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## LEVEL 1: ECONOMICS

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Reading 8 (1<sup>st</sup> out of 7): INTRO TO MICROECONOMICS

Difficulty:

**easy**

Benchmark Study Time:

**2.2h**

2022





**THIS E-BOOK:**

- ❖ is a selective summary of the corresponding Reading in your CFA® Program Curriculum,
- ❖ provides place for your own notes,
- ❖ helps you structure your study and revision time!

## How to use this e-book to maximize your knowledge retention:

1. **Print** the e-book in duplex and bind it to keep all important info for this Reading **in one place**.
2. **Read** this e-book, best twice, to grasp the idea of what this Reading is about.
3. **Study** the Reading from your curriculum. **Here add** your notes, examples, formulas, definitions, etc.
4. **Review** the Reading using this e-book, e.g. write your summary of key concepts or revise the formulas at the end of this e-book (if applicable).
5. **Done?** Go to [your study plan](#) and change the Reading's status to **green** :  
(it will make your Chance-to-Pass-Score™ grow ☺).
6. **Come back** to this e-book from time to time to **regularly review for knowledge retention!**

**NOTE:** While studying or reviewing this Reading, you can use the tables at the end of this e-book and mark your study/review sessions to hold yourself accountable.



## DEMAND

Demand determines the quantity of goods and services consumers are able and willing to purchase in a given time and at a given price.

The **law of demand** states that:

- ▶ if the price of a given good rises, consumers are willing to buy less,
- ▶ if the price of a given good drops, consumers are willing to buy more.

The **demand function for the good**:

$$Q_D = f(P, I, P_A, \dots)$$

Where:

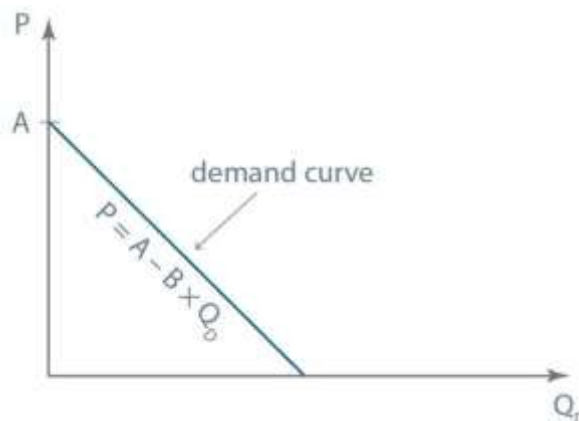
- ▶  $f$  – demand function for the good,
- ▶  $Q_D$  – quantity demanded of the good,
- ▶  $P$  – price of the good (own price),
- ▶  $I$  – consumers' income,
- ▶  $P_A$  – price of another good (complement or substitute).

**Inverse demand function:**

$$P = A - B \times Q_D$$

Where:

- ▶  $P$  – price of the good,
- ▶  $Q_D$  – quantity demanded of the good,
- ▶  $A, B$  – constants.



**NOTE:** This demand function is called inverse because the price is on the Y-axis and the quantity demanded on the X-axis.

Usually, in mathematics, the independent variable (in this case price) is given on the X-axis and the dependent variable (in this case quantity demanded) is given on the Y-axis. This is how economists present the demand function.



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## DEMAND ELASTICITIES

### Types of elasticity

Elasticity is a ratio of a percentage change in one variable to a percentage change in another variable.

Types of elasticity:

- ✦ own-price elasticity of demand,
- ✦ income elasticity of demand,
- ✦ cross-price elasticity of demand.

### Own-price elasticity of demand

$$E_P = \text{own-price elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where:

- ✦ Q – quantity demanded,
- ✦ P – price,
- ✦  $\Delta P$  – small change in price,
- ✦  $\Delta Q$  – small change in quantity demanded.

