Principles of Economics (Spring 2024)
Lecture 9
Cost

Part I

Cost

- **Accounting Cost vs. Economic Cost**
  - **Explicit Cost vs. Implicit Cost**
    - **Explicit Cost** – Input cost that ___requires___ an ___outlay___ of ___money___ by the firm.
    - **Implicit Cost** – Input cost that ___does not require___ an ___outlay___ of ___money___ by the firm. It measures the ___value___ of ___non-purchased inputs___.

Cost < ___Explicit___ Cost → ___Accounting___ Cost (a number)
Cost < ___Implicit___ Cost → ___Opportunity___ Cost (an alternative)

sum ⇒ Economic cost = Accounting Cost (money) + The Value of Opportunity Cost (time & energy)

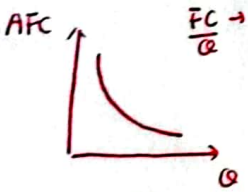
- **Components of Economic Cost**
  - **Fixed Cost (FC)** – The cost that doesn't vary with the quantity of output produced.
    ⇒ It exist only in the short run.
  - **Average Fixed Cost (AFC)** – FC divided by the quantity of output.
  - **Variable Cost (VC)** – The cost that varies with the quantity of output produced.
  - **Average Variable Cost (AVC)** – VC divided by the quantity of Output.
  - **Total Cost (TC)** – The market value of all input a firm uses in production.
    ⇒ In the short-run, TC = FC + VC.
  - **Average Cost (AC)** – TC divided by the quantity of output. It is also called average total cost (ATC). The short-run AC curve is U-shaped.
    Managers often refer to AC as their unit cost.
    ⇒ In the short-run,

In short-run AC = (AFC + AVC), TC/Q

AFC: $\frac{FC}{Q}$ → not vary!

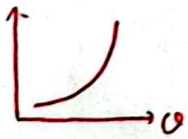
= FC/Q + VC/Q

= AFC + AVC



  - **Marginal Cost (MC)** – The increase in TC that arises from an extra unit of production.

AVC ⊕

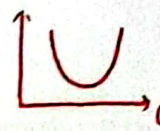


$\frac{VC}{Q}$ ↑ ← opportunity cost↑

⇓

ATC

$ATC = \frac{FC}{Q} + \frac{VC}{Q}$



- **Relationship between AP and AC**

Suppose

a = Units of Output

b = Units of One Input Used

c = Unit cost of This Input

Then

AP = a/b

AC = bc/a = $c \cdot \frac{b}{a}$

⇒ If the AP or MP of an input increases because of improved technology or management, AC or AVC of any given output will fall.

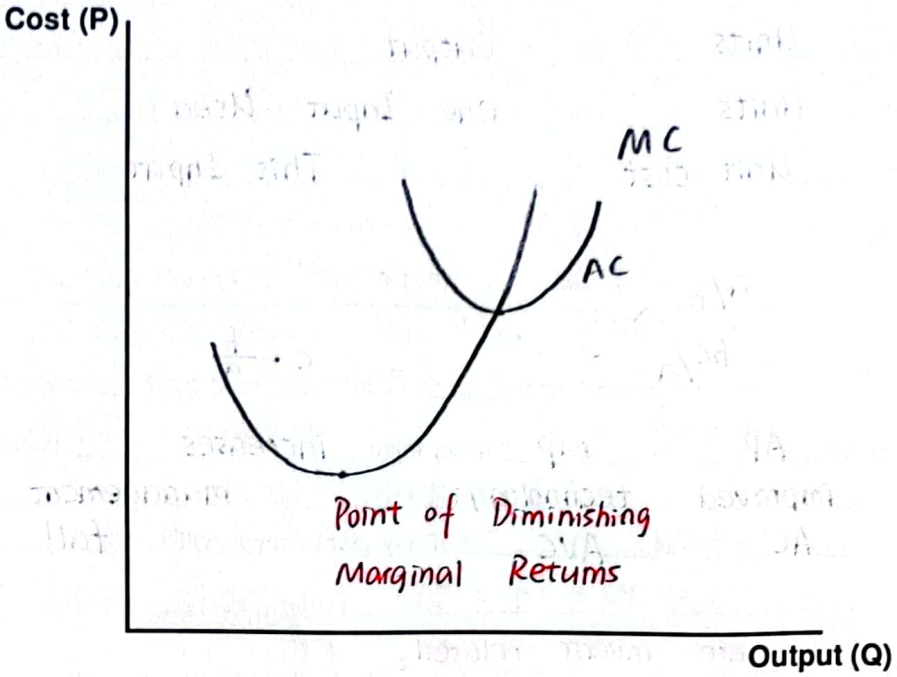
MP & MC are inverse related:

