Perfect competition

- Homogenous products
  - → everyone produces exactly the same y
- "Many" firms
  - actions of individual firms don't affect the market as a whole
- Free entry/free exit
  - firms can costlessly enter and exit the market
- Perfect information
  - Everyone can observe all prices simultaneously

→ In competitive markets, there is only one market price

→ Firms are "price takers"
  - They don't have any power to choose a price

Profits

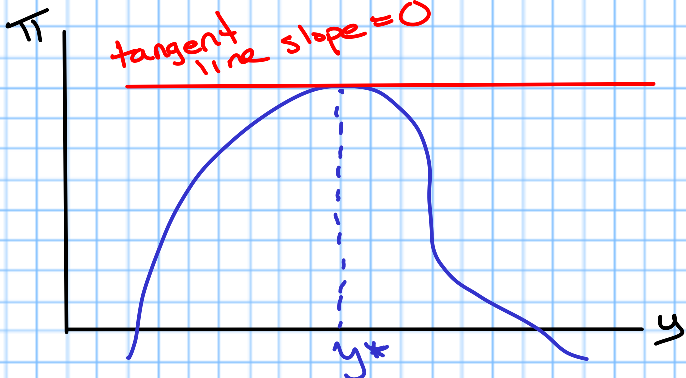
π = revenue − cost

Revenue: $R(y) = py$

Costs: $C(y)$

cost-minimization

$$\pi(y) = R(y) - C(y)$$



Profits are maximized when:

$$\frac{d\pi}{dy} = 0$$

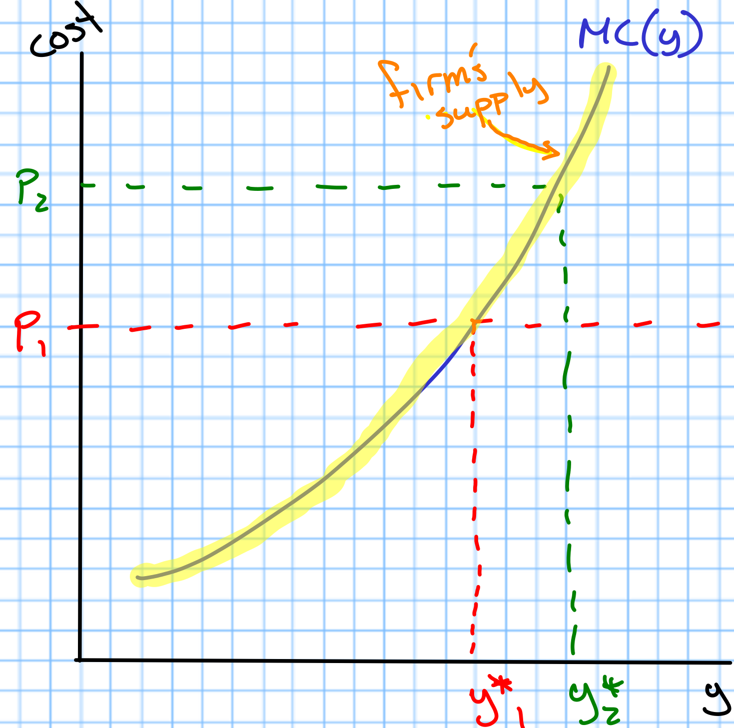
$$\pi(y) = R(y) - C(y)$$

$$\frac{d\pi}{dy} = \frac{dR(y)}{dy} - \frac{dC(y)}{dy}$$

P $MC(y)$

$$P = MC(y)$$

Marginal revenue = marginal cost



In competitive markets, each firm faces a horizontal demand curve (changes in supply have no effect on price)

Short-run profit max

- Fixed K
- Fixed number of firms

$c(y) = F + c_v(y)$

- Suppose $y = 0$ (the firm has shut down in the short run)

$\pi(y) = p \cdot y - c(y)$

$\pi(y) = p \cdot y - (F + c_v(y))$

$\pi(0) = 0 - (F + 0)$

$\pi(0) = -F$

If the firm shuts down, they earn a profit of $-F$

- Question: When is it worth it for a firm to <u>not</u> shut down?

