Cost. = the least cost of producing a given output Q

↳ most efficient way to use the best quantity of input L + K at the given price P_L, P_K using the best technology available (production function) in the given time frame $\begin{cases} \text{Short-Run} \\ \text{Long-Run.} \end{cases}$

Short-Run Costs Least cost of producing a given output Q where at least one input is fixed.

Inputs – Labor with price = w = wage.
– Capital with price = r = interest } fixed

K is assumed to be the fixed input at $K = K_0$.
at price r $\Longrightarrow$ $r \cdot K_0$ = Total Fixed Cost.
= TFC(Q)
– unchanged with Q

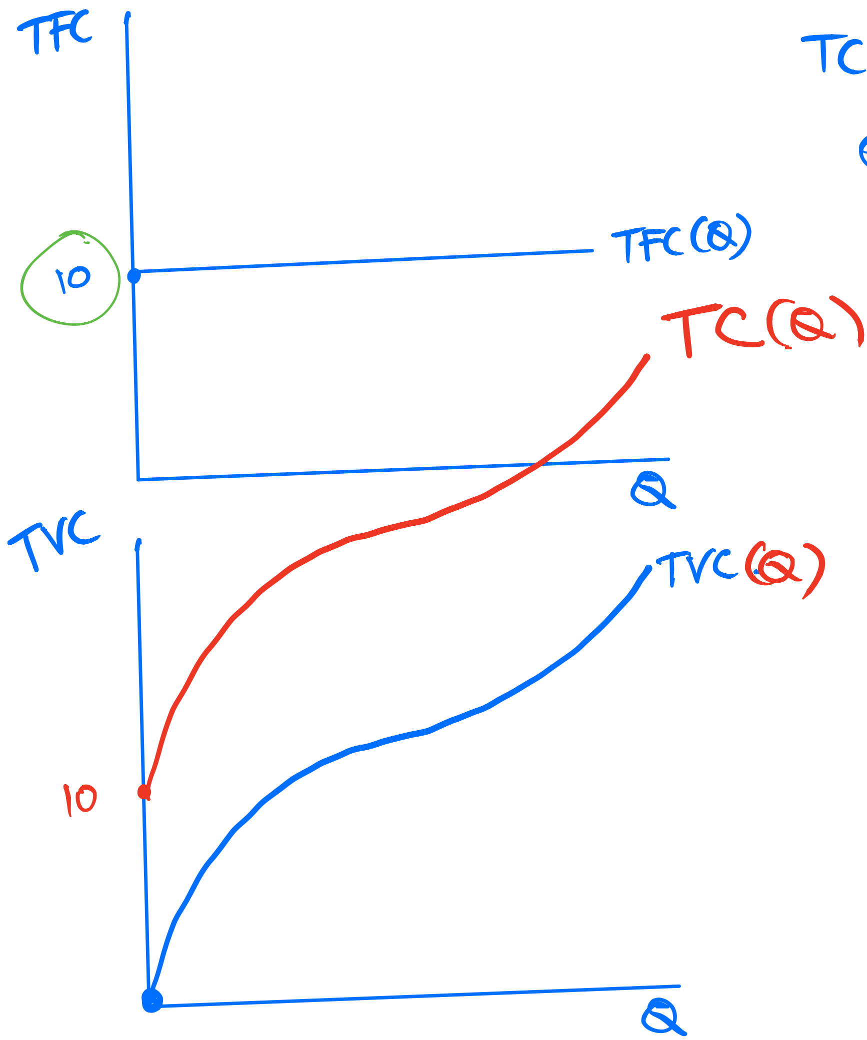
L is variable, at price w.
wL = Total Variable Cost.
= TVC(Q)