MP = (%) x (output) / (input) = x

MC = (Price of Input) x 1 / x (output) = $\frac{\text{Price}}{x}$

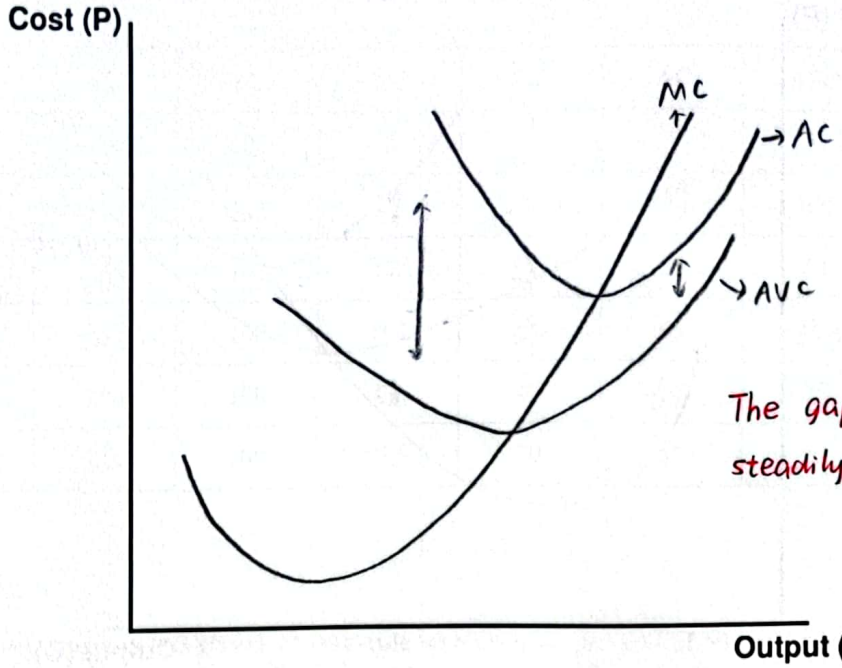
AP & AC are also inverse related:

- **Relationship between MC and AC**



- MC < AC ⇒ AC ↓
- MC > AC ⇒ AC ↑
- MC = AC ⇒ AC_{min}

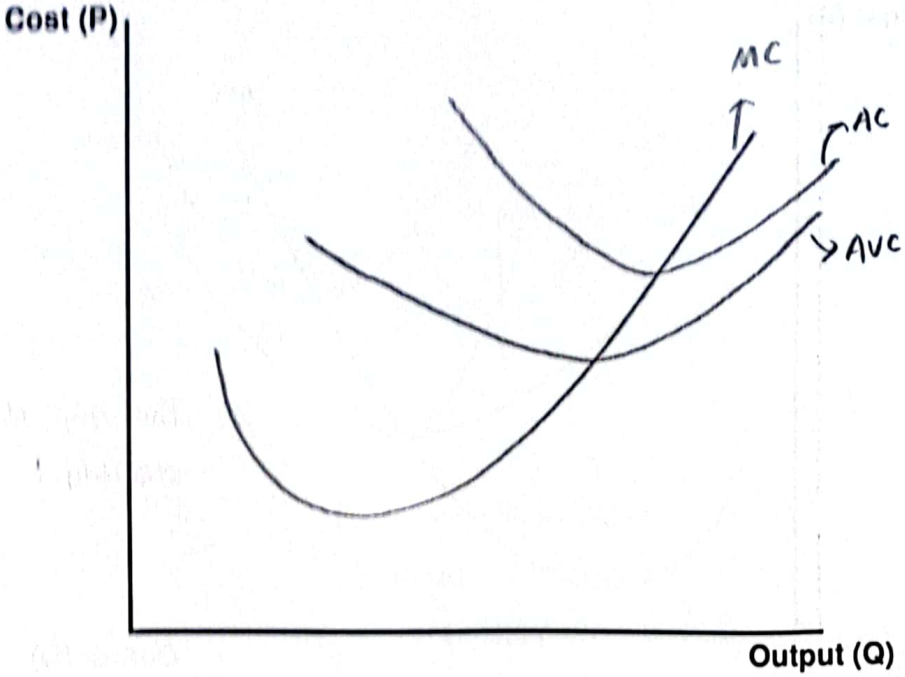
➢ **Same rule applies to AVC.**



The gap diminishes (AC-AVC) steadily ! AFC

- MC < AVC ⇒ AVC↓
- MC > AVC ⇒ AVC↑
- MC = AVC ⇒ AVC_{min}

- **MC intersects AC and AVC at their respective minimum.**



Exercise 1

Suppose that Joan's has done its accounting work, and has come up with these figures for what it costs Joan's Home Care to maintain various numbers of patients for a year. Based on the information given, fill in the chat.

Number of Patients	Total Cost ($)	Fixed Cost ($)	Variable Cost ($)	Marginal Cost ($)
0	1,000	1000	0	\
1	4,500	1000	3500	3500
2	7,500	1000	6500	3000
3	10,000	1000	9000	2500
4	12,000	1000	11000	2000
5	14,500	1000	13500	2500

Exercise 2

Complete the cost sheet below using the information given.

Quantity	TC	FC	VC	MC	AC	AFC	AVC
0	100	100	0	\	\	\	\
1	139	100	39	39	139	100	39
2	168	100	68	29	84	50	34
3	207	100	107	39	69	33.3	107/3
4	256	100	156	49	64	25	39
5	335	100	235	79	67	20	47

Exercise 3

B Davey produces 100 glasses of lemonade with average total cost of 50 cents per glass and average variable cost of 40 cents per glass. What is Davey's total fixed cost?

A. $0.1
B. $10
C. $12
D. $40
E. $50

Exercise 4

D A firm's total variable cost increases from $4,000 to $4,020 as the firm increases its output from 400 to 401 units. What is the marginal cost of the additional unit of output?

A. $4,020
B. $4,000
C. $401
D. $20

Exercise 5

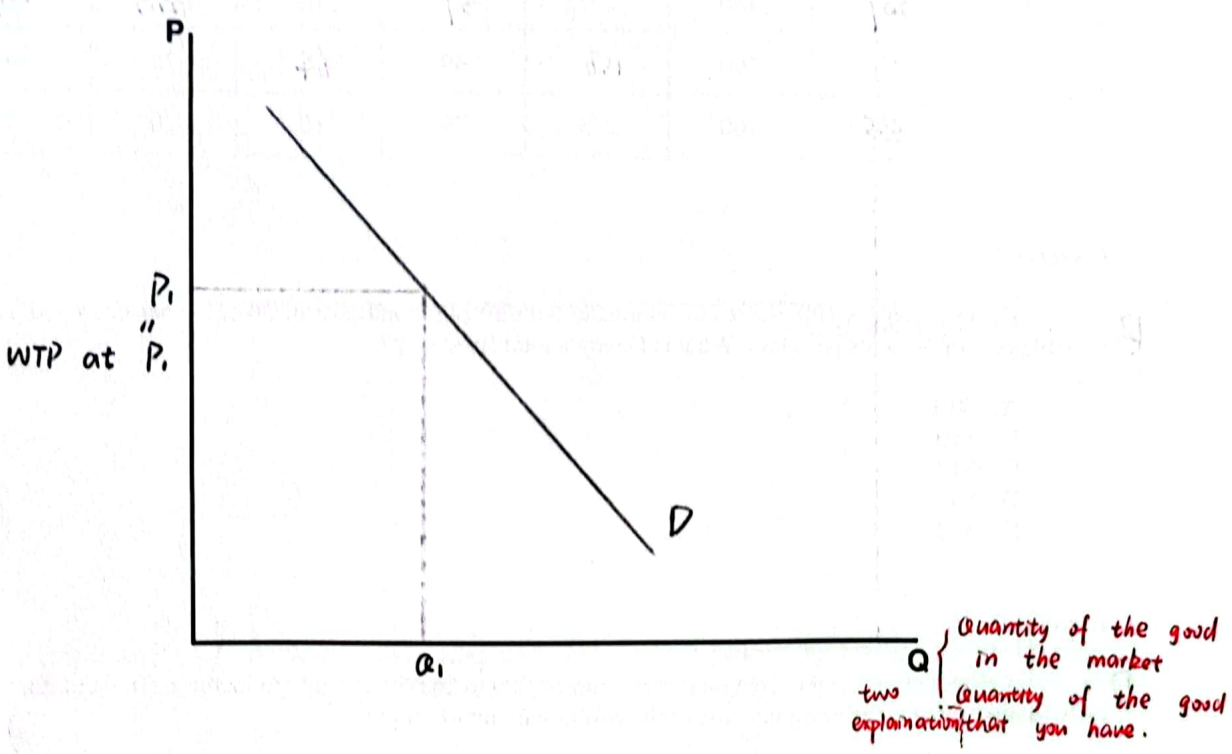
C The point of diminishing returns occurs when