Stay open if $\pi(y) > -F$

$$p \cdot y - (F + c_v(y)) > -F$$

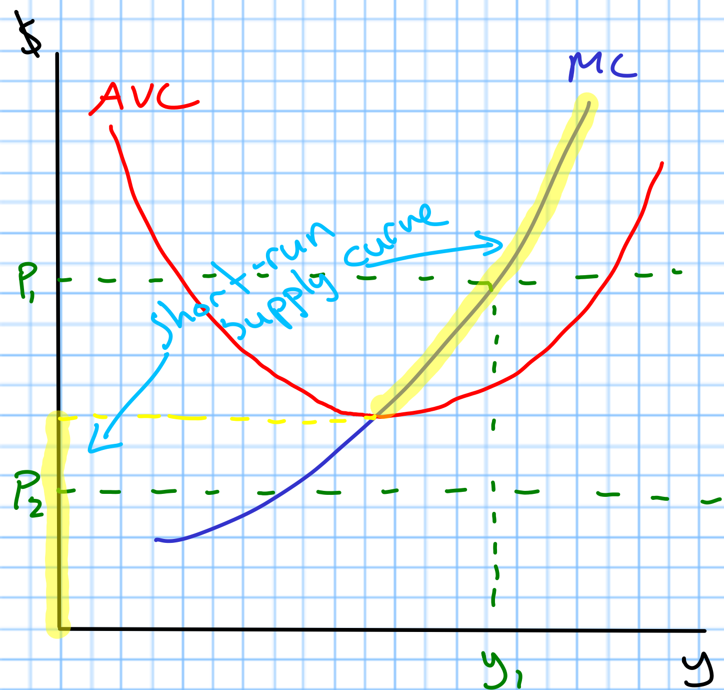
$$p \cdot y \cancel{-F} - c_v(y) > \cancel{-F}$$

