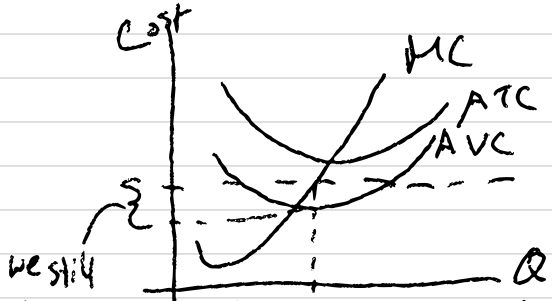
Dylan Black
ECON 231L

Lecture 12:
Firms & Perfect Competition

Shutting Down in the SR:

Produce as long as $P \geq AVC$ } fixed costs are sunk
$TR \geq TVC$ }
$TR - TVC \geq 0 \leftarrow VP \geq 0$

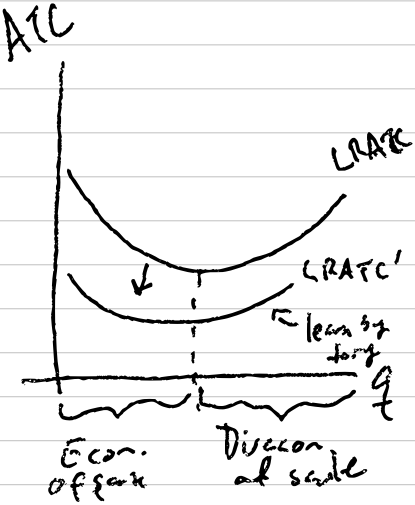
If $P > AVC$ but $P < ATC$, we still produce because we minimize our loss

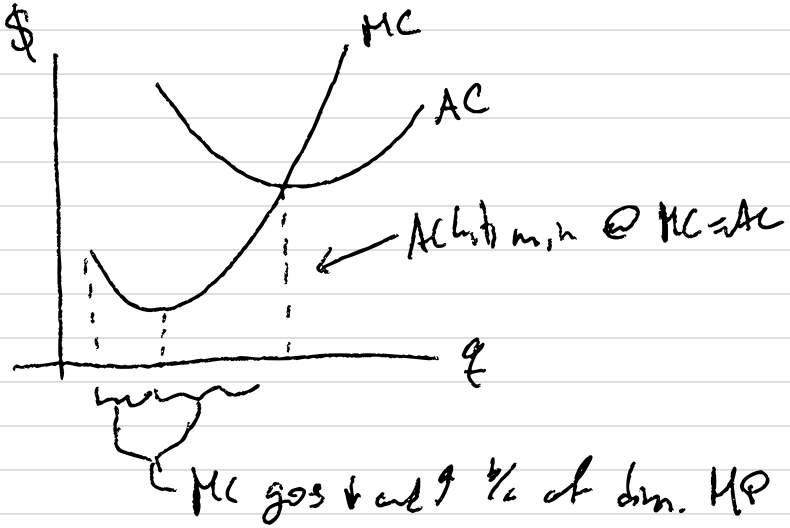


cover our variable costs, so in the short run, we cover all costs in our control

Changes in Average Costs

- Economies of scale
  - average costs decrease in q
- Diseconomy of scale
  - average costs increase in q
- Learning by doing
  - AC curve shifts down





Objective of the Firm

- Goal: Maximize profit
  - ★ $\pi = TR - TC$ ★
  - Max. profit by choosing q^* such that $MR = MC$

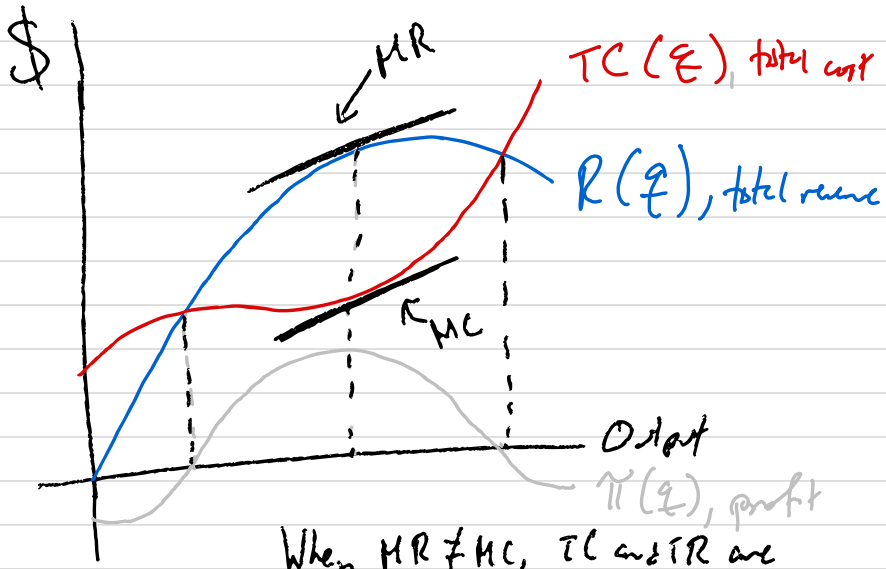
$$\max_q [TR - TC] \rightarrow \text{take derivative wrt } q \text{ @ set} = 0$$

$$\frac{\partial}{\partial q}[TR - TC] = MR - MC = 0$$

$$\Rightarrow MR = MC \quad \blacksquare$$

Marginal revenue $\left(\frac{\partial TR}{\partial Q}\right)$
- Depends on market structure

