

ECON 101: Principles of Economics I

Lecture Note 15

University of Michigan at Ann Arbor

Last Edit Date: 01/6/2023

Disclaimer and Term of Use:

1. We do not guarantee the accuracy and completeness of the summary content. Some of the course material may not be included, and some of the content in the summary may not be correct. You should use this file properly and legally. We are not responsible for any results from using this file.
2. Although most of the content in this summary is originally written by the creator, there may be still some of the content that is adapted (derived) from the slides and codes from *Professor Mitchell Dudley*. We use those as references and quotes in this file. Please [contact us](#) to delete this file if you think your rights have been violated.
3. This work is licensed under a [Creative Commons Attribution 4.0 International License](#).

Lecture 15: Oligopoly

Monday, November 28, 2022 12:17 PM

The Prevalence of Oligopoly

Imperfect competition - when no one firm has a monopoly, but producers nonetheless realize that they can affect market prices.

- Oligopoly - an industry with only a small number of producers (market share)
- Oligopolist - producer in such an industry

Herfindahl-Hirschman Index (HHI) (determine Oligopoly or not)

The Herfindahl-Hirschman Index (HHI) for an industry is the square of each firm's share of market sales summed over the firms in the industry.

- If an industry has 3 firms and market shares are 60%, 25%, and 15%, then HHI is:

$$HHI = 60^2 + 25^2 + 15^2 = 4450$$

Industry	HHI	Largest Firms
PC Microprocessors	6,190	Intel, AMD
Wide-body Aircraft	5,008	Boeing, Airbus
Operating Systems	4,809	Windows, MacOS, Linux
Smartphone O.S.	4,326	Android, Apple
Warehouse Stores	3,730	Costco, Sam's Club
Game Consoles	3,706	Nintendo, Xbox, Playstation

HHI scales:

0 - 1500: Strongly competitive

1500 - 2500: Moderately concentrated

2500 - 10000: Oligopoly (highly concentrated)

*10000 => Monopoly (100*100 = 10,000)

Two-firm oligopoly => duopoly

Production behavior

- **Collusion** - Sellers engage in collusion when they cooperate to raise each others' profits
 - Cartel - an agreement by several producers that increase their combined profits by telling each one how much to produce
- **Non-cooperative behavior** - ignoring the effects of their actions on each others' profits

2 firms: each firm is producing $\frac{Q_1}{2} \rightarrow \frac{Q_1}{2} + \frac{Q_1}{2} = Q_1$

Production Behavior (Duopoly)

- Assume MC = 0 and FC = 0 (assume no costs)

Price	Quantity	Total Revenue	Marginal Revenue
\$12	0	\$0	
\$11	10	\$110	\$11.00
\$10	20	\$200	\$9.00
\$9	30	\$270	\$7.00
\$8	40	\$320	\$5.00
\$7	50	\$350	\$3.00
\$6	60	\$360	\$1.00
\$5	70	\$350	-\$1.00
\$4	80	\$320	-\$3.00
\$3	90	\$270	-\$5.00
\$2	100	\$200	-\$7.00
\$1	110	\$110	-\$9.00
\$0	120	\$0	-\$11.00

Perfect Competition:

Demand intersects $MC = 0$

$\rightarrow P = 0, Q_T = 120, \pi_T = 0$

Monopoly:

MR intersects $MC = 0$

$\rightarrow Q_T = 60, P = 6, \pi_T = 360$

Duopoly (Firm A and B):

Cartel $\rightarrow$ Operate like a monopolist

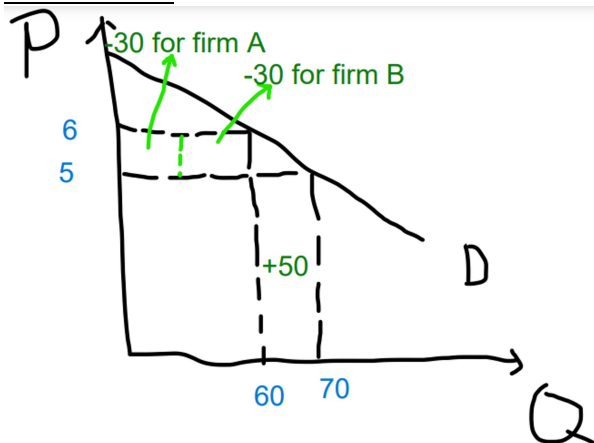
$Q_T = 60, P = 6$

$Q_A = 30, Q_B = 30, Q_T = Q_A + Q_B$

$\pi_A = 6 \times 30 = 180$

$\pi_B = 6 \times 30 = 180$

Firm A cheats:



If firm A "cheats" and produces 40 units ($Q_A = 40$)
then $Q_T = Q_A + Q_B = 40 + 30 = 70$.

