



LEVEL 1: ECONOMICS

Reading 10 (3rd out of 7): INTRO TO MACROECONOMICS

Difficulty:

hard

Benchmark Study Time:

4.5h

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.



GROSS DOMESTIC PRODUCT

Definitions

aggregate output = value of all goods and services produced in an economy

aggregate income = value of income earned by suppliers of factors of production in an economy

(aggregate output = aggregate income)

aggregate expenditure = value of money spent on goods and services produced in an economy

If there is no import or export of goods in an economy:

aggregate expenditure = aggregate output = aggregate income

Gross Domestic Product (GDP) is:

- ✦ a measure of the volume of the goods and services produced in a specified period of time by production factors located in a country, irrespective of who owns the factors of production,
- ✦ the most popular measure of the size of an economy.

Nominal GDP vs Real GDP

Nominal GDP is measured using current prices.

Real GDP is measured using constant prices.

$$\text{real GDP} = \text{nominal GDP} \times \frac{100}{\text{GDP deflator}}$$

$$\text{GDP deflator} = \frac{\text{value of current year output at current year prices}}{\text{value of current year output at base year prices}} \times 100 = \frac{\text{nominal GDP}}{\text{real GDP}} \times 100$$

GDP calculation

Approaches to calculating GDP:

- ✦ the income approach,
- ✦ the expenditure approach,



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



Income approach

In the **income approach**, GDP is calculated as the total income generated by households and businesses in a country in a specified period of time.

$$\text{GDP} = \text{gross domestic income (GDI)} =$$

$$= \text{net domestic income (NDI)} + \text{consumption of fixed capital (CFC)} + \text{statistical discrepancy}$$

$$\text{gross domestic income} = \text{total income received by all factors of production} =$$

$$\begin{aligned} &= \text{compensations of employees} + \text{gross operating surplus} + \text{gross mixed income} + \text{taxes less subsidies on} \\ &\text{production} + \text{taxes less subsidies on products and imports} = \text{compensations of employees} + \text{profits before taxes} + \\ &+ (\text{rent} + \text{interest income}) + \text{indirect business taxes} - \text{subsidies} \end{aligned}$$

Consumption of fixed capital:

- ✦ is a measure of the depreciation of capital stock in a specified time period,
- ✦ determines the value of investments necessary to replace the existing capital stock in order to maintain the level of productivity of the capital.

Statistical discrepancies are a consequence of differences in the sources of data used as the basis of calculating GDP in the two approaches, namely income approach and expenditure approach.

Expenditure approach

According to the **expenditure approach**, GDP is equal to the total spending on final output.

$$\text{GDP} = \text{consumer spending on final goods and services} +$$

$$+ \text{gross private domestic investment} + \text{government spending on final goods and services} + (\text{exports} - \text{imports})$$

Consumer spending on final goods:

- ✦ durable goods,
- ✦ non-durable goods,
- ✦ services.

$$\begin{aligned} \text{gross private domestic investment} &= \text{total expenditure of businesses on production facilities, machines, equipment,} \\ &\text{and inventories} + \text{housing expenditure of households} \end{aligned}$$

$$\text{government spending on final goods and services} = \text{total expenditure of the state on goods and services}$$

$$\text{exports} - \text{imports} = \text{net exports}$$



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Methods of computing GDP using the expenditure approach:

- ▶ sum of value added method,
- ▶ value of final output method,

Value added method

how much different businesses add to a product at each stage of the production process

value added = enterprise's receipts from the sale of products – enterprise's expenditure on any intermediate goods
manufactured by other businesses

GDP = the sum of value added in all sectors of an economy

Value of final output method

when we focus only on the value of final products

According to the value of final output method, we pay attention only to the sum of the total value of the final goods or services.

GDP (value added method) = GDP (value of final output method)

GDP under the expenditure and income approaches – summary

Expenditure approach:

$$GDP = C + I + G + (X - M)$$

Income approach:

$$GDP = C + S + T$$

Where:

- ▶ C – household consumptions,
- ▶ S – savings of households and companies,
- ▶ T – net taxes (direct and indirect taxes less transfer payments),
- ▶ I – investments,
- ▶ G – government spending,
- ▶ X – exports,
- ▶ M – imports.



