

Market Structures

Different Kinds of Competition

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2015

- 1 Competitive Markets
- 2 Monopoly
- 3 Oligopoly
- 4 Monopolistic Competition

Outline

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CM Features

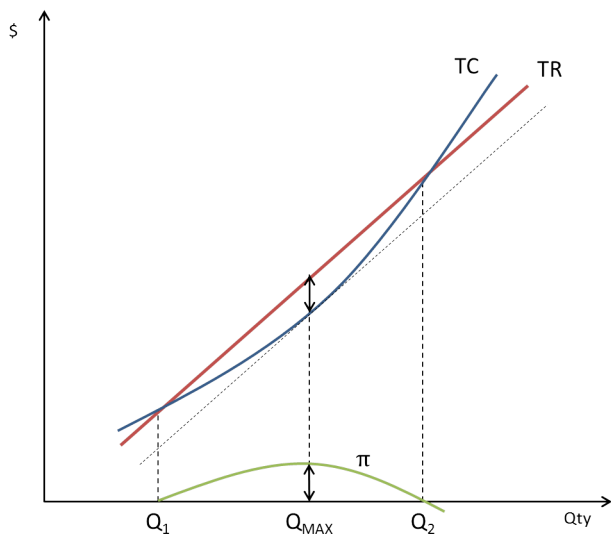
- Simple reference model applying only on few industries
- Many buyers and sellers with insignificant market shares
- Homogeneous product
- Everyone is a *price-taker*, no chance to change the price
- Firms can enter or exit the market freely in the Long-run, no entry-barriers
- No information barriers so that technology spreads freely (no patents, copyrights etc.)

Variables

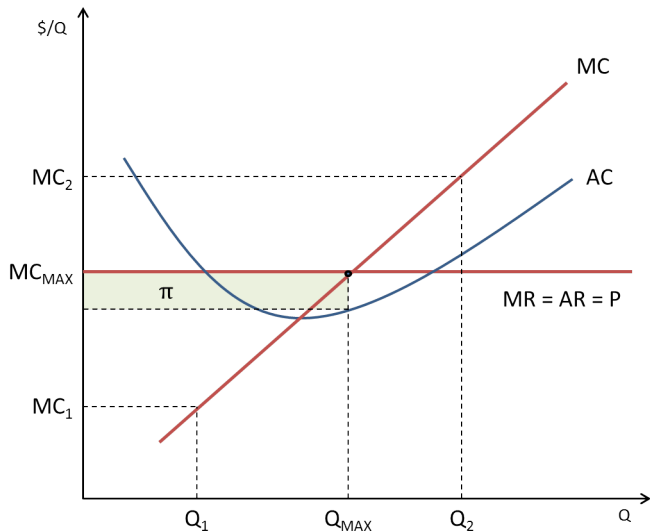
- Summary of presentation 05 *Theory of Firms*
- Quantity produced (Q), Price (P)
- Costs
 - **Variable Costs** (VC) - associated with quantity produced (the more we produce, the more it costs), usually cost of labor, every factor in the Long Term (LR)
 - **Fixed Costs** (FC) - payed once in Short Run (SR) and cannot be spared (the more we produce, it costs the same), usually cost of capital
 - **Total Costs** (TC) - $TC = VC + FC$
 - **Average values** of VC, FC and TC (AVC, AFC, AC) - $AVC = \frac{VC}{Q}$,
 $AFC = \frac{FC}{Q}$, $AC = \frac{TC}{Q}$
 - **Marginal Costs** (MC) - change of TC with additional Q, $MC = \frac{\delta TC}{\delta Q}$
- Revenues
 - **Total Revenues** (TR) - all items sold, $TR = P \cdot Q$
 - **Average Revenue** (AR) - $AR = TR/Q$
 - **Marginal Revenue** (MR) - change of TR with additional Q,
 $MR = \frac{\delta TR}{\delta Q}$

Maximizing Firm's Profit

- Profit: $\pi = TR - TC$
- Firm maximize its profit when $MC = MR \Leftrightarrow \frac{\delta TC}{\delta Q} = \frac{\delta TR}{\delta Q}$

