

# **BEC1116** Principles of Economics

## **Producer and Consumer Behavior**



# Producer Behavior

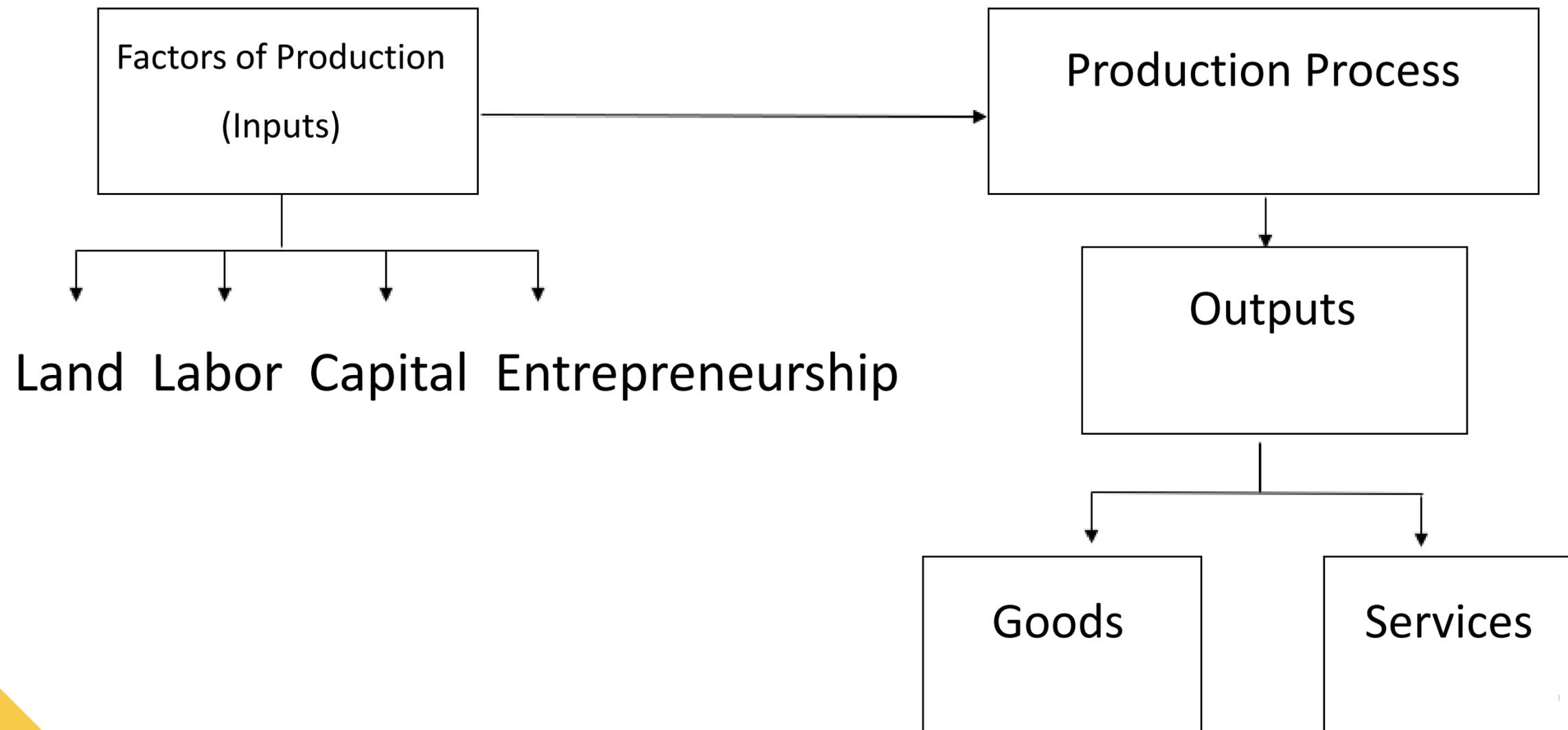
- The study of producer behavior helps us understand the supply side of the market.
- The objective of producers is to maximize profit from production.
- In determining how much profit a producer earns, it is necessary to consider not only the price and quantity of goods sold, but also the cost of production.
- Producers must understand the relationship between output and the quantity of inputs used in production.
- The study of production theory explains how producers should combine different inputs in appropriate proportions in order to achieve the maximum level of output.

# Producer Behavior

Production generally refers to the process of creating a particular good or bringing it into existence. However, in economics, the concept of production has a broader meaning. It includes any activity that can create goods or services capable of satisfying human wants.

Therefore, production does not necessarily involve manufacturing activities in factories, nor does it always require the creation of new physical goods. For example, delivering newspapers or operating a barber shop are also considered forms of production.

**Production** is the process of transforming various factors of production (**inputs**) into **outputs**, which consist of goods and services.



# Production and Time Periods of Production

In economics, production is divided into 2 periods : short-run production and long -run production.

**Short-run production** refers to production in a period of time that is so short that producers **cannot change certain factors of production**, such as the size of the factory, the size of land, and the amount of machinery. Production in the short run involves the use of both **fixed factors** and **variable factors**.

**Fixed factors** are factors of production whose quantities remain constant and do not vary with the level of output. Whether output is large, small, or even zero, producers must still incur costs for these factors. Examples of fixed factors include buildings, machinery, and land.

**Variable factors** are factors of production whose quantities vary according to the level of output. Producers can adjust the amount used depending on their production needs.

# Production and Time Periods of Production

**Long-run production** refers to production over a period of time that is long enough for producers to be able to **change all factors of production** in the production process as appropriate. For example, producers can change the size of the factory or the scale of business operations. In the long run, **all factors are variable factors**, and there are **no fixed factors**.

# Production Function

$$Q = f(K, L, X)$$

**Q** means the quantity of output (production).

**X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, ...** mean the quantities of each type of factor of production used in producing that good.

For example:

**Q** = quantity of rice produced

**K** = land

**L** = labor

**X** = machinery



# Short-Run Production

Output that results from using fixed factors together with variable factors can be presented in three forms:

**Total Product (TP)** Refers to the total amount of output obtained from the production process by using fixed factors together with variable factors.

**Average Product (AP)** Refers to the average amount of total output per one unit of a variable factor used in production, for example, how many kilograms of unhusked rice are produced on average by one unit of labor.

$$AP = \frac{TP}{L}$$

**Marginal Product (MP)** Refers to the additional amount of output obtained when one more unit of a variable factor is added to production, also known as the **Law of Diminishing Returns**.

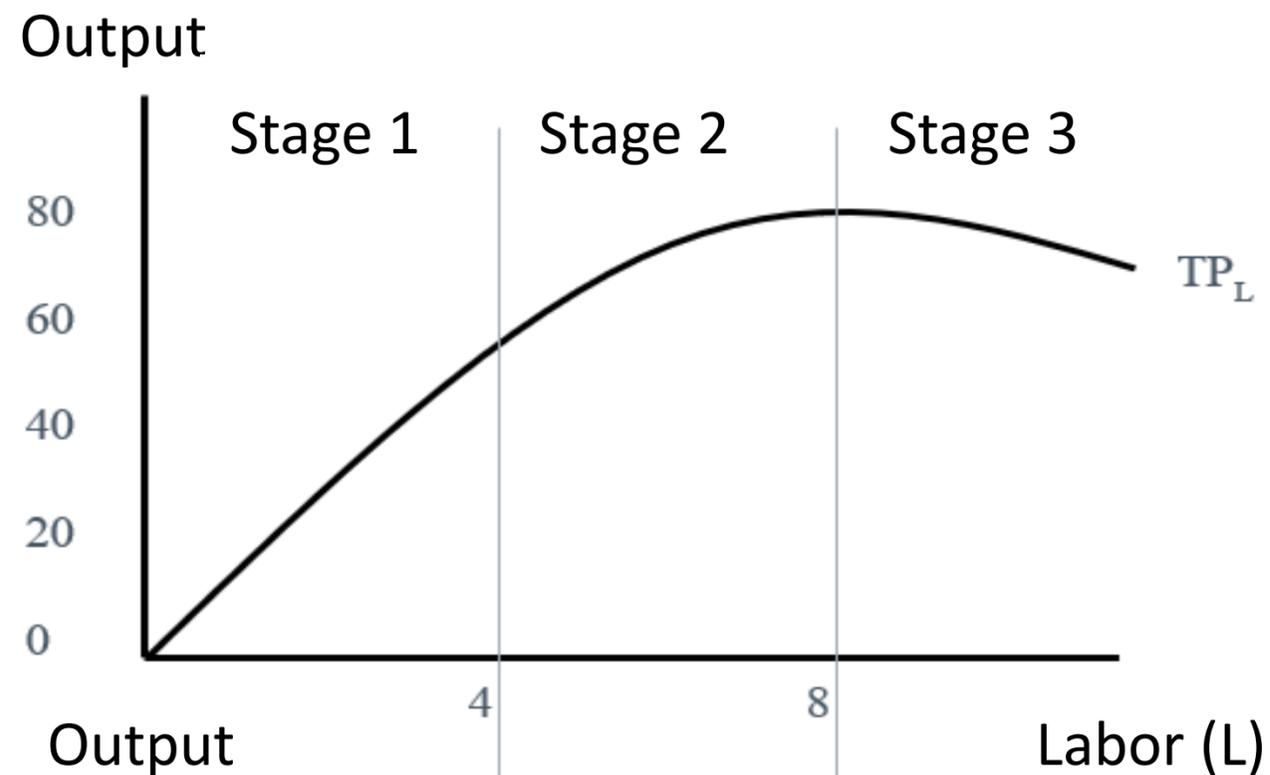
$$MP = \frac{\Delta TP}{\Delta L}$$

# The presentation of the relationship of TP, AP, and MP by a table

K	L	TP <sub>L</sub>	AP <sub>L</sub>	MP <sub>L</sub>
100	1	10	10	10
100	2	24	12	14
100	3	45	15	21
100	4	60	15	15
100	5	70	14	10
100	6	78	13	8
100	7	83	11.9	5
100	8	83	10.4	0
100	9	75	8.3	-8