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National income vs Personal income vs Household disposable income

national income = compensations of employees + profits before taxes + rent + interest income + indirect taxes that are included in the final price – subsidies

personal income = income of households before taxes

personal income = national income + transfer payments – (corporate income taxes + indirect business taxes + undistributed corporate profits)

household disposable income (HDI) = personal income – personal taxes = household primary income – net current transfers paid

AGGREGATE DEMAND

Savings, investments, fiscal balance, and trade balance

total expenditure = aggregate income

therefore:

$$C + I + G + (X - M) = C + S + T$$

thus:

$$S = I + (G - T) + (X - M)$$

Total private savings are absorbed by investment spending used to finance government deficit and used to build positive trade balance.

Fiscal balance

$$(G - T) = (S - I) - (X - M)$$

If:

$G - T > 0 \rightarrow$ fiscal deficit (government spending is higher than net taxes)

$G - T < 0 \rightarrow$ fiscal surplus (government spending is lower than net taxes)



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If there is a fiscal deficit, then at least one of two things occurs:

- ▶ private sector saves more than invests,
- ▶ the country runs a trade deficit.

Trade balance

$$(X - M) = (S - I) - (G - T)$$

If:

$X - M > 0 \rightarrow$ trade surplus (exports is higher than imports)

$X - M < 0 \rightarrow$ trade deficit (exports is lower than imports)

Marginal propensity to consume vs Marginal propensity to save

Marginal propensity to consume (MPC) – the proportion of an additional unit of disposable income that is spent

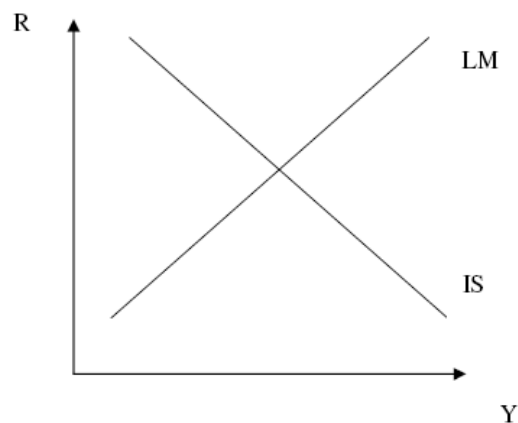
Marginal propensity to save (MPS) – the proportion of an additional unit of disposable income that is saved

$$MPC + MPS = 1$$

IS-LM MODEL

IS-LM model is a tool that tells us about the relationship between the goods and services market and the money market.

IS-LM = Investment Saving - Liquidity preference **M**oney supply





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In the graph, the X-axis is denoted by Y , which stands for aggregate output, and the Y-axis is denoted by R , which stands for interest rate. There are also two curves, IS and LM, that intersect.

The **intersection** of the IS and LM curves demonstrates the level of GDP and the interest rate at which **equilibrium is achieved** in both the goods and services market and the money market.

When there is equilibrium in both markets, then:

- in the goods and services market:

aggregated income = planned expenditures

- in the money market:

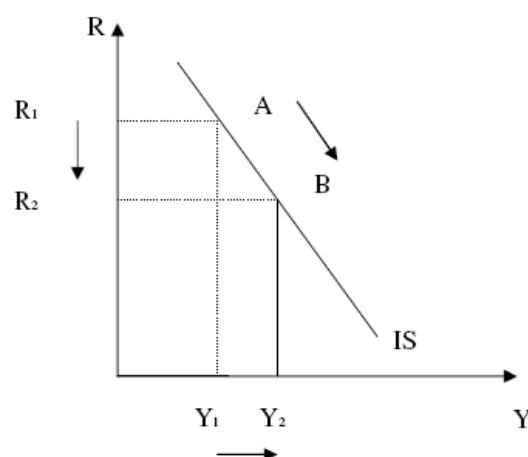
money demand = money supply

IS curve

IS curve:

- is a function of equilibrium in the goods and services market,
- presents combinations of GDP and interest rates at which the market is in equilibrium,
- equilibrium occurs when: aggregated income = expenditures,
- is negatively sloped.