Total Cost = Total Fixed Cost + Total Variable Cost

$$TC(Q) = TFC(Q) + TVC(Q)$$

$$TC(Q) = TFC(Q) + TVC(Q)$$

$Q = 0$

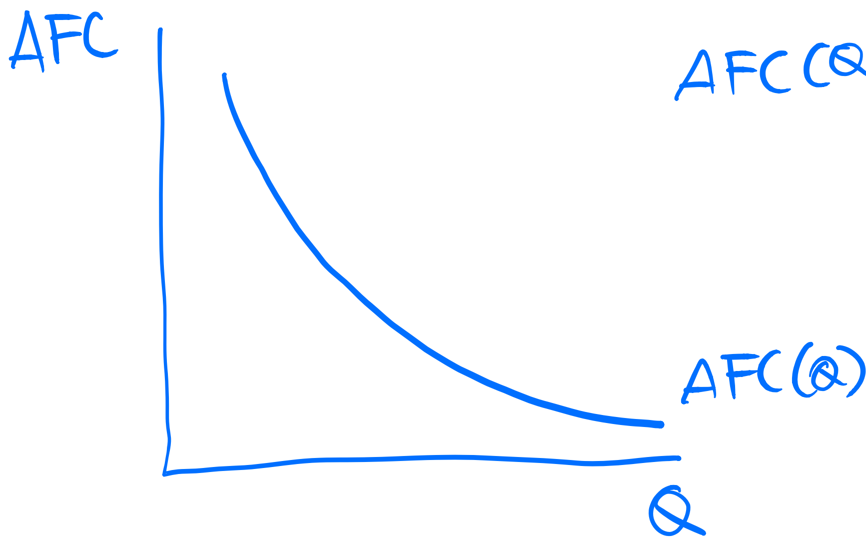


$$TC(Q) = TFC(Q) + TVC(Q)$$

$$TFC \rightarrow \frac{dTFC}{dQ} = 0$$

$$\rightarrow \quad AFC(Q) = \frac{TFC(Q)}{Q}.$$

Q	AFC
1	10
2	5
3	3.33
4	2.5
5	2
⋮	



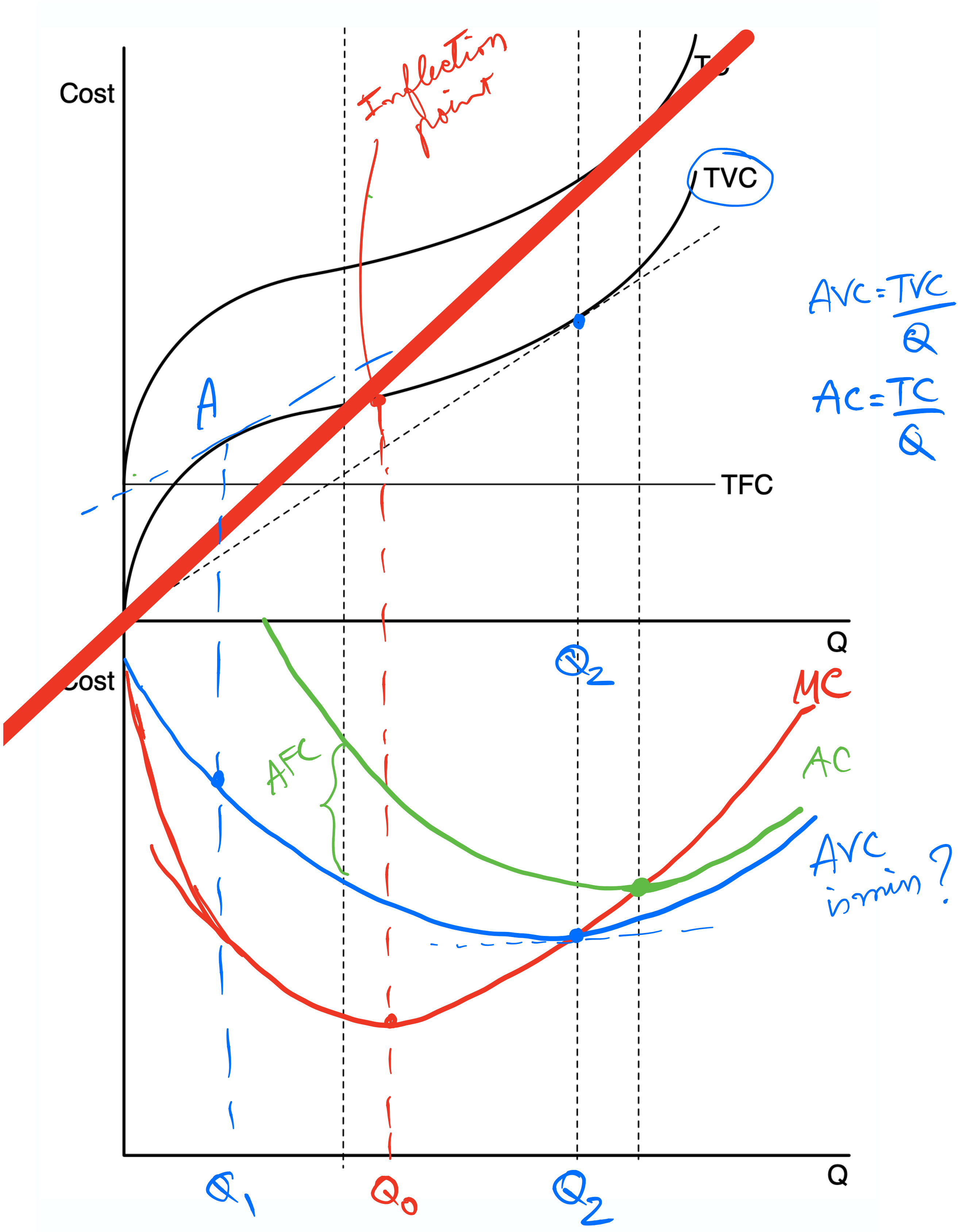
$$AFC(Q) = \frac{10}{Q}$$

$$\frac{TC(Q)}{Q} = \frac{TFC(Q)}{Q} + \frac{TVC(Q)}{Q}$$

$$\Rightarrow AC(Q) = AFC(Q) + AVC(Q)$$