# The presentation of the relationship of TP, AP, and MP by graphs



## Stage of production

### Stage 1

L units 1  $\rightarrow$  4

At the maximum point of  $AP_L = MP_L$

$AP_L$  reaches its maximum,  $TP_L$  is increasing

### Stage 2

L units 5  $\rightarrow$  8

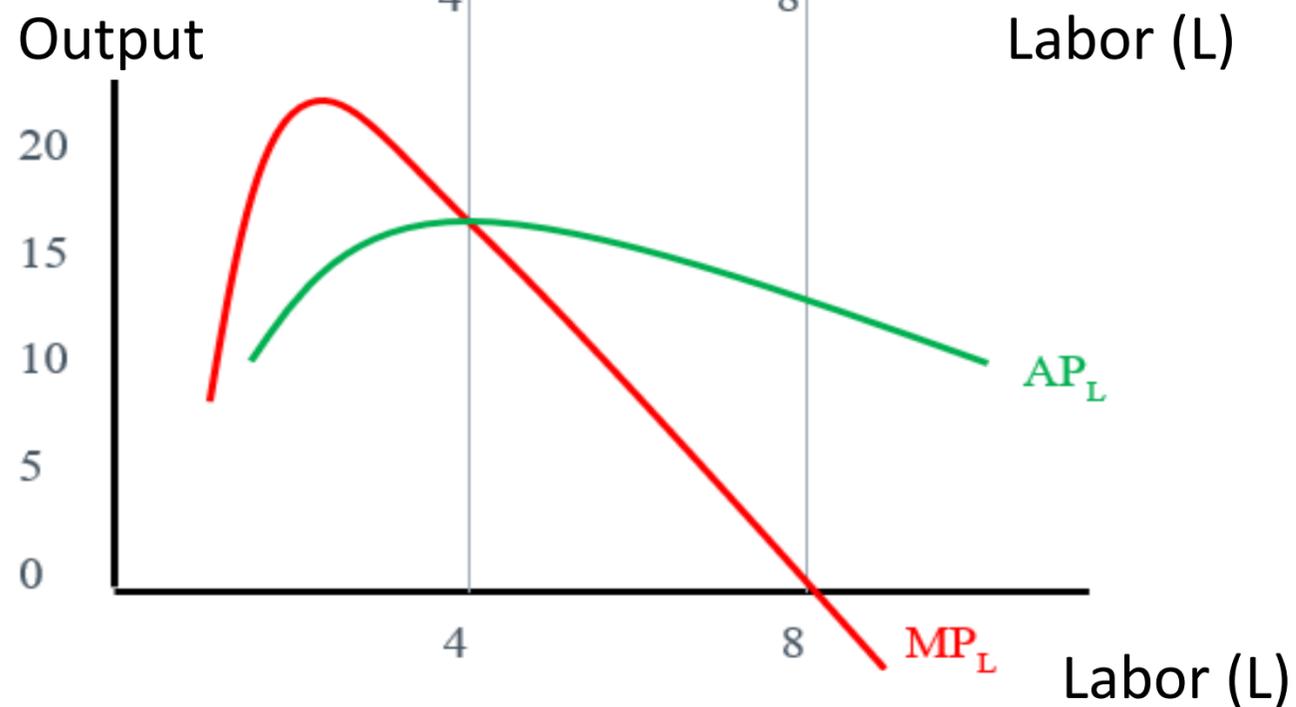
At the maximum point of  $TP_L$ ,  $MP_L = 0$

$AP_L$  begins to decrease,  $TP_L$  reaches its maximum

### Stage 3

L units 9  $\rightarrow$

$MP_L$  becomes negative,  $TP_L$  is decreasing  $\rightarrow$  stop production



# Short-Run Production

## Stage 1 of Production:

The variable factor is still small relative to the fixed factor. Increasing labor (L) allows the fixed factor to be used more efficiently, causing **TP ↑ at an increasing rate**. Production should not stop at this stage because total revenue can still increase.

## Stage 2 of Production:

Increasing the variable factor by one unit causes **TP ↑ at a decreasing rate**. This is the appropriate stage of production.

However, the producer must consider input prices, product prices, and expected sales in order to determine the optimal level of output in Stage 2. This is the stage where the producer decides the level of short-run production.

## Stage 3 of Production:

Increasing the variable factor is wasteful because **TP ↓**.

# Cost of Production

## Opportunity Cost

The use of resources in one particular way causes the loss of the opportunity to use those resources in alternative ways. Therefore, deciding to allocate resources to one option inevitably creates an opportunity cost, which is measured by the highest benefit of the next best alternative that is forgone.

### **Example:**

If an investor decides to build a television station, the investor will not be able to use that capital for other purposes, such as investing in an industrial factory, opening a private hospital, or depositing the money in a bank to earn interest.

Thus, when the investor spends money on building a television station, the opportunity to receive returns from other investment alternatives is lost.

# Explicit Cost and Implicit Cost

## Explicit Cost

Explicit cost refers to production expenses that producers actually pay to various parties during the production process. These include raw material costs, labor costs, managers' salaries, interest expenses, and other related expenditures. These costs are clearly observable as real monetary outflow

## Implicit Cost

Implicit cost refers to costs arising when producers or entrepreneurs use their own factors of production in the production process, such as using their own capital or buildings for business operations. In such cases, no wages are paid to themselves, no rent is paid for the premises used, and no interest is charged on the capital invested. As a result, it may appear as if there are no production costs of this type.

# Accounting Cost and Economic Cost

## Accounting Cost

Accounting cost refers to various expenses that involve actual cash outflows and are recorded in accounting records. These costs are the same as explicit costs, as they represent expenditures that are actually paid.

## Economic Cost

Economic cost refers to all costs necessary for production, regardless of whether actual cash payments are made. Therefore, it includes both explicit costs and implicit costs.

As a result, economic cost is higher than accounting cost, which leads to economic profit being lower than accounting profit.

# Private Cost and Social Cost

## Private Cost or Internal Cost

Private cost refers to expenses incurred from the use of factors of production in producing goods. It consists of both explicit costs and implicit costs.

## Social Cost

Social cost consists of private cost plus externalities arising from the production of goods and services, whether the effects are beneficial or harmful and must be taken into consideration. Social cost is usually higher than private cost because negative externalities impose losses on society. However, if there are positive externalities that benefit society, social cost will be lower than private cost.

# Production Costs Used in Analyzing the Level of Output of a Firm

## Short-Run Production Costs

Short-run production costs refer to expenses incurred in production over the short run, in which there are both fixed factors and variable factors. Therefore, short-run costs can be divided into **fixed costs** and **variable costs**, and can be analyzed as follows:

**Total Cost (TC)** Total cost is the cost incurred in producing all units of output. It consists of Total Fixed Cost (TFC) and Total Variable Cost (TVC).