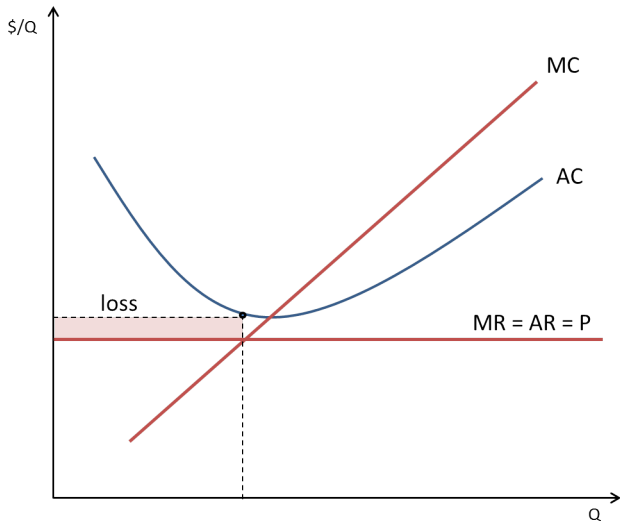


Maximizing Firm's Profit (Marginal Values)



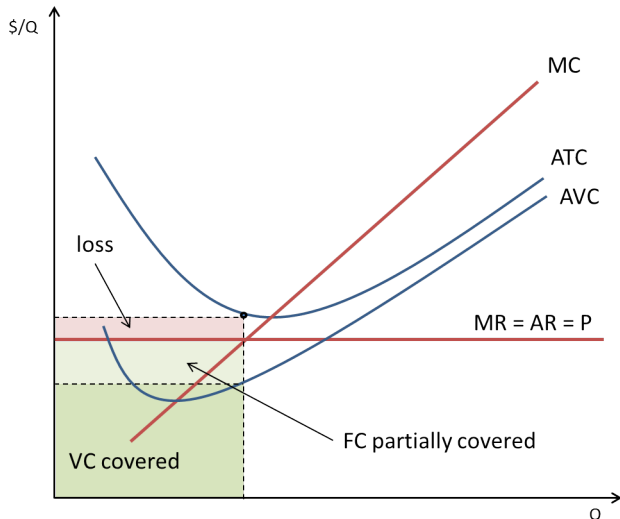
Short Run Shut Down Decision

- Would the firm shut down facing such loss?



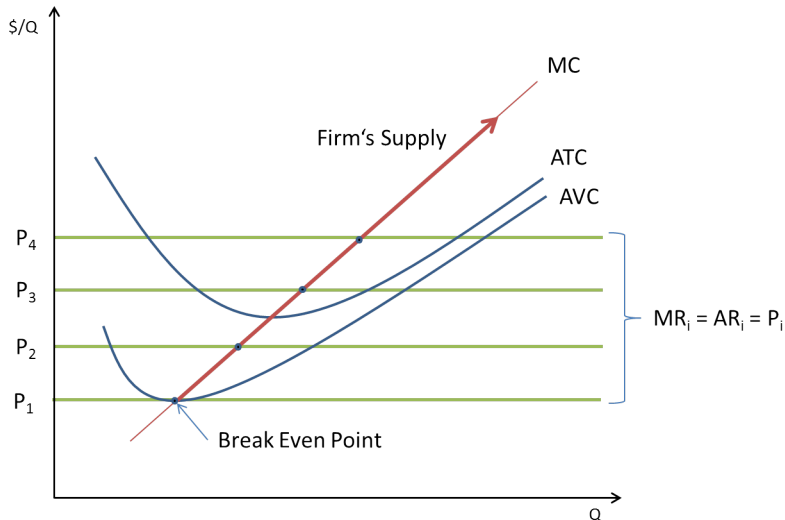
Short Run Shut Down Decision

- Not necessarily. Depends whether *variable* costs are covered. Fixed costs have to be paid anyway.



Firm's Supply

- Connection between *price* and *quantity* produced can be seen. Rising price encourages firm to produce more.

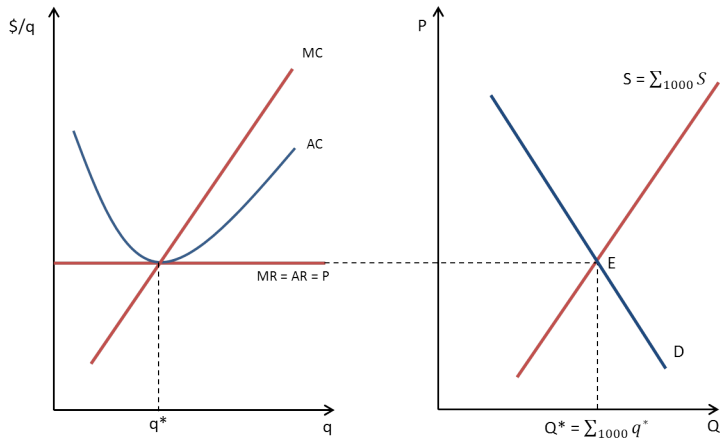


Market Equilibrium

- There is no entry-barrier nor information constraint in competitive market.
- When price is set (sellers are price-takers), only *costs* determine the profit.
- Costs are determined by production function, ei *technology*.
- But with free information exchange, every firm can acquire the best technology to achieve high profit!
- What happens? Incoming producers (firms) together increase the total quantity (even if every one of them cannot do so alone), which result to decrease the price (remember Supply and Demand) so that:
$$P = AVC = MC = MR$$