A. the total product curve is at its maximum.
B. the marginal product curve is at its minimum.
C. the marginal cost curve is at its minimum.
D. the average product curve is at its maximum.

Part II

Welfare Economics – The study of how the allocation of resources affects economic well-being.

- **Consumer Surplus**
  - **Willingness to Pay (WTP)** – The maximum amount that a buyer will pay for a good.

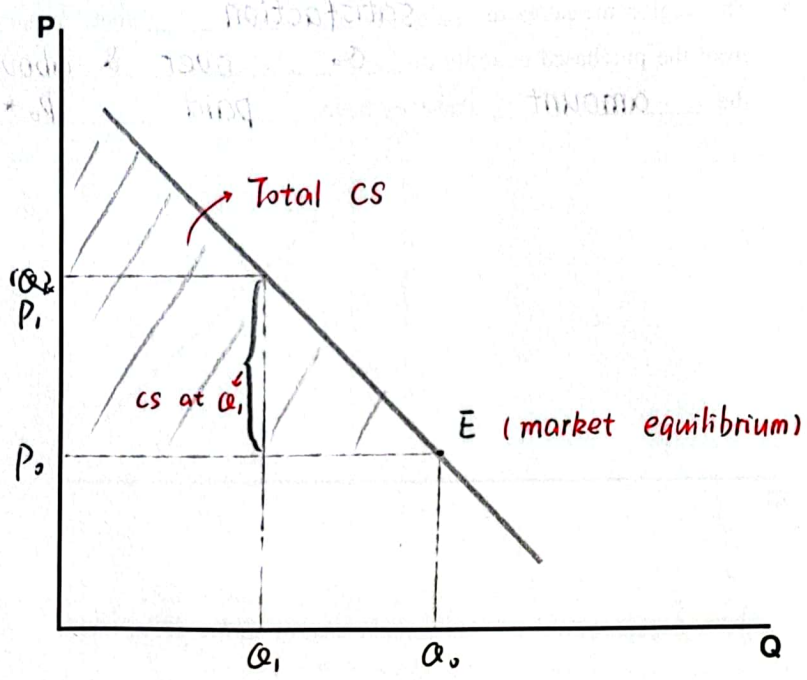


two explanation

- The consumers' WTP for the product equals the height of the demand curve, e.g., the person buying unit Q_1 would have been willing to pay the price of P_1, which is the height of the demand curve at that quantity.

- **Consumer Surplus (CS)** – The amount a buyer is willing to pay for a good minus the amount the buyer actually pays for it, which is the price in the market.