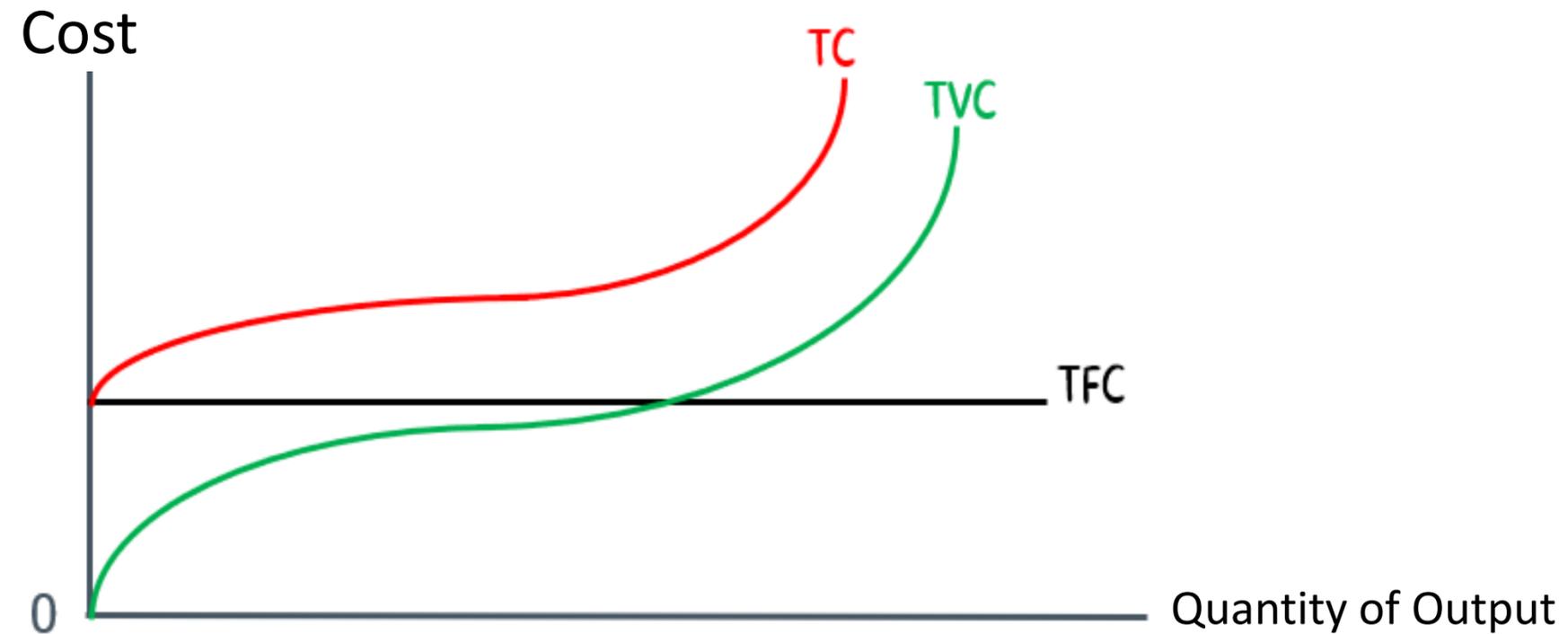
$$TC = TFC + TVC$$

**Total Fixed Cost (TFC)** Fixed costs do not change with the level of output, whether production is high, low, or even zero. TFC remains constant, such as land rent, machinery costs, and factory building costs.

**Total Variable Cost (TVC)** Variable costs change according to the level of output. Higher production leads to higher variable costs, and lower production leads to lower variable costs. If there is no production, variable costs are zero. Examples include labor costs and raw material costs.

# Characteristics of Short-Run Cost Curves

Short-Run Total Cost Curves : TC, TFC, and TVC



**TFC is a straight line parallel to the horizontal axis.**

**TVC in the initial stage is a curve that moves away from the horizontal axis, and later it becomes steeper.**

**The shape of the curve follows the law of production in the short run, where output increases rapidly in the early stage and then increases at a decreasing rate in later stages.**

**TC has the same shape as the TVC curve but lies above the TVC curve by a vertical distance equal to TFC.**

**2. Average Total Cost** (ATC) or Average Cost (AC) is total cost divided by the quantity of output, or it is also called cost per unit.

$$ATC = \frac{TC}{Q}$$

Average Fixed Cost (AFC) is total fixed cost divided by the quantity of output.

$$AFC = \frac{TFC}{Q}$$

AFC ↓ continuously as output ↑, because TFC is constant.

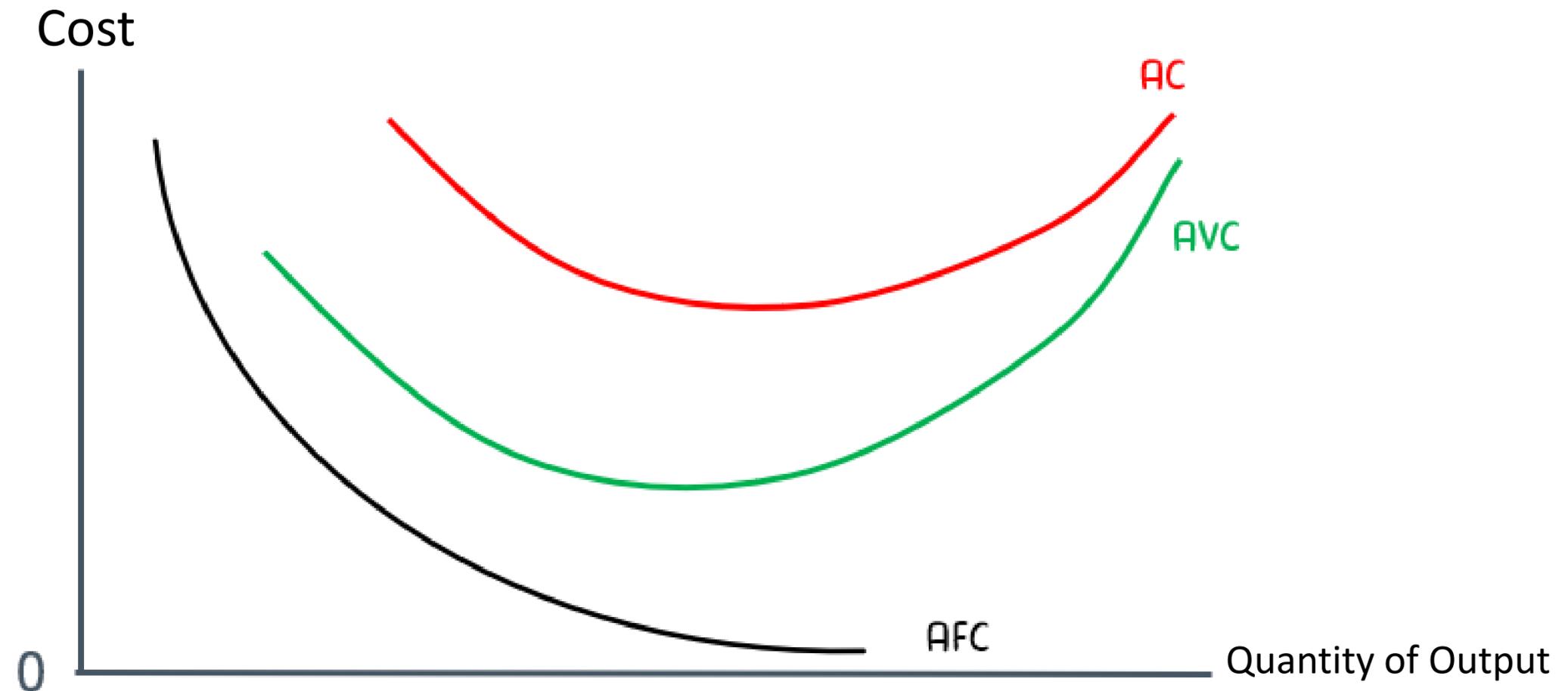
Therefore, when output ↑, AFC ↓.

Average Variable Cost (AVC) is total variable cost divided by the quantity of output.

$$AVC = \frac{TVC}{Q}$$

# Characteristics of Short-Run Average Cost Curve

Short-run average cost curves consist of **AC**, **AFC**, and **AVC**.



**AFC** is a curve known as a **Rectangular Hyperbola**.

**AVC** initially **decreases** (**AVC ↓**), reaches its **minimum level**, and then as output continues to increase, **AVC increases** (**AVC ↑**).