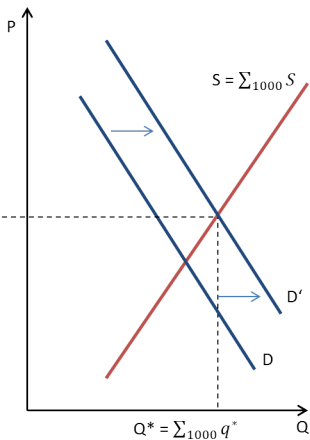
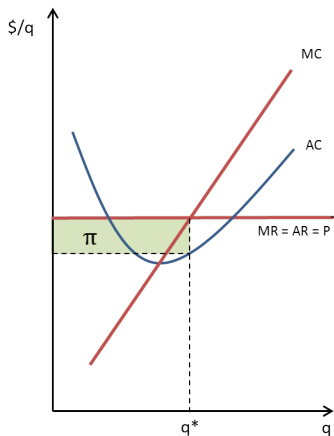
Market and Firm's Equilibria in LT

- All firms produce at minimal AC (technologically optimal q)



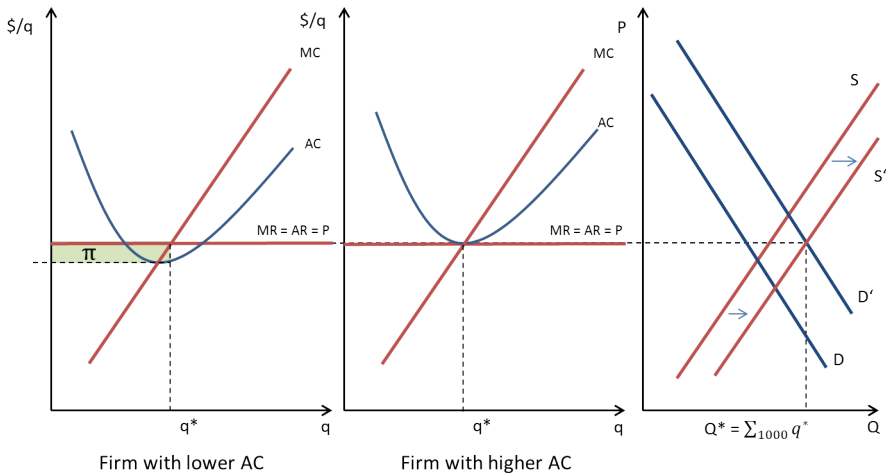
Example of ST Changes

- Rising market demand increases price so producers are willing to produce more and make a profit.



Market Equilibrium in Oil Producers Market

- When efficiency throughout the industry is not the same (various AC), then final price doesn't have to return to previous equilibrium
- There might be producers with substantial profits (eg Saudi Arabia) and no profits (eg Canadian oil sands)



Outline

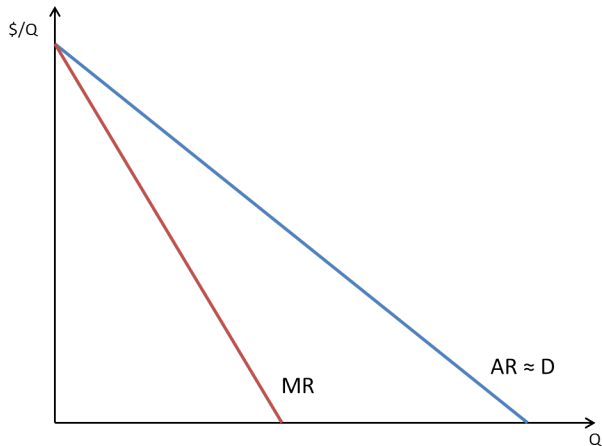
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Assumptions

- Monopoly is a market with one seller and many buyers.
- Seller (Monopolist) is price-maker, buyer is price-taker.
- Monopolist may set price and/or quantity produced, however, it has to take Demand into account
- Why monopoly occurs?
 - **Nature monopolies** - There are such an economies of scale, that two firms servicing whole market are less effective than one (typically network industries)
 - **Resource M.** - The Monopolist own unique resource
 - **Government-created** - Politically determined (eg Railways); Public interest (Army, Police); Copyright; Patents