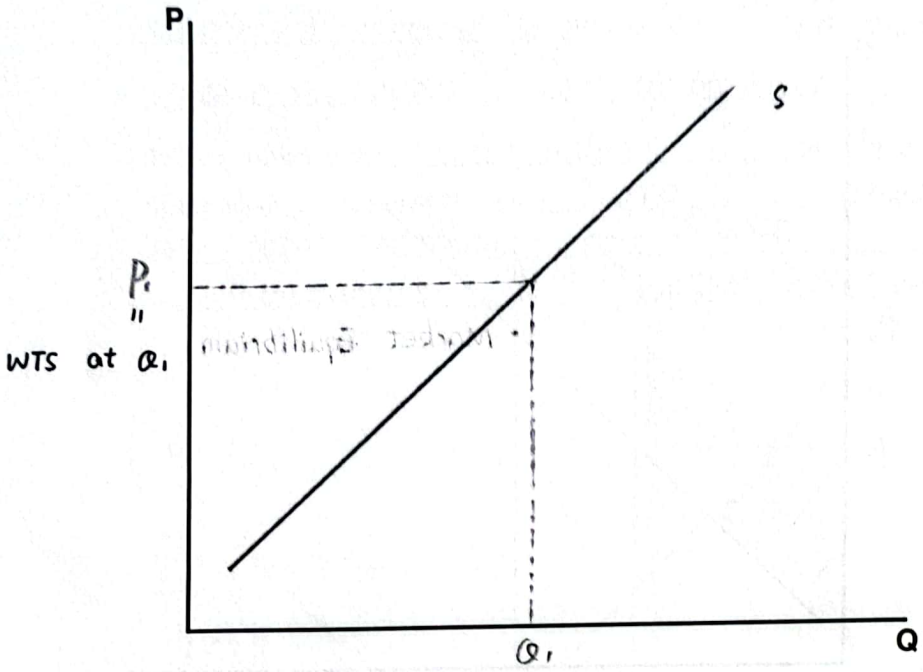
  ⇒ CS measures the benefit buyers receive from participating in a market.



- At the market equilibrium, the quantity demanded is Q_0 units. For the last unit purchased, i.e., the Q_0 unit, the consumer buying it values that unit at its purchased price of P_0, and therefore acquires no surplus over the purchase price.

- For each unit purchased from 0 to Q_0, the consumers values the product at higher than its purchase price of P_0, e.g., the person buying unit Q_1 obtains the CS of ($P_1 - P_0$) from being able to purchase the good at the price P_0.
- Adding up the surplus obtained on each unit purchased from 0 to Q_0, CS can be measured as the shaded region below the demand curve and above the price P_0.
- This region measures the satisfaction that consumers receive from the purchased quantity of Q_0, over & above the amount that they have paid ($P_0 * Q_0$).

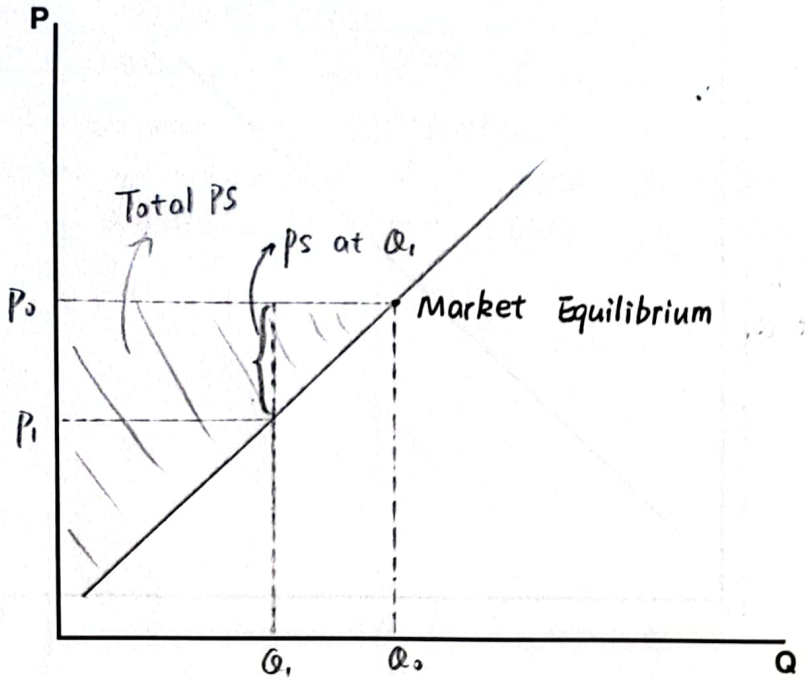
- **Producer Surplus**
  - **Willingness to Sell (WTS)** – The minimum amount that a producer must receive to sell a good, which is the economic cost of the producer.