$$AC - AVC = AFC$$

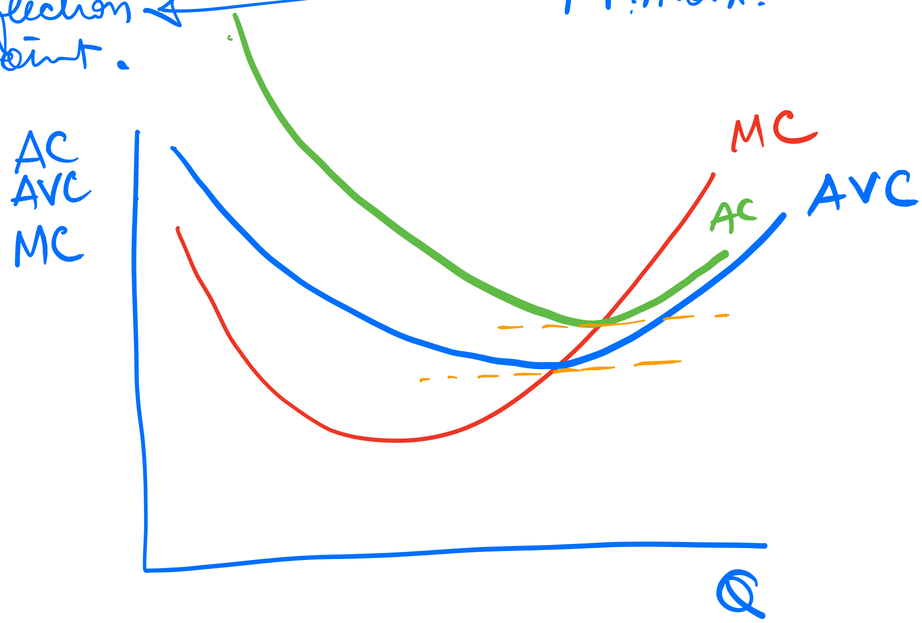
$$\underbrace{\frac{d}{dQ}TC(Q)}_{MC(Q)} = \overset{=0}{\cancel{\frac{d}{dQ}TFC(Q)}} + \underbrace{\frac{d}{dQ}TVC(Q)}_{MC(Q)}$$


Cost
TC
TVC
TFC
Inflection point
A
Q
Q2
Cost
MC
AC
AFC
AVC is min?
Q1
Q0
Q2
Q
AVC = TVC / Q
AC = TC / Q

$$\frac{d}{dQ}TC(Q) = \frac{d}{dQ}\left(AC(Q)\cdot Q\right)$$

$$MC(Q) = AC(Q) + Q\cdot\frac{d}{dQ}AC(Q)$$

T	A	M
	Increasing	M>A
	Decreasing	M<A
	Max	M=A
~~T max~~		~~M=0~~
Inflection point.		M max.