Movement along the IS curve:





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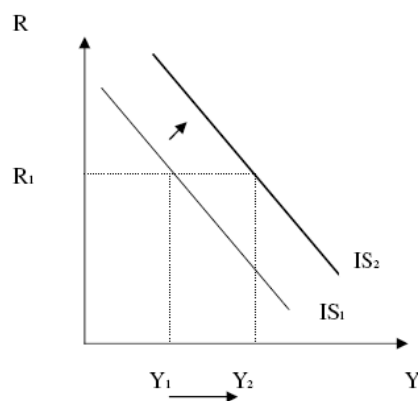


If, for example, rates drop from R_1 to R_2 , then: borrowing costs will go down, aggregate demand will go up, just like investments and workers' income. All this will result in an increase in GDP from Y_1 to Y_2 .

A shift of the IS curve

A shift of the IS curve occurs as a result of a change in fiscal policy, i.e. whenever government expenditure or taxes change. When a government is planning to implement an expansionary fiscal policy (by increasing expenditure or reducing taxes), there will be a parallel upward shift of the IS curve. The government's contractionary fiscal policy, which is a policy involving a reduction in government expenditure or an increase in taxes, will result in a downward shift.

Note: An upward shift is the same as a shift to the right and a downward shift is the same as a shift to the left.

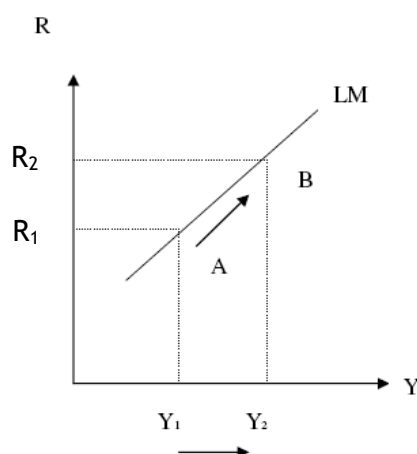


LM curve

LM curve:

- ▶ is a function of equilibrium in the money market,
- ▶ presents combinations of GDP and interest rates at which the money market is in equilibrium,
- ▶ equilibrium occurs when: money demand = money supply,
- ▶ is positively sloped.

Movement along the LM curve:



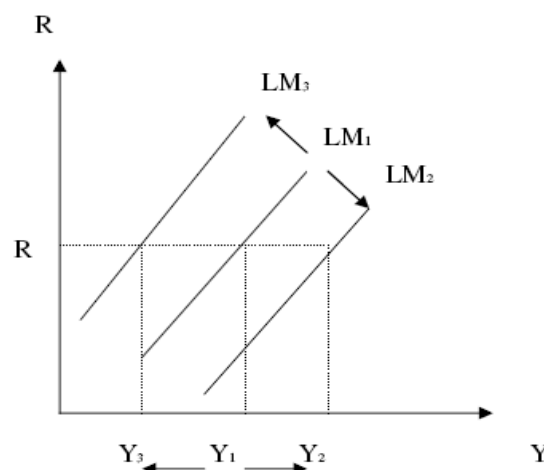


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Movement along the LM curve is usually the outcome of a change in GDP. In the money market, the relationship between income and the interest rate is positive. When the output goes up, so does the transactions demand for money (because more money is necessary to carry out a greater number of transactions). At a given constant level of money supply, an increase in demand makes market participants withdraw their savings from banks and the price of money, i.e. the interest rate, goes up.