Q↑ → opportunity cost ↑ → WTS ↑
law of increasing cost — want more money in return

- **Producer Surplus (PS)** – The amount a producer is paid for a good, which is the price in the market minus, the producer's economic cost of providing it.

  ⇒ PS measures the benefit sellers receive from participating in a market.

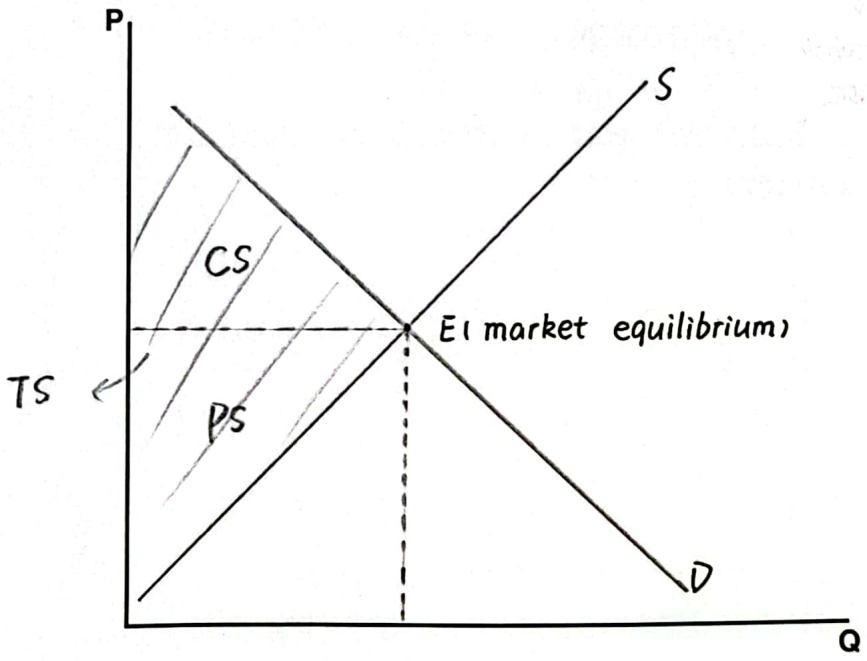


- At the market equilibrium, the quantity supplied is Q_0 units. For the last unit supplied, i.e., the Q_0 unit, the price P_0 equals the economic cost of production for the firm supplying that unit, and therefore, the firm acquires no (sup) surplus.
- For each unit sold from 0 to Q_0, the firms are able to produce them at an economic cost less than the price P_0, e.g., the firm supplying unit Q_1 could produce it with an (op economic cost of P_1, and hence obtains the PS of ($P_0 - P_1$) from being able to sell the good at the price P_0.
- Adding up the surplus obtained for each unit sold from 0 to Q_0, PS can be measured as the shaded region above the (price), supply curve and below the price P_0.

- **Market Efficiency and Market Failure**
  - **Total Surplus (TS)**

TS
= CS + PS
= (value to buyers − amount paid by buyers)
+ (amount received by producers − cost to producers)
// without government intervene
= value to buyers − cost to producers

⇒ TS in a market is the total value to buyers of the goods, as measured by their WTP, minus the total economic cost to producers of providing those goods.



- **Efficiency** – The property of a resource allocation of maximizing the TS received by all members of society.
- **Market Failure** – A situation in which a market left on its own fails to allocate resources efficiently. Because of:
  - Externality – The impact of one person's actions on the well-being of a bystander.
  - Market Power – The ability of a single economic actor or small group of actor to have a substantial influence on market price.

production pollutes the environment. If producer leave it unmanaged, supply curve may shift right due to reduction in cost. so TS will ↑. however, anyone who does not participate in this market will suffer. so the welfare of the whole society won't increase.

Exercise 6

A Suppose Raymond and Victoria attend a charity benefit and participate in a silent auction. Each has in mind a maximum amount that he or she will bid for an oil painting by a locally famous artist. This maximum is the

A. willingness to pay.
B. consumer surplus.
C. producer surplus.
D. None of the above.