AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

About me

- Education: Al-Farabi KazNU, pedagogical experience - 24 years.
- PhD degree. Thesis topic: "Social effects of FDI in the regions of Kazakhstan" (2016).
- Scientific internship under the Bolashaq program at the University of Kansas, USA (2022 - 2023). Topic: "Direct Measurement of Welfare in Kazakhstan".

- Supervisor of the research project funded by the National Bank of the Republic of Kazakhstan (2021-2022). Subject: "Private capital market in Kazakhstan, prospects for its development."
- Supervisor of the research project funded by the Ministry of Science and Higher Education for 2023-2025 on the theme: "Research of new tools for the development of a business environment in the regions of Kazakhstan to improve the investment attractiveness and competitiveness of the country in the Eurasia region."
- Courses taught: Microeconomics, Macroeconomics, Microeconomic Analysis, Macroeconomic Modeling, Financial Mathematics, Business Economics, Investment Design, etc.
- Author of 2 and co-author of 5 textbooks and more than 60 scientific publications, including in the Scopus, WoS, and national databases.

Course structure

Theoretical block:

MODULE 1 - 4 weeks

MODULE 2 - 3 weeks

MODULE 3 - 5 weeks

MODULE 4 - 3 weeks

Practical block:

1. Active work at seminars (discussion, practical works) – 5-10 points

2. Independent Work of Master's students - **4** (Week 4, Week 7, Week 10, Week 14) 20-30 points

3. Examination - final project

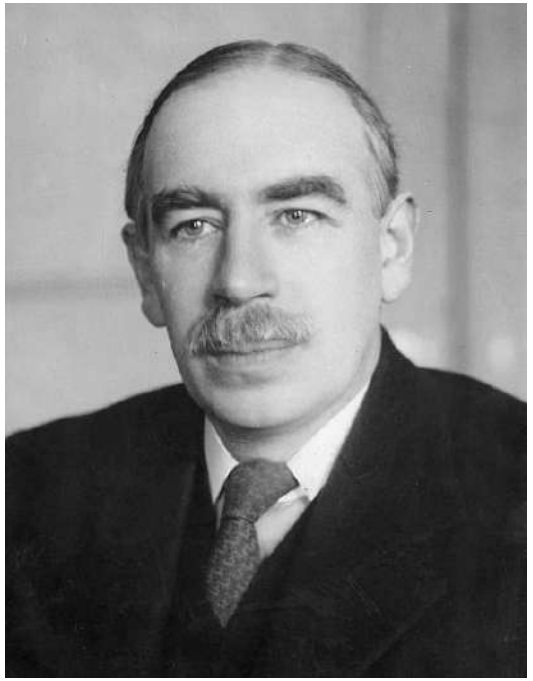
MODULE 1. Fundamentals of macroeconomic theory.

Topics 1-7 according to the syllabus.

Macroeconomics

(in Greek, “macro” - large) is a part of the general economic theory that studies the laws of development and the behavior of the national economy.

The founder of the macroeconomic approach was **John M. Keynes**



“The General Theory of Employment, Interest, and Money” (1936).

He justified the need for active state regulation of the economy and confirmed the need for macroanalysis.

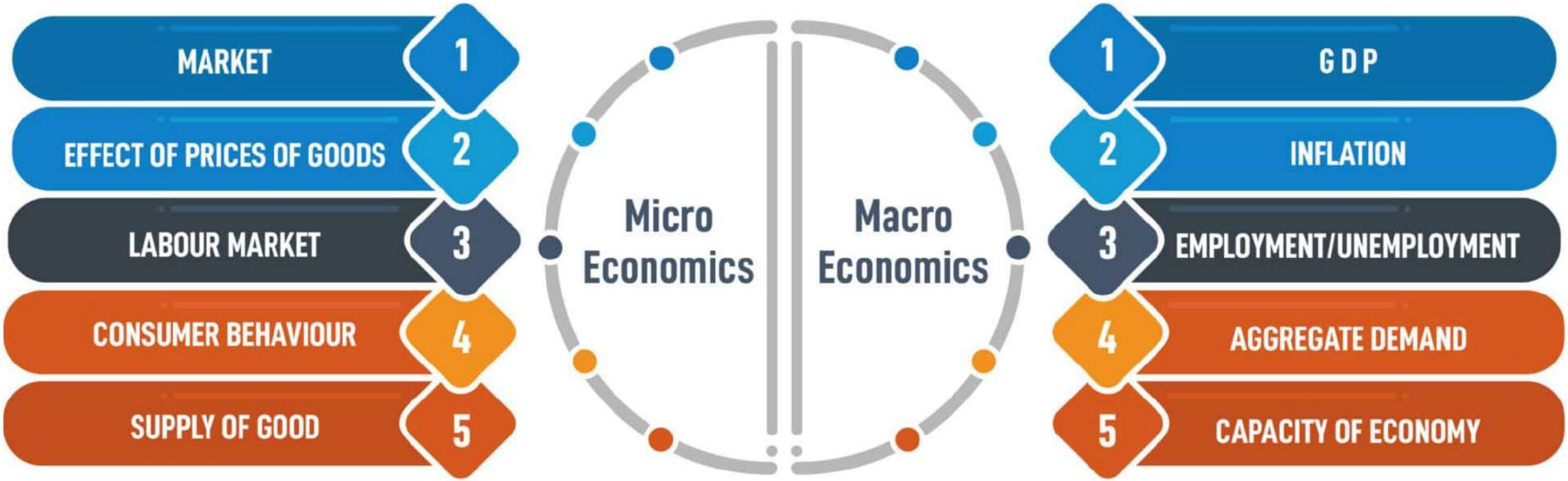
About Keynes's Role in a macroeconomics

- During the Great Depression of the 1930s, Keynes revolutionized economic thought by challenging the ideas of neoclassical economic theory that free markets automatically provide full employment in the short to medium term if workers are flexible in their wage demands.
- He argued that aggregate demand (total spending in the economy) determines the overall level of activity in the economy. Insufficient aggregate demand can lead to prolonged periods of high unemployment.
- Keynes advocated using fiscal and monetary policy to mitigate the adverse effects of economic downturns and depressions.
- Almost all governments in developed countries adopted Keynes's recommendations in 1946.

Macroeconomics & Microeconomics – what are the differences?

- Microeconomics is the study of economics at an individual, group, or company level.
- Macroeconomics is the study of a national economy as a whole.
- Microeconomics focuses on issues that affect individuals and companies.
- Macroeconomics focuses on issues that affect nations and the world economy.

Don't be confused between
MICROECONOMICS & MACROECONOMICS



Macroeconomics is vital

While microeconomics is vital from the point of view of theory, macroeconomics is essential because it is what we observe **in real life**.

In the real world, different individuals and economic agents may have various preferences, and measuring or analyzing their actions in economics is impossible and impractical.

Main macroeconomic goals

1. The non-inflationary Economic Growth / Sustainable Economic Growth.
2. Full Employment / Low Unemployment.
3. Stable price level / Low inflation.
4. Fair distribution of income.
5. Equilibrium in Balance of payments.

Aggregation is a fundamental method of macroeconomics

- It is the integration of individual elements into a single whole.
- It is based on abstraction (abstracting from unimportant moments and selecting the most essential, typical features and regularities of economic processes and phenomena).
- It allows identifying the macroeconomic agents, markets, interrelations, and indicators.

Aggregation based on the identification of the most typical patterns of behavior of economic agents makes it possible to distinguish four macroeconomic sectors:

1. Households.
2. Firms.
3. State.
4. Rest of world (Foreign sector.)

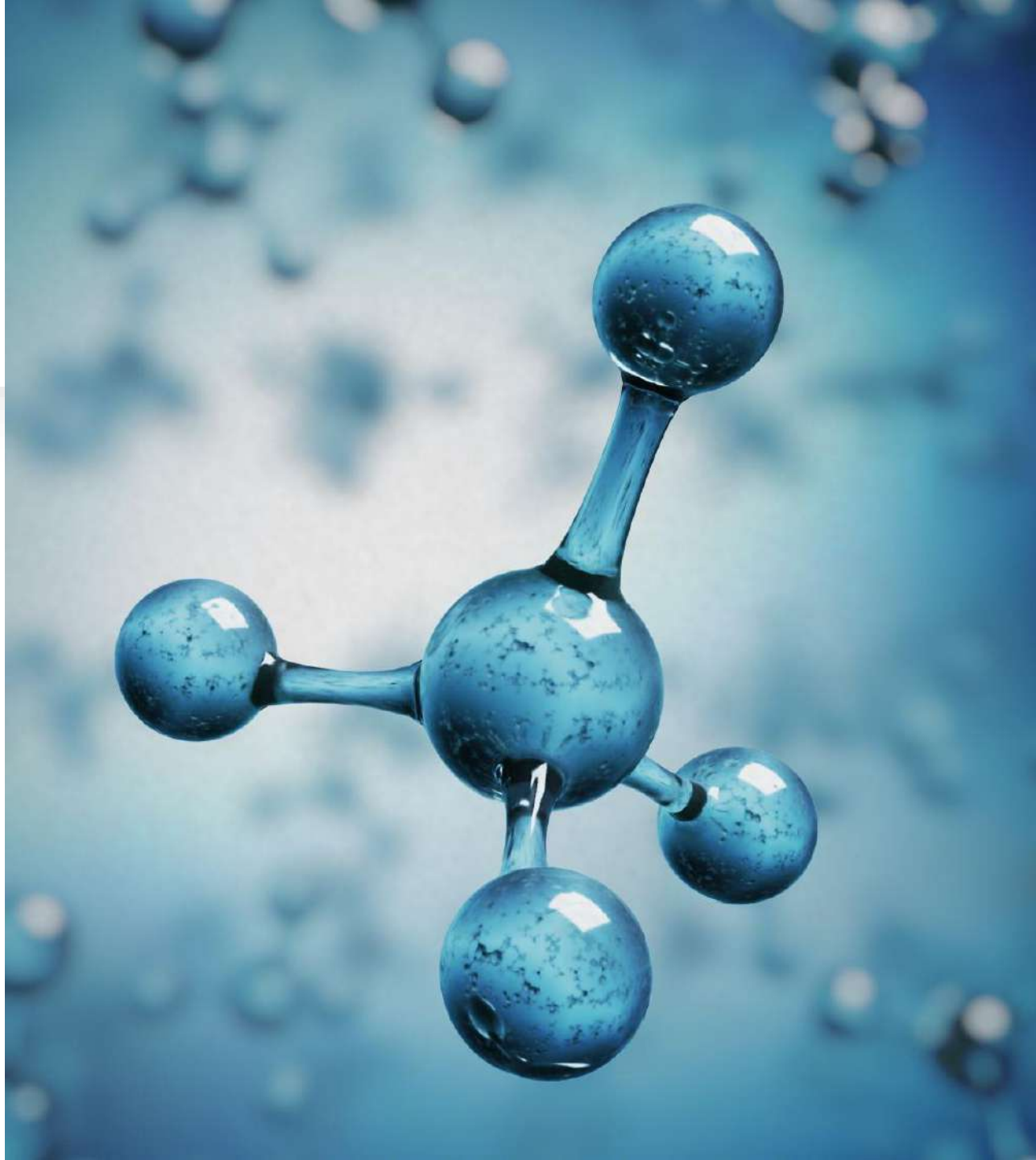
Macroeconomic model and variables

A model is a simplified theoretical framework in which only significant factors are considered, and secondary factors are omitted.

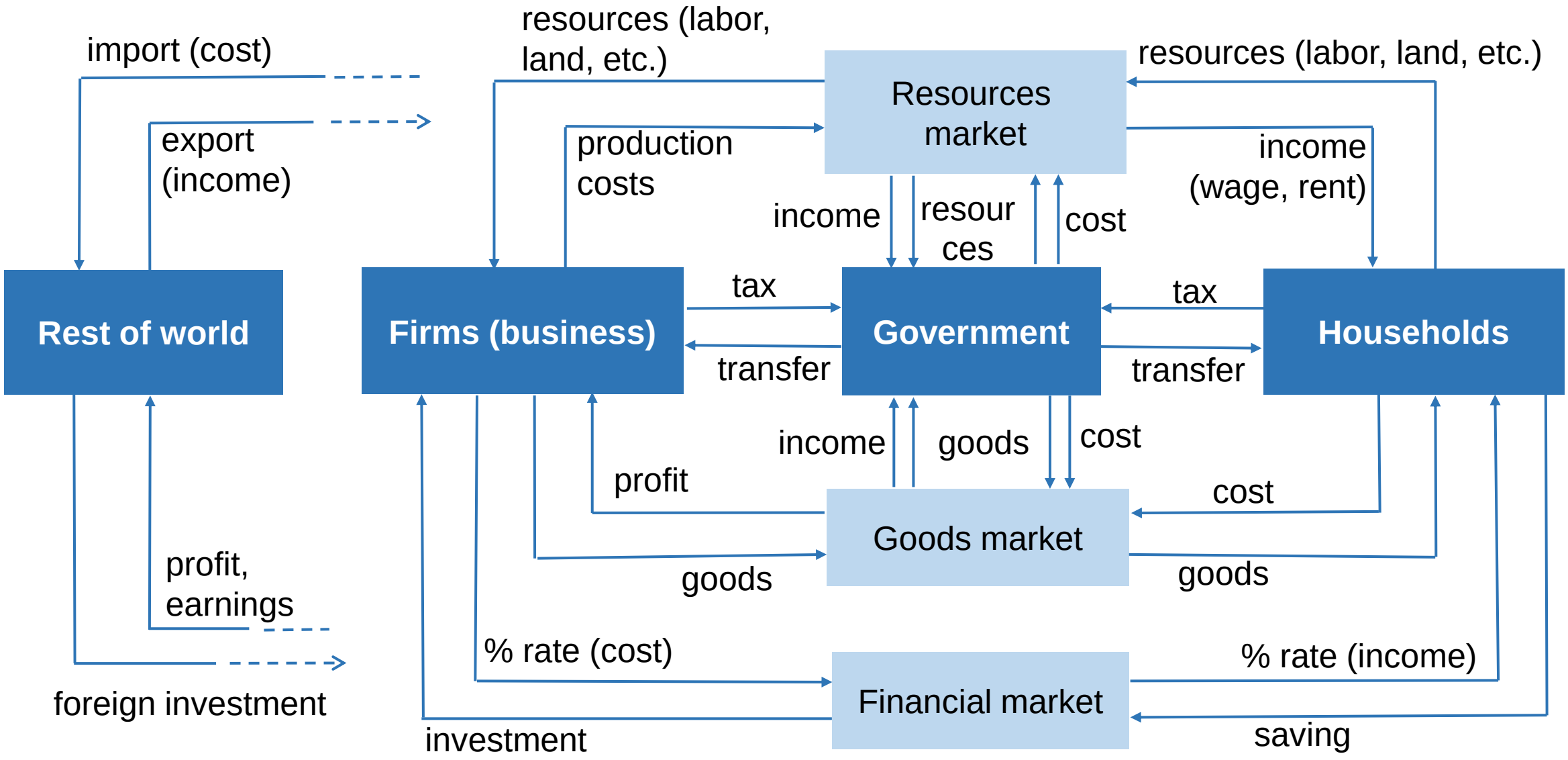
Two elements are included in the model:

Endogenous (unknown data, determined within the model).

Exogenous (known in advance, e.g., statistical data).



The model of income and expenditure circulation



System of national accounts (SNA)

Historical development – 1953 SNA, 1968 SNA, 1993 SNA, 2008 SNA

SNA aims to provide a comprehensive, coherent, and consistent picture of the economy that reflects

- all transactions,
  - taking place between the agents that together constitute the economy
- and other economic flows in an accounting period,
- and the opening and closing stocks of assets and liabilities.

Integrated Framework for Socio-Economic Analysis

for self-learning: details of the SNA concept

Macroeconomic indicators in SNA

Gross Domestic Product (GDP) is the market value of all final goods and services produced in a country over a given period (year/quarter).

GDP is divided into **4** components:

1. Consumption (C).
2. Investment (I).
3. Government expenditures (G).
4. Net export (NX/X_N).

$$Y = C + I + G + NX$$

Gross national product (GNP)

- It is the total income a nation's permanent residents earn.
- It differs from GDP by including income that citizens earn abroad and excluding income that foreigners earn within the country.

For example, when a Chinese citizen works temporarily in Kazakhstan, his production is part of Kazakhstan's GDP but not Kazakhstan's GNP. (It is part of China's GNP.)
In many countries, including Kazakhstan, GDP and GNP are close.

GNP = GDP + Δ (net property income from abroad)

For example…

GDP

https://ssmoil.kz/

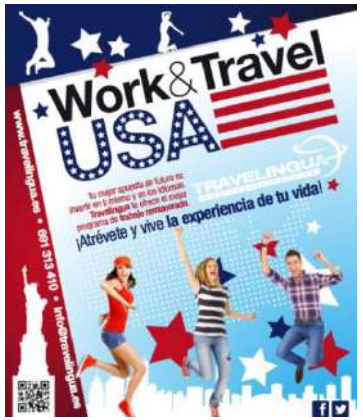
GNP

GDP

https://stolf.today/

GNP

What is included into GDP and/or GNP?



What is included into GDP and/or GNP?

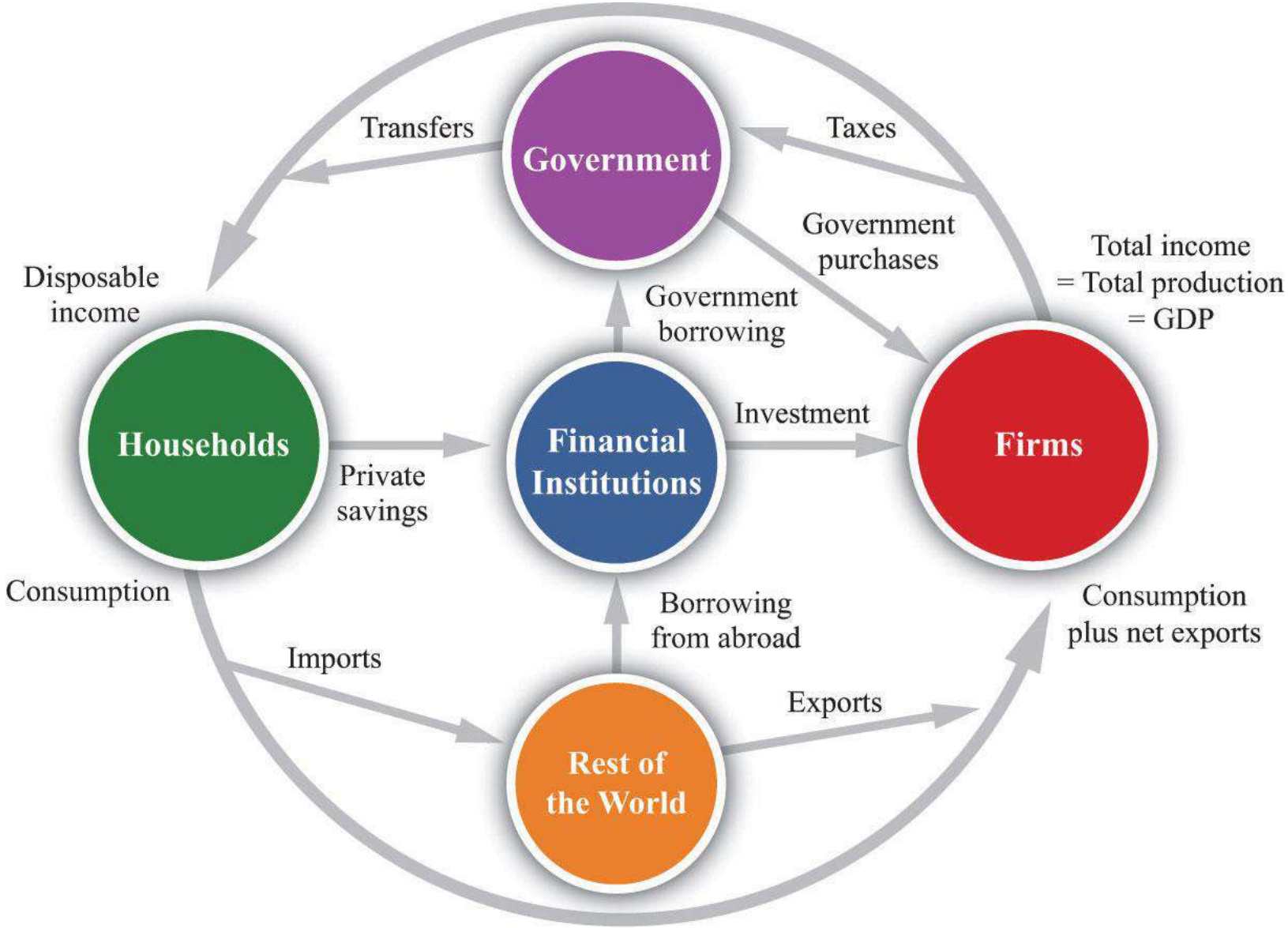
We're earning through
Work and Travel program

Foreign teachers
earn at NIS

Where to include: "*Purchases of new housing*"?

$$Y = C + I + G + NX$$

- consumption (C)
- investment (I)
- government expenditures (G)
- net exports (NX) (E-M)


Government
Households
Financial Institutions
Firms
Rest of the World
Transfers
Taxes
Government purchases
Disposable income
Government borrowing
Total income = Total production = GDP
Investment
Private savings
Consumption
Borrowing from abroad
Consumption plus net exports
Imports
Exports

Economic growth - what is its significance?

Economic growth is an increase in the output of economic goods and services in one period of time compared to the previous period.

- It describes the national wealth's growth.
- It can be measured in nominal or real (inflation-adjusted) terms.
- It is measured in terms of GNP or GDP.

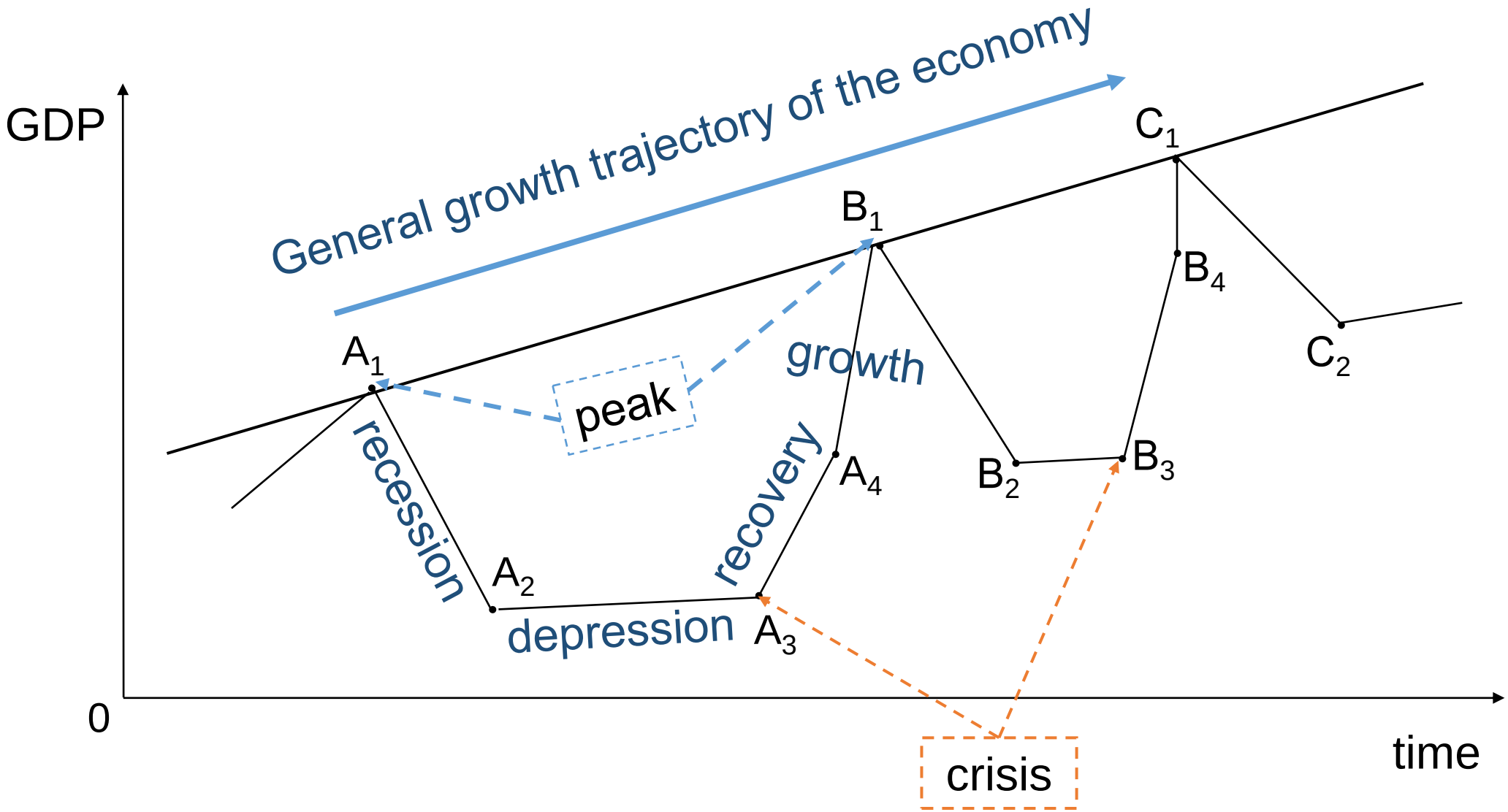
Economic development vs economic growth

Economic growth is the annual increase in national production.

