers that no one firm could affect any other firm

Oligopoly

- Why do oligopolies exist?
 - 1) economies of scale – arise because of minimum efficient scale
 - Construction companies at the local level
 - Biotech companies
 - Multinational corporations
 - Railroad companies

Figure 3 Minimum Efficient Scale and Market Structure



Oligopoly

- Why do oligopolies exist?
 - 1) economies of scale – arise because of minimum efficient scale
 - 2) Reputation as a barrier
 - Strategic barriers
 - Government created barriers
 - US steel companies
 - Zoning

Oligopoly

- How to capture this strategic interaction among firms?
- Mostly use **Game Theory**
 - This captures explicitly the strategic interaction between firms
 - Strategies
 - Dominant strategy
 - Weakly vs. strictly dominant strategy
 - Dominated strategy

Oligopoly

- Classic example of the prisoners dilemma
 - Two people (Colin and Rose) have committed a crime – say murder
 - They were both seen beating two people – one person got away and the other - less fortunate, person was actually murdered
 - No body was ever found – only these two people know where it is.
 - If they both keep their mouths shut then they will only get convicted of assault – each gets 5 years
 - However, if one (i.e. Colin) confesses and agrees to a plea bargain then they get 3 years but the other individual (Rose) gets 30 years
 - If they both confess then they each get 20 years

Oligopoly

- Classic example of the prisoners dilemma
 - Also assume they Colin and Rose did not really know each other before the crime and do not really care what will happen to each other in the future.
 - What is the solution here?
- Consider the payoff matrix where Rose's sentence is in orange and Colin's sentence is in purple

Figure 4 The Prisoner's Dilemma

		Colin's Actions	
		Confess	Don't Confess
Rose's Actions	Confess	Rose gets 20 years Colin gets 20 years	Rose gets 3 years Colin gets 30 years
	Don't Confess	Rose gets 30 years Colin gets 3 years	Rose gets 5 years Colin gets 5 years

Example – A game between Super Powers

- US vs. its old nemesis USSR (CCCP)
- Cuban missile crisis circa 1962
- Background
- Each country has two options
 - 1) Launch
 - 2) Do not launch (immediately)– if they choose not to launch this just means they decide to wait a little while (a few extra minutes or hours) before deciding whether to press the button

Example – A game between Super Powers

- If neither firm launches then there are no casualties on either side – i.e. deaths for each country =0
- If the US decides to launch and Cuba does not launch right away, US loss of life will be 60 million while in the USSR loss of life will be 120 million
- If US does not launch but the USSR does, US loss is 150 million and USSR loss is 40 million
- If both launch at the same time, US loss of life=100 million and USSR loss of life=80

Example – A game between Super Powers

- Also assume that the goal of each country is to minimize the number of dead citizens
 - With that goal stated though – each country would like to destroy the other if it would not lead to any loss of life in their own country
- Payoff matrix:

		USSR	
		Launch	Don't Launch
US	Launch	(-100, -80)	(-60, -120)
	Don't Launch	(-150, -40)	(0, 0)

Example – A game between Super Powers

- What is the US best response if USSR launches?
- What is the US best response if USSR does not launch?
- What is the USSR best response if US launches?
- What is the USSR best response if the US does not launch?

Example – A game between Super Powers

- In this example neither country has a dominant strategy – that is, neither country will take only one action no matter what the other country does
 - Their actions will depend critically on the other country
- There are two possible outcomes to this game
 - 1) both launch
 - 2) both do not launch – This was the actual outcome -
 - * This is also the most efficient outcome since no one actually dies

Example – A game between Super Powers - modification

- What if both countries think that their plan of attack is so good that if they launch first that only one nuc from the other country will hit killing only 1 million people?
 - It turns out this does not change the outcome(s) from this game

		USSR	
		Launch	Don't Launch
US	Launch	(-100, -80)	(-1, -120)
	Don't Launch	(-150, -1)	(0, 0)

Figure 5 A Duopoly Game

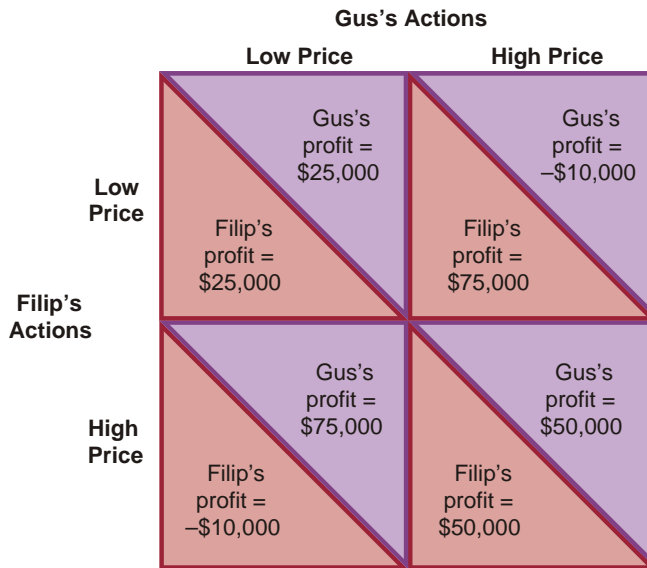


Figure 7 An Advertising Game

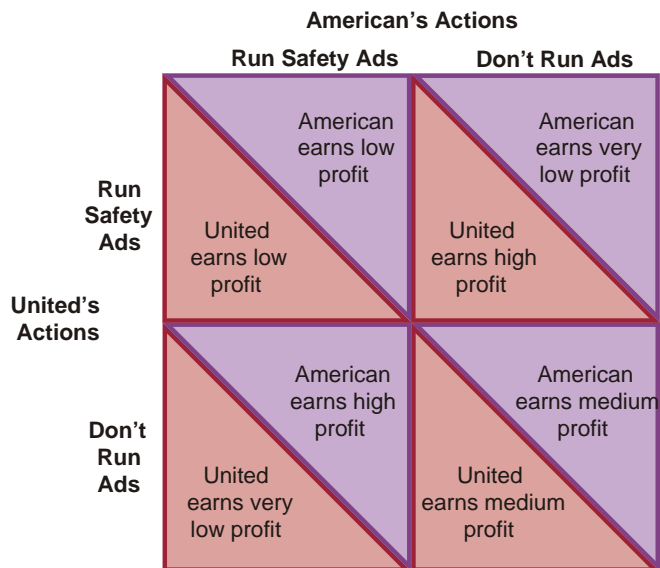


Table 1 A Summary of Market Structures

	Perfect Competition	Monopolistic Competition	Oligopoly	Monopoly
ASSUMPTIONS ABOUT:				
Number of Firms	Very many	Many	Few	One
Output of Different Firms	Identical	Differentiated	Identical or differentiated	–
View of Pricing	Price taker	Price setter	Price setter	Price setter
Barriers to Entry or Exit?	No	No	Yes	Yes
Strategic Interdependence?	No	No	Yes	–
PREDICTIONS:				
Price and Output Decisions	MC = MR	MC = MR	MC=MR while anticipating other firms actions	MC = MR
Short-Run Profit	Positive, zero, or negative	Positive, zero, or negative	Positive, zero, or negative	Positive, zero, or negative
Long-Run Profit	Zero	Zero	Positive or zero	Positive or zero
Advertising?	Never	Almost always	Yes, if differentiated product	Sometimes