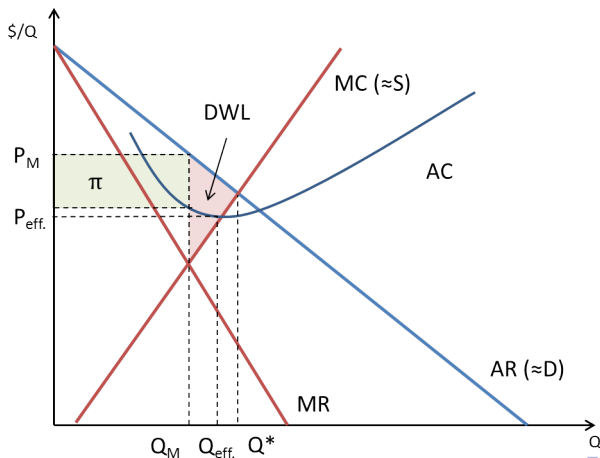
Revenues

- Monopolist faces downward-sloped market demand ($P \uparrow \Rightarrow Q \downarrow$)
- This demand equals monopolist's AR (each unit sold at the same price)



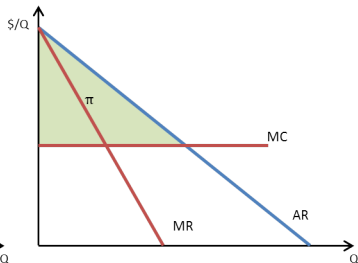
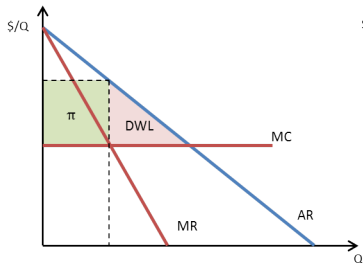
Profit Maximization

- Monopolist maximizes its profit when $MR = MC$.
 - This generates Dead Weight Loss ($MR < AR \Rightarrow Q_M < Q^*$ and $P_M > P^*$) and
 - market does not tend to price equal AC.



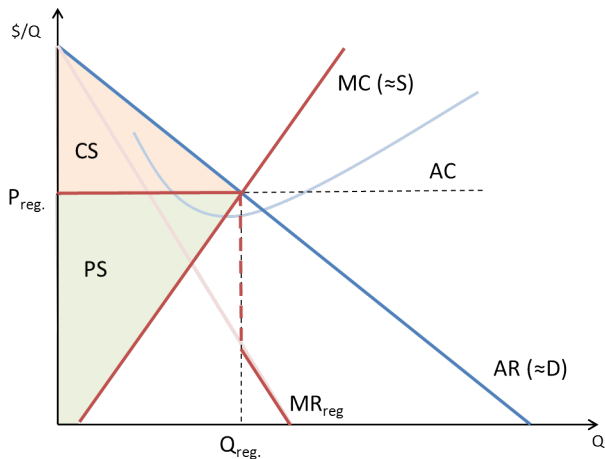
Some Monopoly Issues

- Government attitude towards monopolies
 - Avoiding monopolies - antitrust laws
 - Regulating natural m.
 - Public ownership
- Price discrimination - Monopolist able to sell at various prices (separate customers) may increase its profit and reduce DWL.



Regulating Price in Monopoly

- Price regulated exactly at $P = AR = MC$ (and $= MR_{reg}$) erase DWL
- Monopolist's profit depends on its AC



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Overview

- Contrary to extreme examples of Competitive markets and Monopolies:
 - Few sellers with substantial market share
- Each seller may set its production quantity and price, given the demand
- Product of each seller is similar if not the same
- Important: *Action of one seller may have a large impact on the others*
- Examples: Crude oil, Car makers, Aviation industry, Airlines. . .
- Two most famous oligopoly models: Bertrand and Cournot (see chap. 27 in Varian 2010)

Game Theory

- GT describes exactly this kind of relation:
- *How people behave in strategic situations*, ei anticipating others behavior
- Firms in Comp. Mark. and Monopolies didn't have to care about other firms - they were either insignificant or the only one
- Firms in Oligopolies must take it into account \Rightarrow they are playing strategic game, so the GT is good way how to understand their behavior

Prisoners Dilemma

- Two suspects under arrest deciding *separately* strategy for interrogation.
- Dilemma: Confess or Silence with different outcomes depending on others choice

		B	
		Confess	Silence
A	Confess	8 / 8	0 / 20
	Silence	20 / 0	1 / 1

- The best outcome (1/1) cannot be achieved even if players act in collusion, risk of getting 20yrs sentence is way much high.

