Week-2

L1 Opportunity & Sunk Cost

- Profit = Total Revenue - Cost
  = PQ - C(Q) Q↑, C(Q)↑
- Discounts, rebates, returns & allowances
- Opportunity Cost → In eco., the cost of any resources is its opportunity cost. It is what a seller gives up to use a particular resource. 2 kinds of resources - transacted in the market and non-transacted.
- Explicit cost - Opp. cost for a resource involving monitary transac^n. Fees.
- Implicit cost - Opp. cost of using a resource that is not getting transacted in the market.
- Opp. cost - The value of the next best alternative set of activities $\{x_1, x_2 \dots x_n\}$
  Net Benefit from i ⇒ $B(x_i) - C(x_i)$
- Accounting Cost - The cost used by the accountants to keep a business financial records.
- Accounting Profit = Revenue - Explicit Cost
- Economic Profit = Acc. profit - Implicit cost
- Sunk Cost ⇒ a gone cost that can't be recovered. Eg. Movie, Trainer fee, overhead & administrative charges.

L2 **Fixed & Variable Cost**

- consider implicit costs and never consider sunk costs
- $C(Q)$ = Implicit + Explicit cost

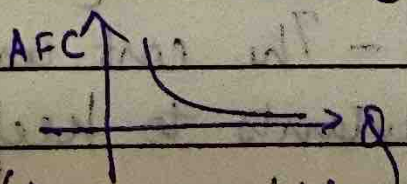
$C(Q) = FC + VC(Q)$ as $Q\uparrow$, $VC\uparrow$

↳ doesn't depend on quantity

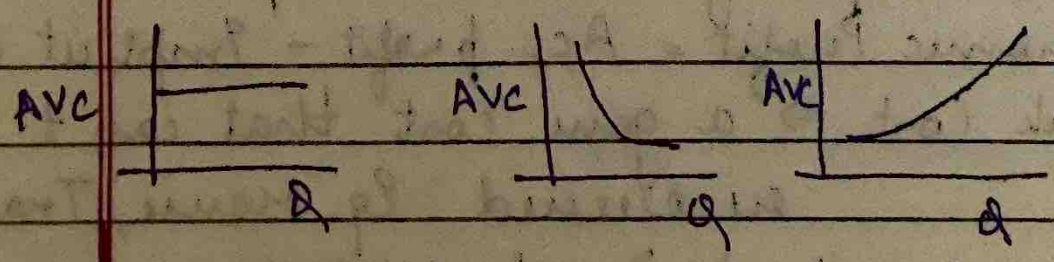
- Quasi Fixed cost — $0 \to \varepsilon$ it increases, after that fixed
- $\frac{C(Q)}{Q} = \frac{FC}{Q} + \frac{VC(Q)}{Q}$

$Avg.C = AFC(Q) + AVC(Q)$

- Avg. Fixed Cost (AFC) always ↓ with Q.



- AVC (Avg. variable cost) may inc., dec. or remain constant



- Marginal Cost – Cost to produce one more unit.