**AC** lies **above the AVC curve**, and the **vertical distance between AC and AVC is equal to AFC**.

**3. Marginal Cost (MC)** is the change in total cost resulting from a change in output of one unit.

$$MC = \frac{\Delta TC}{\Delta Q}$$

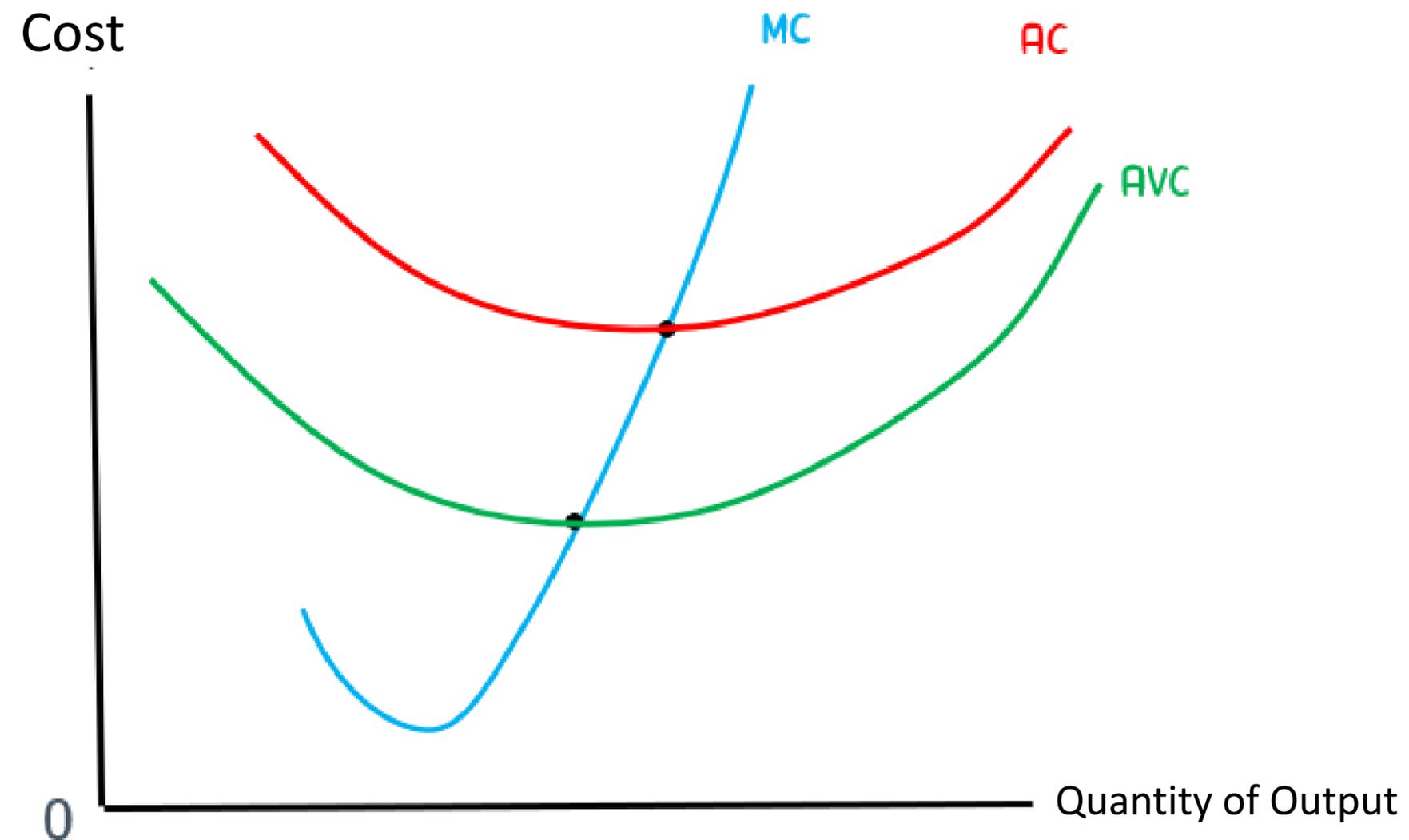
Marginal cost indicates how much additional cost is incurred when output increases by one unit.

Since **TC** consists of **TFC + TVC**, and **TFC** is constant, changes in **TC** result only from changes in **TVC**.

$$MC = \frac{\Delta TVC}{\Delta Q}$$

# Characteristics of the Short-Run Marginal Cost Curve

The marginal cost curve (MC)



MC is the slope of the TC curve.

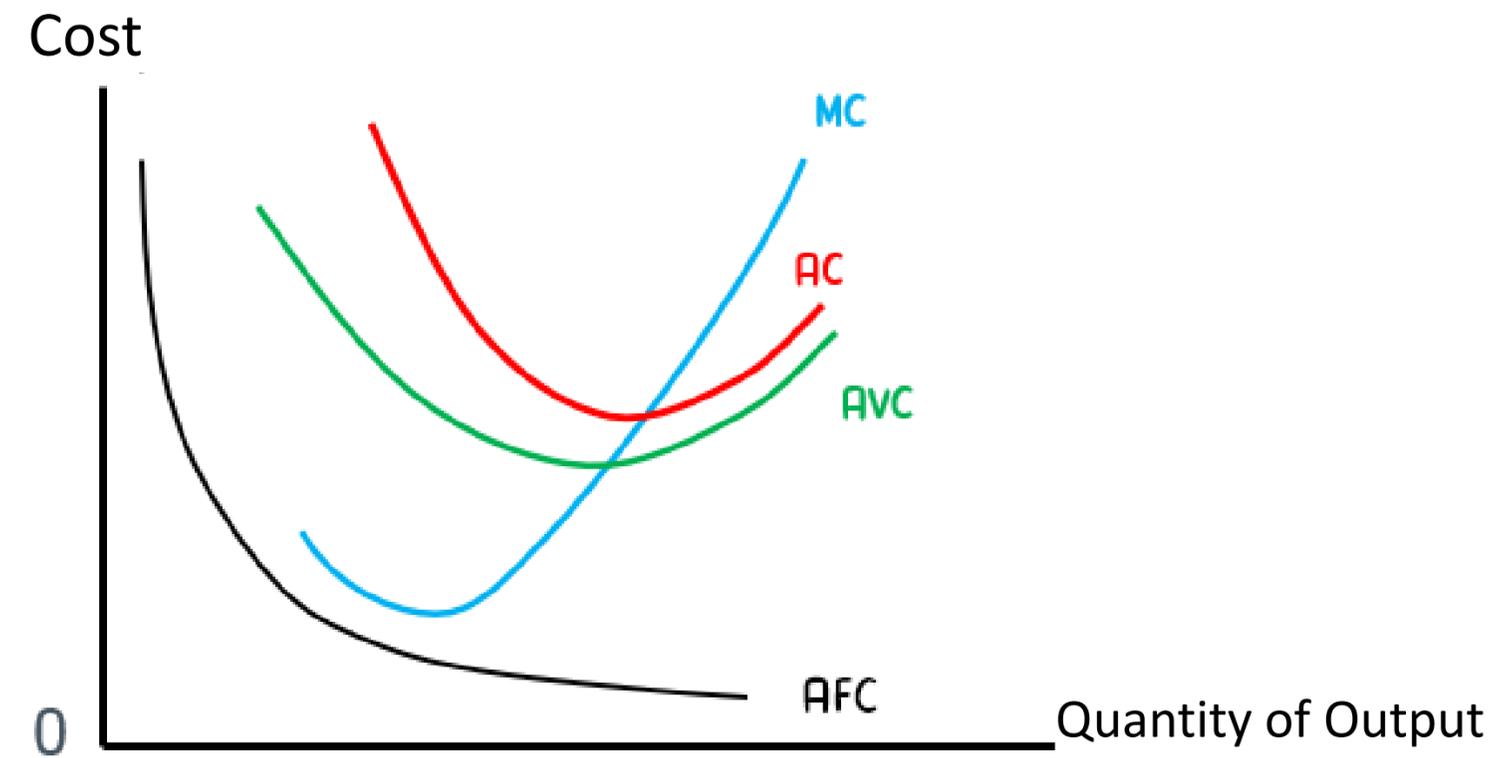
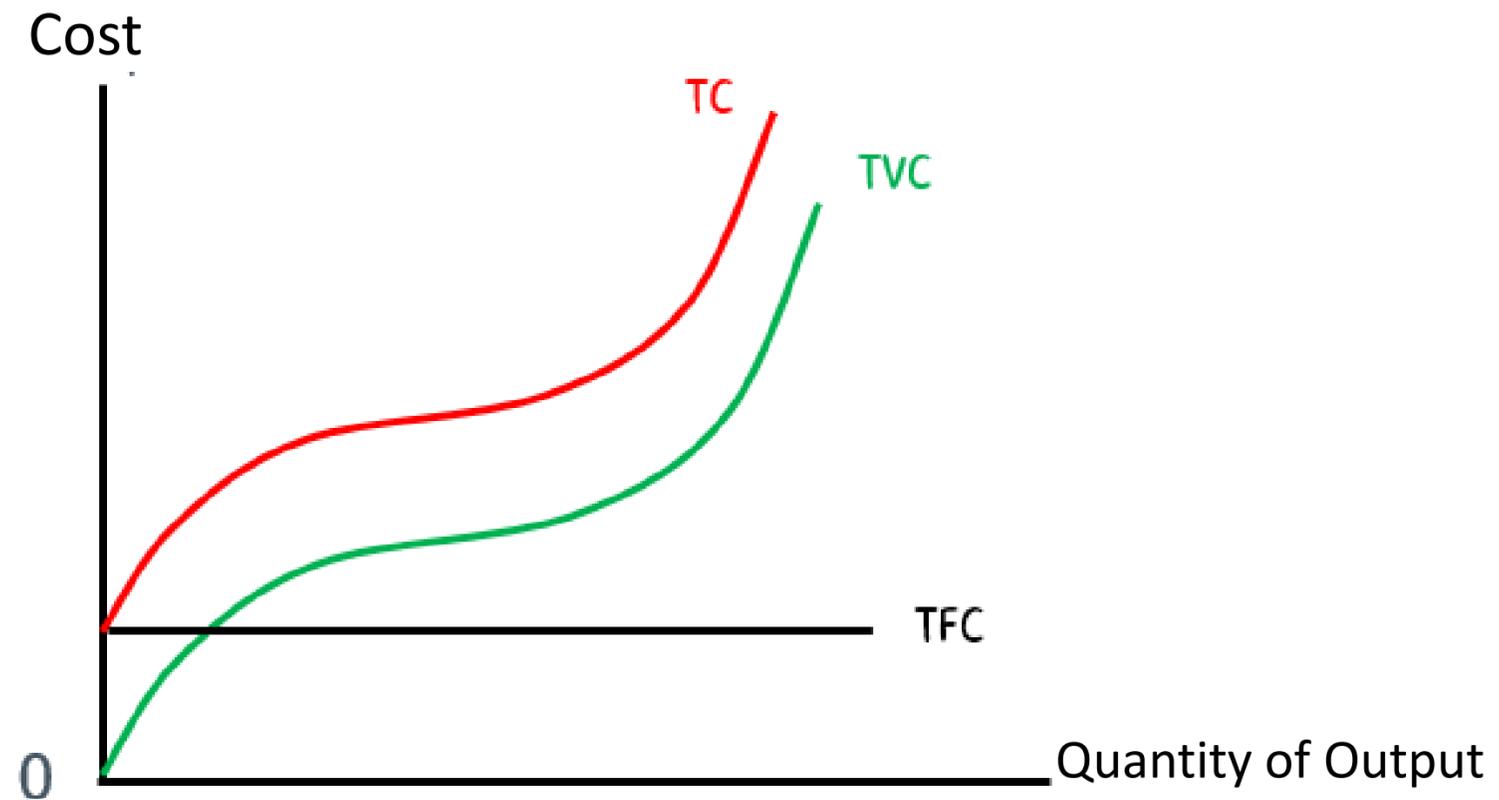
MC is equal to AC and AVC