Marginal cost $\left(\frac{\partial TC}{\partial Q}\right)$
- Does not depend on structure

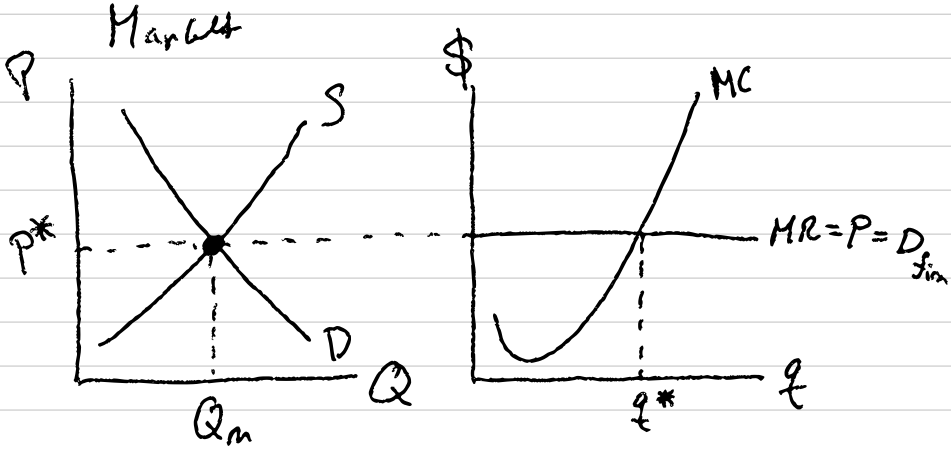


When MR ≠ MC, TC and TR are getting closer together, meaning TR − TC = π ↓

Perfect Competition
↳ 3 assumptions
- Equal / free entry
- Price takers
- Identical products — product homogeneity

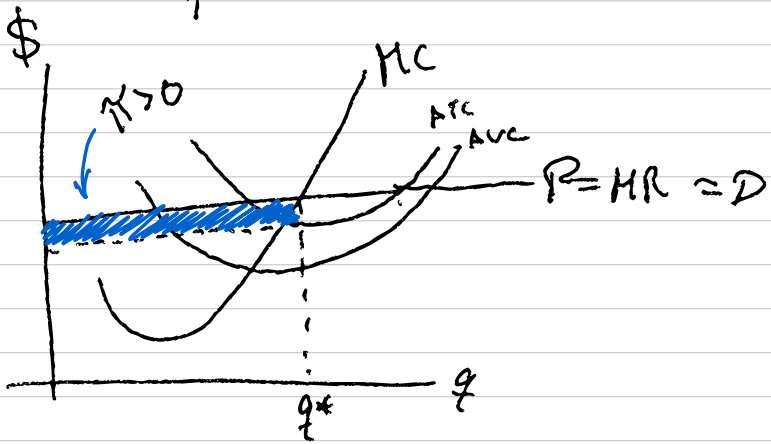
↳ MR = P under perfect competition

Perfect Competition



Demand for a firm in perfect competition is <u>perfectly elastic</u>!

To summarize:
- Firm demand → MR = P
- Profit maximized @ MR = MC
  ⟹ MC = P (in <u>perfect competition</u>)
  - firm's supply curve where q^s is a function of price



Example:

$TC = 20 + 2q^2$, $P = 20$

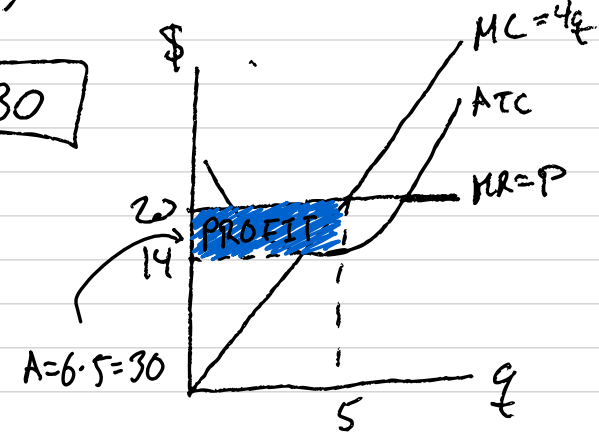
1) What is q^*?

$$MC = \frac{\partial TC}{\partial q} = 4q \Rightarrow \boxed{q^* = 5}$$

2) What is π @ q^*?