### Interpretation of elasticity

Demand can be:

- ✦ elastic,
- ✦ perfectly elastic (*it's when we are dealing with a horizontal demand curve*),
- ✦ unitary elastic,
- ✦ inelastic,
- ✦ perfectly inelastic (*it's when we are dealing with a vertical demand curve*).

$$|E_P| > 1 \rightarrow \text{demand is elastic}$$

$$|E_P| = +\infty \rightarrow \text{demand is perfectly elastic}$$

$$E_P = -1 \rightarrow \text{demand is unitary elastic}$$

$$|E_P| < 1 \rightarrow \text{demand is inelastic}$$

$$E_P = 0 \rightarrow \text{demand is perfectly inelastic}$$



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### Elasticity vs Total Expenditure

demand is elastic: decrease in price → increase in total expenditure

demand is inelastic: decrease in price → decrease in total expenditure

### Factors that affect the price elasticity of demand

The factors that affect the price elasticity of demand are:

- ▶ the number of substitutes for a good – when it is small the demand is inelastic,
- ▶ the share of the consumer's budget spent on the product – the higher the share, the higher the elasticity of demand,
- ▶ time – in the long run the price elasticity of demand is higher than in the short run.

### Income elasticity

$$E_I = \text{income elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}} = \frac{\Delta Q}{\Delta I} \times \frac{I}{Q}$$

Where:

- ▶ Q – quantity demanded,
- ▶ I – income,
- ▶  $\Delta I$  – small change in income,
- ▶  $\Delta Q$  – small change in quantity demanded.

The income elasticity of demand helps answer the question:

**By how many percentage points will the demand change if there is one percentage change in income?**

### Normal good vs Inferior good

$E_I > 0 \rightarrow$  good is a normal good = when the income rises, more of the product is demanded

$E_I < 0 \rightarrow$  good is an inferior good = when the income rises, less of the product is demanded





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## Cross-price elasticity of demand

$$E_C = \text{cross-price elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in the price of another good}} =$$

$$= \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where:

- ✦ Q – quantity demanded,
- ✦ P – price of **another good**,
- ✦  $\Delta P$  – small change in price,
- ✦  $\Delta Q$  – small change in quantity demanded.

## Substitutes vs Complements

$E_C > 0 \rightarrow$  good is a substitute = a rise in the price of another good leads to a rise in demand for the given good

$E_C < 0 \rightarrow$  good is a complement = a rise in the price of another good

leads to a drop in the demand for the given good

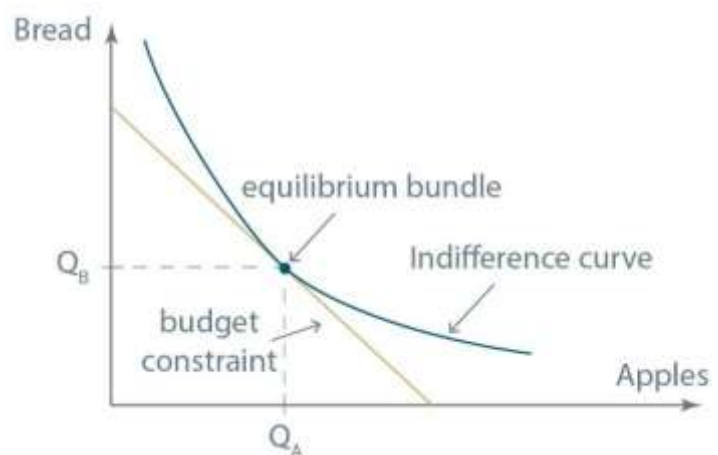
## SUBSTITUTION EFFECT VS INCOME EFFECT

### Consumer's equilibrium bundle

A **consumption bundle** is a set of goods and services that consumers are willing to purchase.

The consumer's equilibrium bundle of goods is a basket of goods thanks to which the consumer maximizes his utility within his budget constraints.