A shift of the LM curve



All else equal, a shift of the LM curve may be a result of an increase in money supply (a consequence of an expansionary monetary policy) or a decrease in money supply (if monetary policy is contractionary). If the money supply goes up, the LM curve moves to the right, from LM_1 to LM_2 , and the output increases from Y_1 to Y_2 with a given value of interest rate. Conversely, if the money supply goes down, the LM curve moves to the left to LM_3 and the output also moves to the left to Y_3 .

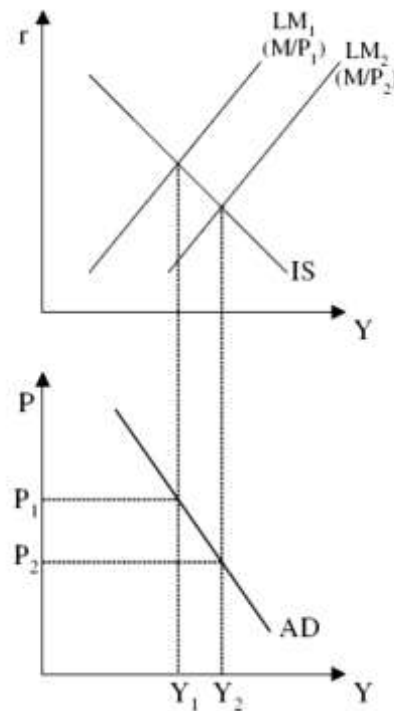
Aggregate demand (AD) curve

The intersection of the IS and LM curves demonstrates the level of GDP and the interest rate at which equilibrium is achieved in both the goods and services market and the money market.

The intersections of the IS curve and the LM curve for different levels of money supply delineate the aggregate demand curve (AD curve).



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



A shift of the AD curve may be caused by:

- ✦ an increase/a decrease in autonomous spending (shift to the right/left),
- ✦ more/less optimistic expectations of businesses about future sales, which increases/decreases investment (shift to the right/left),
- ✦ more/less optimistic expectations of consumers about their future income, which increases/decreases investment (shift to the right/left),
- ✦ greater/less capacity utilization, which makes businesses invest more/less (shift to the right/left),
- ✦ expansionary fiscal and monetary policies (shift to the right), and contractionary policies (shift to the left),
- ✦ depreciation of the national currency, which increases exports and reduces imports (shift to the right),
- ✦ appreciation of the national currency, which reduces exports and increases imports (shift to the left),
- ✦ a growing global economy, which results in growing exports (shift to the right),
- ✦ a global economic downturn (shift to the left).

AGGREGATE SUPPLY (AS) CURVE

Aggregate supply (AS) curve illustrates a positive correlation between the level of prices and the aggregate output of an economy.

We distinguish:

- ✦ very-short-run aggregate supply (VSRAS) curve,
- ✦ short-run aggregate supply (SRAS) curve,
- ✦ long-run aggregate supply (LRAS) curve.



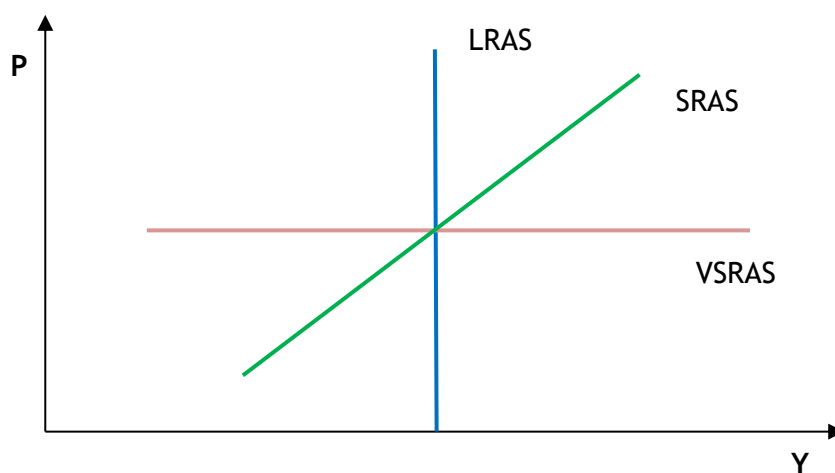
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Slope of the AS curve

The slope of the AS curve depends on the time period:

- in a very short run → the AS curve is horizontal,
- in the short run → the AS curve is upward sloping. Provided that prices of factors of production are held constant, higher prices of goods and services result in an increased output. It means that in the short run some of the prices are assumed to be sticky.
- in the long run → the AS curve is vertical. It means that the LRAS curve is perfectly inflexible and simply represents the level of potential output. It is because the prices of factors of production adjust to changes in prices of goods and services in the long run. In other words, it means that in the long run, all prices are flexible.



