Market Supply Under Competition

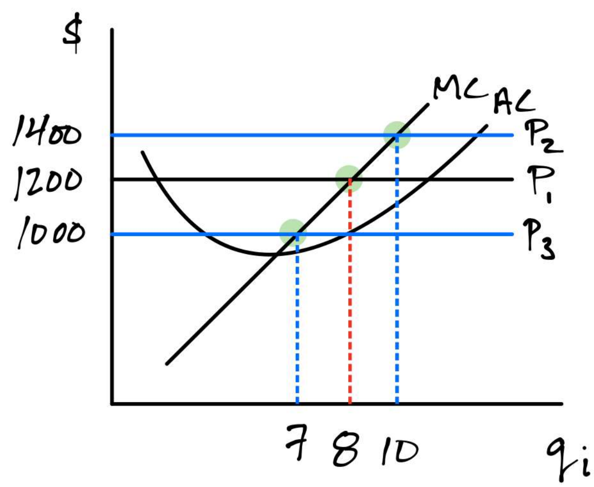
Building the market supply from a group of competitive firms

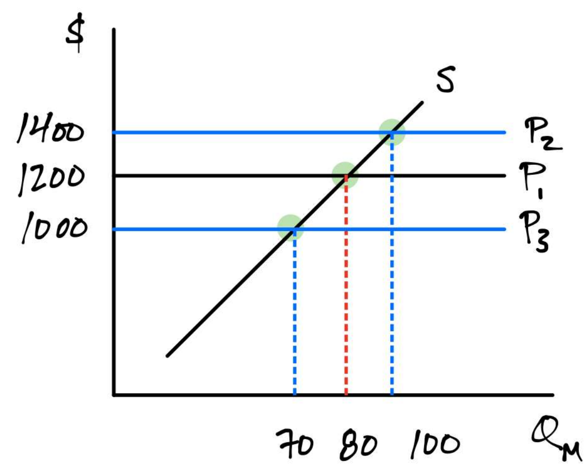
- MC curve determines individual q_i
- Market supply is the sum of the individual q_i's

Example:

- Ten identical sailboat firms
- Responses to 3 prices: 1200, 1400, 1000

Individual Firm | Market





- Market supply (WTA) is driven by individual MC curves

Production and Efficiency

Is the producer's Q efficient?

Condition for efficiency:

$$WTP = WTA$$

But, a producer must get at least MC to produce:

$$WTA = MC$$

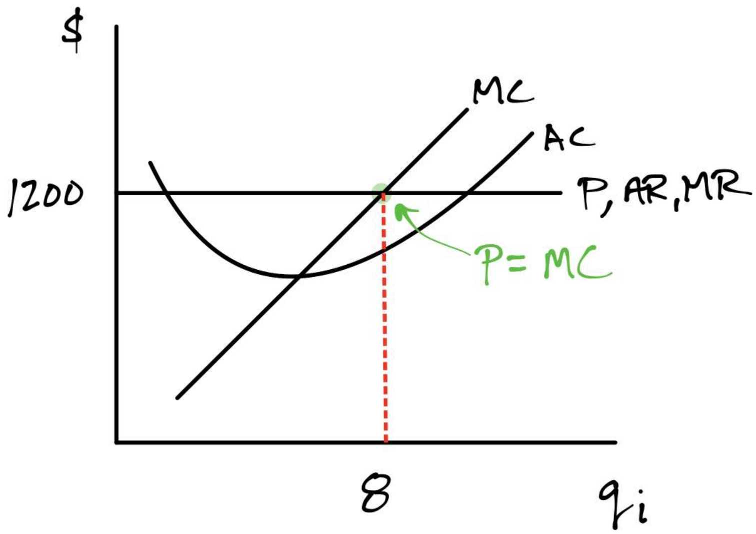
Combining gives condition for efficiency in production:

$$WTP = MC$$

Competitive market, profit maximization:

1	Producer choose Q where:	$MR = MC$
2	Competition implies:	$MR = P$
3	1 & 2 mean producer picks Q where:	$P = MC$
4	Buyer chooses Q where:	$WTP = P$
5	3 & 4 imply Q will be where:	$WTP = MC$