Let's assume 2 goods: bread and apples  $\rightarrow$





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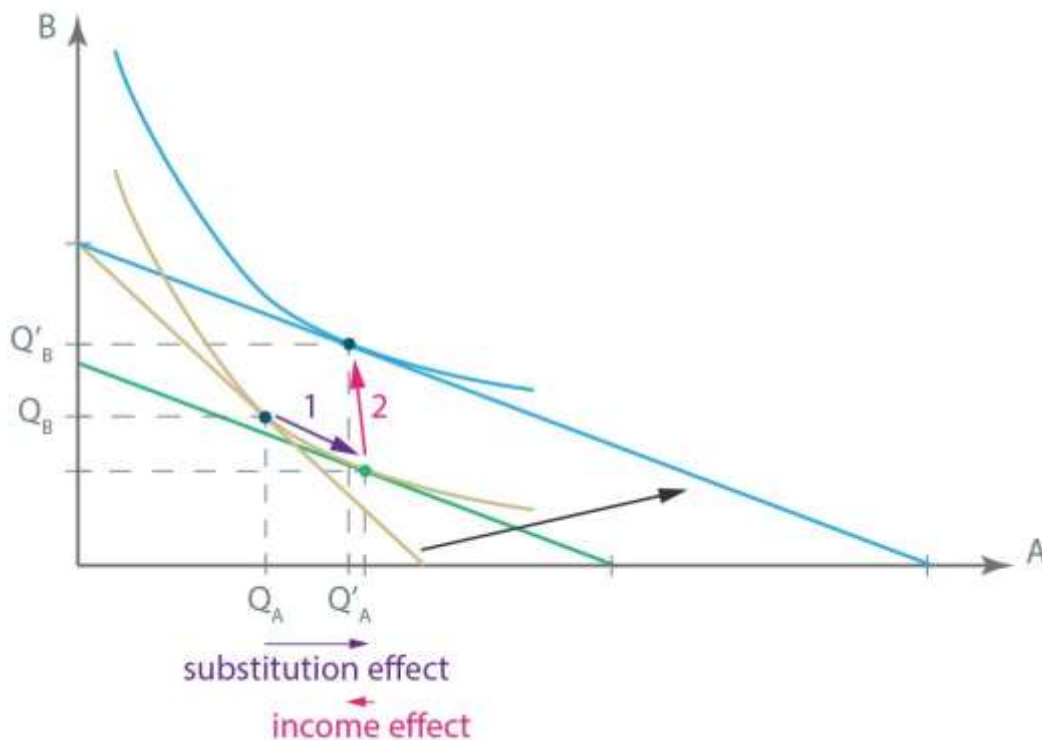
### The substitution effect:

- a decrease in the price of a given good is accompanied by the consumer purchasing more of this good and less of the goods whose prices did not change,
- is a result of changes in the ratio of goods prices.

### The income effect:

- reflects how prices and consumer purchasing power affect the demand for a certain good,
- if the price of one good decreases → the real income of the consumer will increase → the demand for goods changes.

### Substitution Effect vs Income Effect: Apples as an Inferior Good



The **substitution effect** always positively affects the demand for a certain good:

- when its price drops → the demand increases.

The **income effect** may result in both an increase or a decrease in demand.



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### 3 scenarios for the income effect:

1. a positive response to the substitution effect and a positive response to the income effect → the demand for good A increases,
2. a positive response to the substitution effect and a negative response to the income effect, but less responsive than to the substitution effect → the demand for good A increases,
3. a positive response to the substitution effect and a negative response to the income effect, but more responsive than to the substitution effect → the demand for good A decreases.

## Normal goods

Scenario 1:

**A positive response to the substitution effect and a positive response to the income effect → the demand for good A increases.**

normal good = good whose income elasticity of demand has a positive value

In scenario 1, good A is a normal good because the increase in income results in the increase in demand.