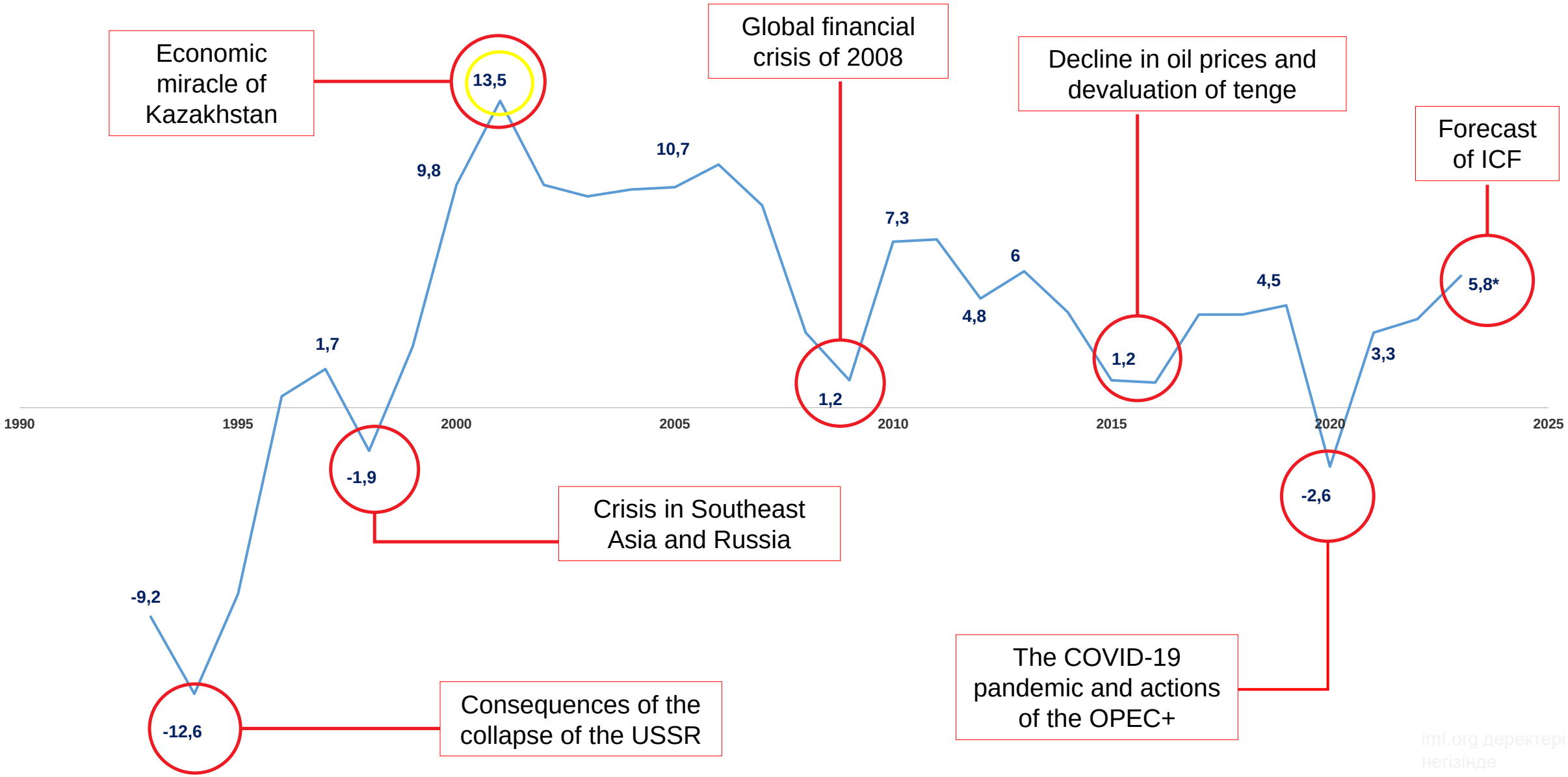
Economic development is the alternation of growth and decline over time.

An economic cycle is a fluctuation in business activity that repeats itself over time.

Recession ⇦ **The Economic Cycle** ⇨ Growth



Real GDP growth of Kazakhstan, since 1993 to 2023, %



Inflation

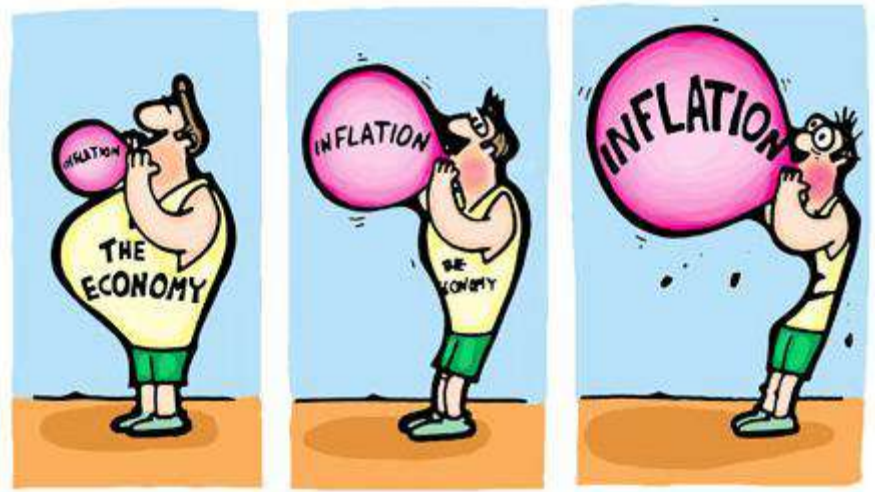
- Inflation is a general increase in an economy's price level over time (usually for the month, quarter, or year).
- It increases the cost of living because the prices of goods and services become high, but it doesn't improve the quality of living.
- The inflation reduces the real income of people.
- The national currency loses its value because of inflation and negatively affects economic activity.

$$\pi(inflation) = \frac{(P_1 - P_{-1})}{P_{-1}}$$

where:

P_1 - price level in the current year

P_{-1} - price level in the previous year



Unemployment

- The term "**unemployment**" refers to a situation where a person is actively looking for a job but cannot find one.
- Unemployment is considered one of the leading indicators of the state of the economy.
- The most used measure of unemployment is the unemployment rate.

$$u = \frac{U}{L} \cdot 100\% \quad \text{or} \quad u = \frac{U}{E+U} \cdot 100\%$$

where: U – unemployed, E – employed, L – labor force

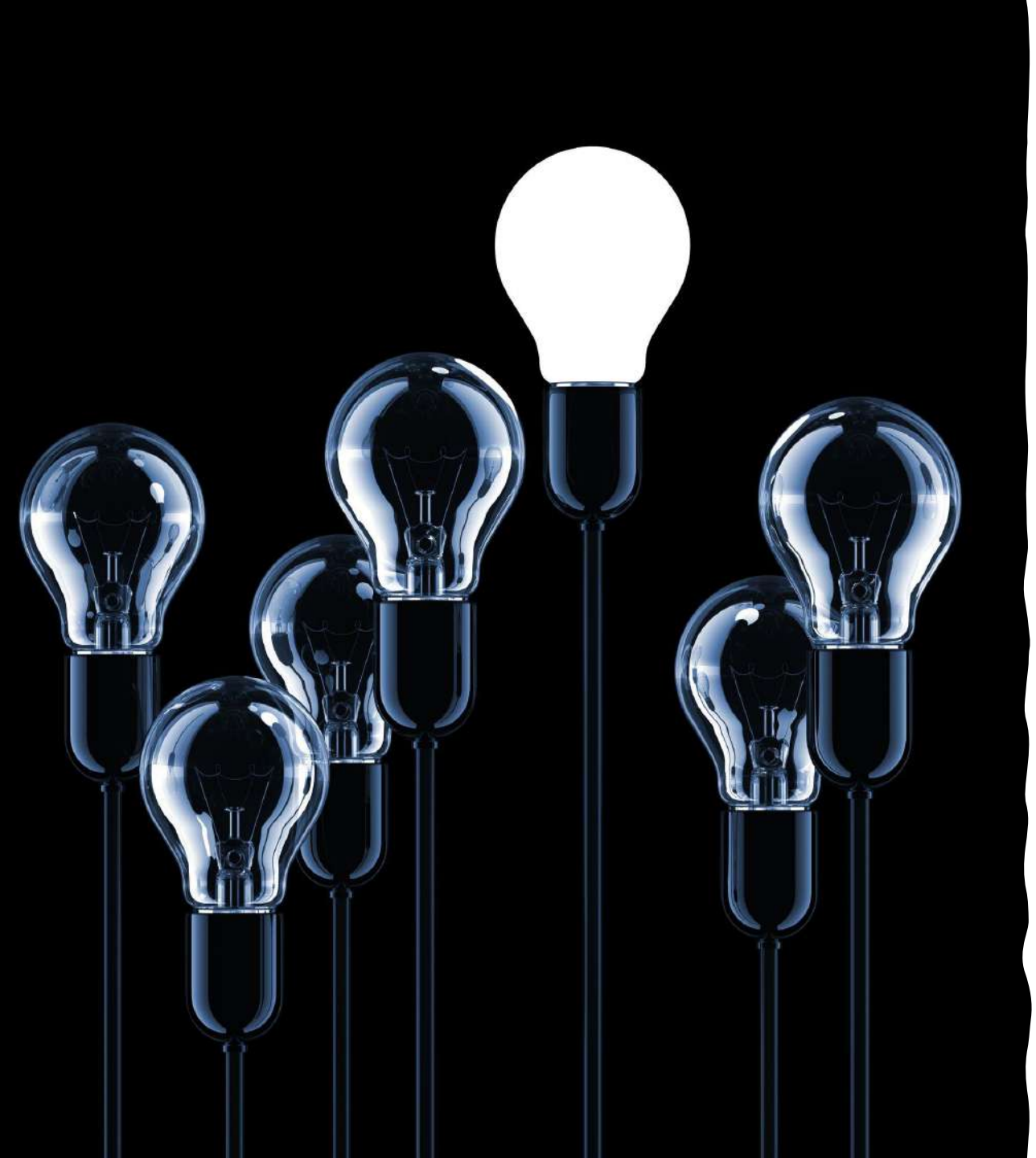
Conclusion

- Economic stability is the absence of excessive fluctuations in the macroeconomy.
- An economy with constant output growth and low and stable inflation would be considered economically **stable**.
- An economy with frequent significant recessions, a pronounced business cycle, very high or variable inflation, or frequent financial crises would be considered economically **unstable**.

Classwork

Find data on Kazakhstan and China and compare their positions in the ranking of countries according to the following indicators:

1. GDP
2. GNP
3. NNP
4. HDI
5. Unemployment
6. Inflation



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

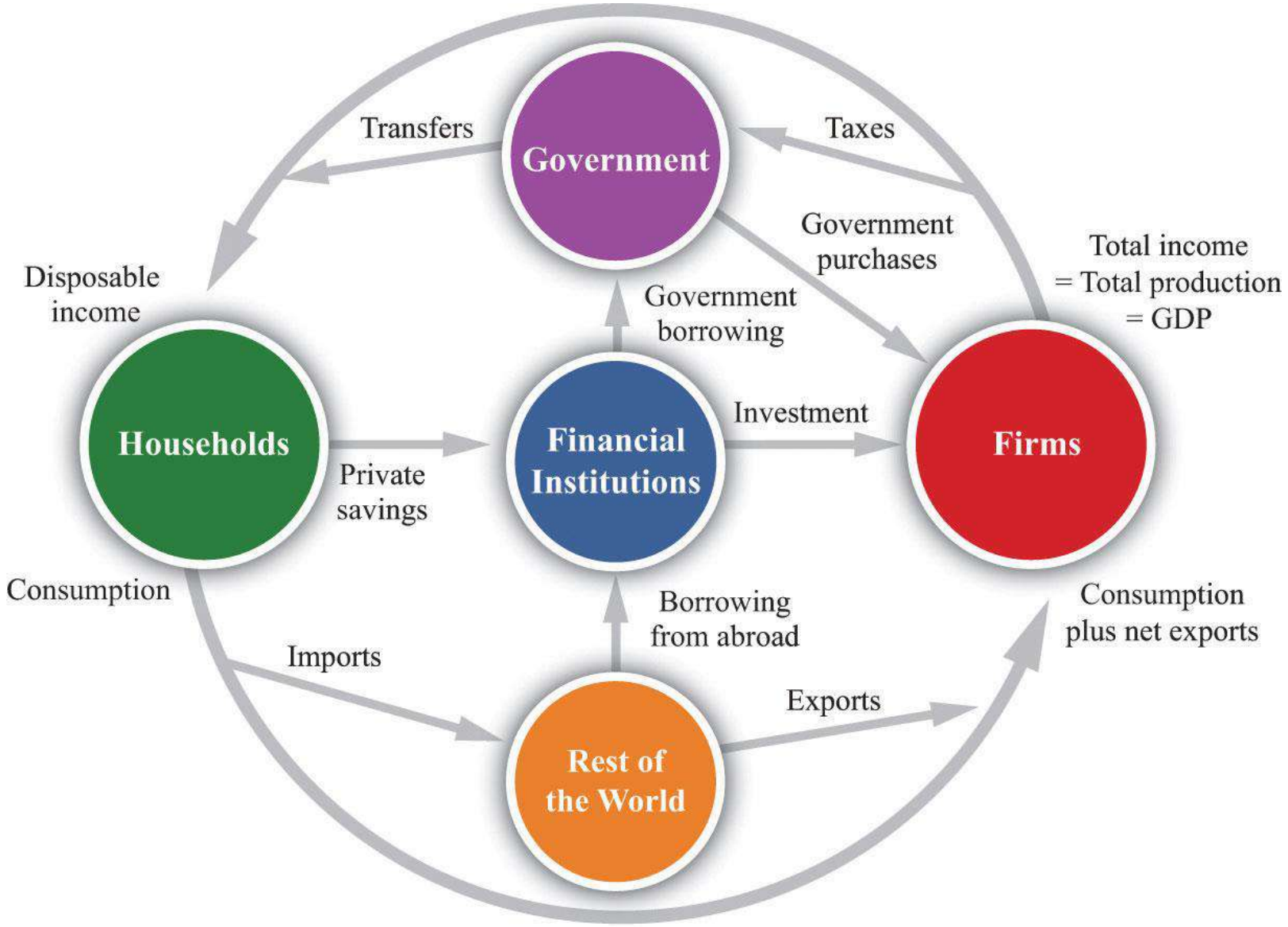
Lecture 1-7.pdf

MODULE 1.

Fundamentals of macroeconomic analysis.

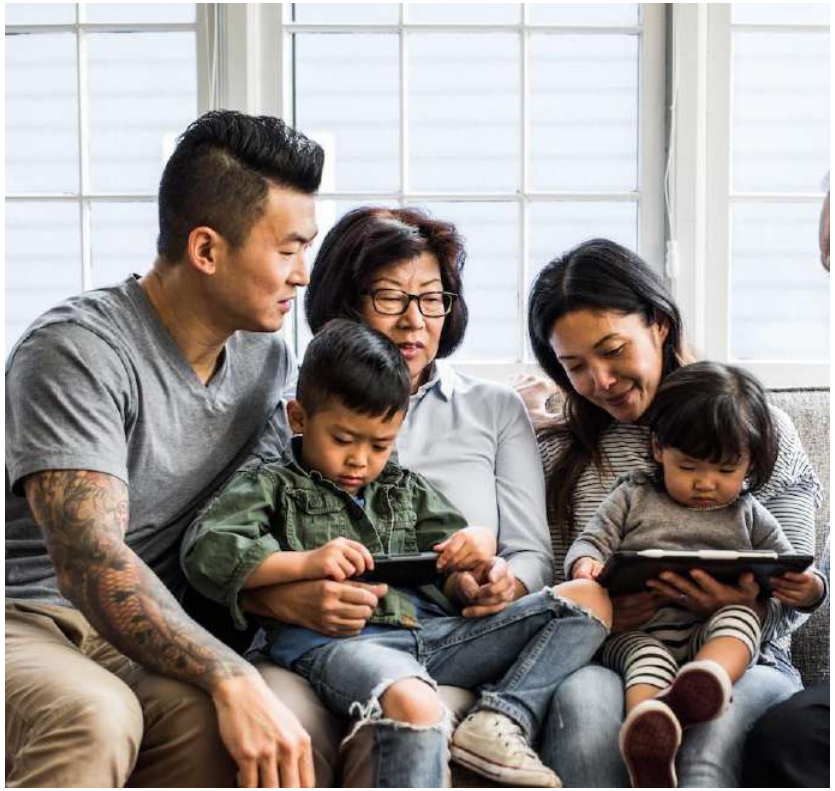
Aggregate demand and aggregate supply: concepts, modeling equations and implications

.


Government
Transfers
Taxes
Government purchases
Total income = Total production = GDP
Disposable income
Government borrowing
Households
Financial Institutions
Investment
Firms
Private savings
Consumption
Borrowing from abroad
Consumption plus net exports
Imports
Exports
Rest of the World

There are 4 kinds of macroeconomic agents:

1. Household
2. Firms
3. Government
4. Rest of world



What is a Household?

A home and its occupants regarded as one unit

Mother father and children

Adults sharing a home

Nuclear family & Grandad

Single parent family

Person living alone

There are many types of households

What is Government?

Legislature

A deliberative assembly with the authority to create new laws, alter existing ones, and terminate old ones. In democracies, members are elected by the people.

Executive

USA	UK
President	Prime Minister
Vice President / Cabinet	Cabinet

Judiciary

The system of courts that interprets and applies the law in the name of the state.

What is a firm?

Law Firm

Firm of Architects

Plumbing Firm

Marketing Firm

Consultancy Firm

Oil & Gas Firms

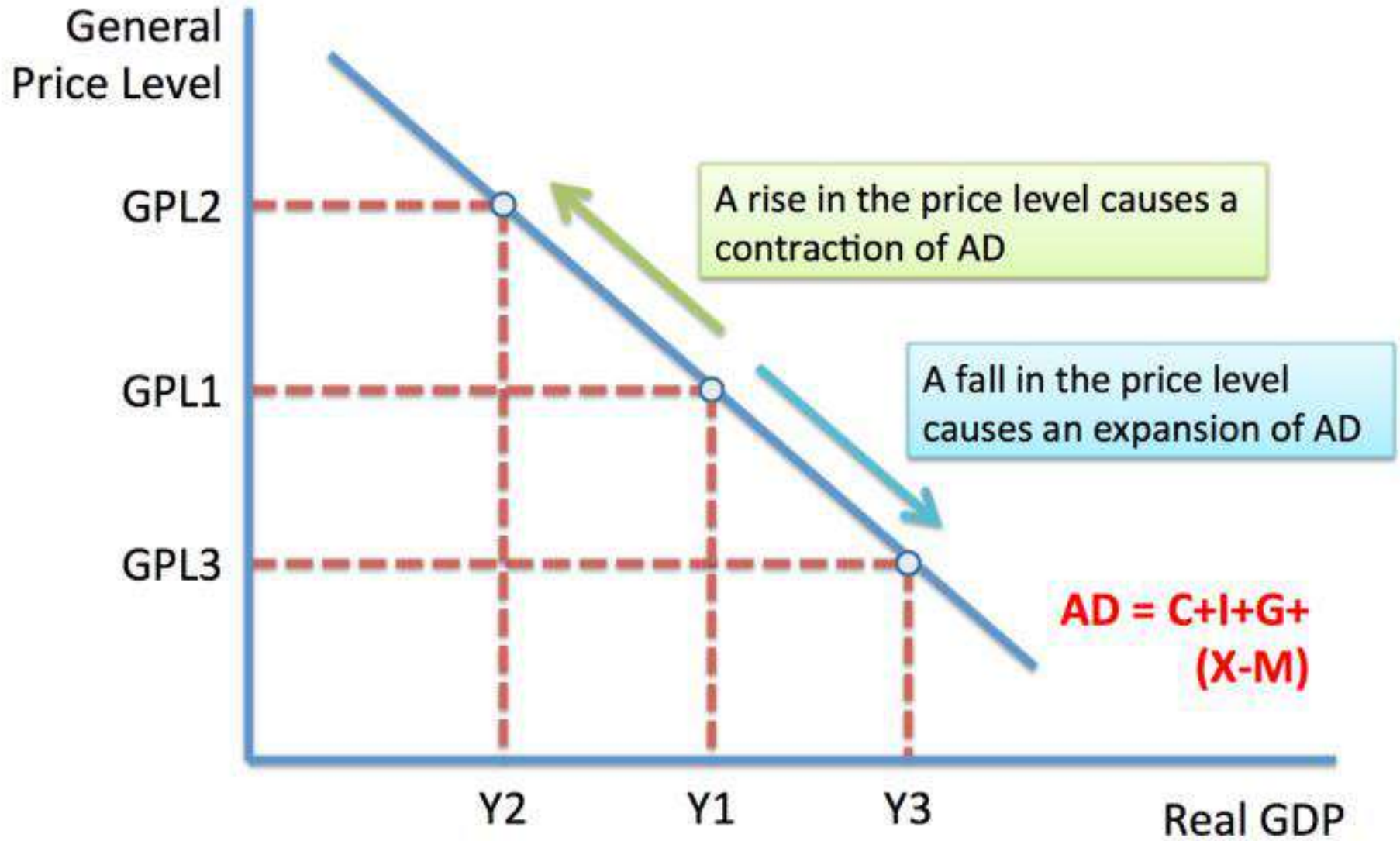
Aggregate Demand (AD)

This is the total demand for all final goods and services produced in the country for the year by four sectors:

AD = C + I + G + Xn

- C – household's demand
- I - investment demand
- G – governmental demand
- Xn – demand for net export

The Aggregate Demand Curve (AD)



The **negative slope** of the AD curve is determined and explained by **three effects**:

1. The effect of **wealth**:

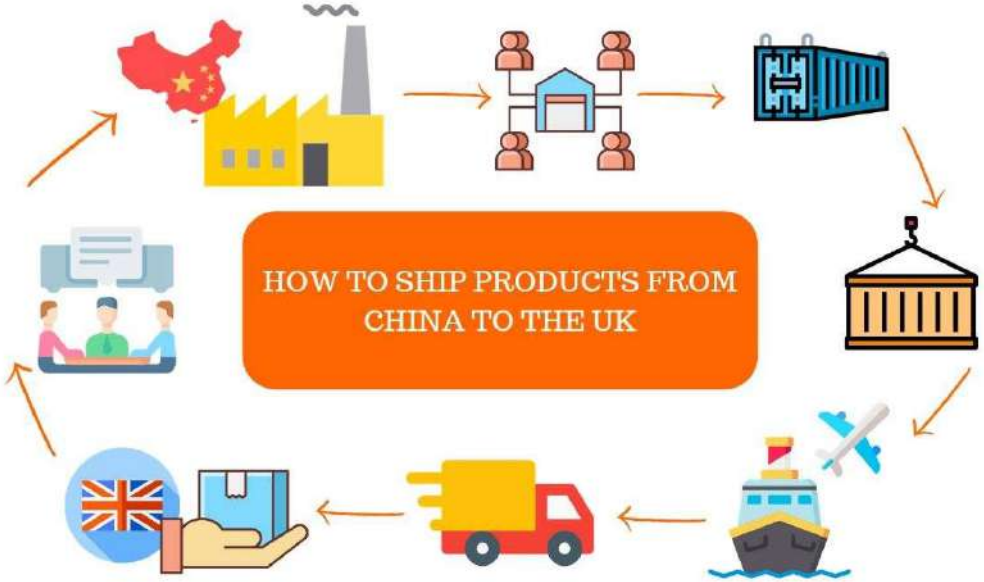
$$P \uparrow \rightarrow \text{wealth} \downarrow \rightarrow AD \downarrow$$

2. The effect of the **interest rate**:

$$P \uparrow \rightarrow r \uparrow \rightarrow AD \downarrow$$

3. The effect of **import procurement**:

$$P \uparrow \rightarrow Nx \downarrow \rightarrow AD \downarrow$$

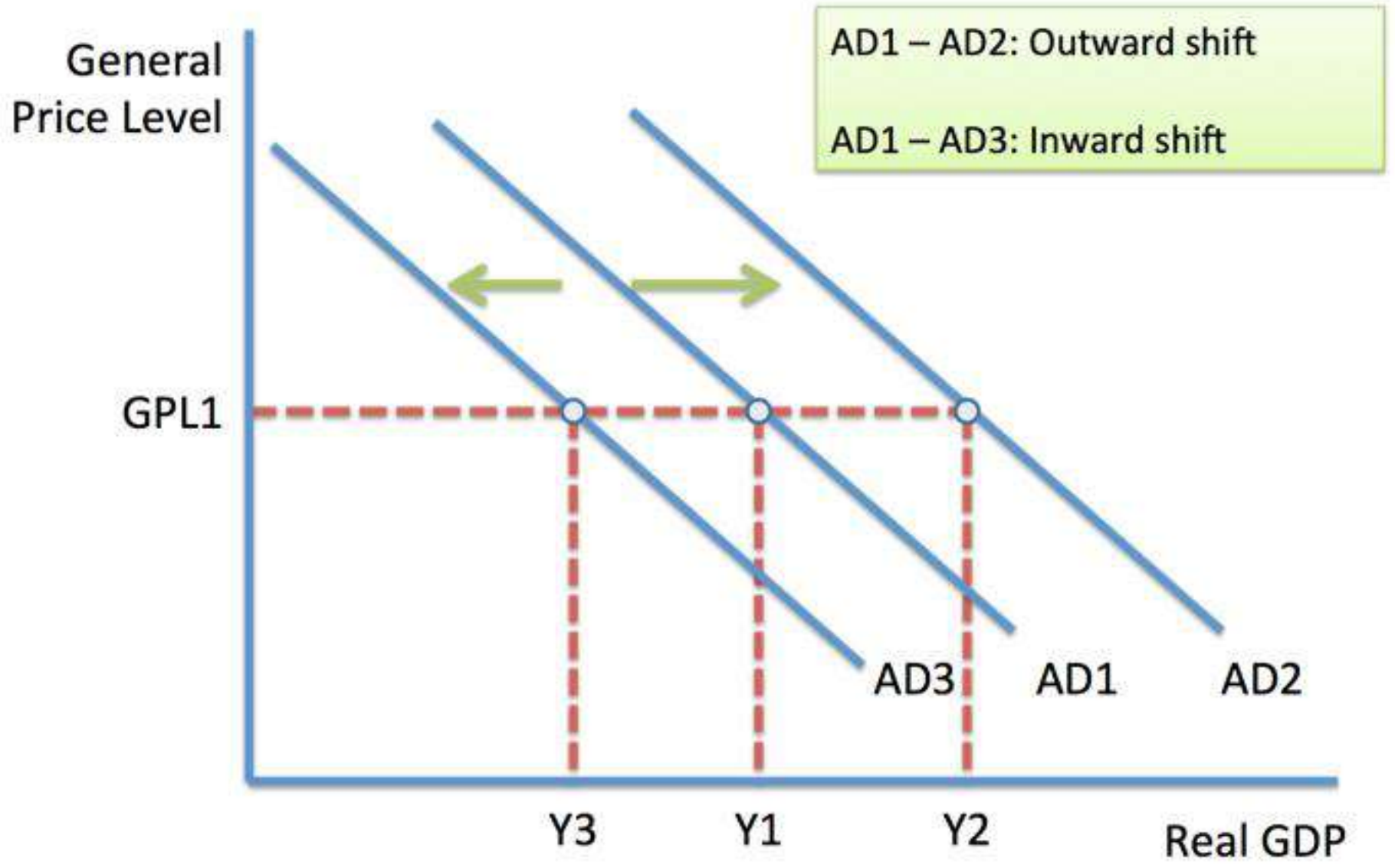


Non-price Factors of Aggregate Demand

1. Change in Money Supply
2. Factors Affecting Household Consumption
3. Factors Affecting Firm Investments
4. Government policy and Public spending
5. Foreign market conditions

They shift the AD curve !!!

Shifts in the Aggregate Demand Curve (AD)



Examples of Shifts in Aggregate Demand

Fall in AD

- Fall in net exports (M>X)
- Cut in government spending (G)
- Higher interest rates
- Decline in household wealth and confidence

Increase in AD

- Depreciation of the exchange rate
- Cuts in direct and indirect taxes
- Increase in house prices
- Expansion of supply of credit + lower interest rates

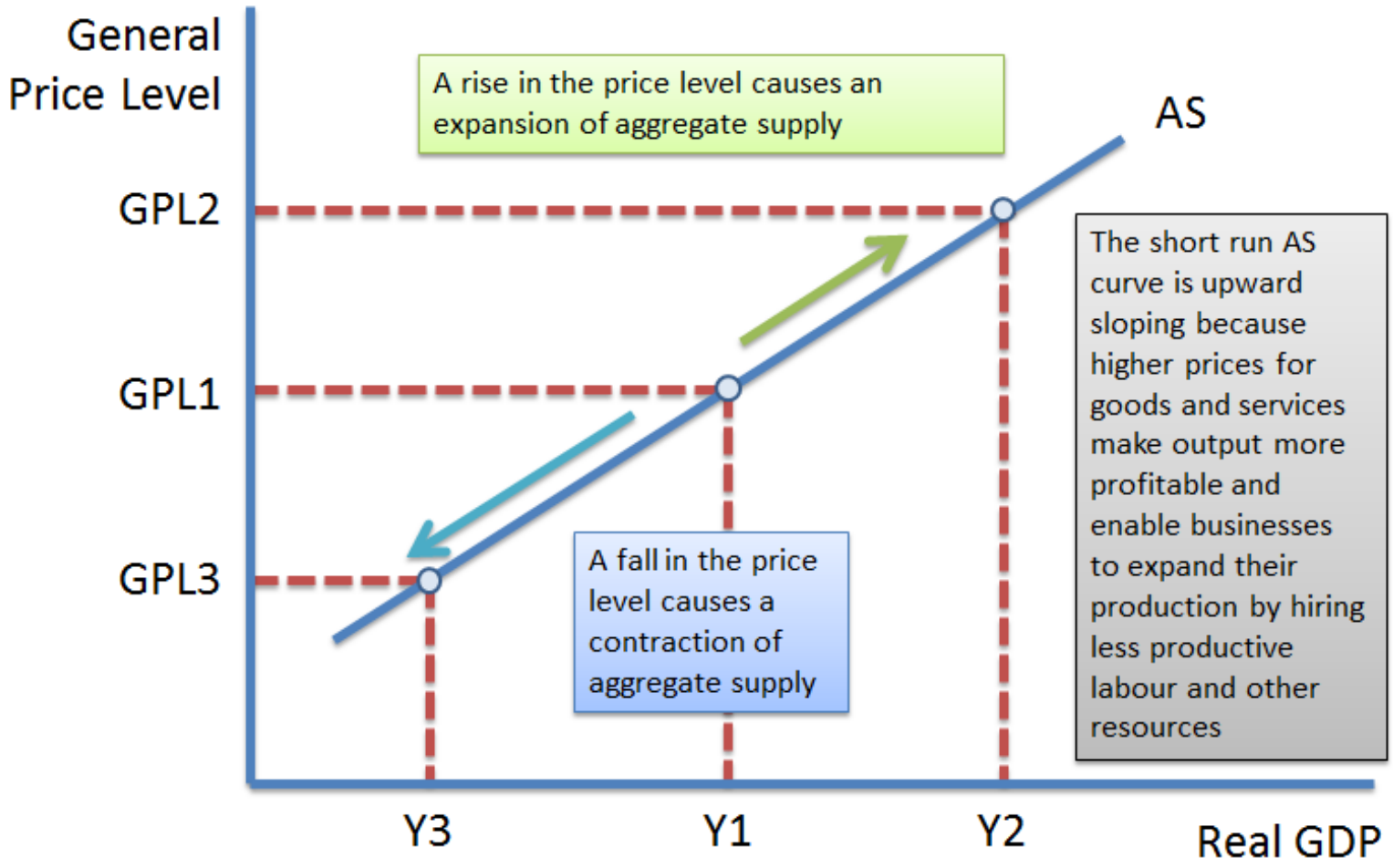
Aggregate supply (AS)

These are the final products produced and offered by the firms in the country for the year (real GDP)

AS: Y = F (K, L) – production function

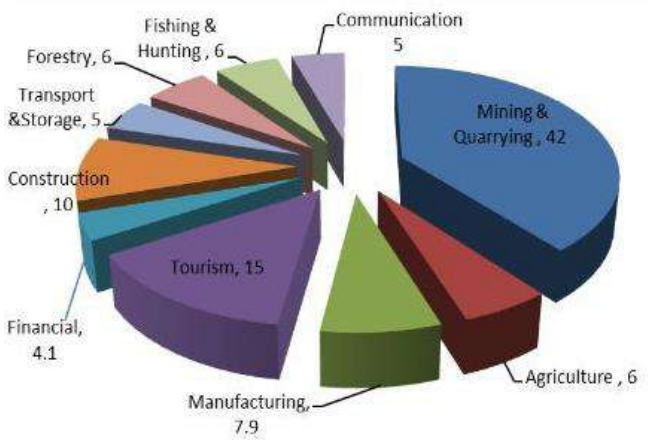
1. $z \cdot Y = F(z \cdot K, z \cdot L)$, $z > 0$ – constant return scale
2. K (L) ↑, → MPK(MPL) ↓ - principle of decreasing marginal productivity of factors of production. Therefore, if the MPK(MPL) > 0, → Y ↑, MPK(MPL) < 0, → Y ↓,

The Short Run Aggregate Supply Curve (AS)



Non-price Factors of Aggregate Supply

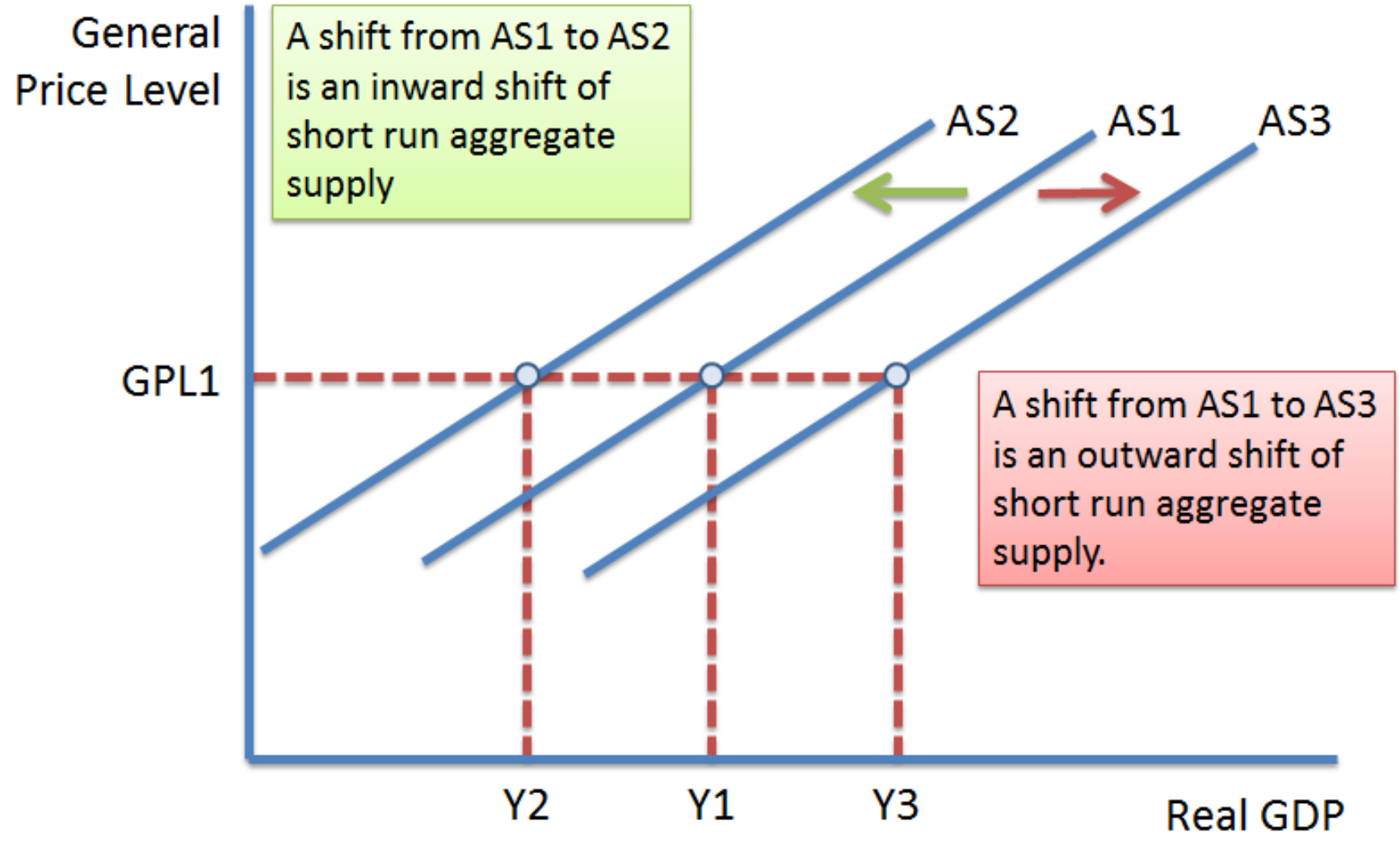
- Production technology
- Prices and volumes of resources
- Company taxation
- Structure of the economy
- Changes in legislation
- Activity of professional union of workers

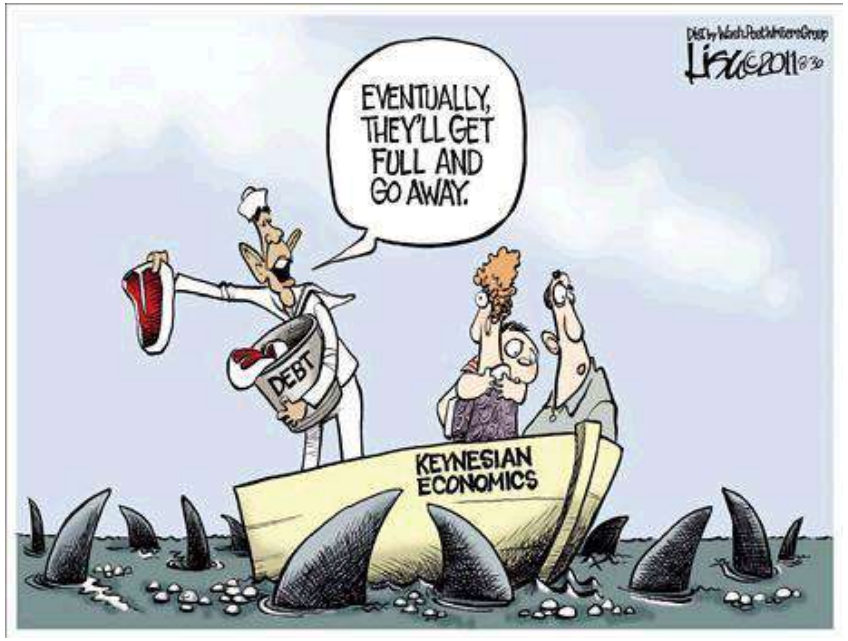


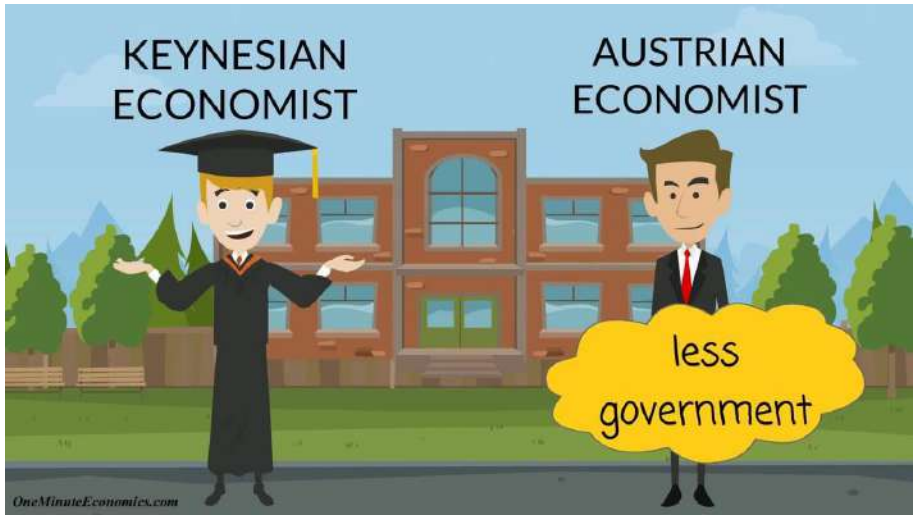
Change AC (average cost) of product and profit of the firm, as a result, affects the output and supply

They shift the AS curve !!!

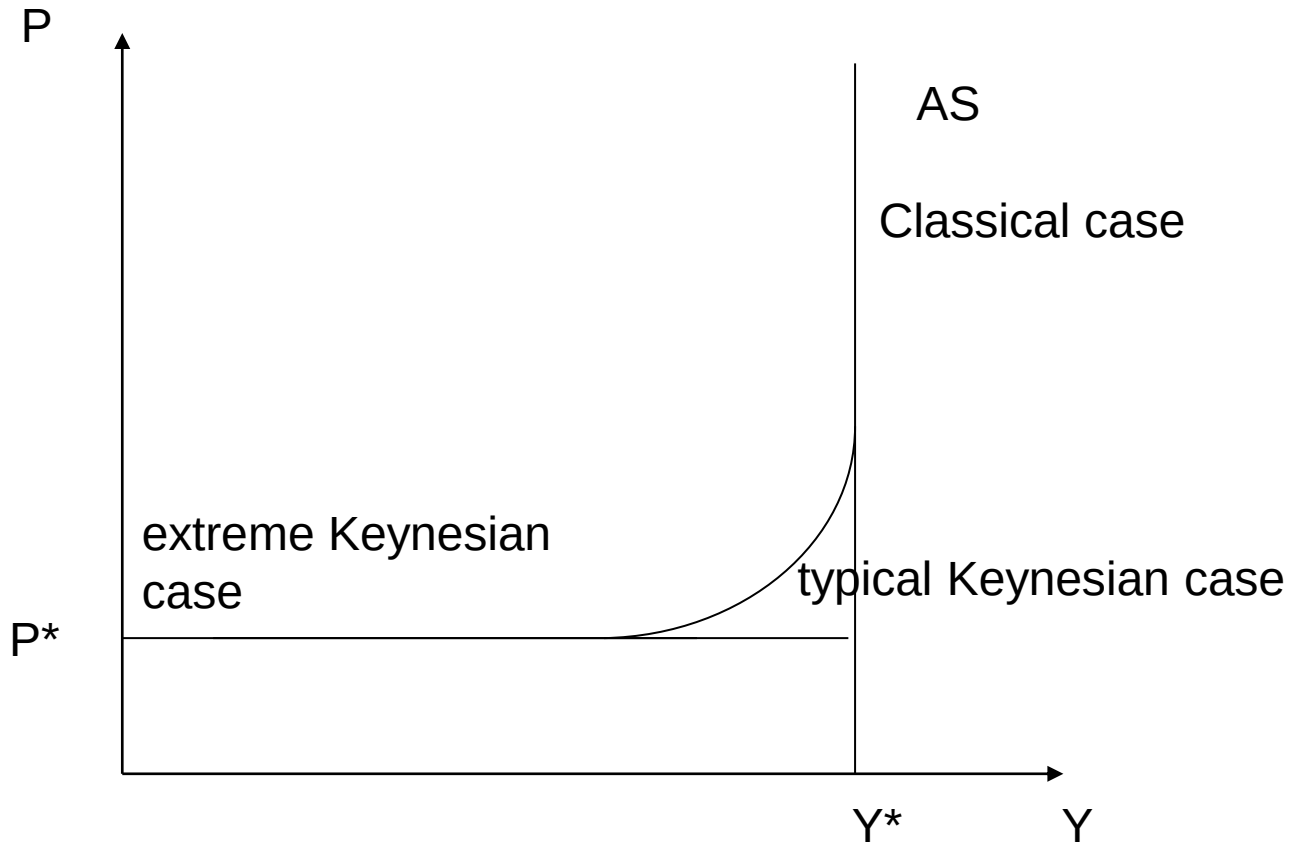
Showing Shifts in Short Run Aggregate Supply