$$p \cdot y - c_v(y) > 0$$

$$p \cdot y > c_v(y)$$

$$p > \frac{c_v(y)}{y}$$

$$p > AVC$$



Long-run π-max

- Firms can adjust K and L → leave the market if they wish

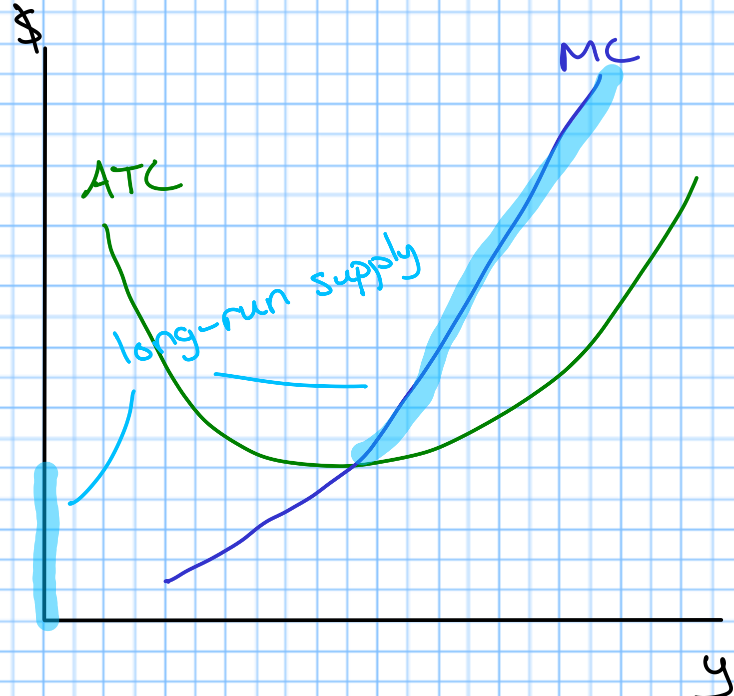
$\pi(0) = 0$

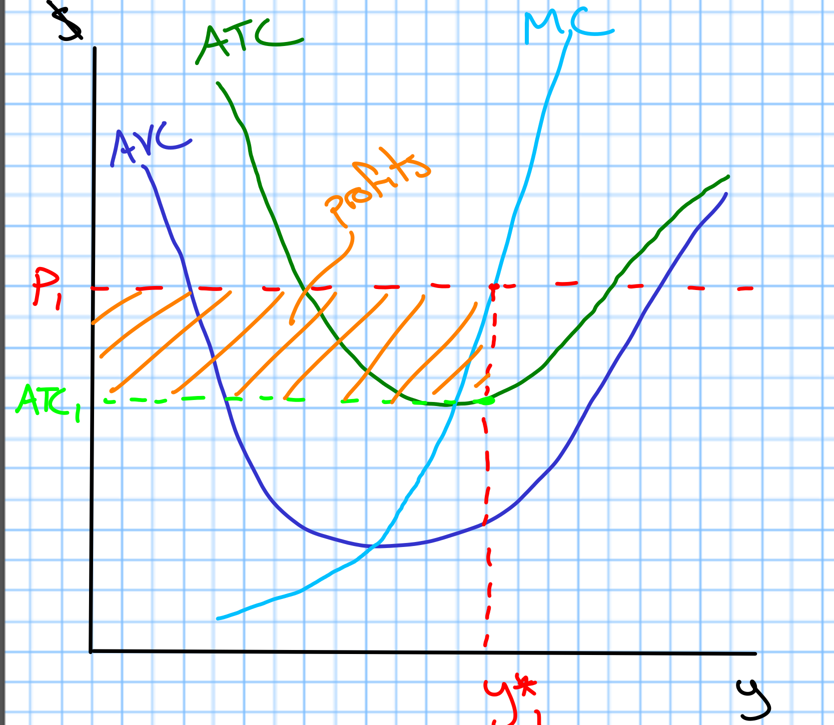
$$py - c(y) = 0$$

$$py = c(y)$$

$$p = \frac{c(y)}{y}$$

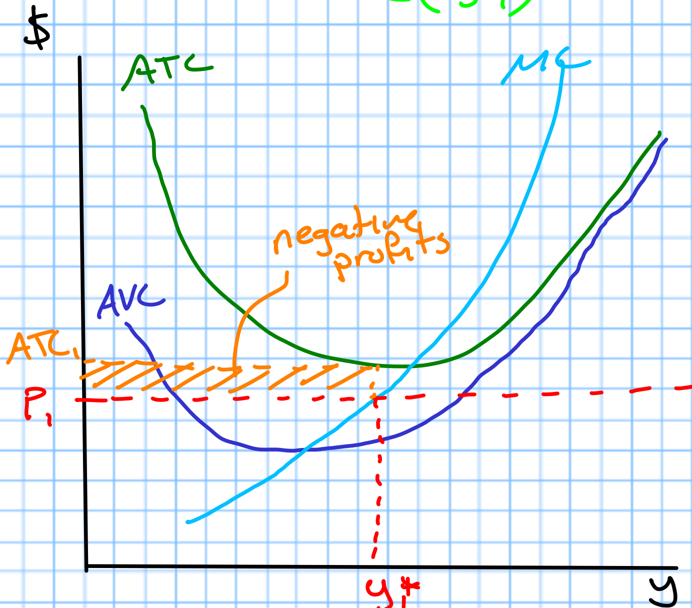
Firm exits the market if $p < ATC$


$
MC
ATC
long-run supply
y


$
ATC
MC
AVC
profits
P1
ATC1
y*1
y

$$ATC_1 \cdot y_1^* = \frac{C(y_1^*)}{\cancel{y_1^*}} \cdot \cancel{y_1^*}$$

$$= C(y_1^*)$$



Result:

- In the long run, firms exit the market when p is less than ATC ($\pi < 0$)
- In the short run, firms may be willing to incur negative profits

Long-run Equilibrium

- Suppose firm is producing y^* output $\pi(y^*) > 0$
- Free entry/exit
- More firms enter the market
- Market supply increases
- $P \downarrow$
- $\pi \downarrow$
- Long run profits in competitive markets:

$$\pi(y) = 0$$