**For normal goods, the income effect is positive.**

## Inferior good

Scenario 2:

**A positive response to the substitution effect and a negative response to the income effect, but less responsive than to the substitution effect → the demand for good A increases.**

inferior good = good whose income elasticity of demand has a negative value

In scenario 2, good A is an inferior good because the increase in income results in the decrease in demand.

**For inferior goods, the income effect is negative.**



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## Giffen good

Scenario 3:

A positive response to the substitution effect and a negative response to the income effect, but more responsive than to the substitution effect → the demand for good A decreases.

Giffen good = good whose income effect is greater than the substitution effect

In scenario 3, good A is Giffen good because the decrease in price results in the decrease in demand.

Giffen goods are characterized by a positively sloped demand curve.

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## Veblen good

Veblen goods:

- are goods whose rise in their prices results in higher demand,
- are not inferior goods,
- the consumer is more inclined to purchase the good when its price is higher because together with the price also the perception of the good enhances.





HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## SUPPLY

Supply determines the quantity of goods and services sellers are willing to offer at a given time and price.

The **law of supply** states that:

- ▶ if the price of a given good rises, a greater quantity is supplied,
- ▶ if the price of a given good drops, a lower quantity is supplied.

The **supply function**:

$$Q_s = f(P, W, \dots)$$

Where:

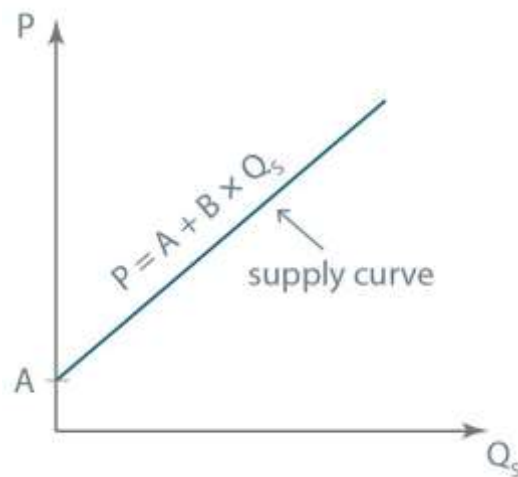
- ▶  $Q_s$  – quantity supplied of some good,
- ▶  $P$  – price of some good,
- ▶  $W$  – wage rate of labor.

**Inverse supply function:**

$$P = A + B \times Q_s$$

Where:

- ▶  $P$  – price of some good,
- ▶  $Q_s$  – quantity supplied of some good,
- ▶  $A, B$  – constants.



## Change in demand (supply) vs Change in quantity demanded (supplied)

**ceteris paribus** = all independent variables apart from the price of a good hold constant

A change in the own-price of the good is reflected by the change in quantity demanded or supplied (**a movement along** the demand or supply curve).

When a variable other than the own-price of the good changes, there is a change in demand or supply (the supply curve and demand curve may **move either right or left**).



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## PROFIT-MAXIMIZING LEVEL OF OUTPUT

The output of the company may be expressed as the production function of labor and capital:

$$Q = f(C, L)$$

Where:

- Q – output,
- f – production function, e.g. Cobb–Douglas production function,
- C – capital,
- L – labor.

## Profit

$$\text{profit} = \text{total revenue} - \text{total cost}$$

Companies try to maximize their profit.

## Productivity

$$\text{productivity} = \text{an average output generated by one unit of input}$$

Products of labor:

- total product of labor,
- average product of labor,
- marginal product of labor.

**Total product of labor** is the total volume of the output of the firm produced in a given period of time.

**Average product of labor** at the level of output = (total product of labor) divided by (number of workers at the level of output).