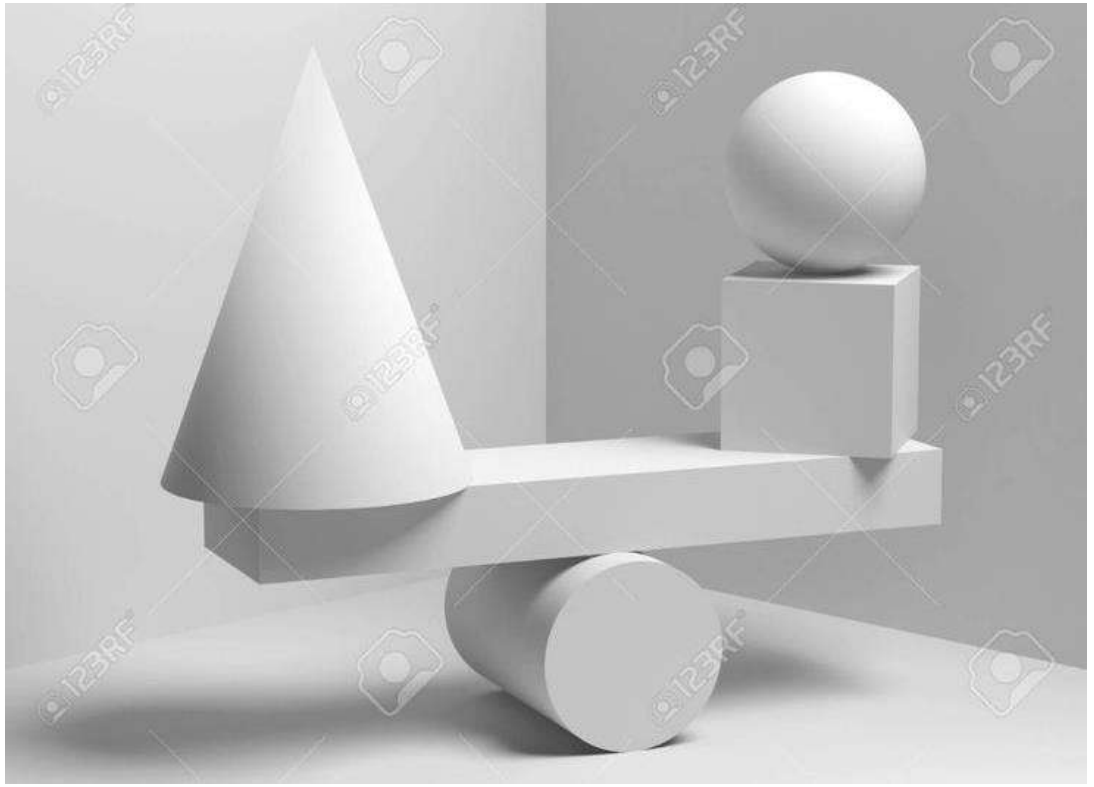
Aggregate supply curve



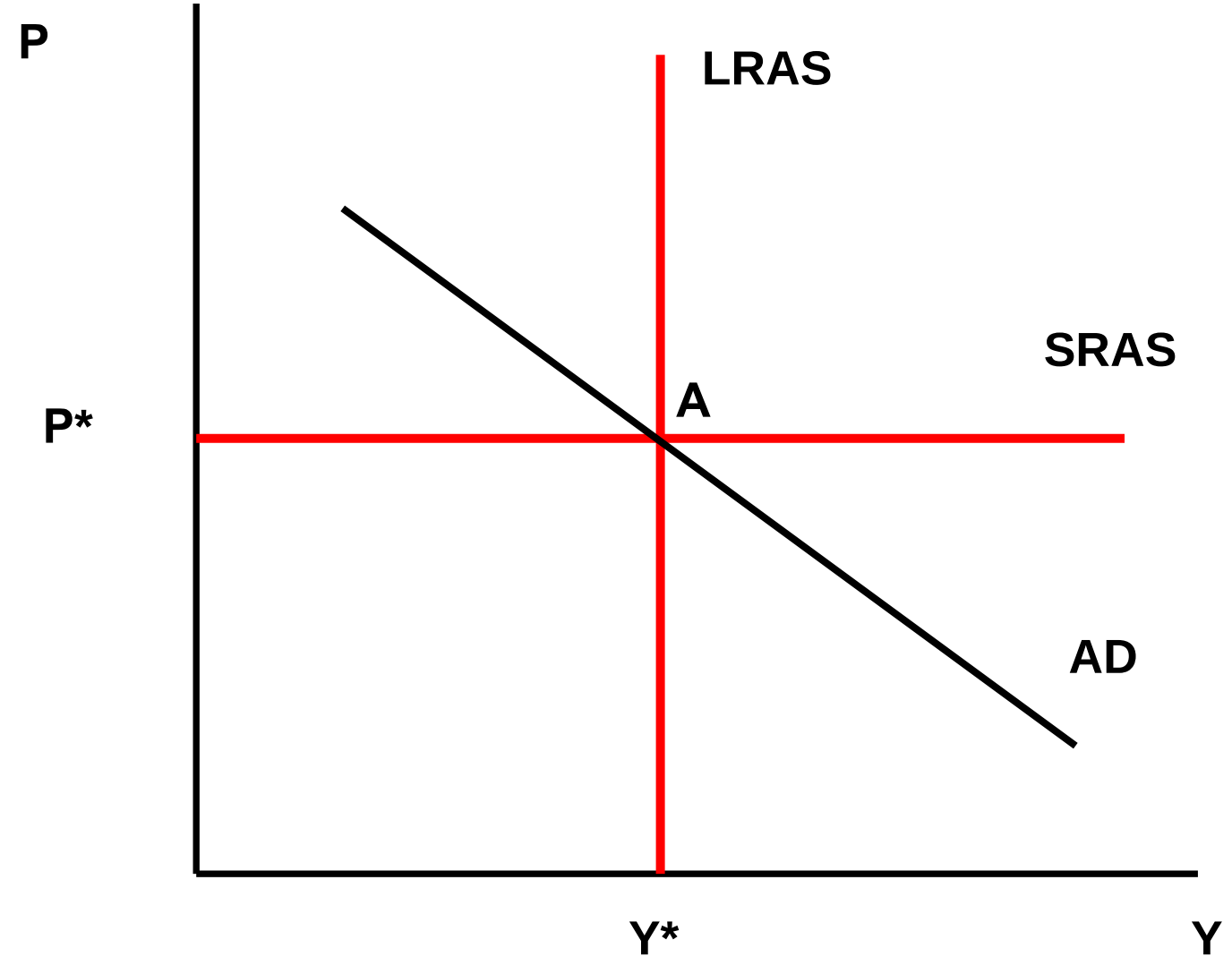
1. **Classical case:** the prices are flexible, the changing of aggregate demand no affect on output because it is potential and affect only on prices. If the AD increase, the prices level will increase also, it means that inflation is. If the AD decrease, the prices level will reduce also, it means that deflation is.
2. **Normal Keynesian case:** the prices change very slowly, it means that all of real indicators are inflexible. The changing of aggregate demand can change the output and prices in an economy.
3. **Extreme Keynesian case:** tough prices in the economy, it means that all of real indicators no change. The changing of aggregate demand no effect on prices, but will change the output only. If the AD increase, the output level will increase also, it means that firms sell its goods stock. If the AD decrease, the output level will reduce also, it means that firms decrease its goods stock.

Macroeconomic equilibrium

This is the state of the economic system when the overall balance between the proportionality of economic flows of goods, services, and factors of production, incomes and expenses, supply and demand, material and financial flows is achieved.

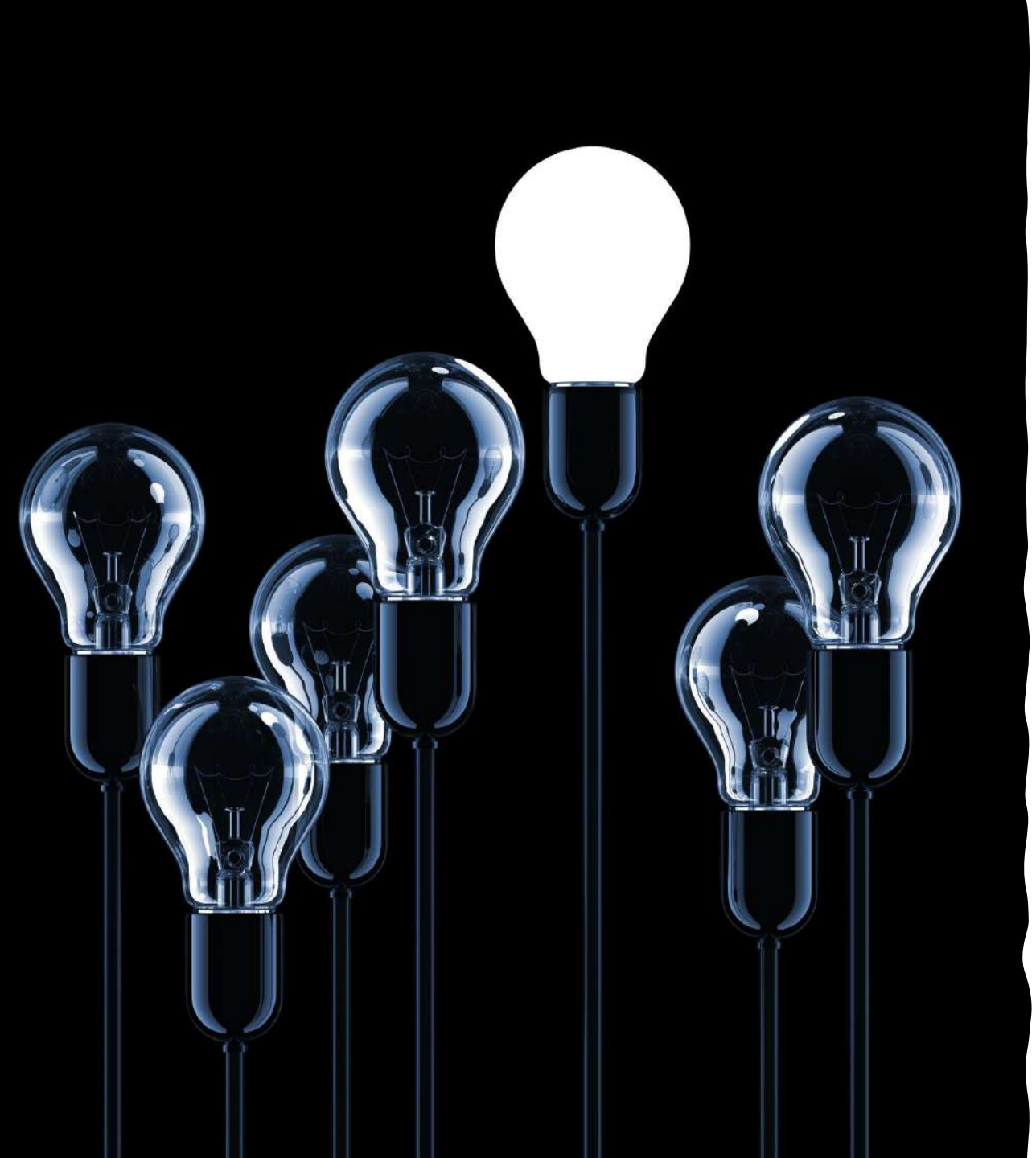


Long-term and short-term macroeconomic equilibrium in the AD–AS model



Homework

- Use the platform stat.gov.kz and home country’s statistical database
- Find data for the AD and AS in Kazakhstan and China and compare them.
- Construct the diagrams for each case



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

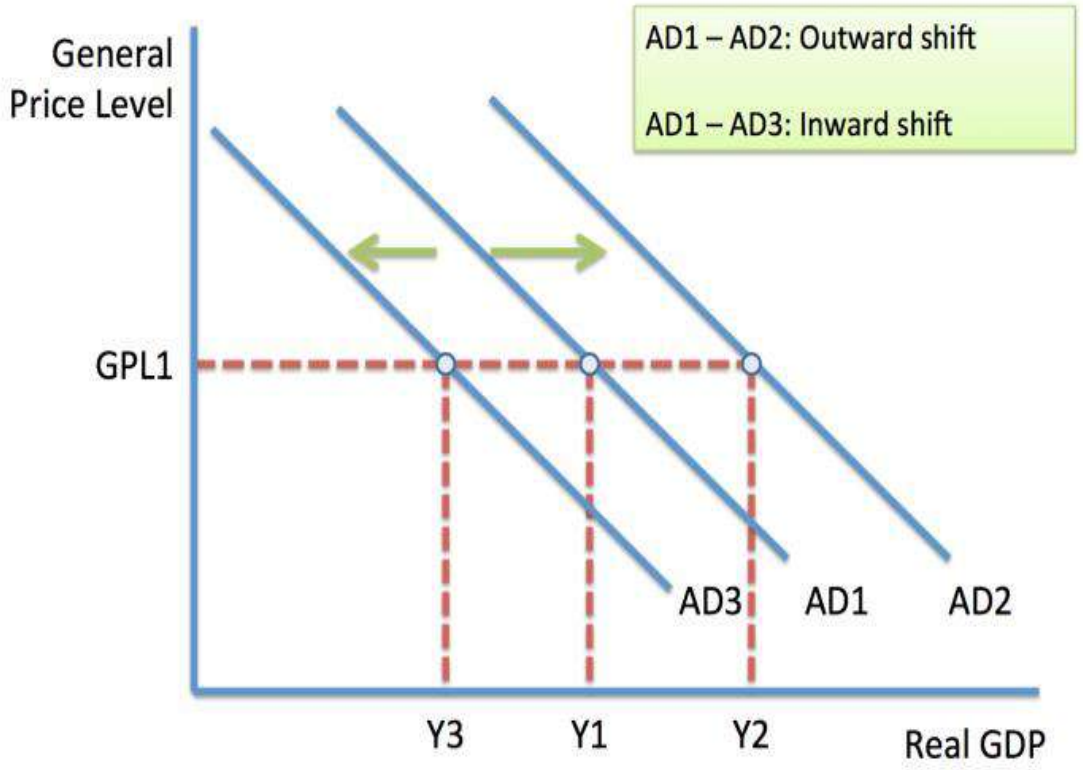
MODULE 3. Fundamentals of macroeconomic analysis.

Topic 9. Modeling the exogenous shocks of the aggregate demand and aggregate supply using the macroeconomic stabilization instruments.

Aggregate Demand (AD)

AD curve shifts in the next cases:

- Monetary policy changes in regulation of money supply and interest rates.
- Fiscal policy changes in taxes and purchases.
- Changes in expectations of households and firms.
- Changes in foreign variables.



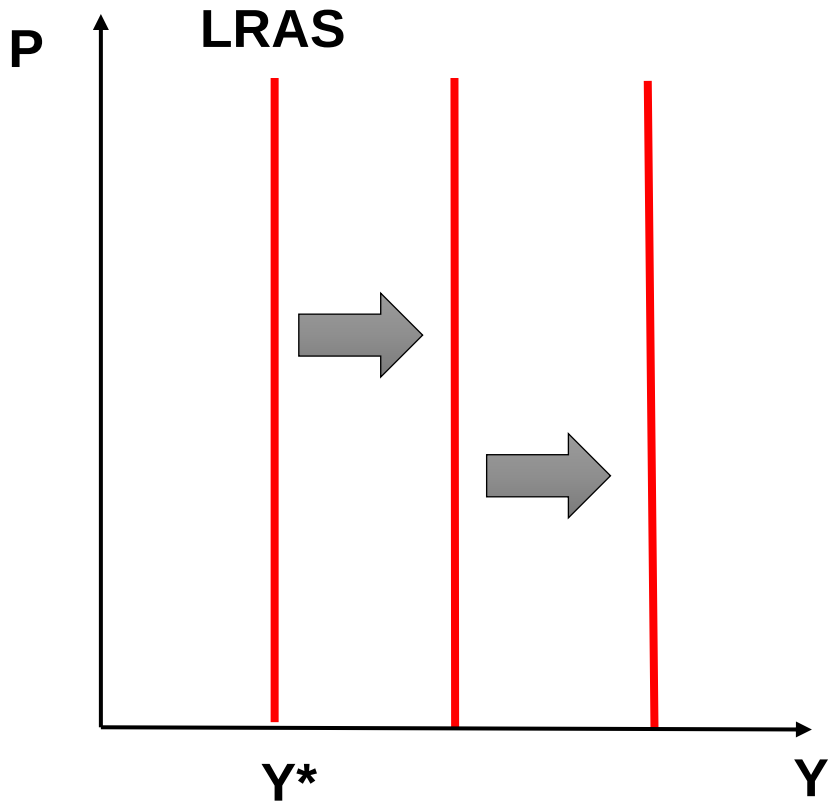
Aggregate supply (AS)

1. Classical approach (prices are **flexible**):

Long run (LRAS): Y = Y*

Y* reflects the economy's output capacity at full employment of available resources using the best technology.

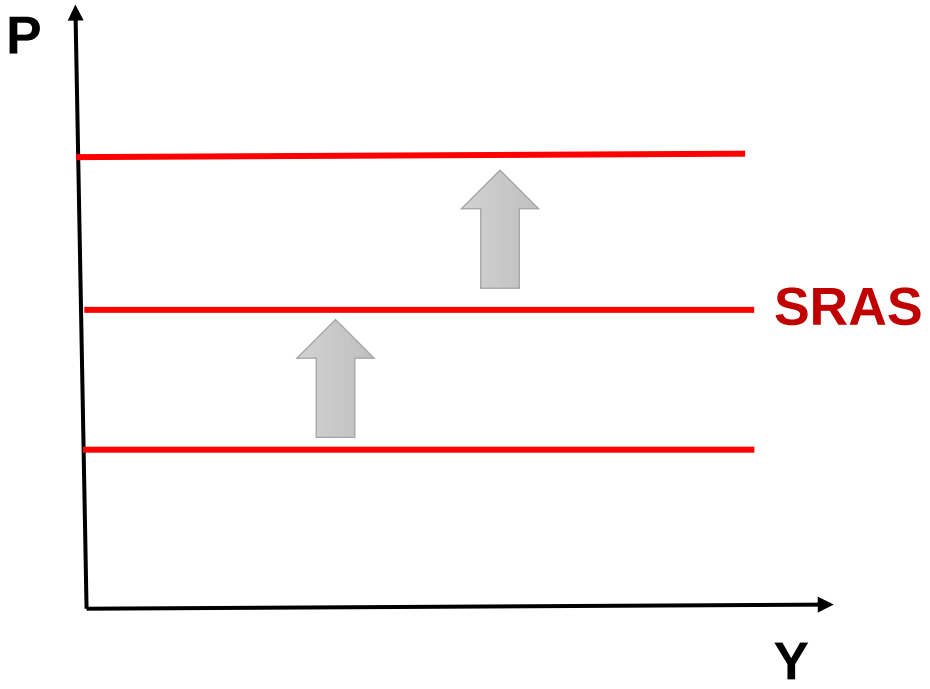
LRAS **shifts** outward as capital accumulates, the labor force grows, and technology improves.



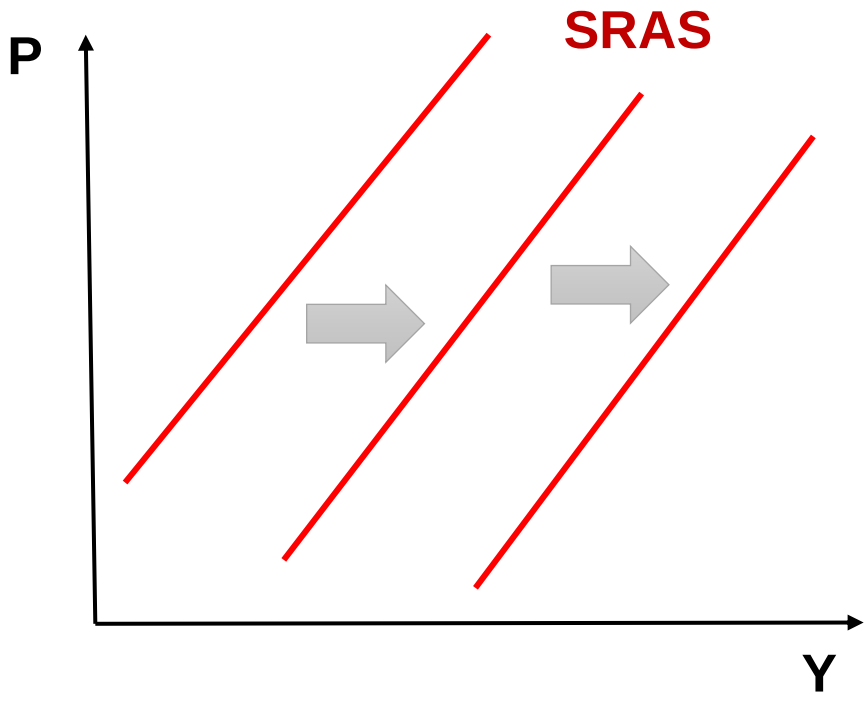
Aggregate supply (AS)

2. Keynesian approach: Short run (SRAS): P = P*

- extreme case (prices are **sticky**)

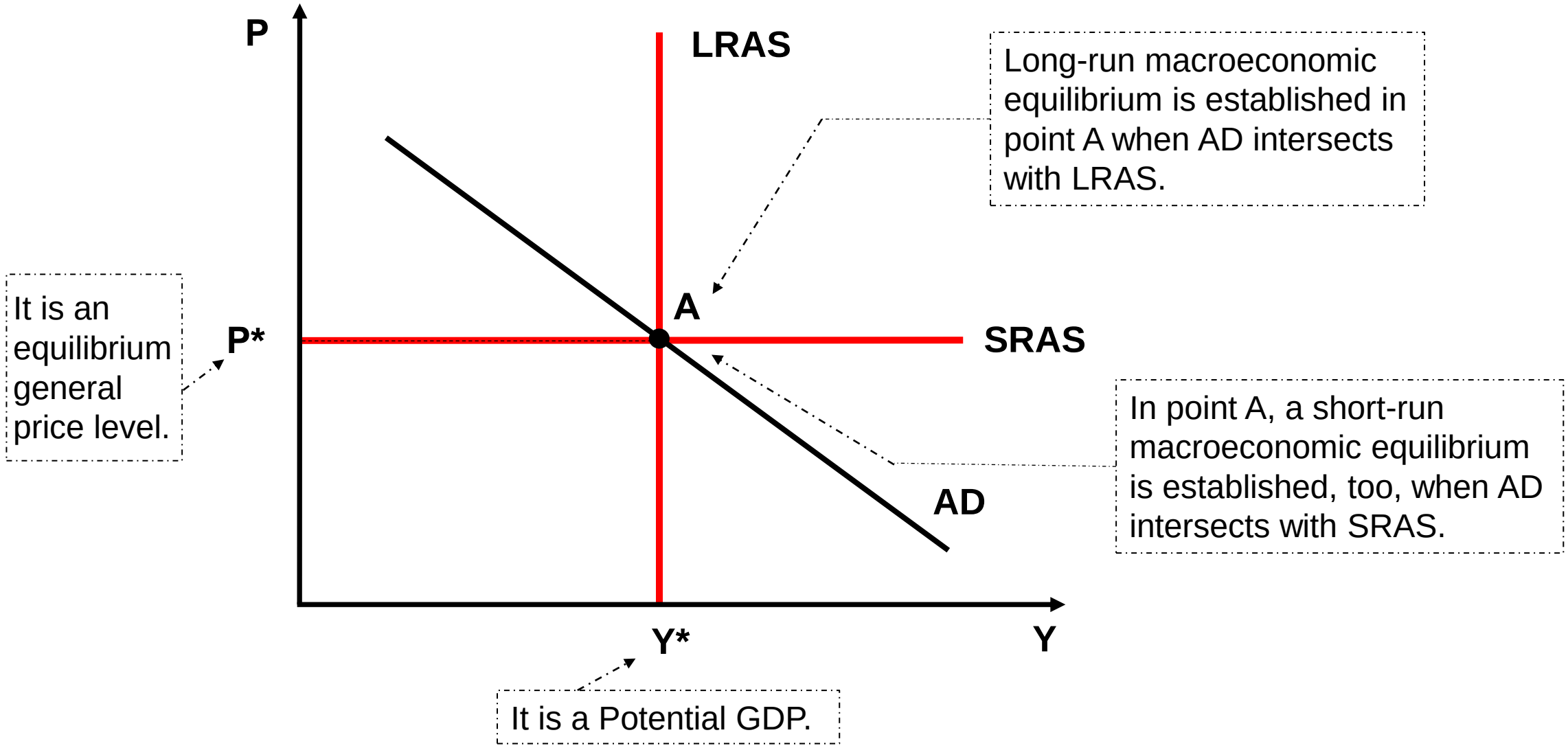


- typical case (prices are **inflexible**)



AS curve shifts when its non-price factors will change.