Shifts of the SRAS curve

A shift of the SRAS curve may be caused by:

- an increase/a decrease in the productivity of labor (upward/downward shift),
- an increase/a decrease in production costs (upward/downward shift),
- an increase/a decrease in nominal wages (upward/downward shift),
- more/less optimistic expectations of businesses about future output prices (downward/upward shift),
- lower taxes and greater government subsidies, which results in a drop in production costs (downward shift); greater taxes and lower subsidies, which makes production costs grow (upward shift),
- appreciation of the national currency, which makes production costs go down (downward shift); depreciation of the national currency, which results in greater production costs (upward shift).

Shifts of the LRAS curve

The LRAS curve shifts to the right when there is technological progress or an increase in productivity or a greater quantity of factors of production, like labor or capital.

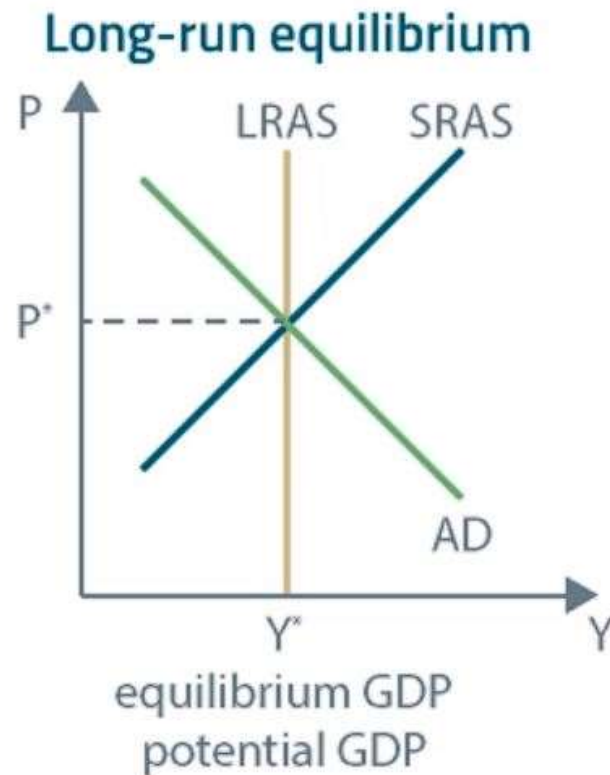


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EQUILIBRIUM

Long-run full equilibrium



The graph presents a situation in which the economy is in long-run full employment. The AD curve, short-run AS curve, and long-run AS curve intersect at the same point. At this point, equilibrium GDP is equal to potential GDP. However, shifts in AD and SRAS curves are possible. What will happen if either the AD or the SRAS curve shifts?

Three situations are possible:

1. a short-run recessionary gap,
2. a short-run inflationary gap, or with
3. short-run stagflation.

The first two are the effects of AD curve shifts, while short-run stagflation results from the shift in the short-run AS curve.