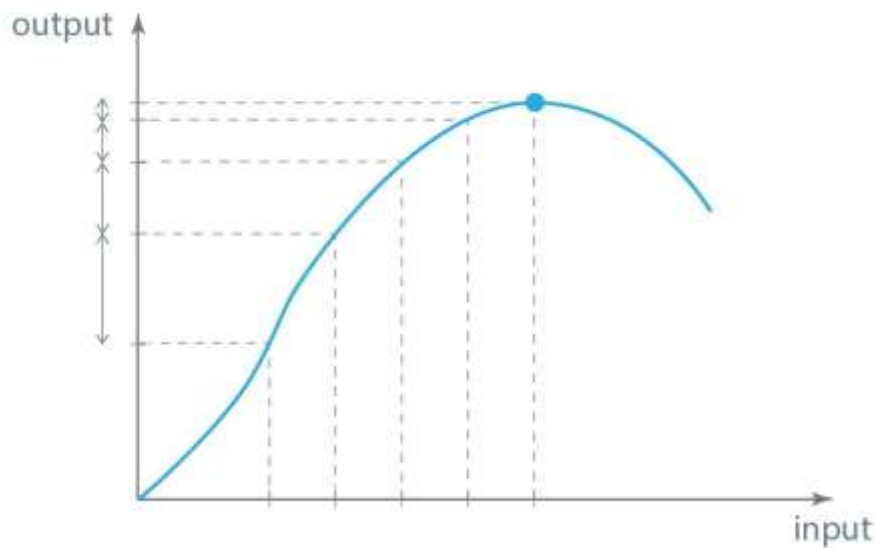
**Marginal product of labor** measures the productivity of each additional worker.



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## Law of diminishing returns



## Accounting profit vs Economic profit

accounting profit = net income reported on the income statement =  
= total revenue – explicit costs (total accounting costs)

Economic profit takes into consideration:

- ▶ explicit costs,
- ▶ implicit opportunity costs.

economic profit = accounting profit – total implicit opportunity costs

### Normal profit

normal profit = the accounting profit a company must generate to cover implicit opportunity costs

accounting profit = economic profit + normal profit

- ▶ If accounting profit = normal profit → economic profit = 0
- ▶ If accounting profit > normal profit → economic profit > 0
- ▶ If accounting profit < normal profit → economic profit < 0



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## Revenue:

- ▶ total revenue,
- ▶ average revenue,
- ▶ marginal revenue.

### Total revenue (TR):

$$TR = P \times Q$$

### Where:

- ▶ P – per-unit price of the product (*note: in the case of imperfect competition P is the function of Q*),
- ▶ Q – quantity of products sold.

### Average revenue (AR):

$$AR = \frac{TR}{Q}$$

**Marginal revenue (MR)** = an increase in total revenue resulting from the sale of an additional unit of product

## Costs

### Types of costs:

- ▶ fixed costs,
- ▶ variable costs.

**Fixed cost** is the cost that doesn't have a direct relationship with the output.

**Variable cost** changes when the output changes.

$$\text{Total costs (TC)} = \text{total fixed cost (TFC)} + \text{total variable cost (TVC)}$$