$TR = 20(5) = 100$, $TC = 20 + 50 = 70$

$\boxed{\pi = TR - TC = 30}$



In the long run: firms enter, $S \uparrow$, $P \downarrow$, $\pi = 0$

Suppose market quantity $Q = 500$, how many firms?

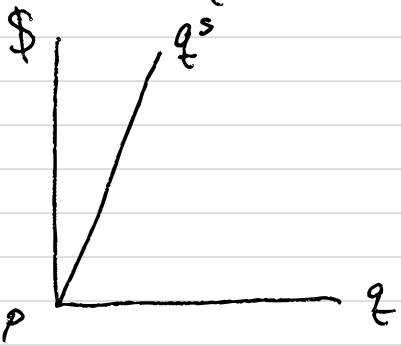
$500/5 = 100$ firms

More generally: we found $MC = 4q$, we also know $MC = P$ in perfect competition

→ one firm's supply curve: quantity as a function of price

$$q^S = f(P) \Rightarrow P = 4q$$

$$\Rightarrow q^S = \frac{P}{4}$$



w/ 100 identical firms:

$$Q^S = nq^S = \frac{100P}{4} = 25P$$

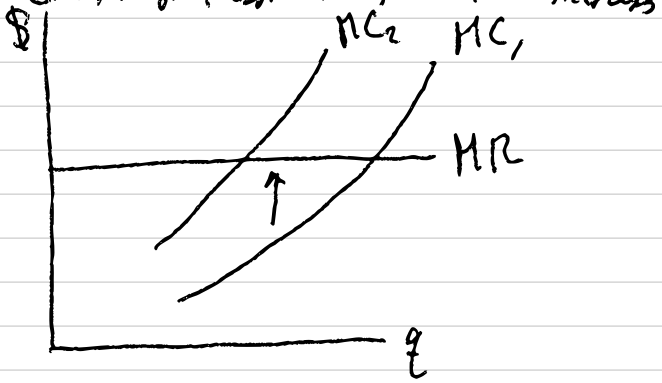
Back to the Shutdown:

↳ a firm shuts down in the SR if it cannot cover its variable costs

↳ firm supply curve is portion of MC where $MC > AVC$

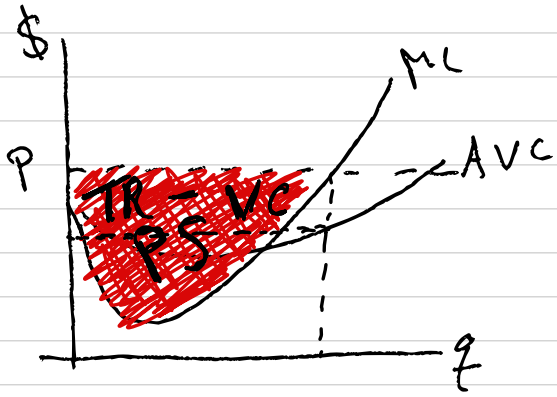
Shifts in the SR-supply curve

Ex. marginal cost of production increases

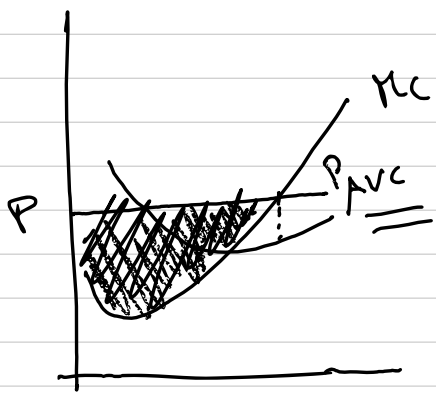


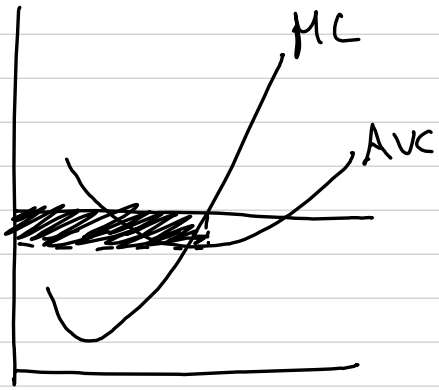
Producer Surplus

Producer Surplus - Sum of diff between market price and marginal cost



$PS = TR - VC$





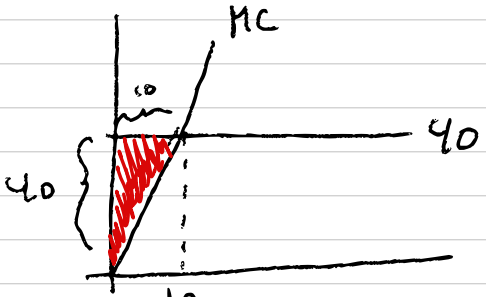
$PS = TR - VC$
$= (P - AVC) \cdot q$
= area between P & MC up to q

Practice:

$TC = 50 + 2q^2$, $P = 40$

→ What is one firm's PS?

$MC = 4q$



$PS = \frac{1}{2}(40)(10) = 200$

$\pi = TR - TC = 40(10) - 250 = 150$