Dominant Strategy and Nash Equilibrium

- When there is a best solution for a player regardless of opponents choice it is *dominant strategy*

		B	
		Confess	Silence
A	Confess	8* / 8*	0 / 20*
	Silence	20* / 0	1 / 1

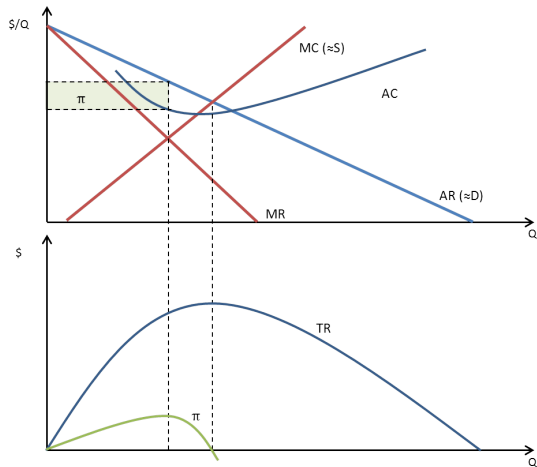
- In this particular game, dominant strategy for both players is to confess, which is *Nash equilibrium*
- NE - not necessarily the most effective outcome, but definitely one that *can* be reached in strategic encounter
- Even though being silent \Rightarrow less time spent in prison, precaution and self-interest (or simply assuming others moves) lead to opposite strategy

Cartel

- Limited number of sellers on the market may deliberately (in *collusion*) decrease their output in order to increase price and profit.
- Sellers would like to act as a monopolist, and set the highest price to achieve highest profit
- When the demand elasticity is low, price increase might be substantial
- Governments don't like cartels - extensive search for possible collusion and consequent bans

Cartel

- Cartel members seeking monopolist's profit:



- Is this really the best solution for all cartel members?

Example

- Imagine two oil producers with no marginal costs. Any additional barrel is simply taken out of pocket. Total production capacity of each producer is 6 mbpd. Demand schedule might look like this.

Price (\$/b)	0	10	20	30	40	50	60	70	80	90
Q (mbdp)	12	11	10	9	8	7	6	5	4	3
Profit (m\$)	0	110	200	270	320	350	360	350	320	270

- In comp. market with $MC = 0$ price would be 0 and all 12 mbpd would be produced.
- Monopolist would certainly choose $Q = 6$ with highest revenue/profit
- Duopolistic cartel face a dilemma:
 - While producing 3 mbpd each with equal profit 180 m\$ each producer is tempted to increase Qty
 - With total production 7 mbpd divided 4:3, producer with higher share enjoys 200 m\$ profit vs 150 m\$ of the other

Oil Producer's Game

- What quantity should they choose?

		Iraq	
		3	4
Iran	3	180* / 180*	150 / 200*
	4	200* / 150	160* / 160*

- Two dominant strategies \Rightarrow It is difficult to maintain low production and high price

Cartel

- Key problem of the cartel is its instability
- Members always motivated to cheat
- *Game Theory* is usually applied when inspecting oligopolies and cartels
- Comparison with Competitive markets and Monopoly:
 - Price: $CM < Oligopoly < Monopoly$
 - Qty: $CM < Oligopoly < Monopoly$

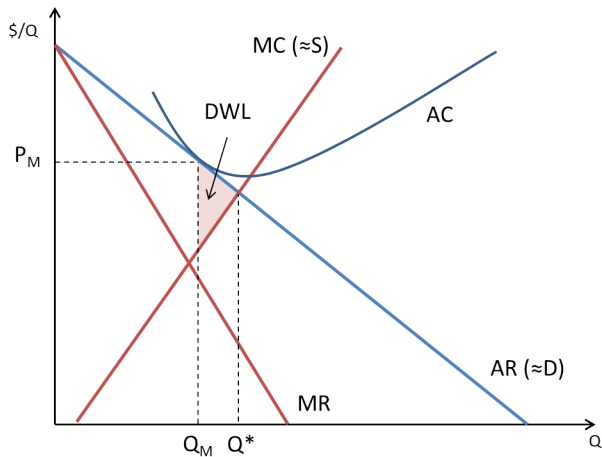
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Overview

- Many sellers, many buyers
- Free entry
- Product differentiation - each seller meets down-sloped demand with its special product
- Price-making works like a monopolist's but free entry ensure that in industries (or products) with high profit attract newcomers
- \Rightarrow price and demand falls so that long-term profits tend to zero (like in competitive markets)
- Examples:
 - Books, Movies, Restaurants, Fashion, Shoes, Food etc.

Long Term Profit and Equilibrium



References

Hal R. Varian. *Intermediate Microeconomics. A Modern Approach*. W. W. Norton & Company, 2010.