### Average total cost (ATC):

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

### Average fixed cost (AFC):

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

### Average variable cost (AVC):

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

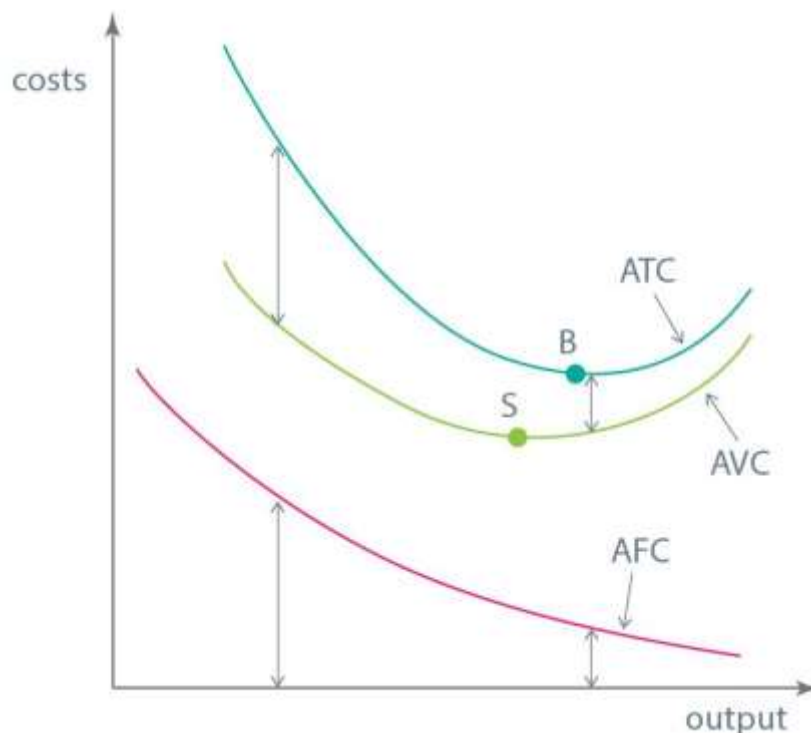




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- Average fixed cost (AFC) will decline if the output increases.
- Usually, the average variable cost (AVC) and average total cost (ATC) initially decline while the output increases. However, after reaching a certain value of output, an increase in output leads to an increase in average variable cost.



**marginal cost (MC)** = an increase in total cost resulting from the production of an additional unit of product

### Profit maximization

A company deals with the profit-maximizing level of output if:

**Condition 1:** the marginal revenue equals marginal cost:

$$MR = MC$$

**Condition 2:** (second-order condition): MC is not falling

If:

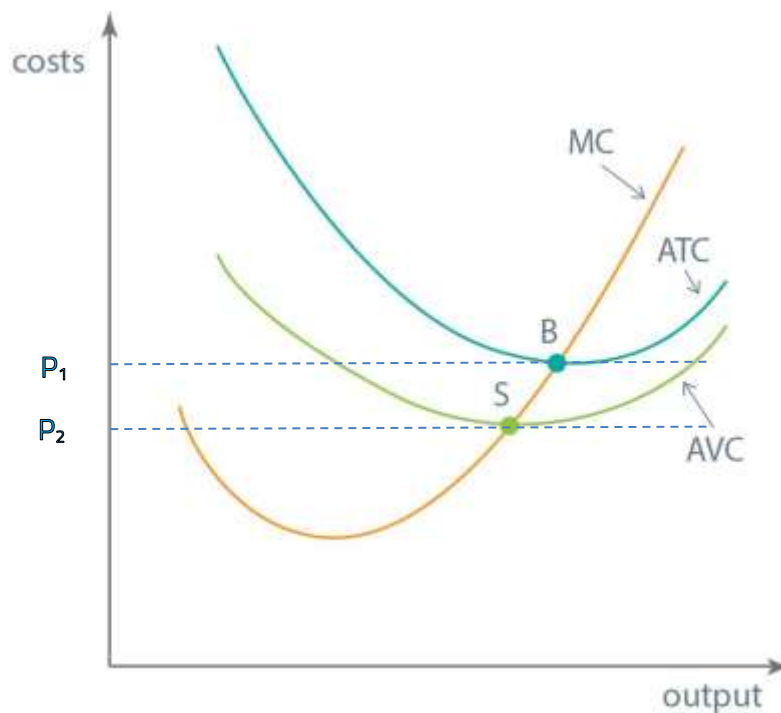
- marginal revenue > marginal cost → the company should increase the output
- marginal revenue = marginal cost → the profit will be maximized
- marginal revenue < marginal cost → the company should decrease the output



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## Breakeven point vs Shutdown point (image below is for perfect competition)



Where:

- ▶ S – shutdown point
- ▶ B – breakeven point

**Point S**, which is at the intersection of marginal cost and average variable cost, is called the **shutdown point**. If the price is below  $P_2$ , the company won't be able to cover its average variable cost, so it should cease to exist even in the short run.