at the points where AC and AVC are at their minimum.

All the costs mentioned above can be presented in the following table.

Q	TFC	TVC	TC	AFC	AVC	AC	MC
0	100		100	-	0	0	0
10	100	70	170	10.0	7.0	17	7
20	100	138	238	5.0	6.9	11.9	6.8
30	100	200	300	3.3	6.7	10	6.2
40	100	260	360	2.5	6.5	9	6
50	100	300	400	2.0	6.0	8	4
60	100	380	480	1.7	6.3	8	8
70	100	530	630	1.4	7.6	9	15
80	100	700	800	1.3	8.8	10	17
90	100	890	990	1.1	9.9	11	19

# Cost Curves in the Short Run

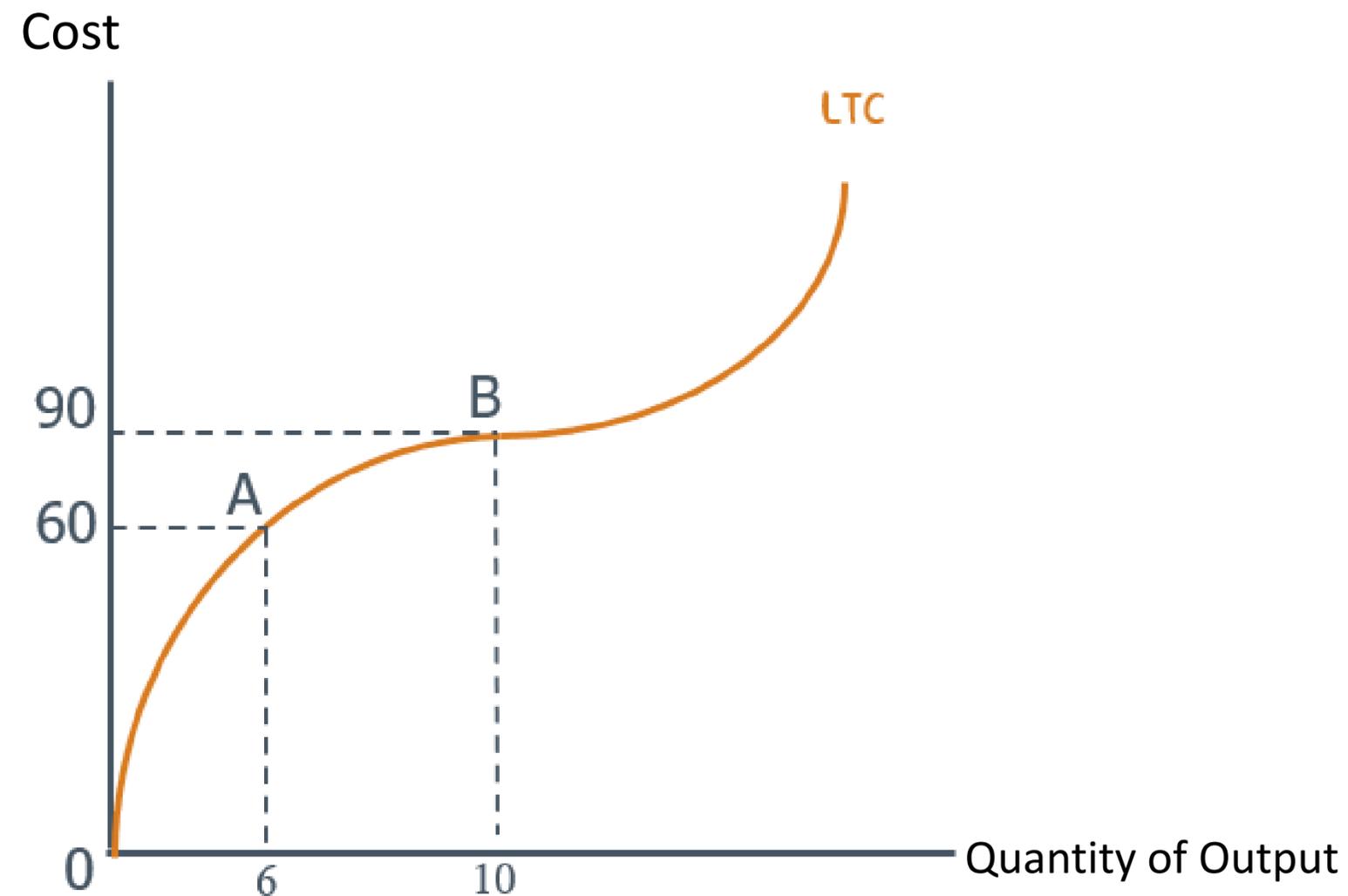


# Long-Run Cost

## Long-Run Total Cost (LTC)

In the long run, producers can adjust all inputs to be appropriate for the increased level of output. Therefore, in the long run, there are only variable inputs.

The **LTC curve** has characteristics similar to the short-run total cost curve (STC), except that the LTC curve starts from the origin, whereas the STC curve starts from the level of fixed cost.