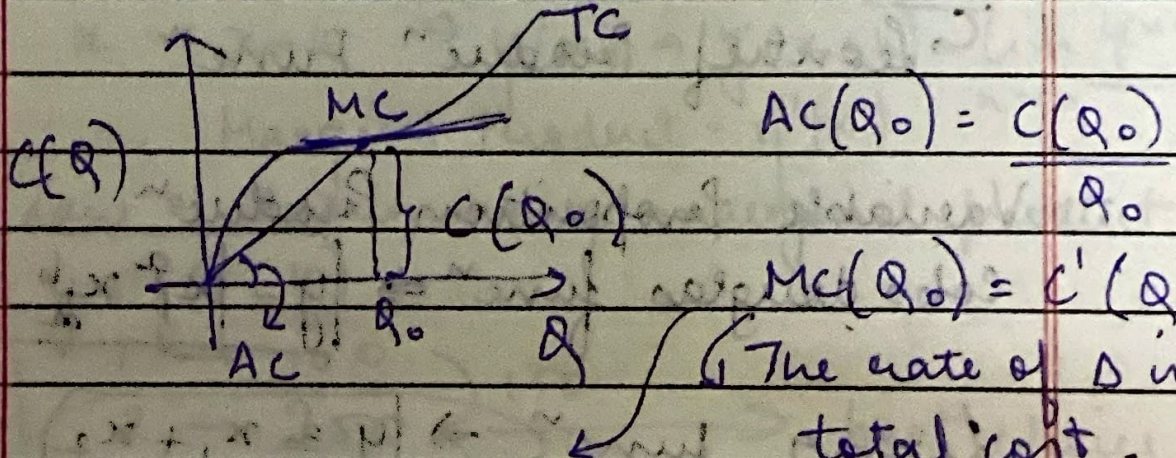
$$MC(Q) = \frac{C(Q+1) - C(Q)}{(Q+1) - Q}$$

$$MC(Q) = \lim_{h \to 0} \frac{C(Q+h) - C(Q)}{h} = C'$$

$$AC(Q) = \frac{C(Q)}{Q} \Rightarrow \frac{d(AC)}{dQ} = \frac{1}{Q}[MC - AC]$$

If. $MC > AC \Rightarrow$ AC inc.

$MC < AC \Rightarrow$ AC dec.

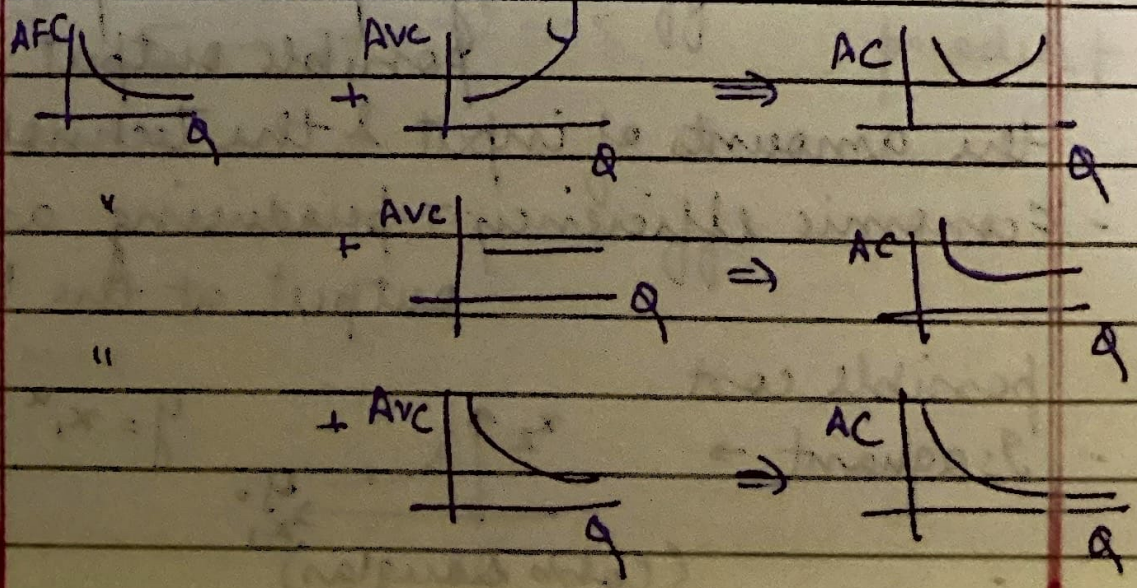


$$AC(Q_0) = \frac{C(Q_0)}{Q_0}$$

$$MC(Q_0) = C'(Q_0)$$

The rate of Δ in total cost.

The tangent to the cost curve gives us the marginal cost.