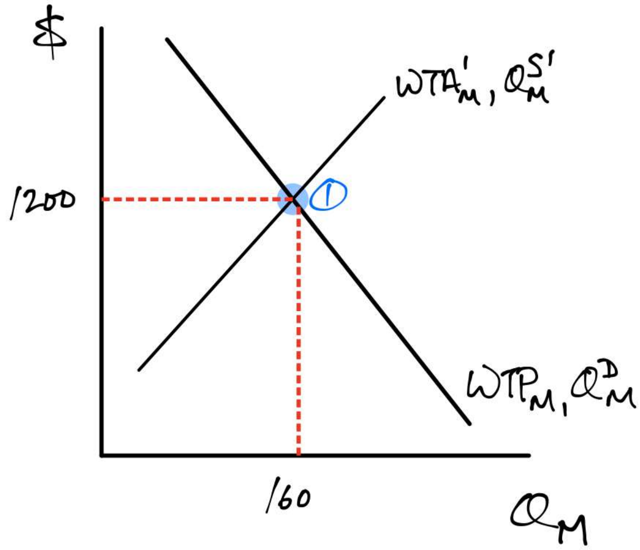
Conclusion: *Q is efficient*:



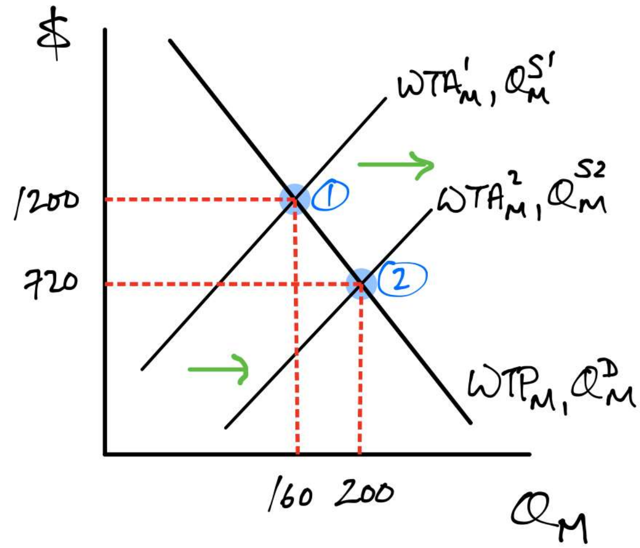
In the long run, profits attract more firms and price falls:

- Firms enter when P > AC since profits > 0
- Price falls to minimum AC

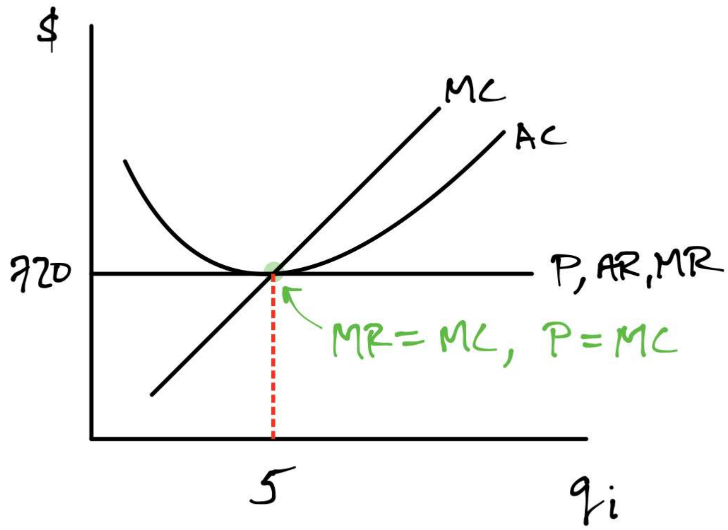
Market in the short run:



Entry expands supply:



Firm's long run equilibrium:



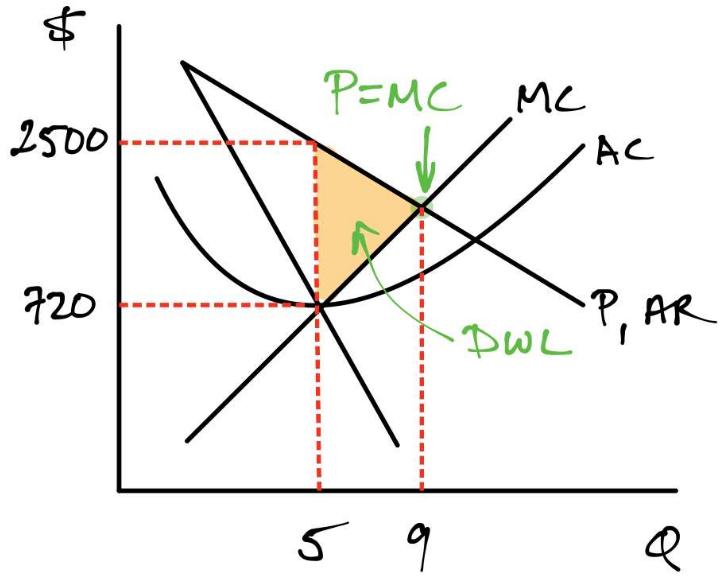
Overall:

- Efficient q_i for each firm: $WTP = MC$
- Individual and total Q is produced at the minimum AC

Monopoly, profit maximization:

1	Producer chooses Q where:	$MR = MC$
2	Because $P > MR$:	$P > MC$
3	Buyer chooses Q where:	$WTP = P$
4	2 & 3 imply:	$WTP > MC$

Conclusion: *Q is inefficiently small*:



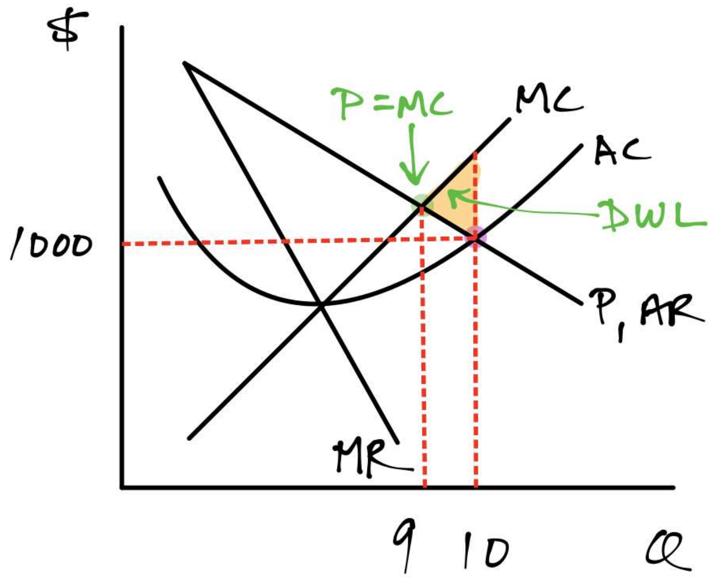
Producer Q = 5
Efficient Q = 9

Monopoly, output maximization:

Case A: typical cost curve with diminishing returns:

1	Monopolist chooses Q where:	$P = AC$
2	Diminishing returns means:	$MC > AC$
3	1 & 2 imply:	$MC > P$
4	Buyer $WTP = P$ implies:	$MC > WTP$

Conclusion: *Q is inefficiently large*:

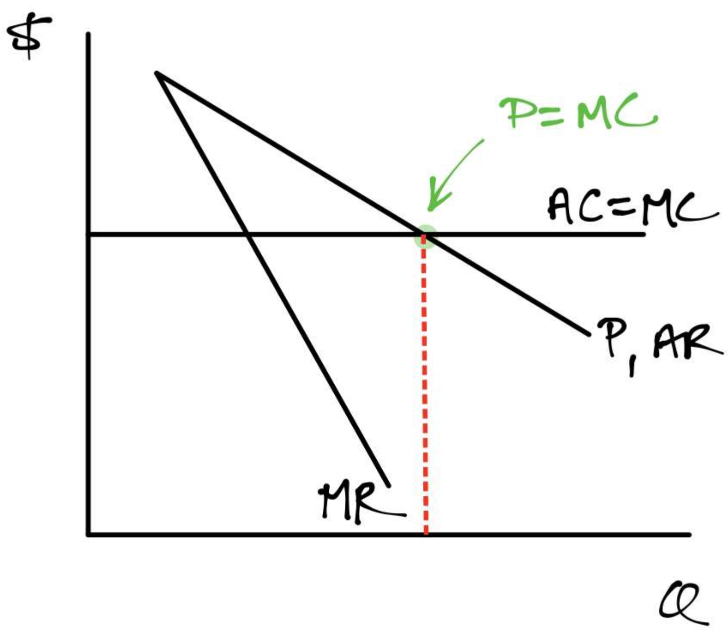


Producer Q = 10
Efficient Q = 9

Case B: constant returns to scale:

1	Monopolist chooses Q where:	$P = AC$
2	Constant returns means:	$AC = MC$
3	1 & 2 imply:	$P = MC$
4	Buyer $WTP = P$ implies:	$WTP = MC$

Conclusion: *Q is efficient*:



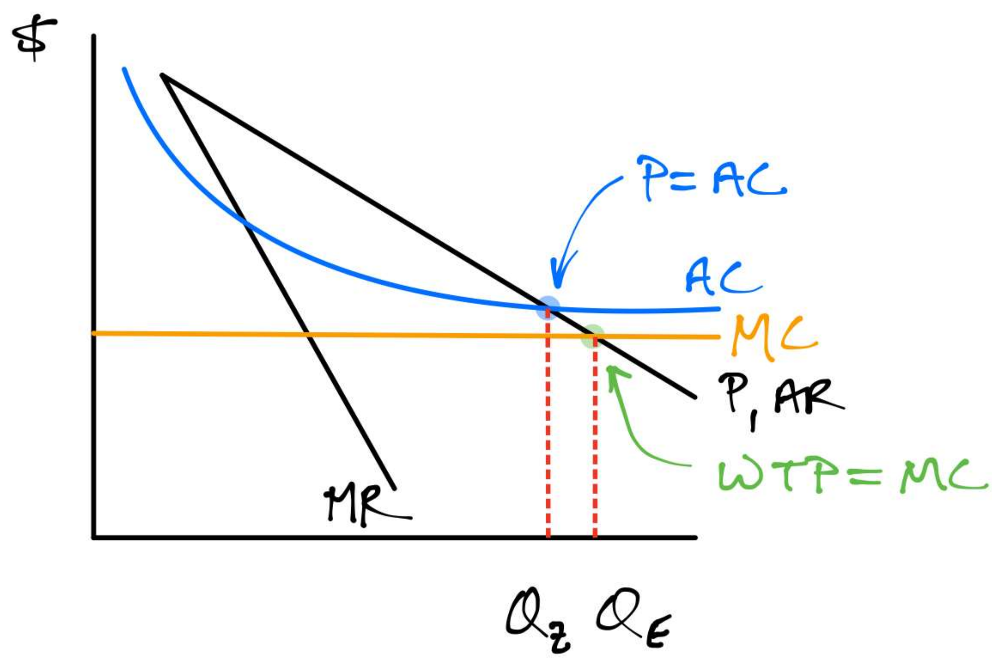
Different TC function with CTRS.

Example:
$TC = 1400*Q$
$AC = MC = 1400$

Case C: Increasing returns to scale

1	Monopolist chooses Q where:	$P = AC$
2	Increasing returns means:	$AC > MC$
3	1 & 2 imply:	$P > MC$
4	Buyer $WTP = P$ implies:	$WTP > MC$

Conclusion: *Q is inefficiently small*:



Zero profit:
Q_Z

Efficiency:
Q_E

Known as a *natural monopoly*
Would require a subsidy to reach Q_E

Summary:

Competition with profit maximization:
Reaches efficient Q

Monopoly with profit maximization:
Inefficient: Q too small

Monopoly with output maximization:
Efficient with CRTS

Tying It All Together

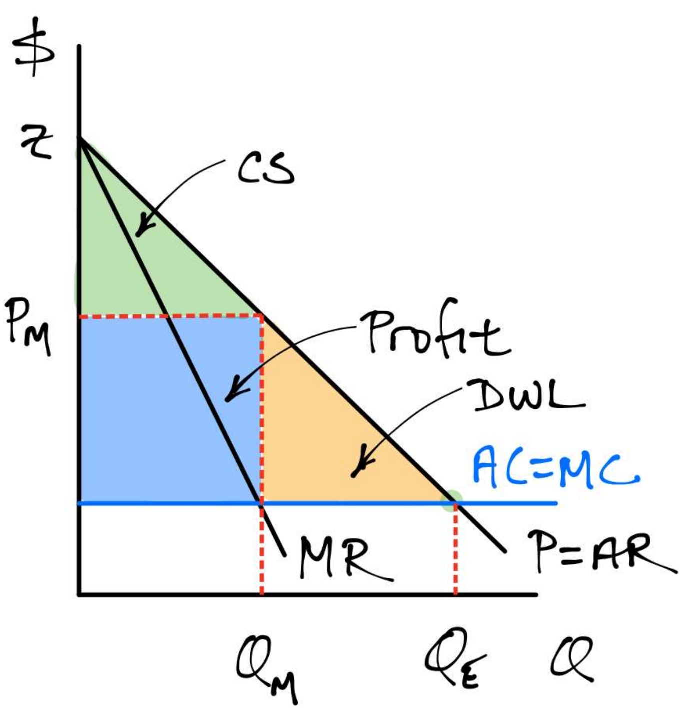
Can analyze complex, important questions involving:

- Long periods of time
- Uncertainty
- Efficiency
- Distributional impacts

Example: patents for pharmaceuticals

- Very large research and testing cost
- Manufacturing cost is low and CRTS
- Patents last 20 years

Market during patent period:



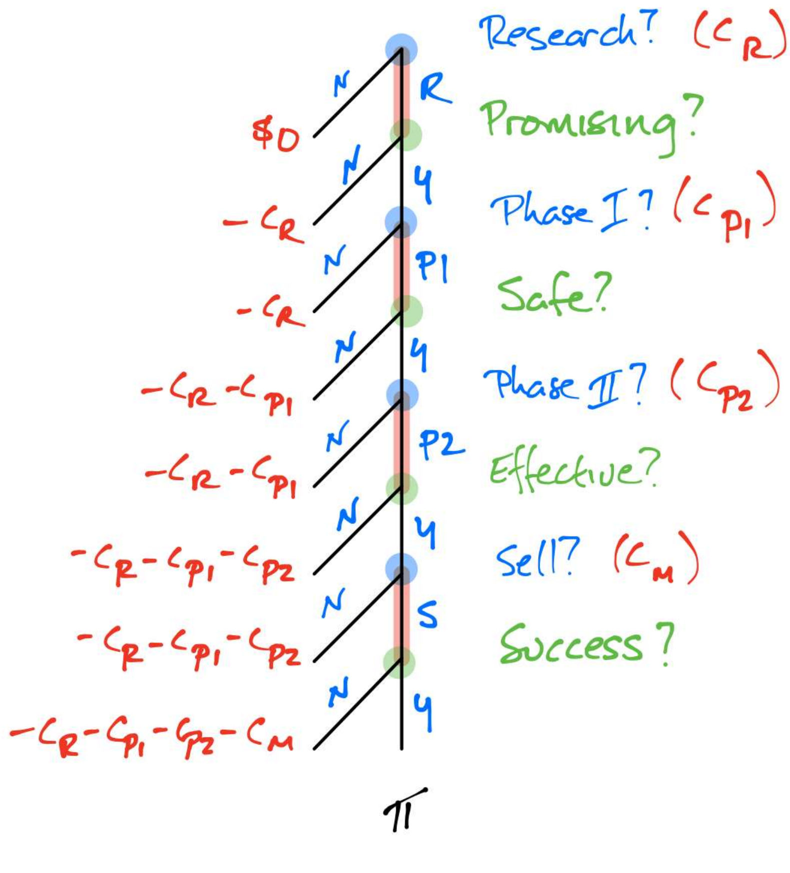
Can calculate each area:

$$CS = 0.5 * (Z - P_M) * Q_M$$

$$\pi = (P_M - AC) * Q_M$$

$$DWL = 0.5 * (P_M - MC) * (Q_E - Q_M)$$

But, drug development is very risky; many, many ways to fail:

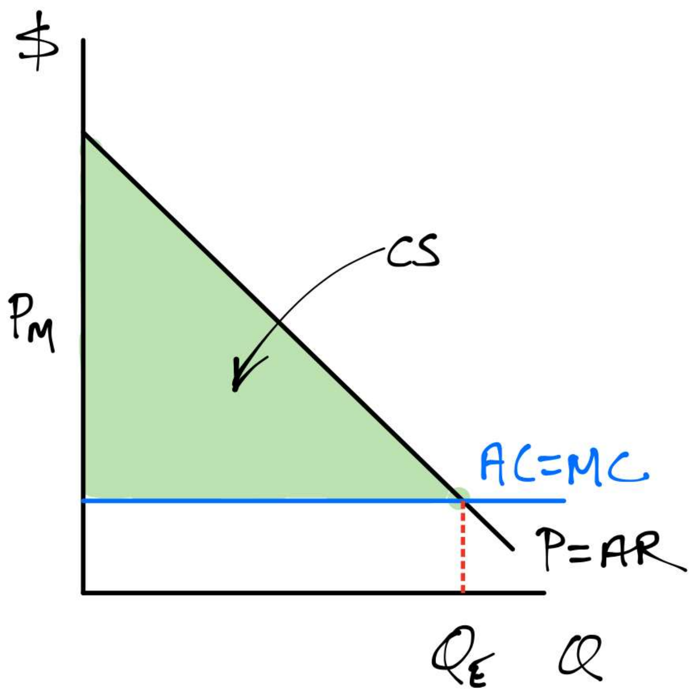


Cash flow of profits if successful:

Can compute NPV of profits if the entire project succeeds:

$$NPV = \frac{\pi}{r}\left(1 - \frac{1}{(1+r)^{20}}\right)$$

But, CS continues after the patent period and is larger:



Brings together:

- Production
- CS and PS (profits)
- PV
- EV
- Efficiency
- Distributional impacts (within or between periods)

- Could involve government incentives with CV>0