**Long-run Average Cost (LAC)** is the total cost in the long run averaged per unit of output. It can be calculated as

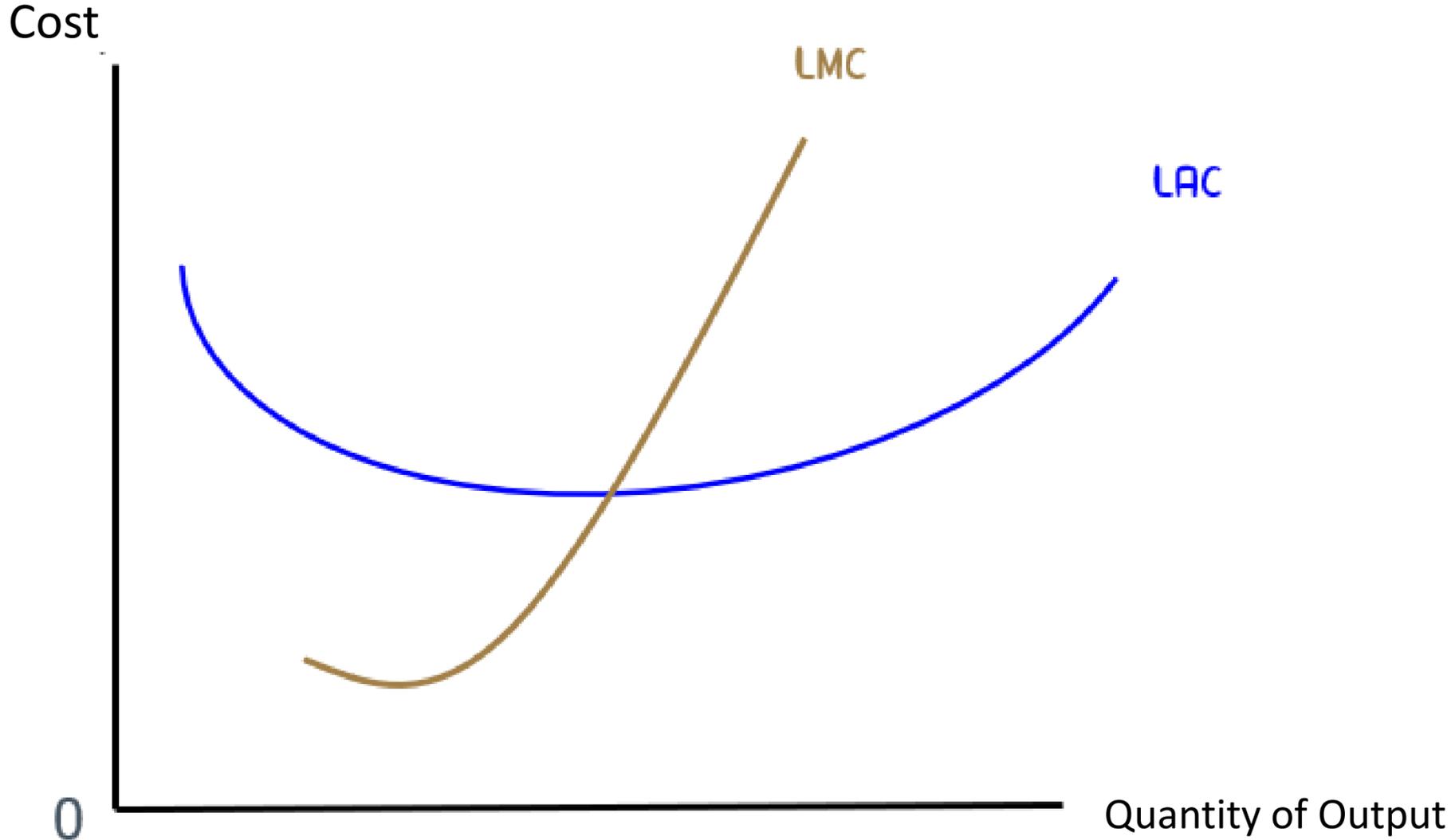
$$LAC = \frac{LTC}{Q}$$

**Long-run Marginal Cost (LMC)** is the cost of producing the last unit of output in the long run. It can be calculated as

$$LMC = \frac{\Delta LTC}{\Delta Q}$$

# Characteristics of the long-run average cost curve (LAC) and the long-run marginal cost curve (LMC)

The LAC and LMC curves have characteristics similar to short-run cost curves.



## Optimal Level of Production

The objective of a producer's business operation is to achieve maximum profit or minimize losses. Therefore, the producer must compare the cost of goods with the revenue from goods.

If revenue > production cost → profit

If revenue < production cost → loss

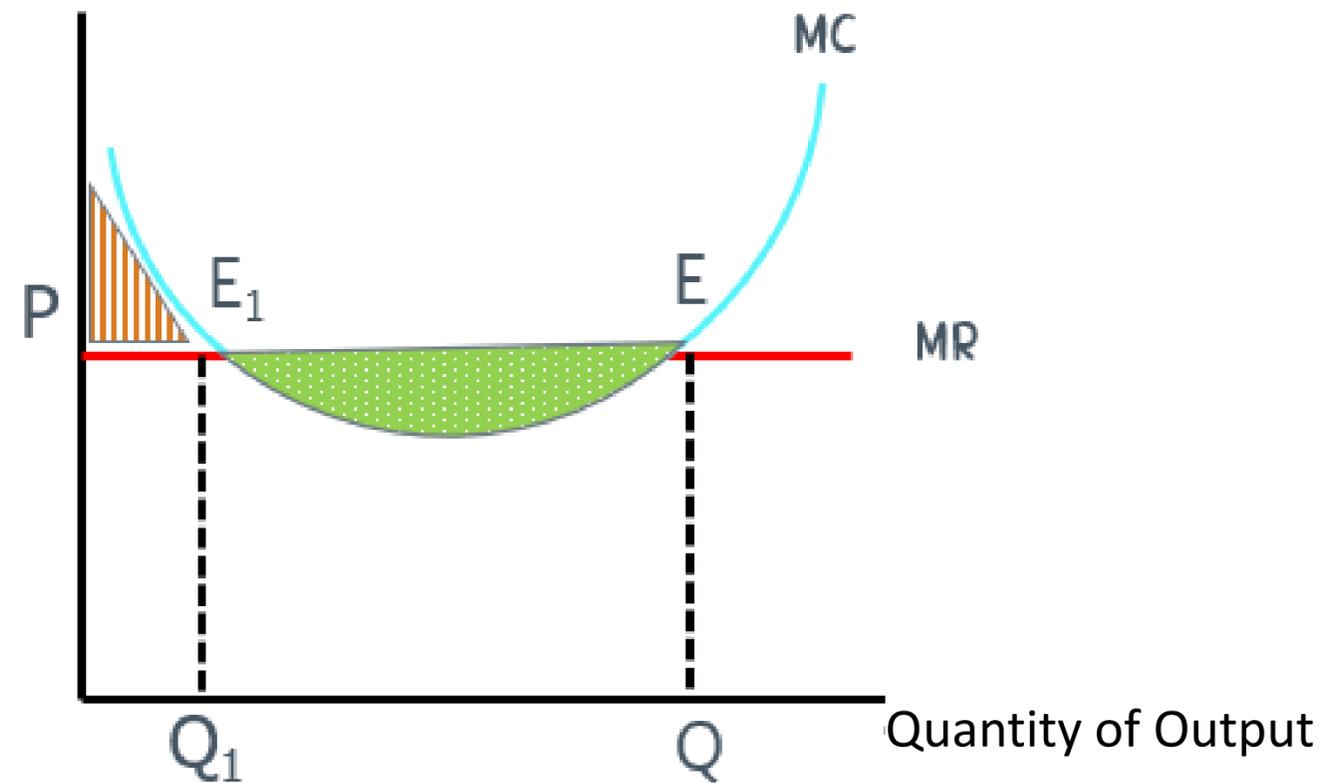
The comparison is made by considering marginal revenue (MR) and marginal cost (MC).

Marginal Revenue (MR) means the change in total revenue resulting from a one-unit change in the quantity of goods sold.

$$MR = \frac{\Delta TR}{\Delta Q}$$

# Marginal Concept

Cost & Revenue

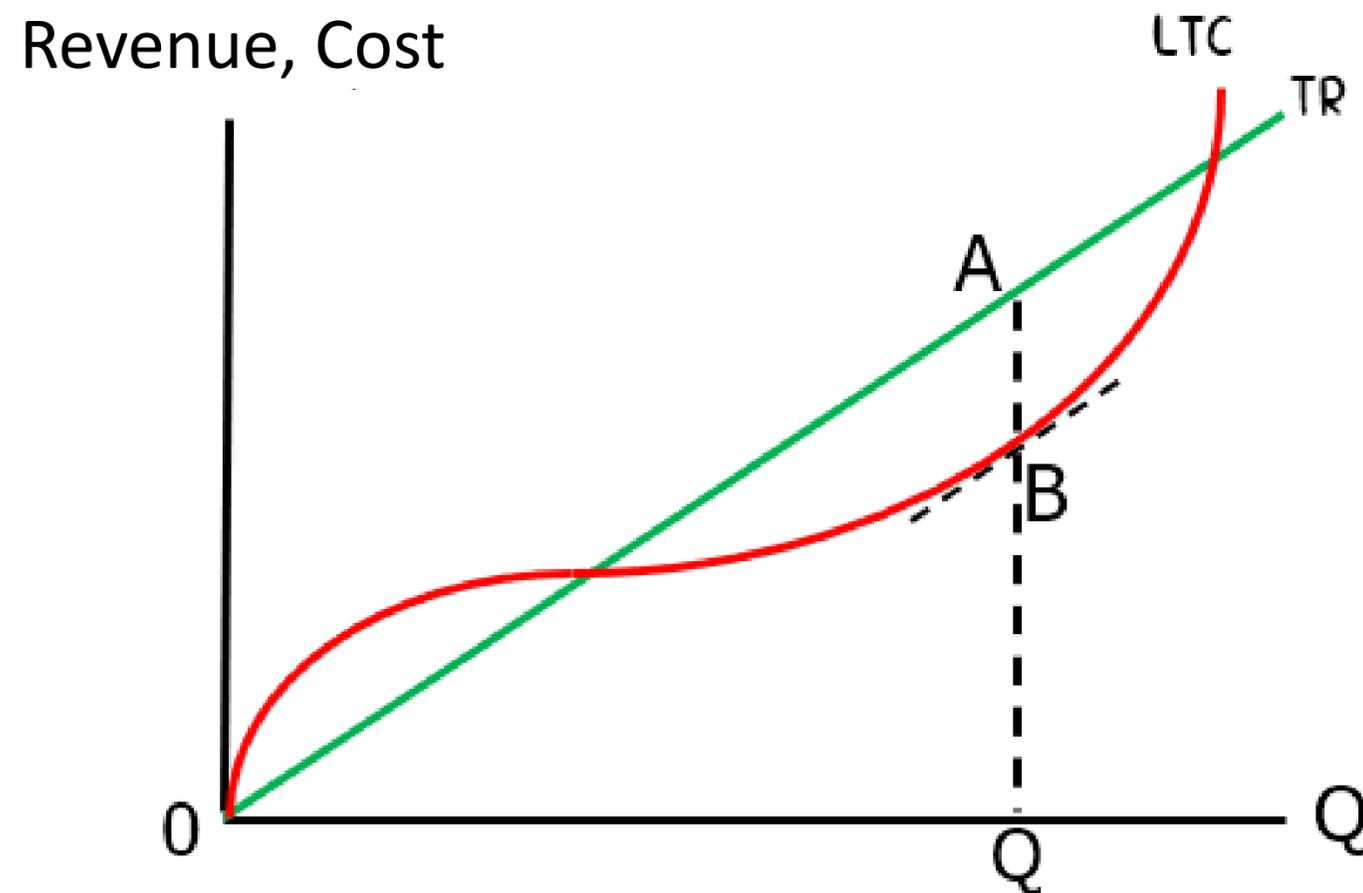


Production at  $Q_1$ , point  $E_1$ : production where  $MC = MR$ , but it is a loss-making level of output because it is the initial stage of production, during which some fixed costs are incurred.