L3 Firm: A Simplified View

- Firm - An entity that takes resources as inputs & churns out goods as output.
- Technology is black box.

$y = f(x_1, x_2) = f(L, K)$

- Fixed Proportions Produc^n

2 slice of bread + 1 spoon butter = 1 sandwich

$$y = \min\left(\frac{x_1}{a}, \frac{x_2}{b}\right)$$

↳ Leontief Produc^n Func^n

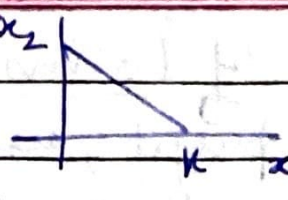
- Variable Proportion Produc^n

Cobb douglas func^n ⇒ $y = x_1^a x_2^b$

Linear func^n → $y = x_1 + x_2$

- Technical efficiency - producing max. possible output given the amounts of input & the technology.
- Economic efficiency - producing any output at the lowest possible cost.
- Isoquant → $y = x_1^a x_2^b$

(Cobb Douglas)

(linear) 

$x_1 + x_2 = k$

(leontief) $y = \min(x_1, x_2)$

- $y = f(x) \Rightarrow y$ = Total Product

$x \to y \Rightarrow$ Avg. Product $= \frac{y}{x}$

$x \to x+1 \Rightarrow y \to y' \Rightarrow y' - y$

$x \to x+h \Rightarrow y(x) \Rightarrow y(x+h) = \lim_{h \to 0} \frac{y(x+h) - y}{h}$

Marginal Product $= y'(x)$

- Law of diminishing marginal product

$y = f(L, K)$

Law:

1 → 100 (100)

2 → 250 (150) → best choice

3 → 350 (100)

4 → 400 (50)

5 → 375 (−25) ↓ the marginal product

L4 Legal Organiza^{n} of Firms

- for profit / non-profit, registra^{n}, liability
- Sole proprietorship, partnership, LLC, coopera^{n}
- coopera^{ns} - Sears, DuPont, General Motors, Std. Oil of New Jersey (Exxon)
- types of firm in India - sole proprietorship, partnership, LLC, private ltd. companies, public listed comp., 1-person comp., sec^{n} 8 comp., NGO, joint venture comp., joint hindu family business.

L5 Marginal Analysis thru eqs - II

Eg.1

no. of hrs.	eco.		stats	
0	7.0	0.7	6.0	0.8
1	7.7	0.5	6.8	0.6
2	8.2	0.3	7.4	0.4
3	8.5		7.8	

Eg.2 daily cost to run a train → 15 lakh

no. of train	daily total benefit		
0	0	30	
1	30	18	18 > 15
✓ (2)	48	12	
3	60	4	
4	64	2	
5	66		

- $\Pi = PQ - C(Q)$

$Q_0 \to Q_0+1$ $\quad TR(Q_0+1) - TR(Q_0) =$ Marginal Revenue

$TC(Q_0+1) - TC(Q_0) =$ Marginal cost

$MR - MC > 0 \Rightarrow Q_0$ to (Q_0+1)

$MR - MC < 0 \Rightarrow$ not Q_0 to (Q_0+1)

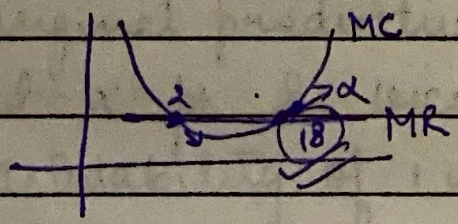
Eg. A firm faces price $P = 66$, indep. of its output q. The cost func^n is given as $\frac{Q^3}{3} - 10Q^2 + 102Q + 3$. What is the most profitable lvl. of output?

$$\boxed{MC = \frac{dTC(Q)}{dQ}}$$

$MR = MC \Rightarrow 66 = Q^2 - 20Q + 102$

$64 = (Q-10)^2 = \pm 8$

$Q = 18, 2$



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