Modeling Long Run and Short Run Equilibrium

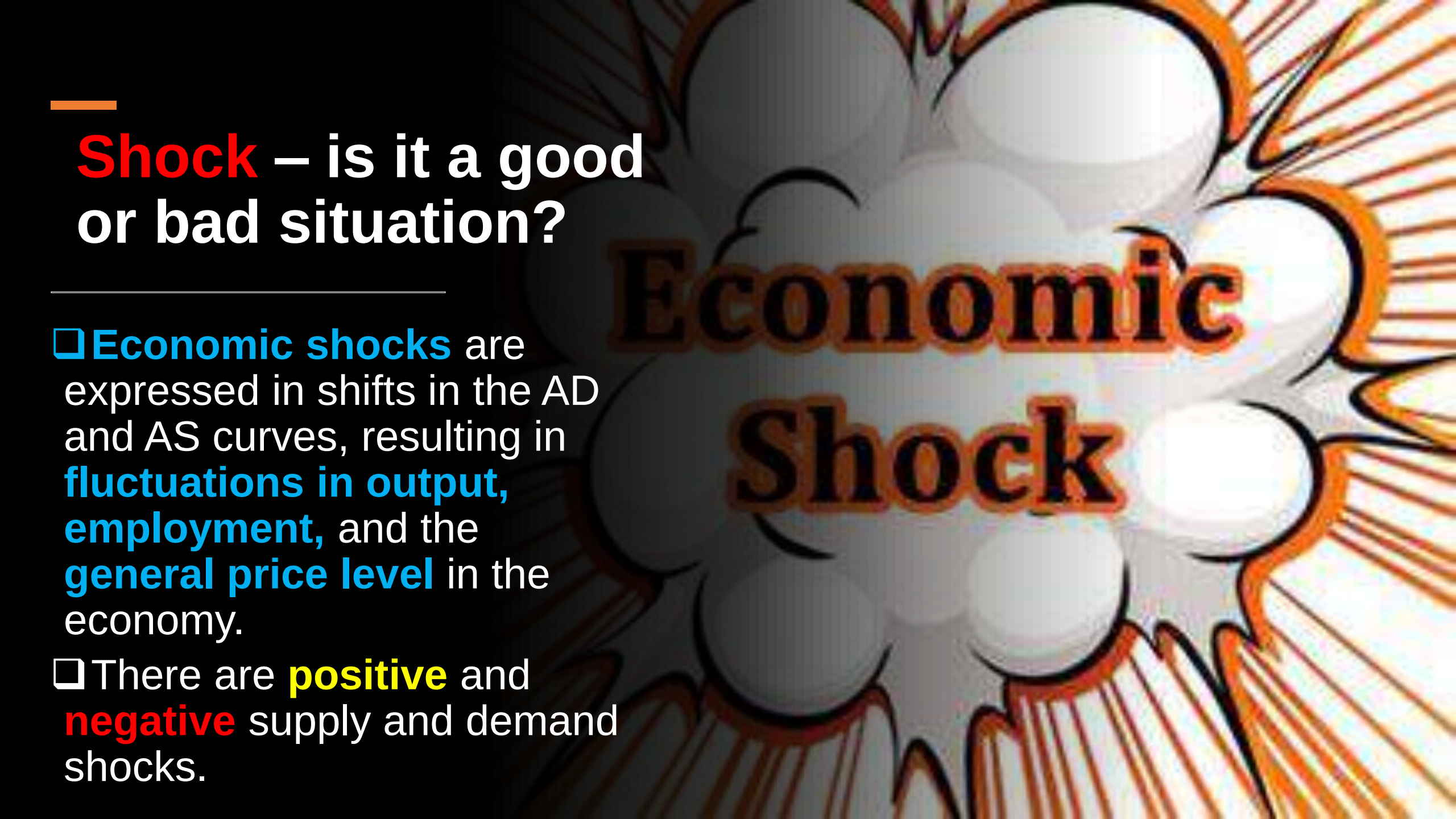


What are the Economic Shocks?

Any economic fluctuations start with changes in aggregate demand or supply, which occur due to external influences or exogenous shocks, such as changes in oil prices, wars, pandemics due to COVID-19, or climate change.

Shock – is it a good or bad situation?

- **Economic shocks** are expressed in shifts in the AD and AS curves, resulting in **fluctuations in output, employment,** and the **general price level** in the economy.
- There are **positive** and **negative** supply and demand shocks.



Where Do We Go From Here?

Stabilization Policy

What is a stabilization policy?

The **stabilization policy** is a governmental policy **to keep output** at full employment of available resources.

Monetary policy is the main effective instrument of stabilization policy because changes in money supply significantly impact aggregate demand.

Monetary Policy Vs Fiscal Policy

- The Central Bank conducts **Expansionary** or **Contractionary monetary policy.**
- The first spurs economic activity and lowers consumer loan and mortgage interest rates, encouraging household spending.

Businesses start new investment projects with reduced financing costs, which can lead to higher profits and more hiring.

- Second, however, consumer and business spending will slow due to higher borrowing costs. Consumers also save more with higher interest rates in place, which reduces the money supply and lowers inflation.

- The Government pursues **Expansionary** or **Contractionary fiscal policy**.
- The former accelerates GDP growth, resulting in more jobs and higher wages for ordinary citizens.

However, this type of fiscal policy also tends to have undesirable effects on interest rates and investment, as well as on the exchange rate and inflation faced by households and businesses, so continued fiscal stimulus becomes less effective over time.

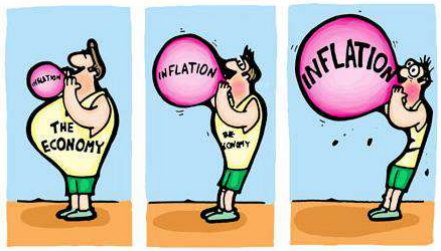
- The second option can slow economic activity, but it can also reduce people's livelihoods and day-to-day spending as hiring tightens and interest rates rise. It could also lead to a recession.

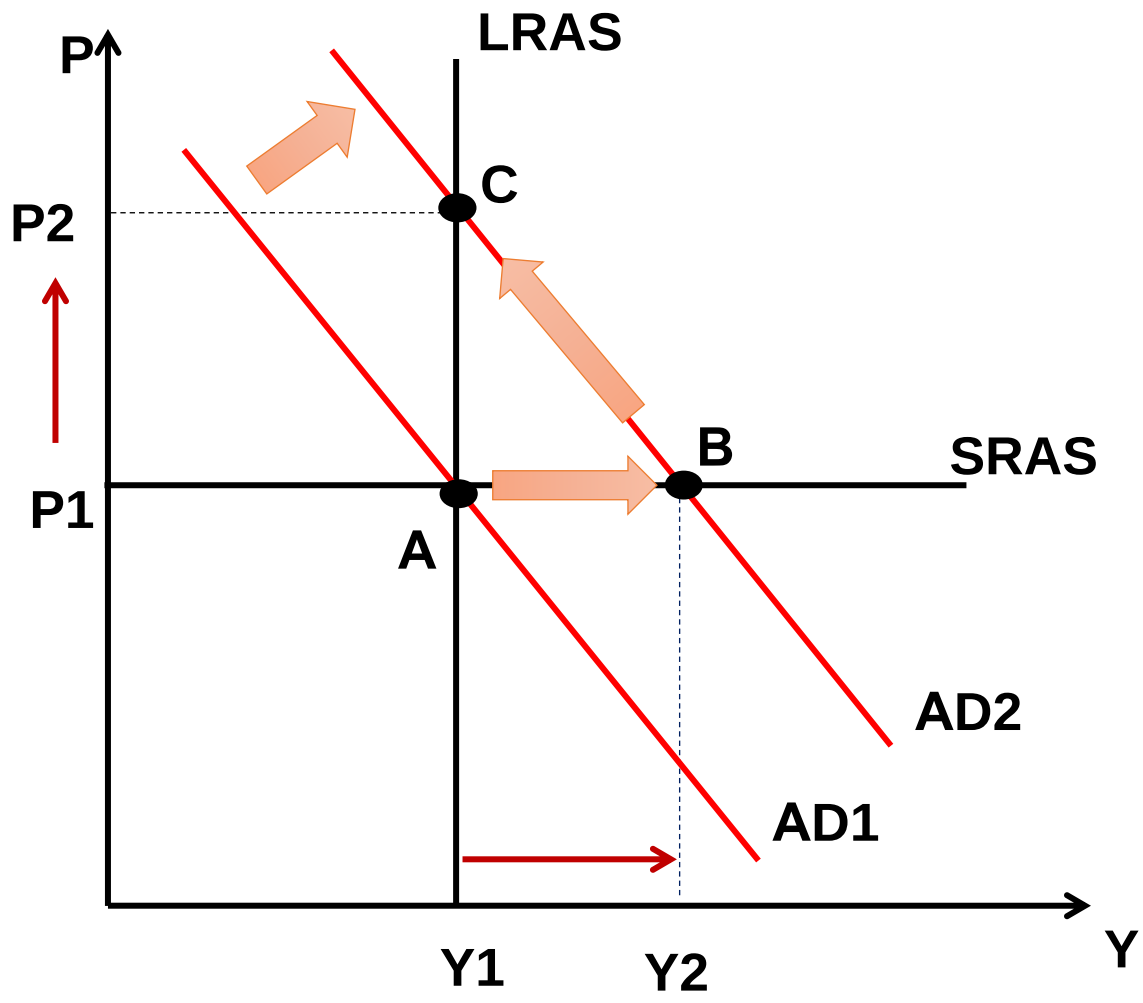
Demand shocks

Demand shock is an unexpected event that causes the aggregate demand curve to shift.
For example, unexpected changes in the bank activity because of:

- Creating new bank equipment like ATMs
- Influence of digitalization
- artificial devaluation of national currency, etc.

As a result, **economic growth (point B)** and **inflation (point C)** happened.

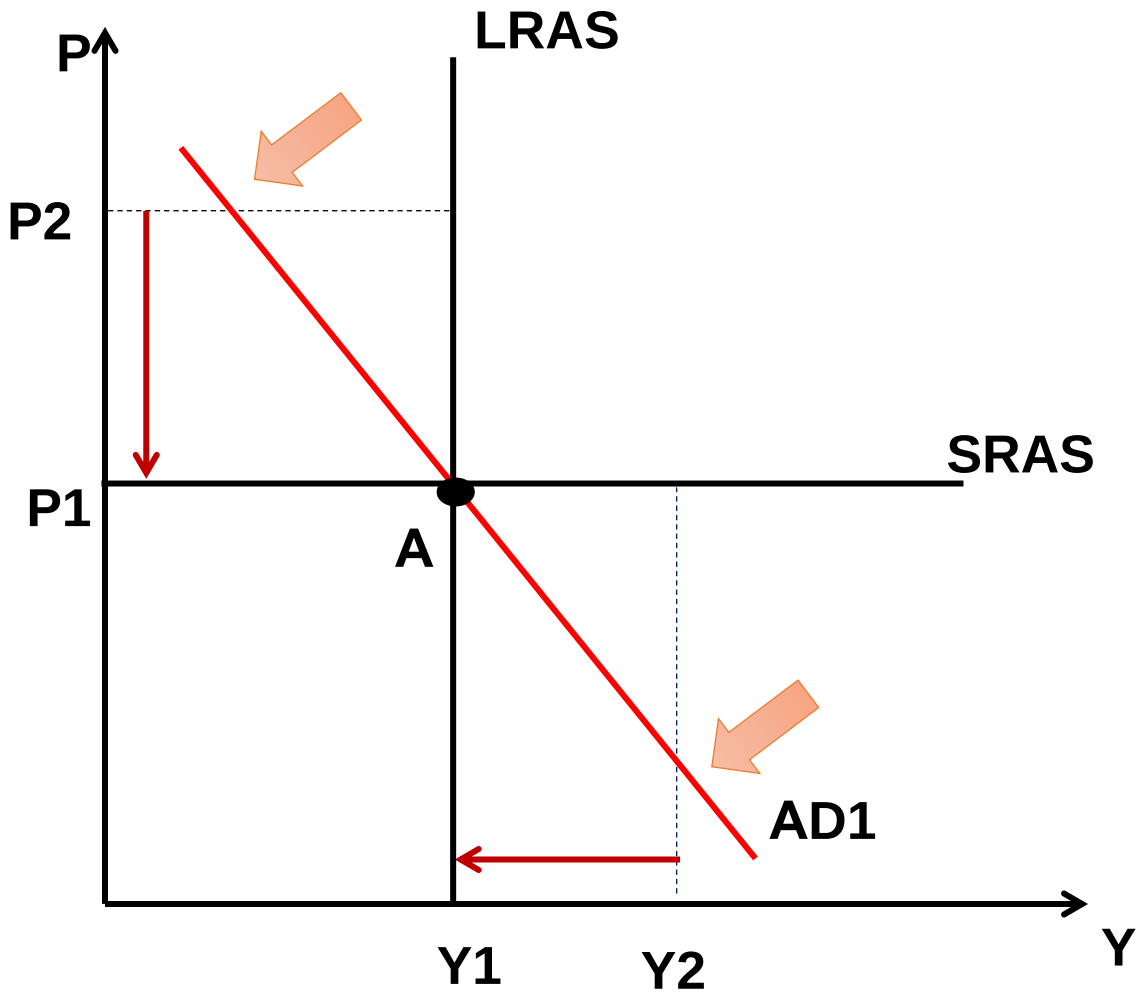




Way of stabilization policy

The first one is "No actions."

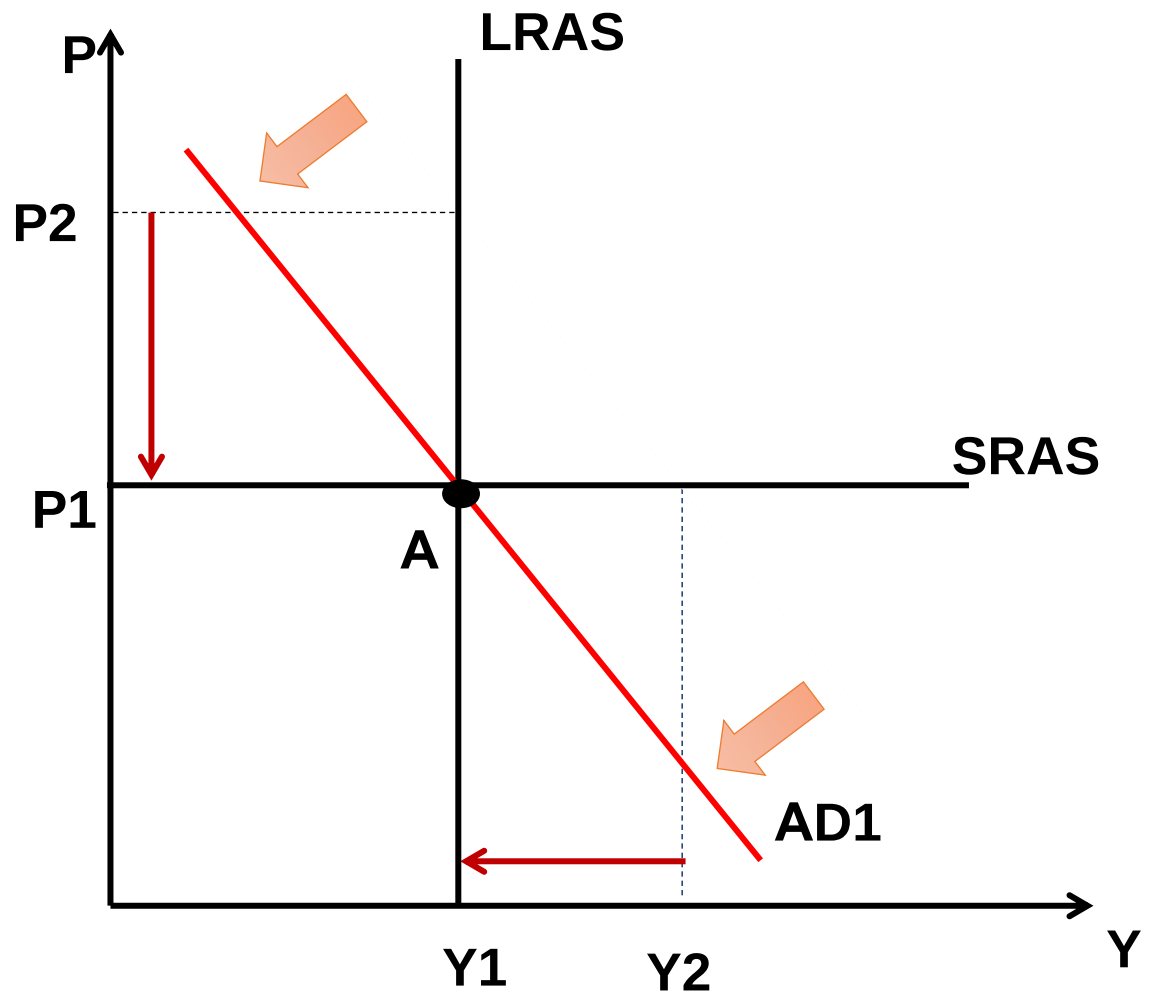
- According to Say's law, demand creates supply (classical approach).
- This means that if aggregate demand is **not stimulated** by monetary or fiscal policy, firms will not produce.
- Since households will not be able to buy more, prices will not remain high for long, and as a result, demand **must fall**.
- Thus, if the money supply does not change in the long run, the AD curve may shift backward.



Way of stabilization policy

The second is "Impact on AD".

- It is carried out through Monetary restrictions that reduce the money supply.
- For this purpose, the Central Bank can use three instruments:
  - reserve requirement (↑).
  - open market operations.
  - discount rate (↑).
- Decrease in the quantity of money to buy goods will lead to a decrease in aggregate demand in general.
- AD curve will shift to its original state, resulting in a decrease in the general price level.

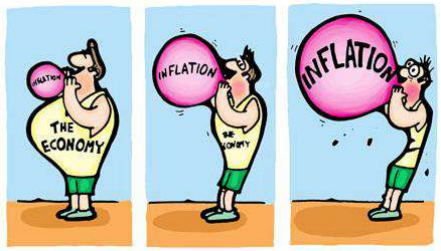


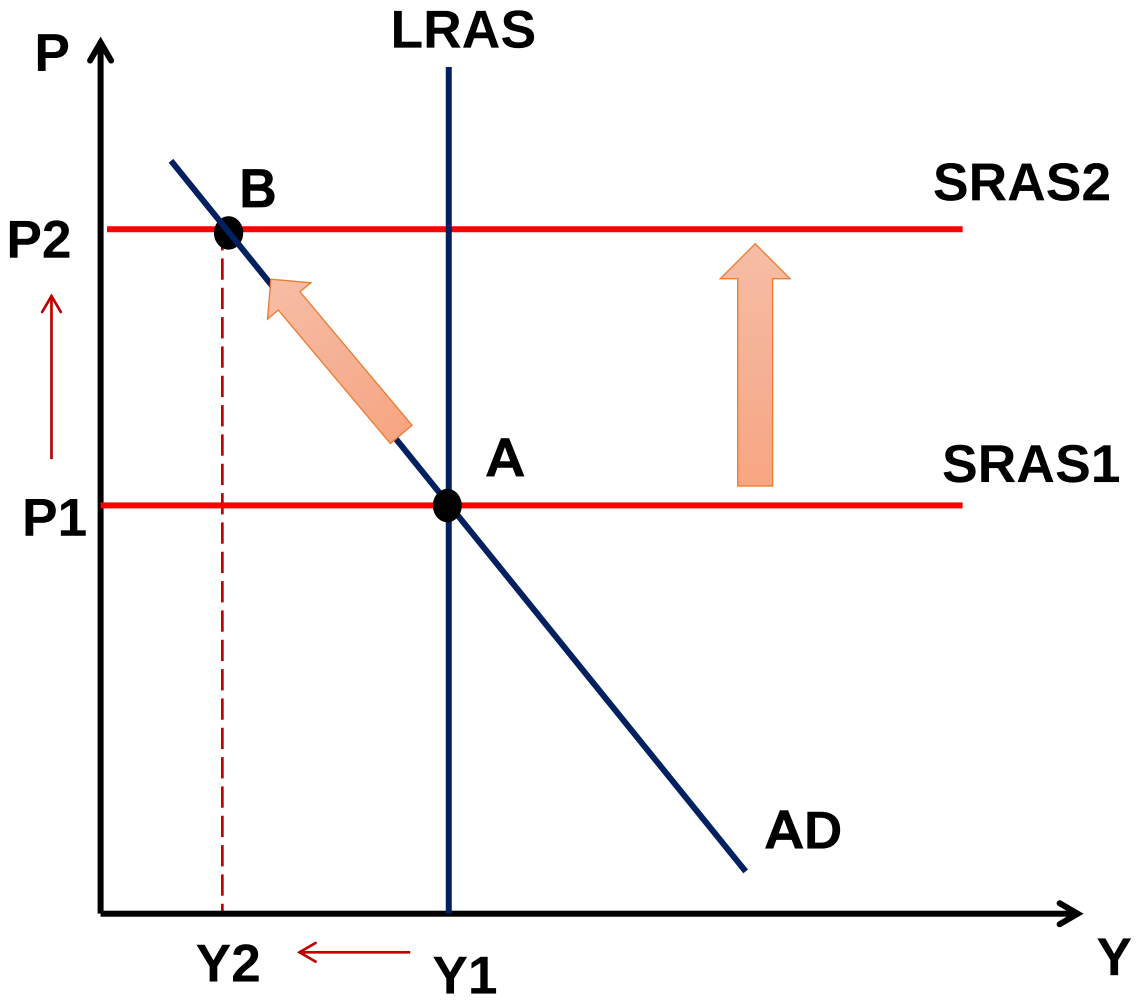
Supply shocks

Supply shock is an unexpected event that causes the short-run aggregate supply curve to shift. For example, unexpected changes:

- In the price of an essential natural resource
- In fiscal policy, etc.

As a result, **stagflation** happens - a combination of inflation and recession.

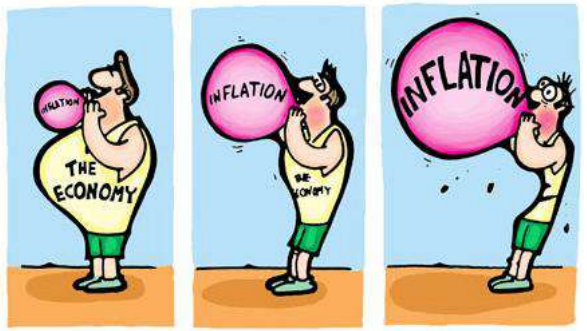




So, what are the ways of stabilization policy?