The level of production that yields the maximum total profit is point E: production where  $MC = MR$  in the range where MC is increasing. When  $MR > MC$ , the producer's profit  $\uparrow$  if production is expanded. But if production exceeds level  $OQ$ , profit  $\downarrow$  if production continues.

**Total Concept** is a comparison of total revenue (TR) with total cost (TC) at different levels of output in order to determine which level of production yields the maximum profit.

The level of output at which the producer earns the highest profit is the level where the distance between TR and TC is the greatest, and slope TR = slope TC.



The level of production that gives the maximum profit is OQ units, profit = AB.

At this level of Q, slope TR = slope LTC, and the distance between them is the greatest.

# Supply

**Supply** refers to the quantity of goods or services that sellers are willing and able to offer for sale at different price levels of that good, during a given period of time, **holding other factors constant** (such as production technology, production season, and production costs).

The relationship between the quantity supplied of goods and services and their price follows the **law of supply**:

when the price of a good increases, the quantity supplied tends to increase;

when the price decreases, the quantity supplied tends to decrease, **ceteris paribus** (other things remaining unchanged).

# Law of Supply

Shows the relationship between the quantity supplied of goods and services and the price of the good.

That is, **“holding other factors constant, the quantity supplied of goods and services has a direct relationship with the price of that good.”**

$P \uparrow \rightarrow Q_s \uparrow$

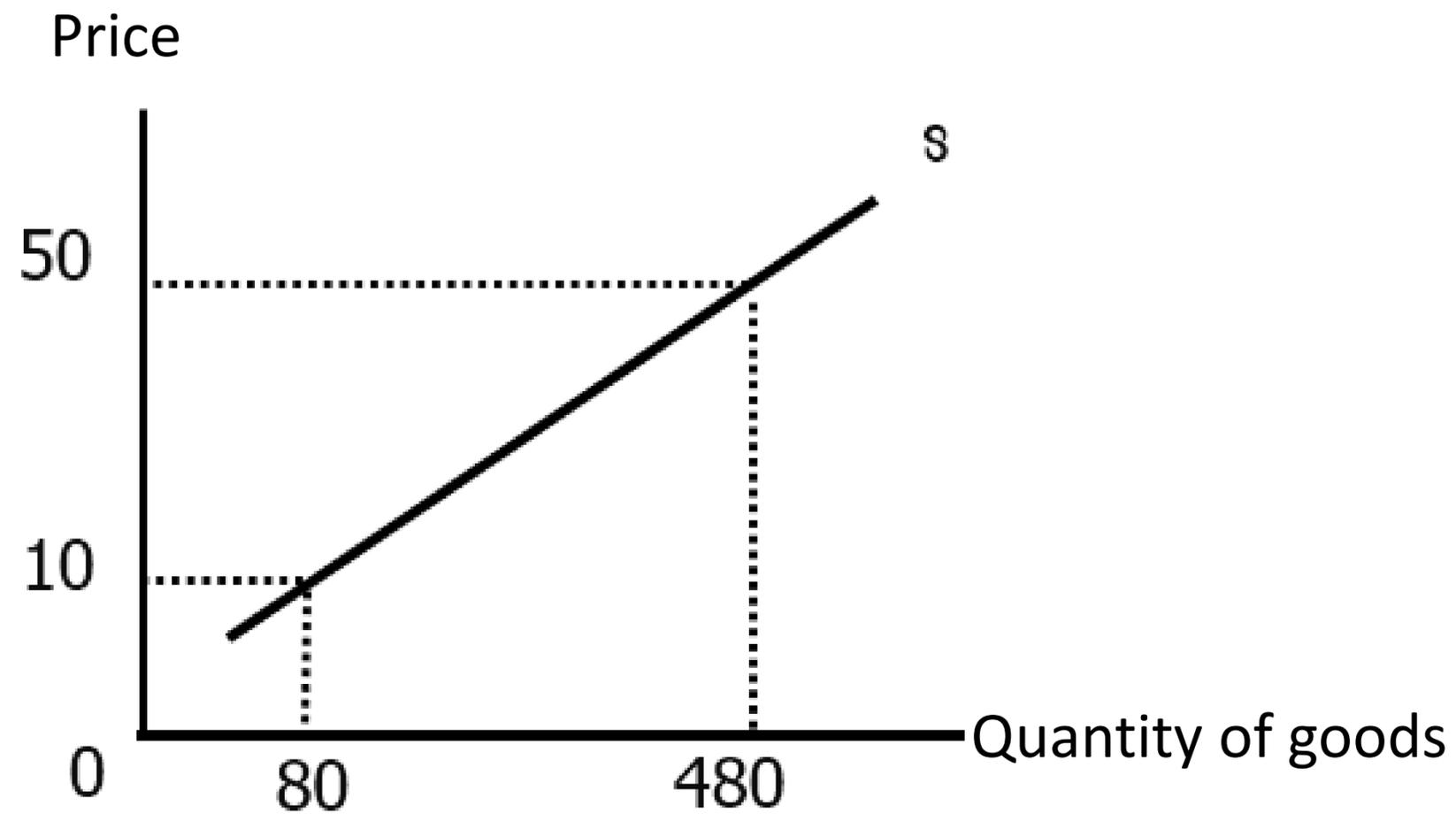
$P \downarrow \rightarrow Q_s \downarrow$

Profit is the factor that motivates sellers to increase or decrease the quantity they supply. A higher price implies higher profit, therefore the quantity supplied increases.

# Supply Schedule

Price	10	20	30	40	50
Quantity Supplied	80	180	280	380	480

## Supply Curve



# Individual Supply and Market Supply

## Individual Supply

Refers to the quantity of a particular good or service that each producer is willing to offer for sale in the market at different price levels of the good during a given period of time.

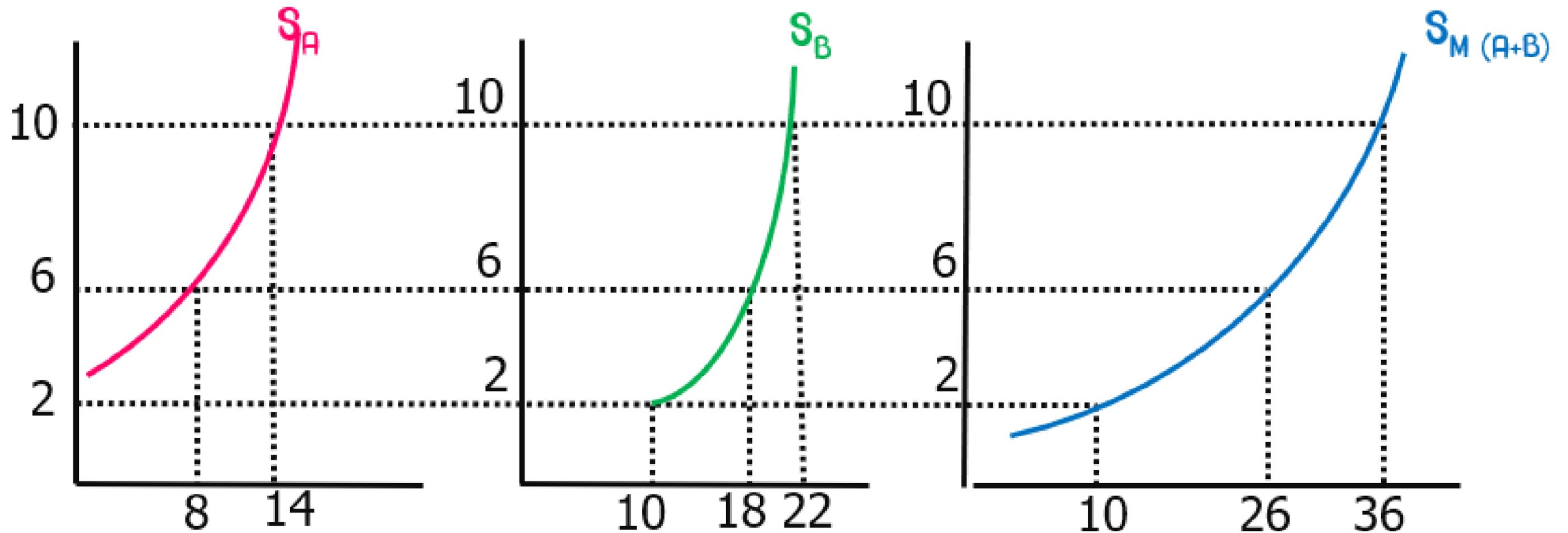
## Market Supply

Refers to the quantity of a particular good that all producers or sellers in the market are willing to offer for sale at different price levels of the good during a given period of time. It is the horizontal summation of individual supplies.