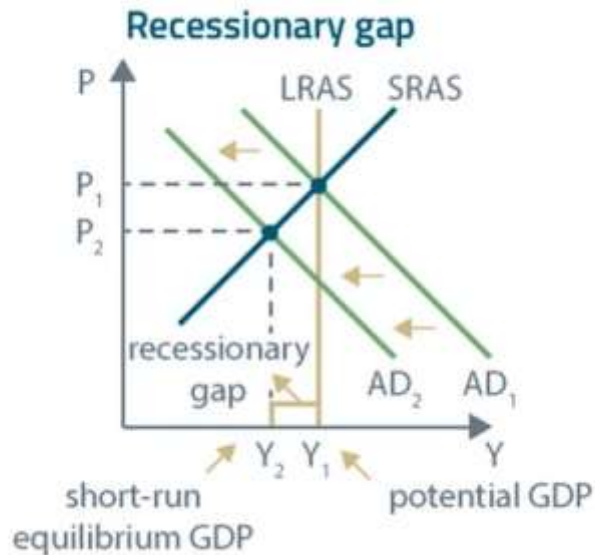


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Short-run recessionary gap

A short-run recessionary gap occurs when the AD curve gets shifted to the LEFT.

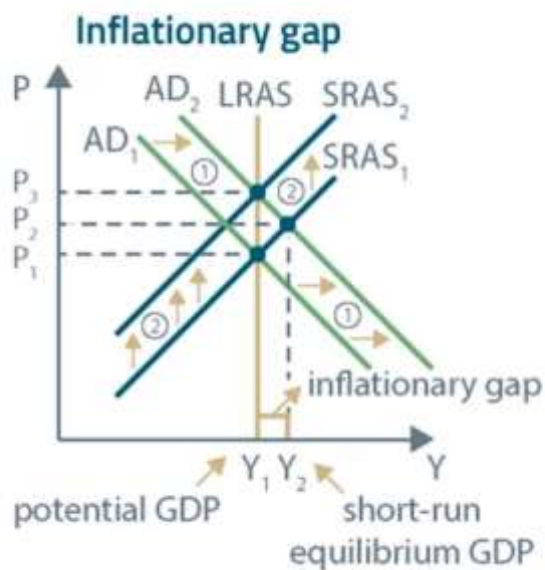


short-run equilibrium GDP < potential GDP

$$P_2 < P_1$$

Short-run inflationary gap

A short-run inflationary gap occurs when the AD curve gets shifted to the RIGHT.



short-run equilibrium GDP > potential GDP

$$P_2 > P_1$$

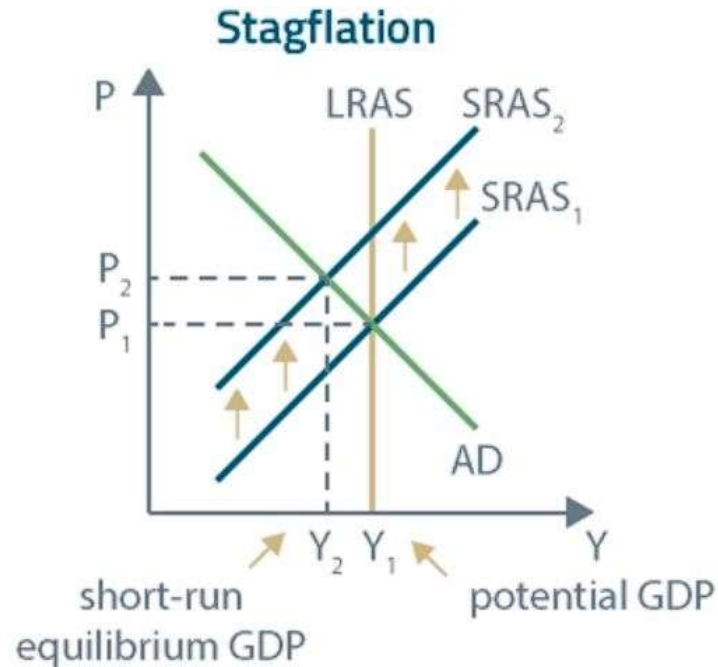


HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



Short-run stagflation

If the short-run AS curve shifts to the LEFT, we will deal with both high inflation and high unemployment.