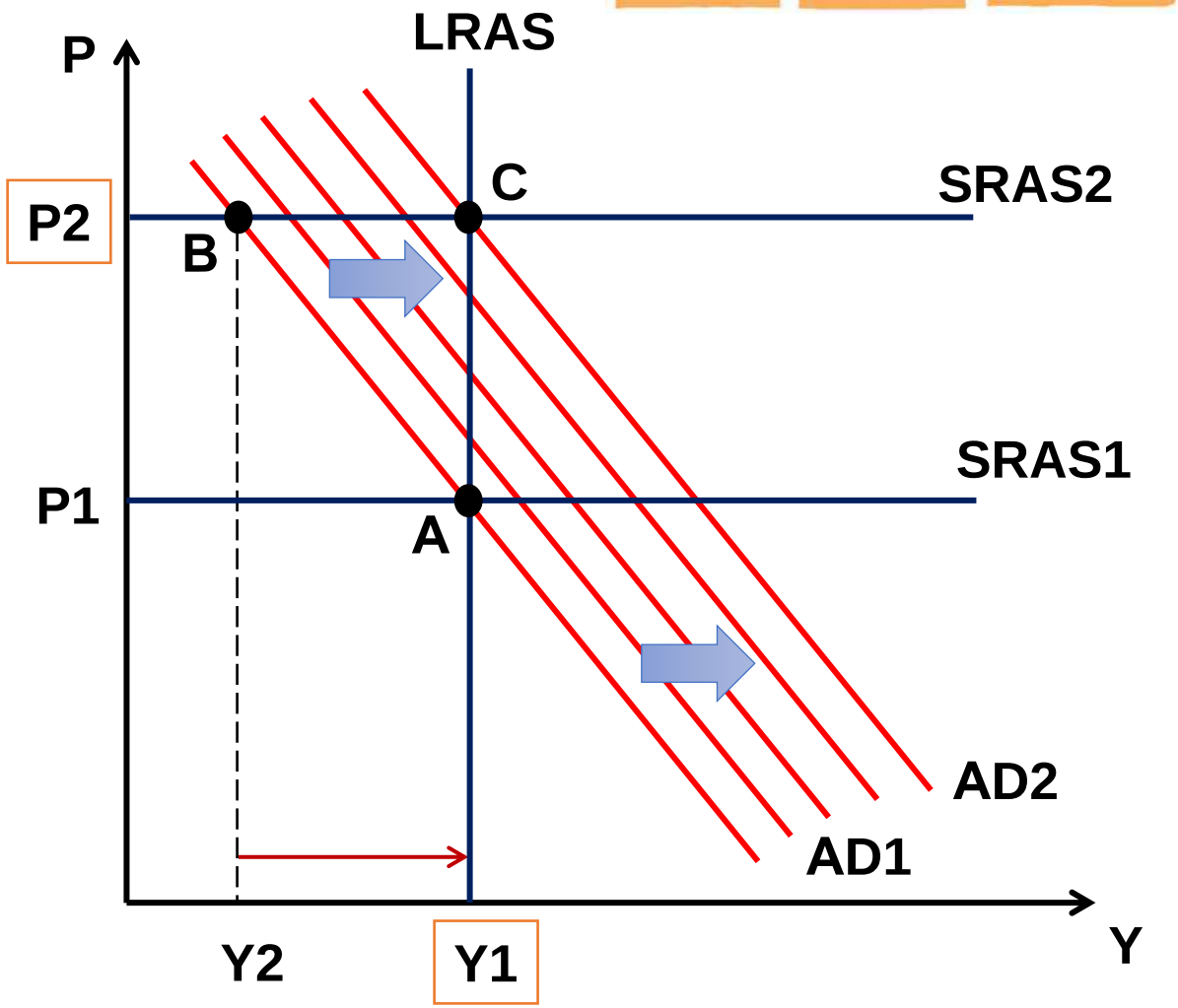
What do we have to do???

Way of stabilization policy



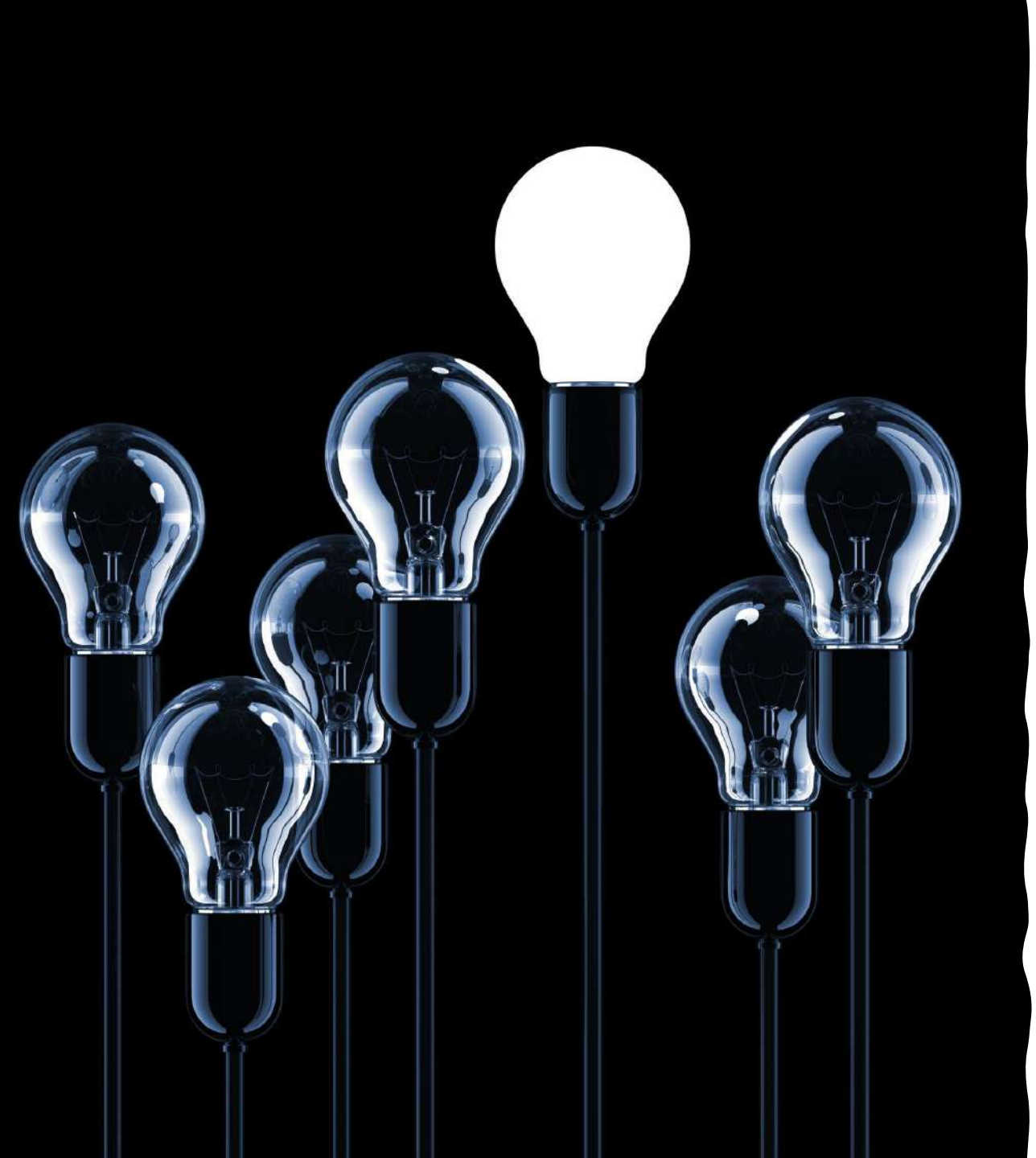
"Impact on AD."

- In this case, it means artificially affecting aggregate demand through expansionary monetary policy.
- An increase in money supply stimulates the purchase of goods, gradually increasing aggregate demand.
- The AD curve will shift to the right and intersect the LRAS curve at **point C**, where output returns to its potential level.
- However, **inflation cannot fall** because of increased aggregate demand.



Classwork

1. Use the stat.gov.kz platform to explore Kazakhstan's statistical database.
2. Find data on AD and AS in Kazakhstan and plot them in a chart where you need to analyze in which years demand or supply shocks occurred in the Kazakh economy.
3. Explain your model’s results.



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

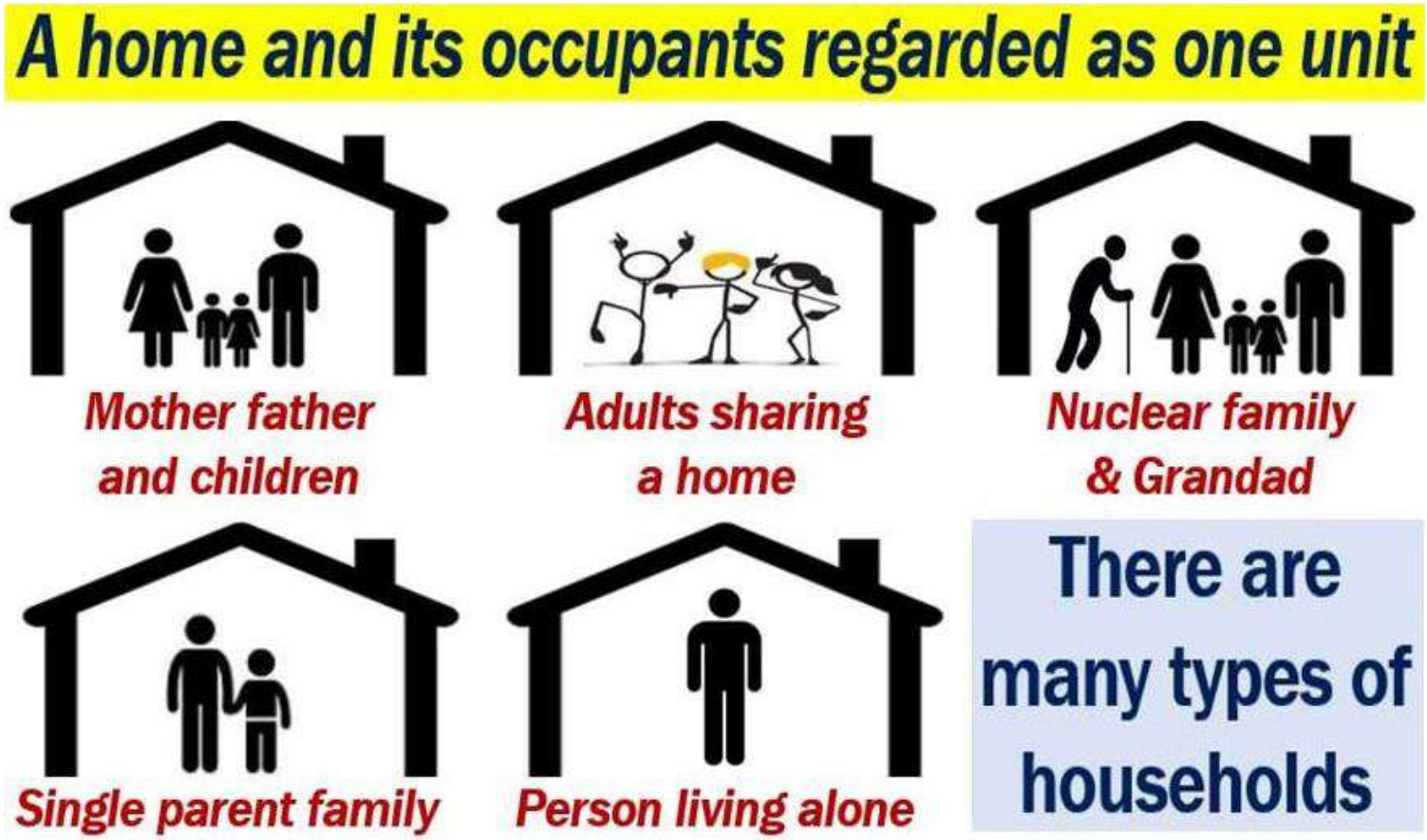
Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 3. Fundamentals of macroeconomic analysis.

Topic 10. Model of consumption and savings. The role of fiscal policy. State budget.

Who is a Household?



Consumption

Consumption is the use of goods and services by households.

Consumption is distinct from consumption expenditure.

Consumption expenditure is the purchase of goods and services for household use.

$$Y = C + I + G + Xn$$

Saving

Savings comprise the amount of money left over after spending.

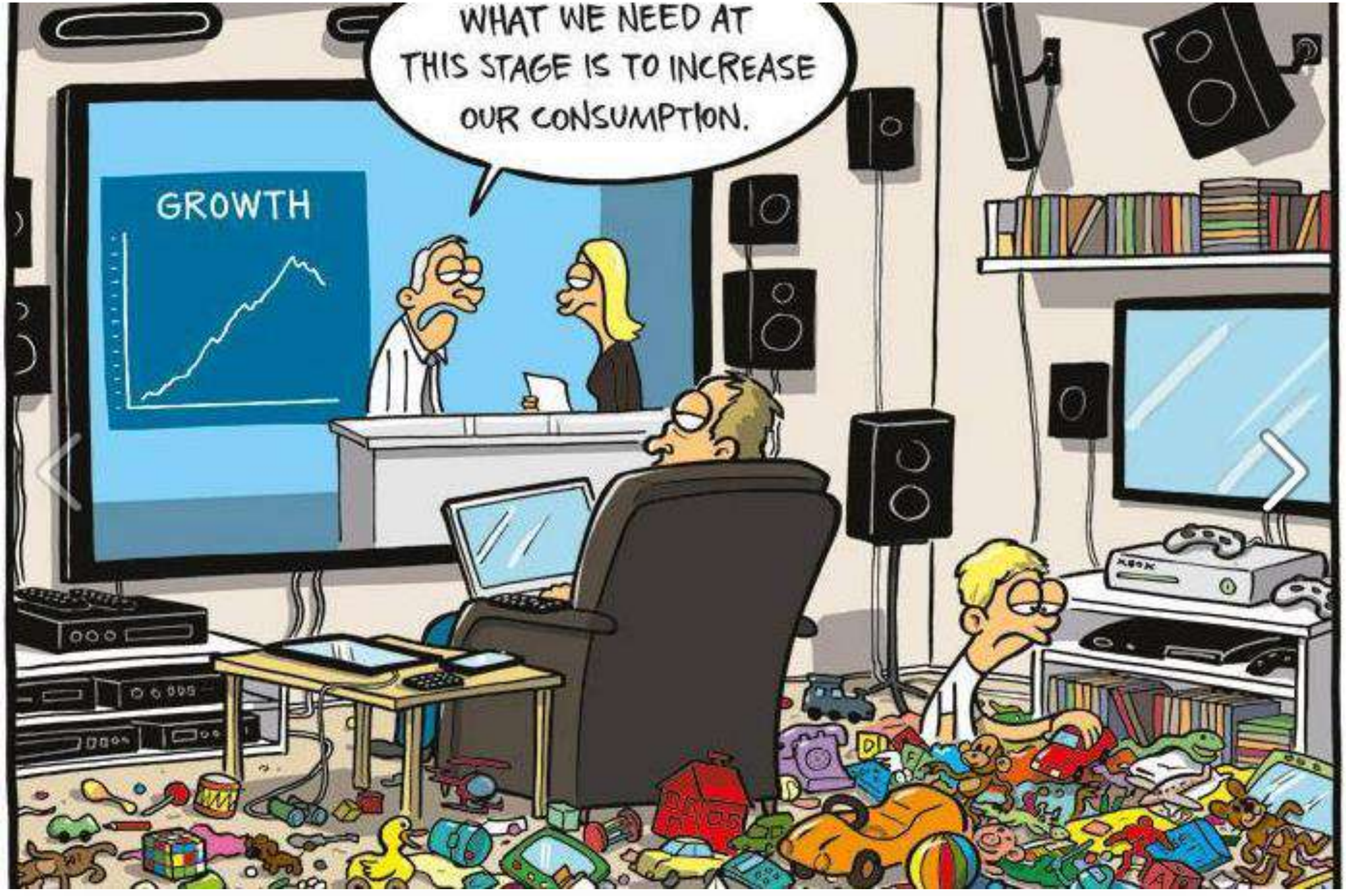
People may **save for various life goals** or aspirations, such as retirement, a child's college education, the down payment for a home or car, a vacation, or several other examples.

Consumption and Saving

Consumption and **saving** decisions are **at the heart of** both short- and long-run **macroeconomic analysis** (as well as much of microeconomics).

In the short run, spending dynamics are central to the business-cycle analysis and monetary policy management.

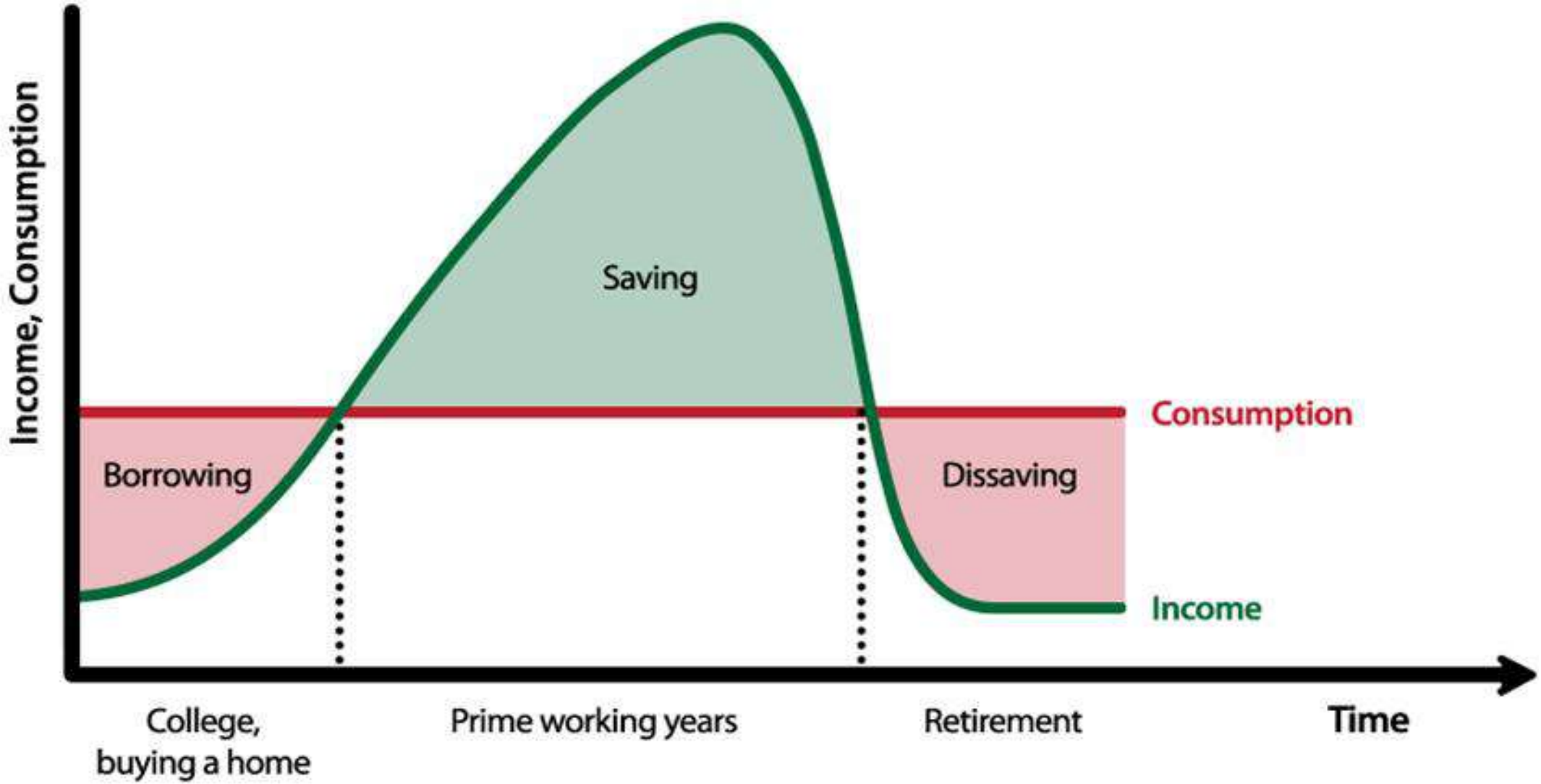
In the long run, aggregate saving determines the size of the aggregate capital stock, with consequences for wages, interest rates, and the standard of living.


WHAT WE NEED AT THIS STAGE IS TO INCREASE OUR CONSUMPTION.
GROWTH

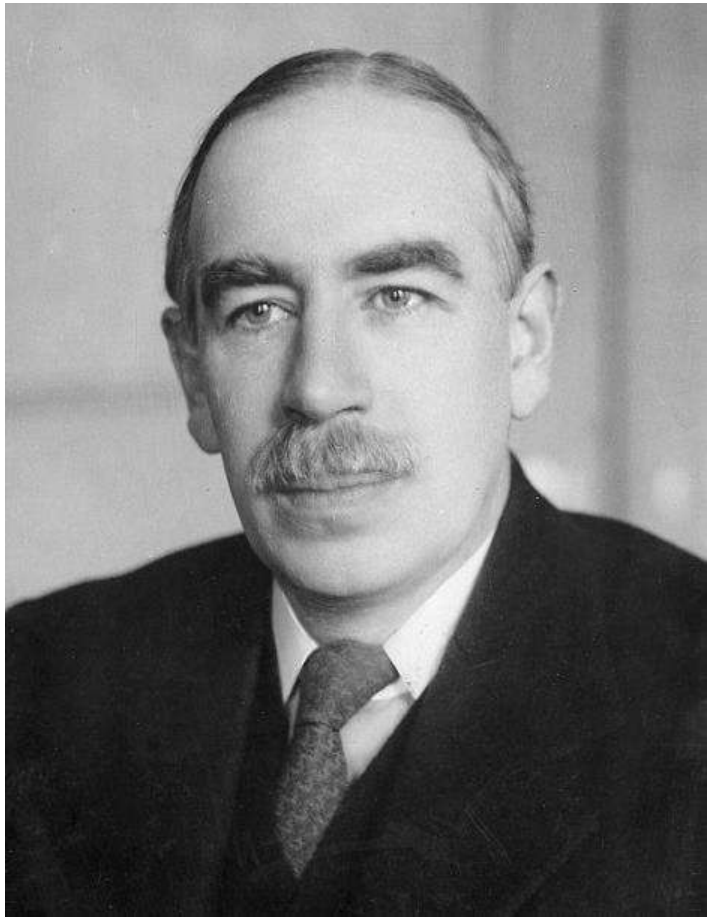
Macroeconomists are interested in aggregate consumption for **two reasons**.

- First, aggregate consumption determines aggregate saving because **saving is defined as the portion of income that is not consumed**.
- Because **aggregate saving** feeds through the financial system to create the **national supply of capital**, it follows that aggregate consumption and saving behavior **have a powerful influence** on an economy's long-term productive capacity.
- Second, since **consumption expenditure** accounts for most of the national output, understanding their dynamics is essential to understanding macroeconomic fluctuations and the business cycle.

How are changed consumption and savings over time?



John Maynard Keynes

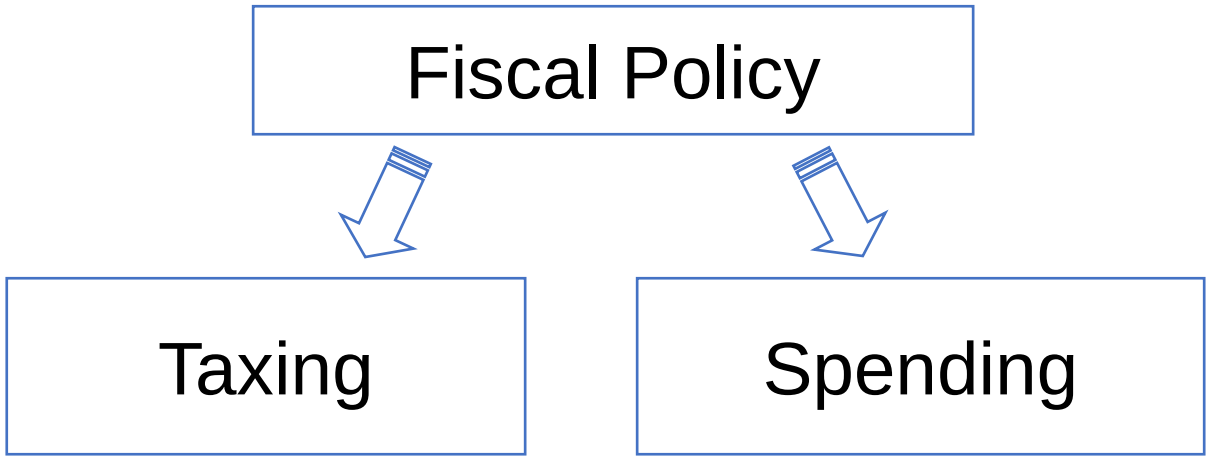


- Author of "The General Theory of Employment, Interest and Money" (1936).
- He is a founder of Macroeconomic analysis.
- Much of the theory of fiscal policy that can affect macroeconomic conditions such as inflation, economic growth, aggregate demand for goods and services, and full employment is derived from his ideas.

Fiscal policy

In economics and political science, **fiscal policy** uses government revenue collection (taxes or tax cuts) and expenditure to influence a country's economy.

The use of government revenue expenditures to influence macroeconomic variables developed in reaction to the Great Depression of the 1930s, when the previous classical approach to economic management became unworkable.