# Individual Supply and Market Supply

For example, suppose there are 2 sellers in the market, A and B, who are willing to sell goods at different price levels.

P	$Q_A$	$Q_B$	อุปทานตลาด Q (A+B)
10	14	22	$(14+22) = 36$
8	11	20	$(11+20) = 31$
6	8	18	$(8+18) = 26$
4	5	15	$(5+15) = 20$
2	0	10	$(0+10) = 10$



**Individual Supply A**

**Individual Supply B**

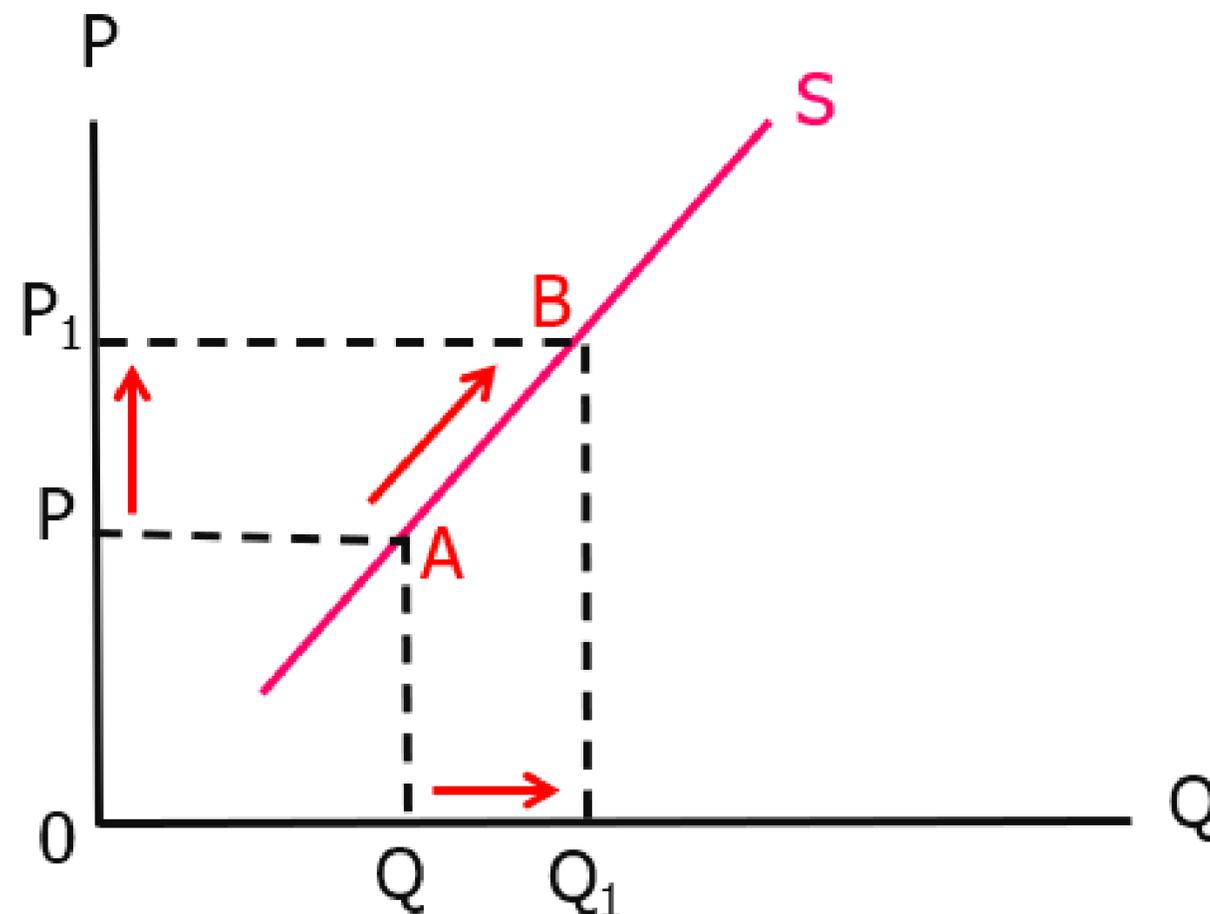
**Market Supply**

The market supply curve has a flatter slope than the individual supply curves.

# Change in Quantity Supplied and Change in Supply

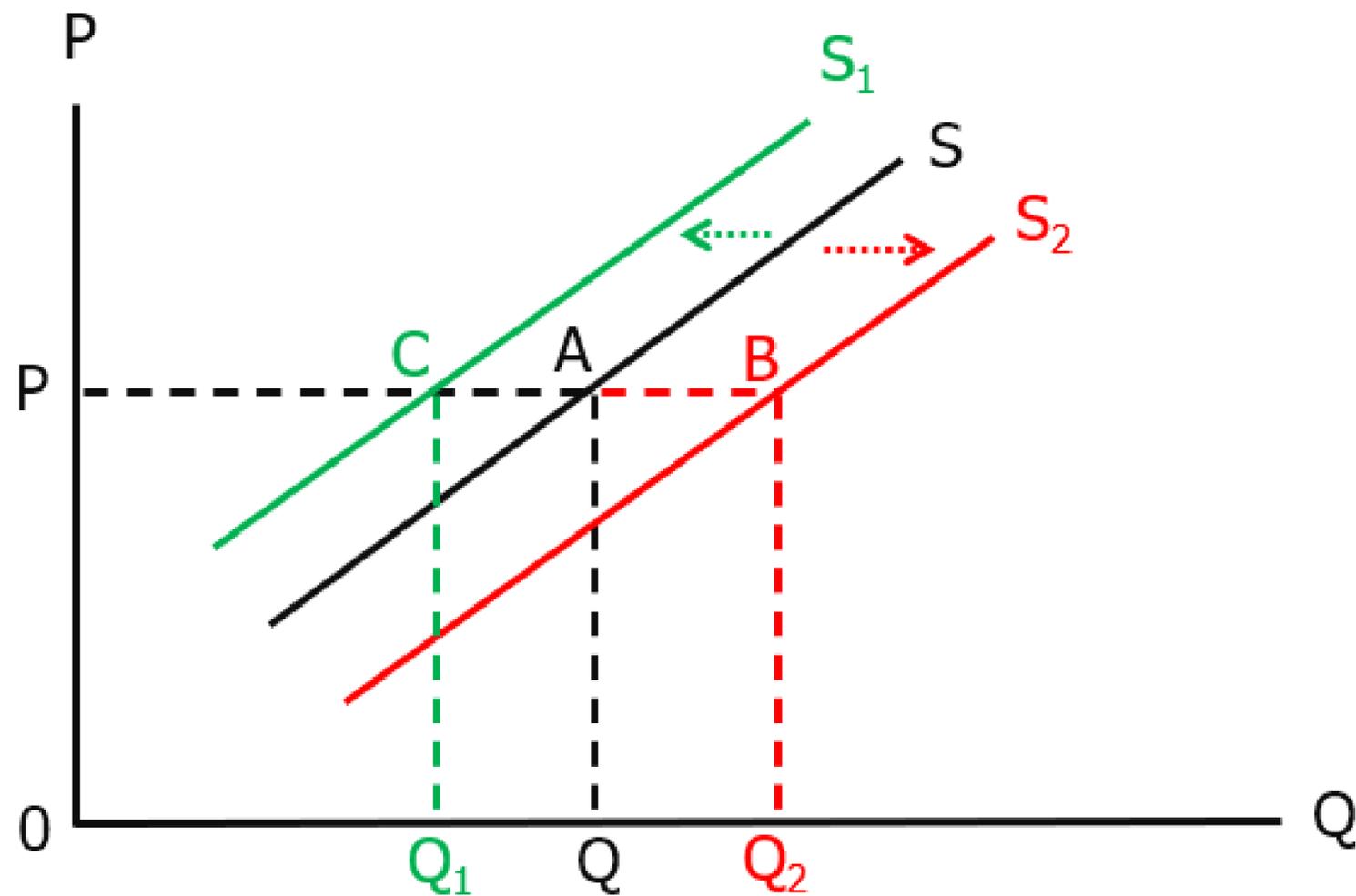
## Change in Quantity Supplied

A change in the quantity of goods and services supplied occurs when there is a change in the price of that good, while other factors are held constant. This change takes place **along the same supply curve**.



## Change in Supply

Change in supply means a change in the quantity of goods and services supplied caused by changes in factors other than the price of the good itself. This change is a **shift** of the supply curve from the original curve to a new curve.



# Causes of Changes in Supply

- Changes in production costs
- Changes in the prices of other goods
- Changes in environmental conditions for example, agriculture, soil, and weather conditions affecting production
- Expectations about future events for example, sellers' expectations about economic conditions