$\rightarrow P = 5$

Profit(a) = $5 \times 40 = 200$

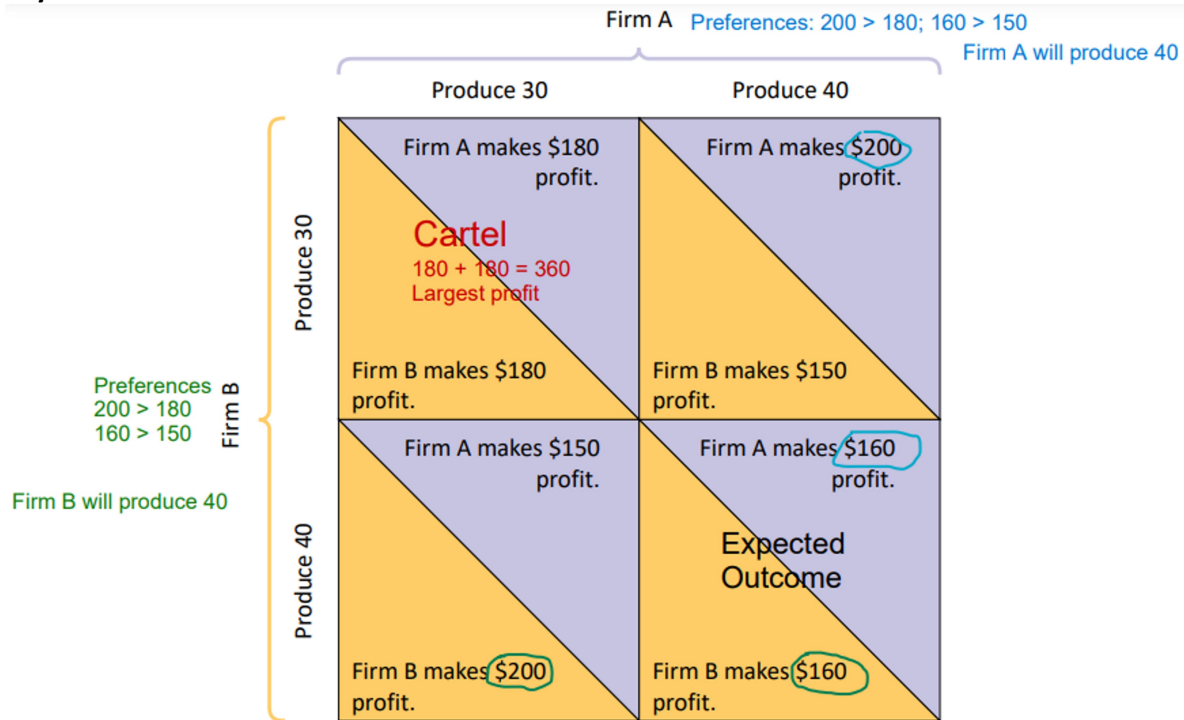
Profit(b) = $5 \times 30 = 150$

Both firms cheat:

If both cheat, then $Q_A = 40, Q_B = 40, Q_T = 80 \rightarrow P = 4$

$\pi_A = 4 \times 40 = 160, \pi_B = 4 \times 40 = 160$

Payoff Matrix



Game Theory

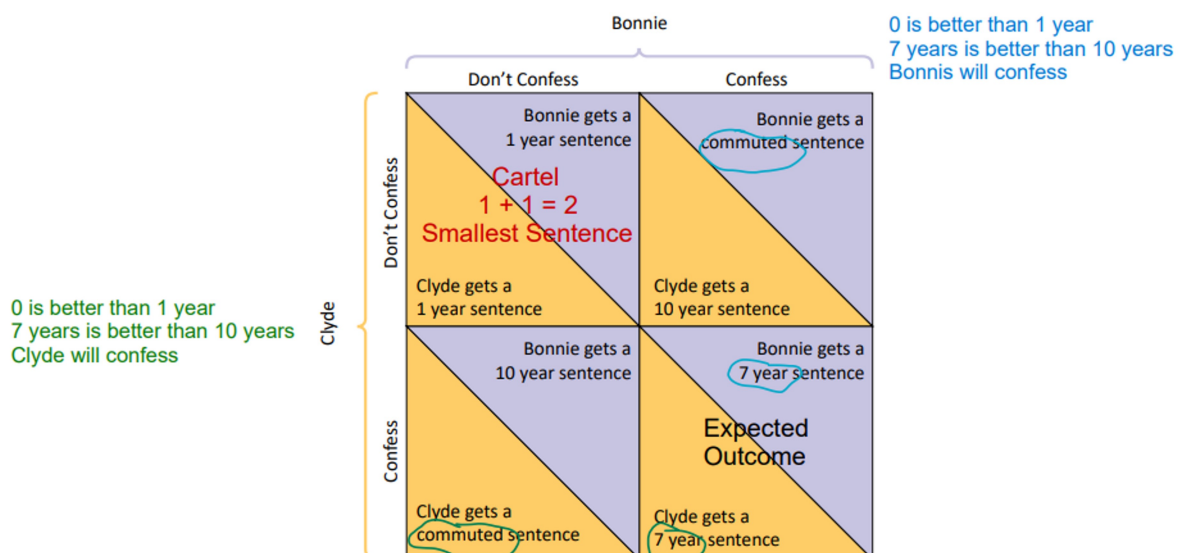
Interdependence - the decisions of two or more firms significantly affect each others' profits

Game theory - the study of behavior in situations of interdependence

The Prisoner's Dilemma

- **Payoff** - the reward received by a player in a game, such as the profit earned by an oligopolist
- **Payoff matrix** - shows how the payoff to each of the participants in a two game depends on the actions of both

Prisoner's Dilemma (Bonnie and Clyde)



Dominant strategy - a player's best action regardless of the action taken by the other player

Clyde's dominant strategy is confess; Bonnie's is confess

Nash equilibrium, also known as a non-cooperative equilibrium - the result when each player in a game chooses the action that maximizes his or her payoff given the actions of other players, ignoring

the effects of his or her action on the payoffs received by those other players

Repeated Interaction

Strategic behavior - Sacrificing short-run profit to influence future behavior

- Tit for tat (do the same thing to other person back next time)

Simplifying assumption for ECON 101: The person playing "tit for tat" will start at the "cartel" option.

Tacit collusion - When firms limit production and raise prices in a way that raises each others' profits, even though they have not made any formal agreement

Repeated Interaction

		Firm A	
		Tit for tat	Always Cheat
Firm B	Tit for tat	Firm A makes \$180 profit each year. Firm B makes \$180 profit each year.	Firm A makes \$200 profit in the first year, and \$160 each later year. Firm B makes \$150 profit in the first year, and \$160 each later year.
	Always Cheat	Firm A makes \$150 profit in the first year, and \$160 each later year. Firm B makes \$200 profit in the first year, and \$160 each later year.	Firm A makes \$160 profit each year. Firm B makes \$160 profit each year.

Oligopoly in Practice

Though oligopolies under legal restrictions in the form of antitrust policy, many succeed in achieving tacit collusion.

Tacit collusion is limited by a number of factors, including

- Large numbers of firms
- Complex pricing (more complicated pricing system, harder to deal with)
- Conflicts of interest among firms

Restraint of Trade and the Antitrust Laws

Antitrust laws make it illegal to restrain trade or attempt to monopolize a market.

- Sherman Antitrust Act of 1890 (federal)
- Clayton Act of 1914

Some economists argue that the law as a whole are inefficient and should be repealed

While majority of dissenting economist only argue the individual points of the laws

For example:

- Resale Price Maintenance (some are legal today)
Producer of a good does not dictate the price (can suggest a price to sell)

- Predatory Pricing (illegal)

Pricing below cost

- Tie-in Sales (illegal*)

Buy things in bundles

* Case by case evaluated