Fiscal Policy

The primary goal of fiscal policy is to help the economy avoid operating at extremes, such as in a recession or out-of-control economic growth, to stabilize the business cycle, and to regulate economic output.

Fiscal Policy

There are six main objectives of fiscal policy:

1. Full employment,
2. Economic growth,
3. Control debt,
4. Control inflation,
5. Re-distribution,
6. Political goals.

- Though fiscal policy is a constant in each country’s economy, it is generally most visible in periods of major economic contraction.
- The Great Depression of 1929, the Great Recession of 2008-2009, and the COVID-19 recession are good examples of the government's aggressive fiscal policy stance by injecting stimulus funds directly to people.
- In those periods, the government financed major job programs to keep working and expanded unemployment benefits to protect potentially impoverished households.

Fiscal Policy

- The Government pursues **Expansionary** or **Contractionary fiscal policy**.
- The former accelerates GDP growth, resulting in more jobs and higher wages for ordinary citizens.

However, this type of fiscal policy also tends to have undesirable effects on interest rates and investment, as well as on the exchange rate and inflation faced by households and businesses, so continued fiscal stimulus becomes less effective over time.

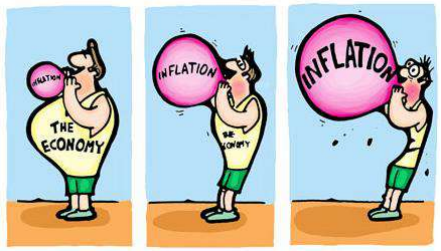
- The second option can slow economic activity, but it can also reduce people's livelihoods and day-to-day spending as hiring tightens and interest rates rise. It could also lead to a recession. But

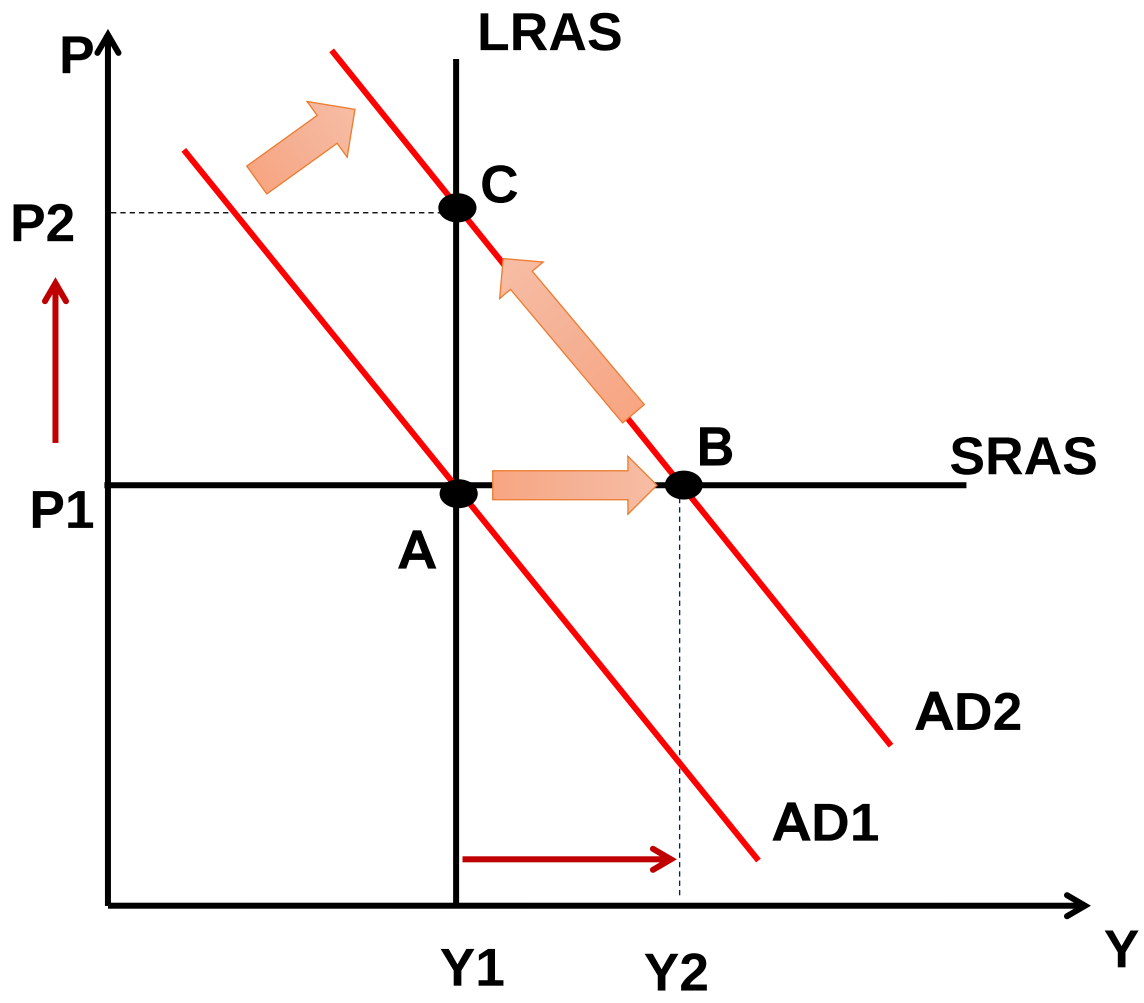
Demand shocks

Demand shock is an unexpected event that causes the aggregate demand curve to shift.
For example, unexpected changes in the bank activity because of:

- Creating new bank equipment like ATMs
- Influence of digitalization
- artificial devaluation of national currency, etc.

As a result, **economic growth (point B)** and **inflation (point C)** happened.

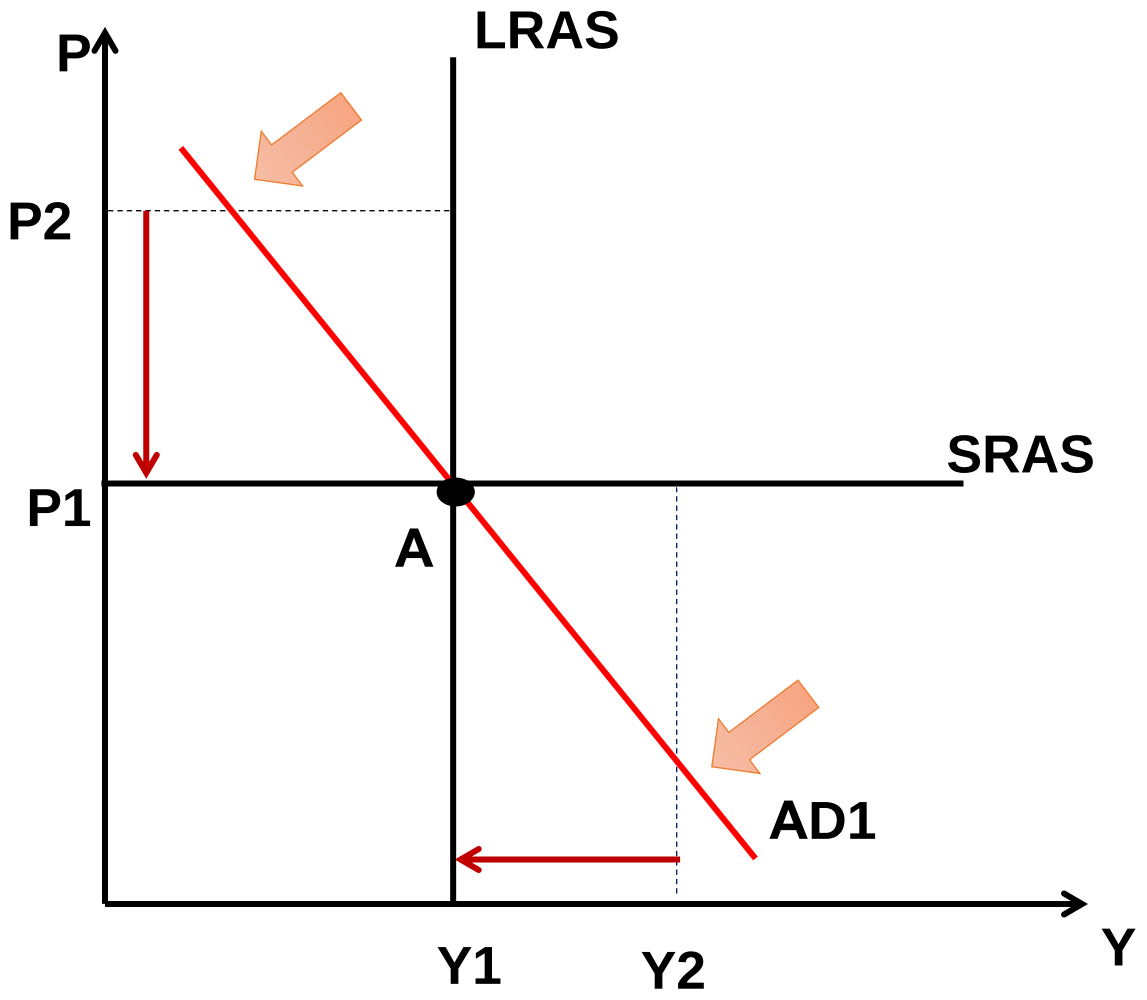




Way of stabilization policy

The first one is "No actions."

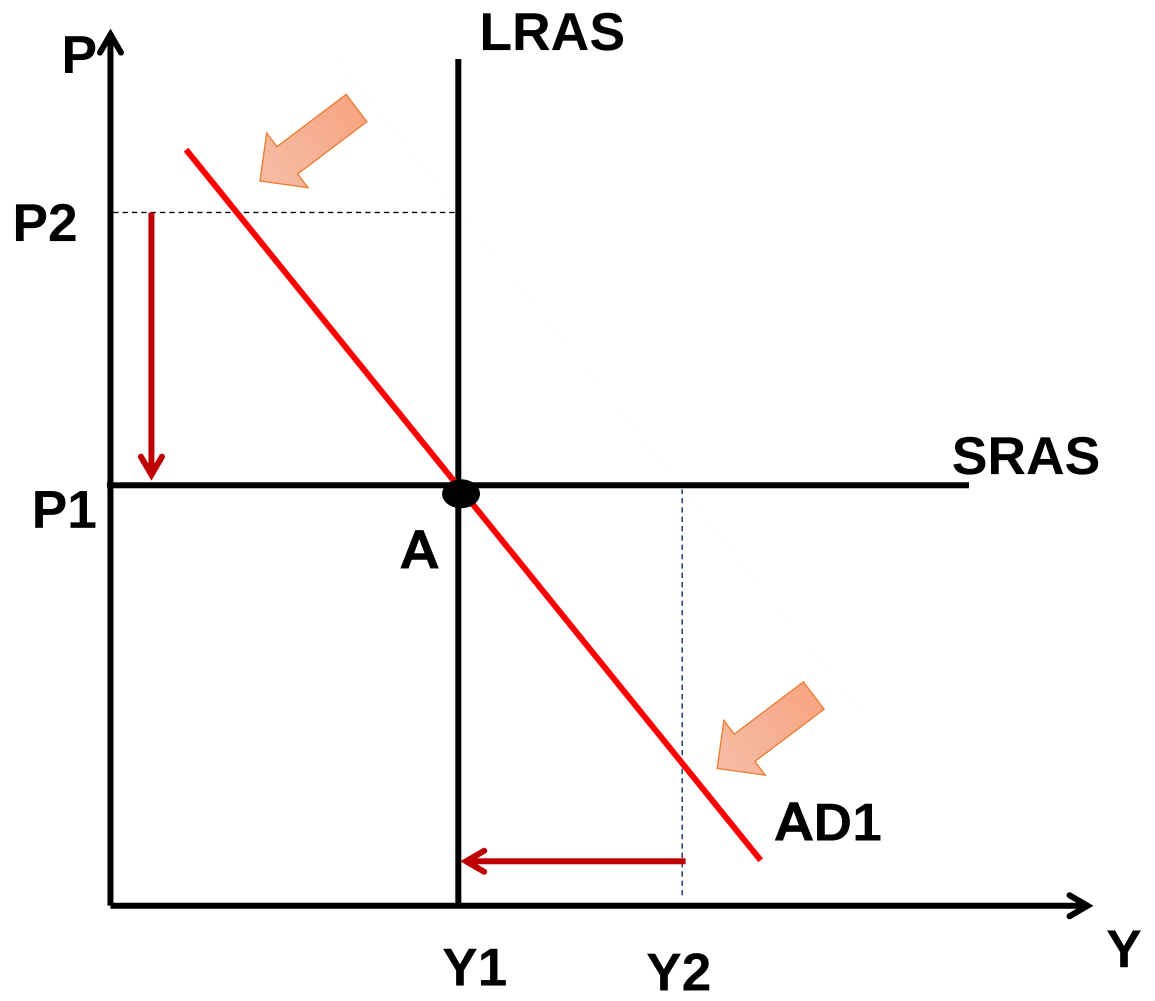
- According to Say's law, demand creates supply (classical approach).
- This means that if aggregate demand is **not stimulated** by monetary or fiscal policy, firms will not produce.
- Since households will not be able to buy more, prices will not remain high for long, and as a result, demand **must fall**.
- Thus, if the money supply does not change in the long run, the AD curve may shift backward.



Way of stabilization policy

The second is "Impact on AD".

- It is carried out through Monetary restrictions that reduce the money supply.
- For this purpose, the Central Bank can use three instruments:
  - reserve requirement (↑).
  - open market operations.
  - discount rate (↑).
- Decrease in the quantity of money to buy goods will lead to a decrease in aggregate demand in general.
- AD curve will shift to its original state, resulting in a decrease in the general price level.

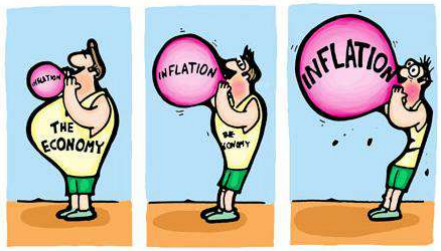


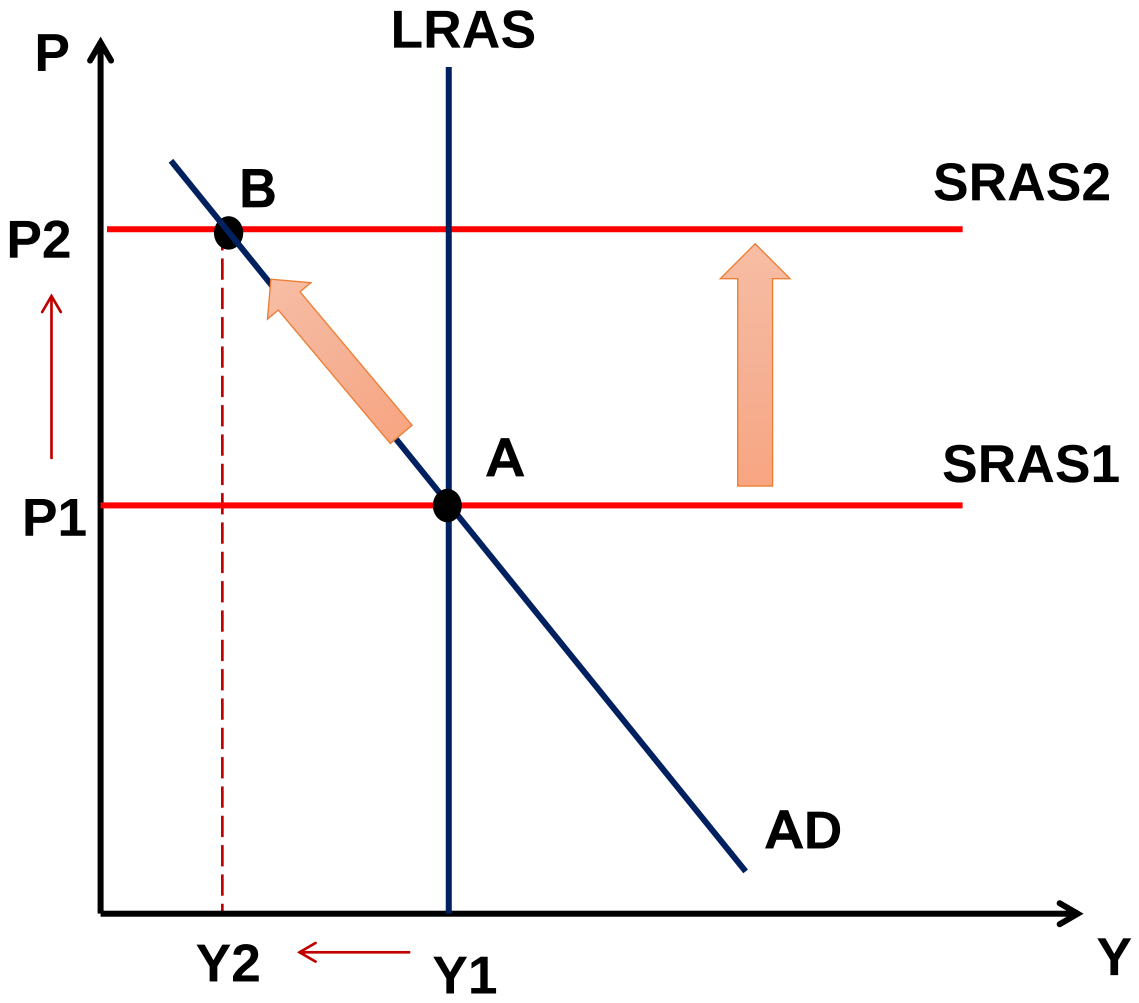
Supply shocks

Supply shock is an unexpected event that causes the short-run aggregate supply curve to shift. For example, unexpected changes:

- In the price of an essential natural resource
- In fiscal policy, etc.

As a result, **stagflation** happens - a combination of inflation and recession.

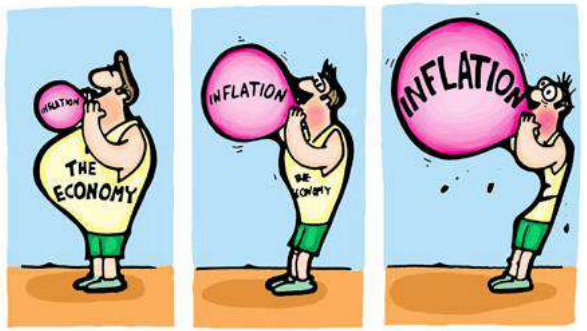




So, what are the ways of stabilization policy?

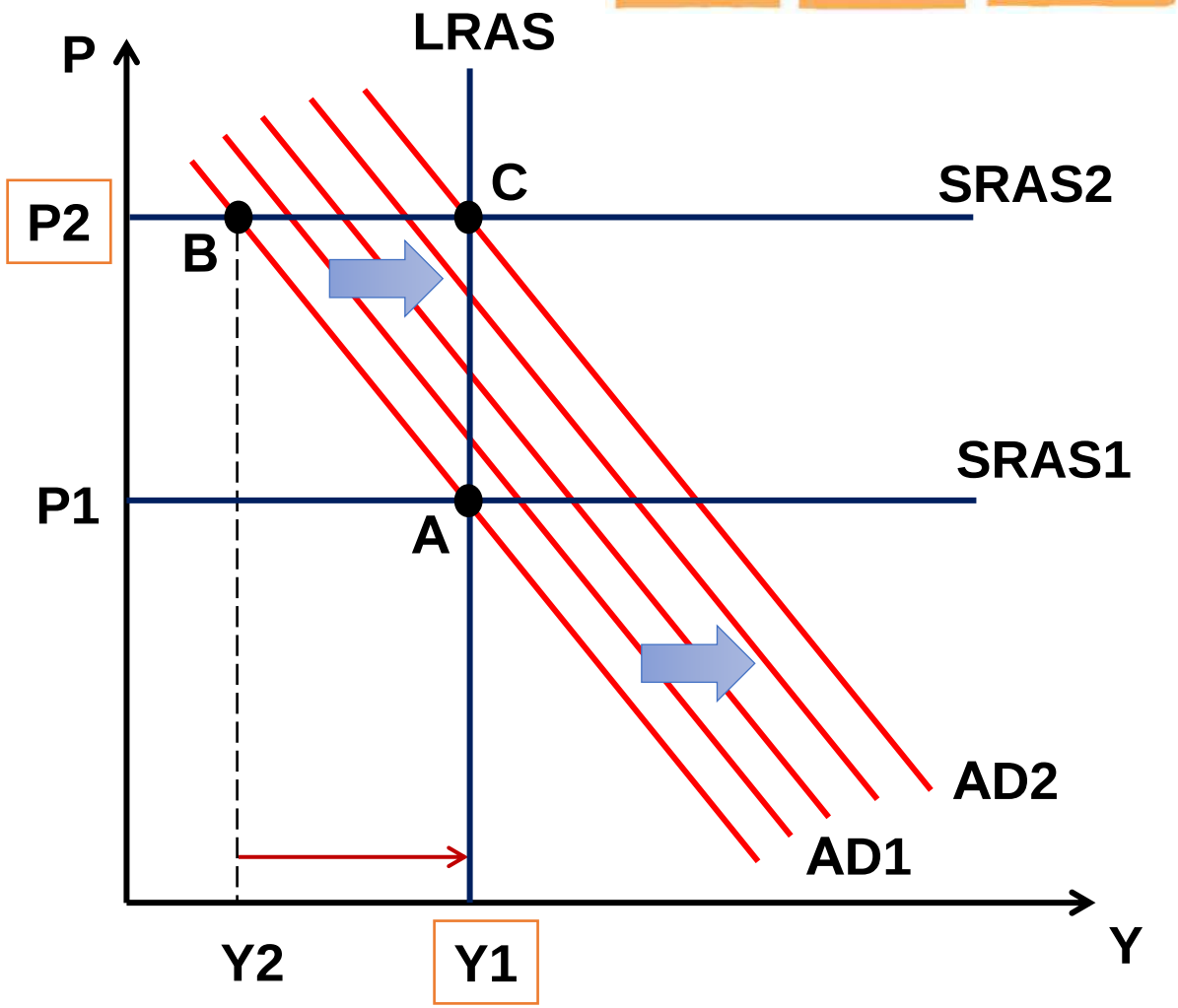
What do we have to do???