equilibrium GDP < potential GDP → no full-employment

$P_2 > P_1 \rightarrow$ inflation

no full-employment + inflation = **stagflation**

Simultaneous changes in aggregate demand and aggregate supply

Aggregate Supply	Aggregate Demand	GDP	Employment	Price level
increase	increase	increase	increase	increase, decrease or remains the same
decrease	decrease	decrease	decrease	increase, decrease or remains the same
increase	decrease	increase, decrease or remains the same	increase, decrease or remains the same	decrease
decrease	increase	increase, decrease or remains the same	increase, decrease or remains the same	increase



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ECONOMIC GROWTH

Sources of economic growth

The basic sources of economic growth include:

- ▶ labor supply – made up of the entire labor force, i.e. all people of working age either employed or unemployed but available to work,
- ▶ human capital – its quality is determined by education and skills and translates into greater productivity of labor and smoother adaptation to technological changes,
- ▶ physical capital – resources such as buildings, machinery, and equipment,
- ▶ technology – its development results in greater productivity and contributes to increasing potential GDP,
- ▶ natural resources – renewable and non-renewable natural resources such as crude oil, soil, or water.

Solow growth model

Solow growth model helps us understand how economic growth works. According to this model, the production function shows the relationship between output and labor, capital, and their productivity:

$$Y = A \times F(L, K)$$

Where:

- ▶ F – production function,
- ▶ Y – level of aggregate output,
- ▶ L – quantity of labor,
- ▶ K – available capital stock,
- ▶ A – total factor productivity.

The greater A, L or K, the greater the total output.

The production function can also be presented for a single worker:

$$Y/L = A \times F(1, K/L)$$

Where:

- ▶ Y/L – level of aggregate output per worker,
- ▶ K/L – available capital stock per worker.



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



Sustainable economic growth under the Solow growth model

Potential GDP growth:

$$\begin{aligned} \text{potential GDP growth} = & \text{growth in technology} + \\ & + \text{growth in labor} \times (\text{share of labor in national income}) + \\ & + \text{growth in capital} \times (\text{share of capital in national income}) \end{aligned}$$

Where:

- ✦ $\text{share of labor in national income} + \text{share of capital in national income} = 1$

Per capita potential GDP growth:

$$\begin{aligned} \text{per capita potential GDP growth} = & \text{growth in technology} + \\ & + (\text{growth in the capital-to-labor ratio}) \times (\text{weight of capital in national income}) \end{aligned}$$

Total factor productivity growth:

$$g_{TFP} = g_p - (w_L \times g_L + w_C \times g_C)$$

Where:

- ✦ g_{TFP} – total factor productivity growth,
- ✦ g_p – growth in potential GDP,
- ✦ $w_L \times g_L$ – weight of labor in national income multiplied by growth in labor,
- ✦ $w_C \times g_C$ – weight of capital in national income multiplied by growth in capital.



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



Summarizing key concepts:

☐ GDP deflator

My summary:

☐ Income approach

My summary:

☐ Expenditure approach

My summary:

☐ Value added method

My summary:

☐ Value of final output method

My summary:



☐ National income vs Personal income vs Household disposable income

My summary:

☐ Aggregate demand

My summary:

☐ Marginal propensity to consume vs Marginal propensity to save

My summary:

☐ IS-LM model

My summary:



☐ IS curve

My summary:

☐ LM curve

My summary:

☐ Aggregate supply

My summary:

☐ Equilibrium

My summary:



☐ Simultaneous changes in aggregate demand and aggregate supply

My summary:

☐ Sources of economic growth

My summary:

☐ Solow growth model

My summary:



Reviewing formulas:

$$\text{real GDP} = \text{nominal GDP} \times \frac{100}{\text{GDP deflator}}$$

Write down the formula:

$$\text{GDP} = C + I + G + (X - M)$$

Write down the formula:

$$\text{GDP} = C + S + T$$

Write down the formula:

$$(G - T) = (S - I) - (X - M)$$

Write down the formula:

$$Y = A \times F(L, K)$$

Write down the formula:

$$Y/L = A \times F(1, K/L)$$

Write down the formula:

$$g_{TFP} = g_p - (w_L \times g_L + w_C \times g_C)$$

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')													
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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	