**Point B**, which is at the intersection of marginal cost and average total cost, is the **breakeven point**. If the price is above  $P_1$ , the company will make a profit. At  $P_1$  it will break even.

If the company's output is between points S and B, the company is able to cover its total variable costs but will suffer a loss due to its fixed costs. Note that in the short run the company can be at the state between points S and B, but in the long run it can't because it will go bankrupt.



HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



## Economies of scale vs Diseconomies of scale

For different levels of capital employed, there are different **SATC** (short-run average total cost) curves.

The envelope curve of all possible short-run average total cost curves can be derived. This curve is called a long-run average total cost (**LRAC**) curve.

In the long run, we can distinguish between:

- economies of scale,
- diseconomies of scale.

**Economies of scale** occur when at a higher production volume the average total cost decreases. In other words, when **LRAC** is downward slopping.

**Diseconomies of scale** occur when at a higher production volume the average total cost increases. In other words, when **LRAC** is upward slopping.



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## Summarizing key concepts:

### ☐ Inverse demand function

My summary:

### ☐ Own-price elasticity of demand

My summary:

### ☐ Income elasticity

My summary:

### ☐ Normal good vs Inferior good

My summary:





☐ Cross-price elasticity of demand

**My summary:**

☐ Substitutes vs Complements

**My summary:**

☐ Substitution Effect vs Income Effect

**My summary:**



☐ Giffen good

**My summary:**

☐ Veblen good

**My summary:**

☐ Profit-maximizing level of output

**My summary:**

☐ Law of diminishing returns

**My summary:**



☐ Accounting profit vs Economic profit

**My summary:**

☐ Breakeven point vs Shutdown point

**My summary:**

☐ Economies of scale vs Diseconomies of scale

**My summary:**



## Reviewing formulas:

$$Q_D = f(P, I, P_A, \dots)$$

Write down the formula:

$$E_P = \text{own-price elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Write down the formula:

$$E_I = \text{income elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}} = \frac{\Delta Q}{\Delta I} \times \frac{I}{Q}$$

Write down the formula:

$$E_C = \text{cross-price elasticity of demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in the price of another good}} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Write down the formula:



$$Q_s = f(P, W, \dots)$$

Write down the formula:

$$\text{profit} = \text{total revenue} - \text{total cost}$$

Write down the formula:

$$\begin{aligned} \text{accounting profit} &= \text{net income reported on the income statement} = \\ &= \text{total revenue} - \text{explicit costs (total accounting costs)} \end{aligned}$$

Write down the formula:

$$\text{economic profit} = \text{accounting profit} - \text{total implicit opportunity costs}$$

Write down the formula:

$$\text{accounting profit} = \text{economic profit} + \text{normal profit}$$

Write down the formula:

$$TR = P \times Q$$

Write down the formula:



$$AR = \frac{TR}{Q}$$

Write down the formula:

$$\text{Total costs (TC) = total fixed cost (TFC) + total variable cost (TVC)}$$

Write down the formula:

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

Write down the formula:

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

Write down the formula:

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

Write down the formula:



## Keeping myself accountable:

### TABLE 1 | STUDY

When you sit down to study, you may want to **try the Pomodoro Technique** to handle your study sessions: study for 25 minutes, then take a 5-minute break. Repeat this 25+5 study-break sequence all throughout your daily study session.



Tick off as you proceed.

POMODORO TIMETABLE: study-break sequences (25' + 5')													
date		date		date		date		date		date		date	
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### TABLE 2 | REVIEW

Never ever neglect revision! Though it's not the most popular thing among CFA candidates, regular revision is what makes the difference. If you want to pass your exam, **schedule & do your review sessions**.

REVIEW TIMETABLE: When did I review this Reading?													
date		date		date		date		date		date		date	
date		date		date		date		date		date		date	