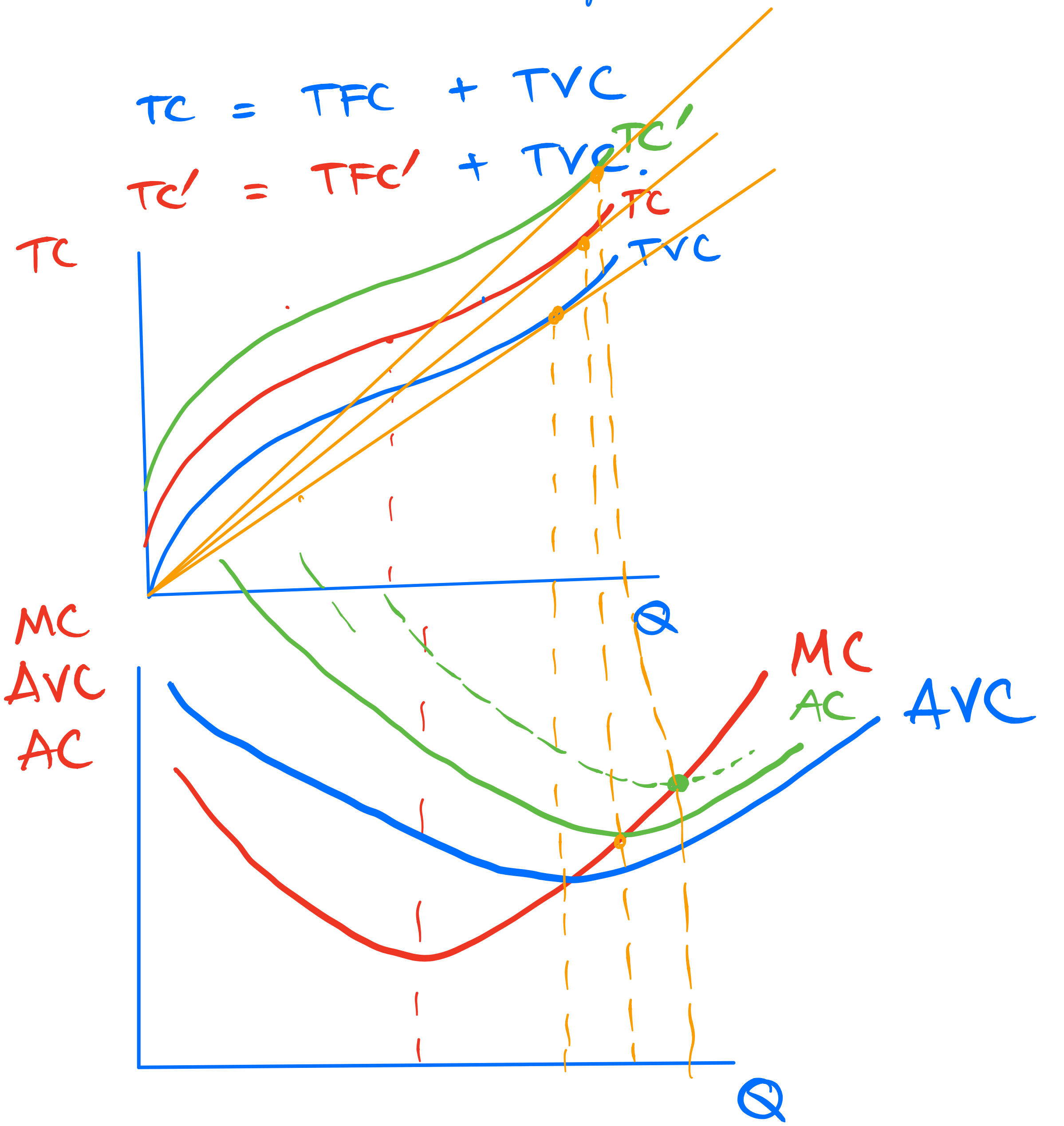
Changes in Cost Curves.

1) Change in TFC: – higher rent
 – higher price of K.

assume K is fixed input.

$TC = TFC + TVC$

$TC' = TFC' + TVC.$



2 <u>Change in TVC</u>. producer has to pay tax = 10 ฿/unit.