Way of stabilization policy



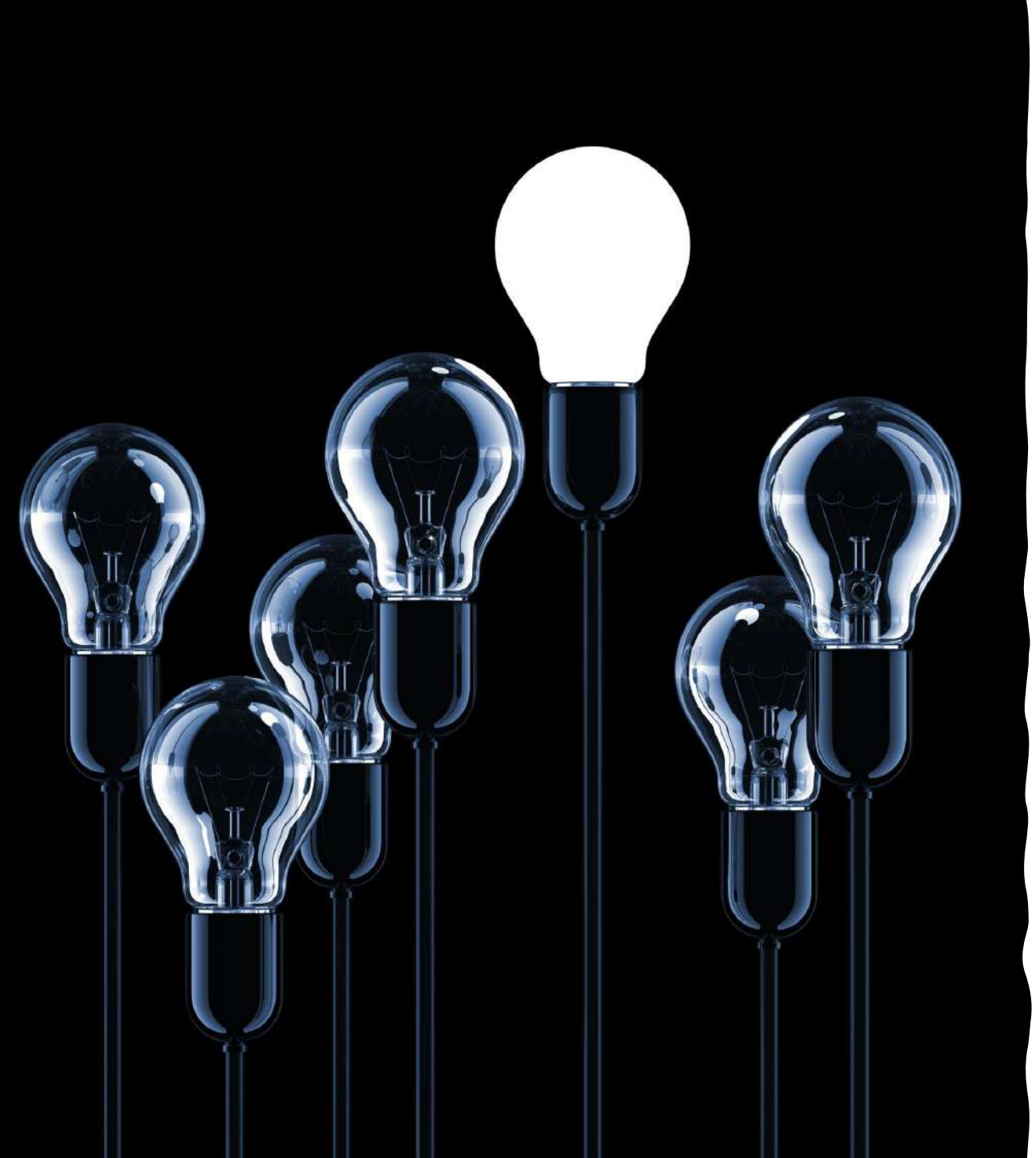
"Impact on AD."

- In this case, it means artificially affecting aggregate demand through expansionary monetary policy.
- An increase in money supply stimulates the purchase of goods, gradually increasing aggregate demand.
- The AD curve will shift to the right and intersect the LRAS curve at **point C**, where output returns to its potential level.
- However, **inflation cannot fall** because of increased aggregate demand.



Classwork

1. Use the stat.gov.kz platform to explore Kazakhstan's statistical database.
2. Find data on AD and AS in Kazakhstan and plot them in a chart where you need to analyze in which years demand or supply shocks occurred in the Kazakh economy.
3. Explain your model’s results.



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 3. Fundamentals of macroeconomic analysis.

Topic 11. Models of the money market and banking system, and their role in the economy.

What is money?

Money is the stock of assets that can be readily used **to make transactions**.

Money is the medium of exchange and the economy's most liquid asset.

Functions of money

Money has **three purposes**:

- It is a **store of value** - people hold money because they can trade it for goods and services at some time in the future.
- It is a **unit of account** - money is the yardstick with which we measure economic transactions.
- A **medium of exchange** - we use money to buy goods and services.

Money supply and monetary policy

The **quantity of money** available in an economy is called the **money supply**.

The **government controls the supply of money**: legal restrictions give the government a **monopoly on the printing of money**.

The government's **control over the money supply** is called **monetary policy.**


BANK

Bank system in Kazakhstan

There are **two levels** in Kazakhstan's bank system.

1. **National Bank** of Kazakhstan
2. **Commercial banks** or banks at the second level

Also, there are **various microfinance organizations** (non-bank entities).

The **National Bank** is the **central bank** of the Republic of Kazakhstan.

The **objective** of the NBK **is to ensure price stability in Kazakhstan.**

Tasks of the National Bank:

- Developing and conducting the monetary policy
- Ensuring the functioning of the payment systems
- Contributing to the stability of the financial system
- Carrying out the statistical activities

National Bank: its functions and role

Structure of money supply in Kazakhstan

M0 = cash
M1 (short money supply) = M0 + domestic deposits, deposits of non-bank legal entities
M2 (broad money supply) = M1 + other domestic deposits and foreign currency deposits
M3 = M2 + domestic deposits in foreign currency, deposits of non-bank legal entities

Deposits are the savings in banks.

Commercial banks

How do banks create new money?

НОМИНАЦИЯ «ЛУЧШИЙ БАНК КАЗАХСТАНА»

Компании с рейтингом выше 7,5 баллов вошли в топ-лучших, но только ОДНА КОМПАНИЯ закрепит за собой право обладать статус-званием «Выбор Страны 2022».

	Оценка за отзывы о компании	Оценка работы колл-центра	Оценка онлайн-ресурсов	Оценка работы приложения	Общий балл по специальной формуле
ForteBank	8,5	9,1	9,5	7,9	8,7
Kaspi.kz	8,3	9,1	8,4	8,4	8,545
ОТБАСЫ БАНК	7,8	9,2	9,3	8,0	8,5
CENTERCREDIT БАНК ТРАДИЦИОННЫХ ЦЕННОСТЕЙ	7,8	9,3	8,5	8,0	8,365
HALYK BANK	8,3	9,0	8,5	7,4	8,29
JUSAN BANK	8,2	8,0	9,0	7,0	8,01
BANKRBK	7,6	8,5	8,6	7,5	8,0
Eurasian Bank	7,7	8,5	8,9	5,9	7,69

Анализ проведен аналитиками «**Выбор Страны**» по авторской технологии «**Человеческих предпочтений**». Включает в себя основные показатели качества, на которые обращают внимание казахстанцы при выборе продуктов и услуг.

В рамках исследования был проведен социальный опрос населения, количество респондентов: **1123**.

Money supply model

There are **three exogenous variables** in a money supply model.

1. **Monetary base**: $B = C + R$

Controlled by the central bank.

where ***B*** – monetary base
C – currency
R – reserves

2. **reserve-deposit ratio** – $rr = R/D$

Depends on the central bank's regulation.

3. **currency-deposit ratio** – $cr = C/D$.

Depends on the Household's preferences.

Money supply model

Money supply: $M = C + D$ $(C = cr \cdot D)$

where: ***C*** – currency/cash;
D – deposits;
cr – currency-deposit ratio.

$$M = B \cdot m$$

where: ***B*** — monetary base,
m — money multiplier.

Money multiplier

The **money multiplier** is a coefficient that describes the relationship between the money supply and the monetary base:

$$m = M / B.$$

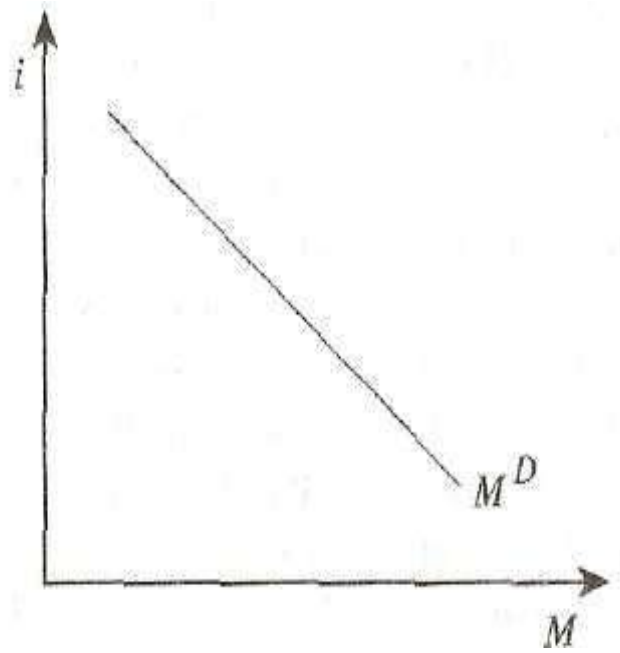
Thus, the money multiplier (***m***) can be defined as the ratio of the money supply (***C+D***) to the monetary base (***C+R***):

$$m = (C+D) / (C+R) = (1 + cr) / (rr + cr)$$

Money demand model

The **money demand** is the demand for the actual quantity of money.
It is inversely related to the economy's general price level (***P***).
The following formula determines the deman for actual money

$$M^d = (M/P)^d.$$



where: ***M*** - the nominal quantity of money;
P - price index or general price level.

Money demand model: Keynes's theory

J.M. According to Keynes' theory, economic actors express demand for money for **three reasons**:

1) Transactional motive. Money is needed for purchases.
2) Savings motive. Money needs to be saved for unforeseen situations.
3) Speculative motive. Because money serves the function of preserving value.

Aggregate* money *demand depends on **aggregate income** (***Y***) and the interest rate (***i***) in the financial market:

$$M^d = L(Y, i),$$

where ***L*** is the liquidity choice function.

The money demand model: a classical approach

The quantitative theory of money says the following: *the money supply determines the price level in the country*. In other words, the price level will also increase if the money supply increases.

Fisher's equation is used in the quantitative theory of money:

$$MV=PY.$$

The equation of the quantitative theory of money can be expressed as a percentage formula:

$$\Delta M\% + \Delta V\% = \Delta P\% + \Delta Y\%$$

If ΔV % = 0 and ΔY % = 0, as a result ΔM% = ΔP%, where ΔP% is an inflation

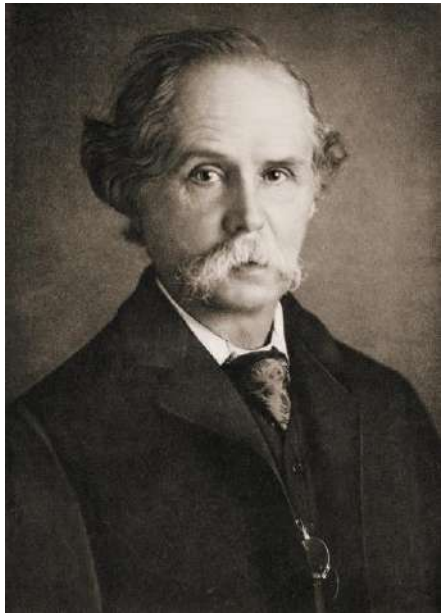
The money demand model: a classical approach

Economists of the Cambridge school (A. Marshall, A. Pigu, D. Robertson) proposed the Cambridge version of the Fisher equation: **M = k·PY,** where k is the inverse of the money circulation rate.

k is also called the coefficient of monetization or the indicator of saturation of the economy with money.

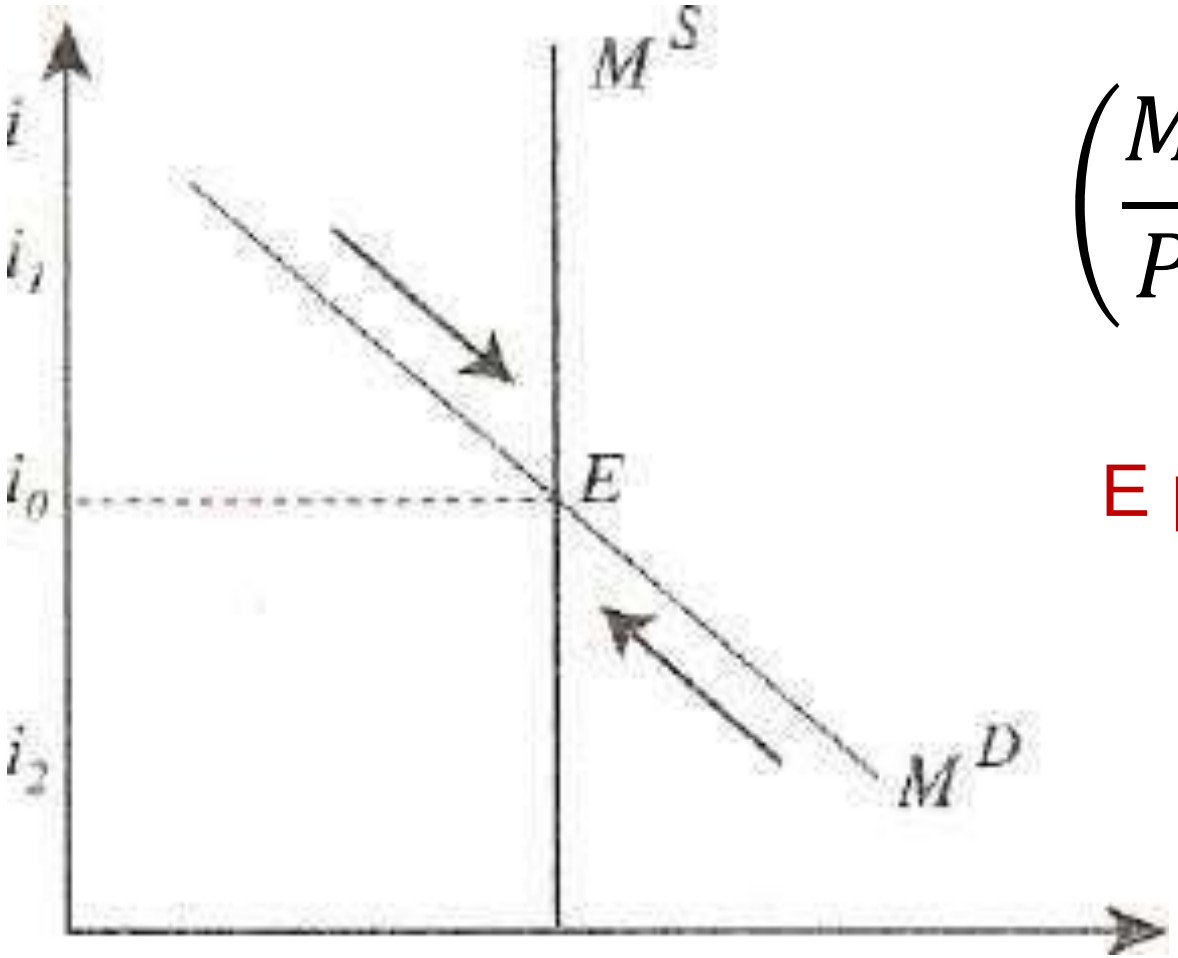
The money demand model is formed from the following two equation systems:

UNIVERSITY OF CAMBRIDGE



$$\begin{cases} \left(\frac{M}{P}\right)^{D} = k \cdot Y, k = const; \\ \left(\frac{M}{P}\right)^{D} = L(r, Y). \end{cases}$$

Model of the equilibrium on the money market



The equilibrium equation is below.

$$\left(\frac{M}{P}\right)^D = \left(\frac{M}{P}\right)^S \; or \; L(r,Y) = \frac{M}{P}$$

E point is the equilibrium point on the money market.

Monetary policy's ways

Discretionary (flexible) monetary policy is based on maintaining the dependence of business activity on the medium-term phase of the economic cycle.

In theory, such a policy is based on the Keynesian view of the role of a stable state in managing aggregate demand.

In addition, there is a non-discretionary or "rules-based" monetary policy.

Discretionary policy: money expansion

Discretionary expansionary policy is a cheap money policy used when output falls.

It is based on the Keynesian transmission mechanism in the economy, which decreases or increases depending on the money supply.

In brief, the sequential change in the macroeconomic variable under **«the cheap money» policy** is as follows:

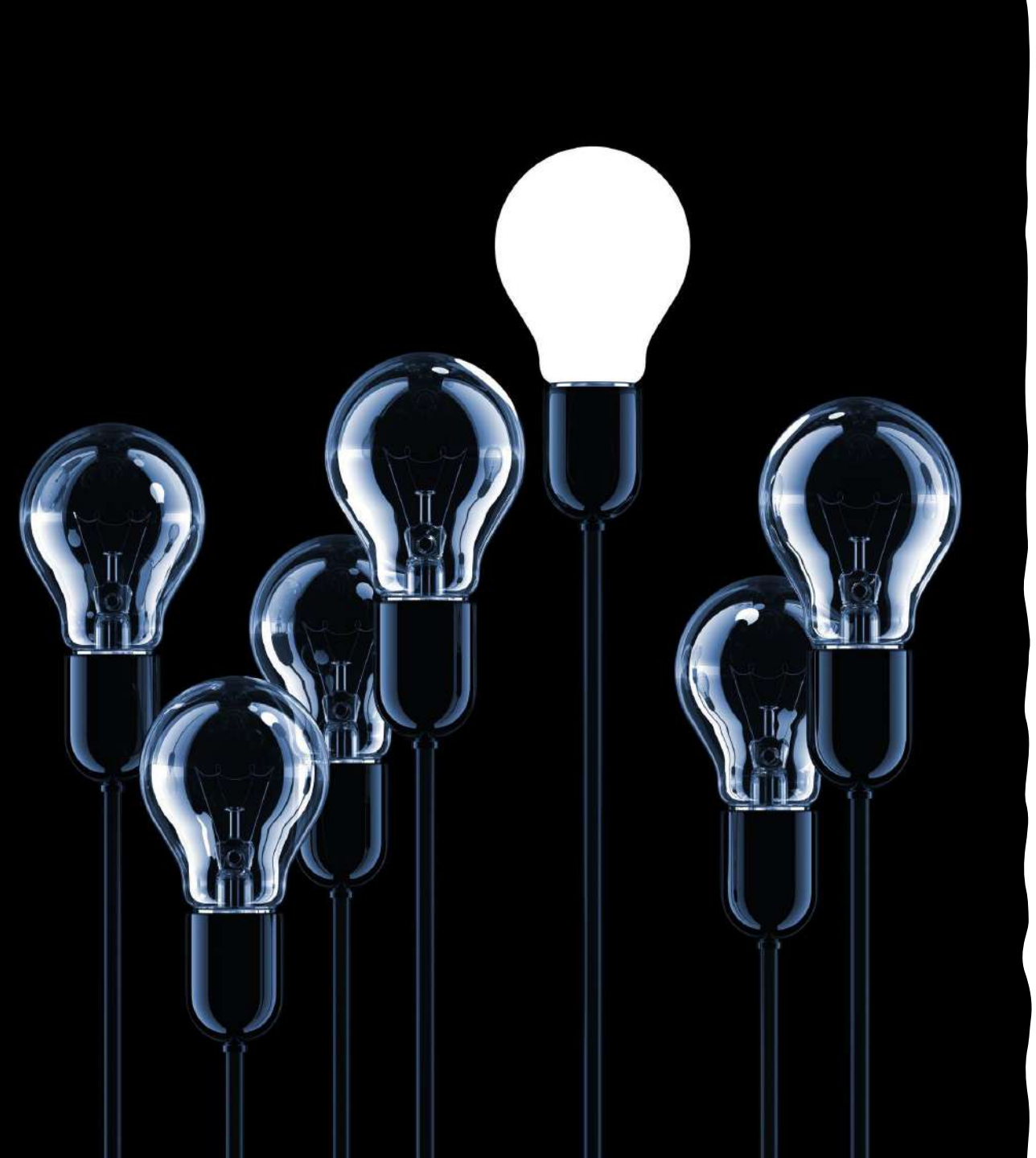
$$Ms\uparrow \rightarrow i\downarrow \rightarrow I\uparrow \rightarrow AD\uparrow \rightarrow Y\uparrow.$$

Discretionary policy: money restrictions

Conversely, **restrictive monetary policy**, or the **policy of "expensive money,"** is applied in conditions of economic recovery accompanied by inflation.

The transmission mechanism will look as follows:

$$Ms\downarrow \rightarrow i\uparrow \rightarrow I\downarrow \rightarrow AD\downarrow \rightarrow Y\downarrow$$



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 3. Fundamentals of macroeconomic analysis.

Topic 12. Model of inter action between commodity and money markets: concepts, equations, and conclusions.

Keynesian economic theory questions the mechanism of market self-regulation laid down in the classical theory.

One of the reasons for this is the **mismatch of plans I and S**, which are carried out by different economic agents for different motives and determined by different factors.

Motives for investment by firms:

1) Maximization of net profit margin;
2) The actual interest rate (the fee for acquiring money capital for investment) is considered when making investment plans

The **motives for household savings** are:

1) Purchase of expensive goods;

2) Provision in old age;

3) Insurance in case of unforeseen circumstances (illness, accident, etc.);

4) Provision for children for the future

Factors determining the dynamics of consumption and savings

1) Household income;
2) Wealth accumulated in the household;
3) Price level;
4) Economic expectations;
5) The amount of consumer debt;
6) Level of taxation.

Consumption function

According to Keynesian theory, household **Disposable Income** (DI) is the main factor determining the dynamics of C and S.

The simple consumption function is

$$C = a + b\,(Y - T).$$

where ***a*** - autonomous consumption,
b - MPC, ***(Y - T)*** is disposable income.

2. Marginal Propensity to Consume (MPC) is the proportion of the increase in spending on consumer goods and services to any change in disposable income.

$$MPC = \Delta C \,/\, \Delta DI$$

3. Average Propensity to Consume (APC) is the proportion of disposable income households spend on consumer goods and services.

$$APC = C \,/\, DI$$

Savings function

A simple **savings function** is of the form:

$$S = -a + (1 - b)(Y - T).$$

Marginal propensity to save (MPS) is the proportion of the increase in savings to any change in disposable income.

$$MPS = \Delta S / \Delta DI$$

Average propensity to save (APS) is the proportion of disposable income that households save.

$$APS = S / DI$$

$$MPC + MPS = 1$$

Main types of investments

1. Production investment;
2. Investments in inventories;
3. Investments in housing construction.

Investment function

The simple **function of an autonomous investment** is of the form:

$$I = e - dR$$

where **I** - investment

e - autonomous investment

d - elasticity of investment demand

R - actual interest rate

Factors determining the dynamics of investment

1) Expected rate of net return;
2) Real interest rate;
3) The level of taxation;
4) Changes in production technology;
5) Money stock of fixed capital;
6) Economic expectations;
7) Dynamics of aggregate income.

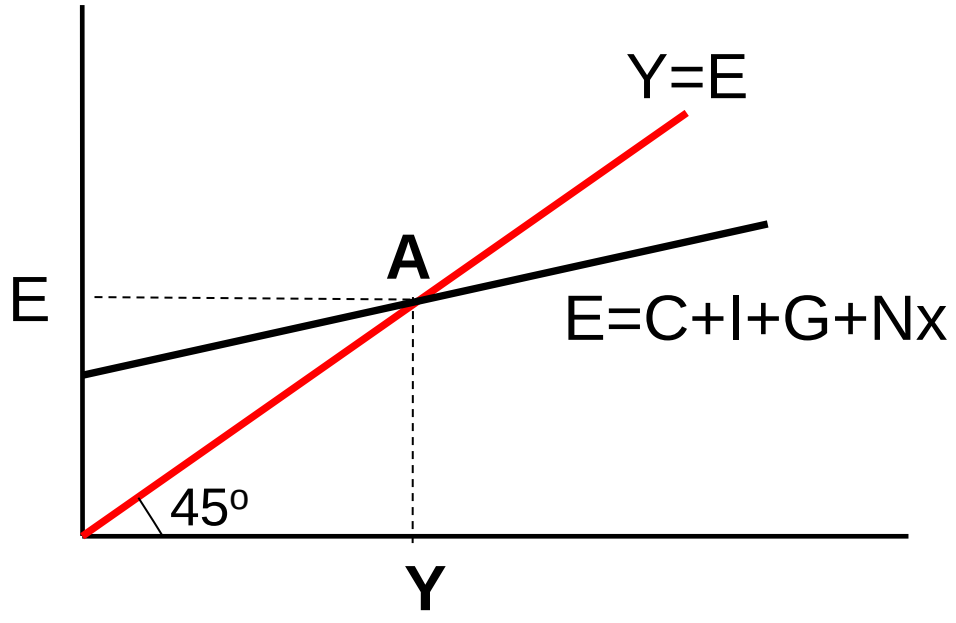
Model of the Keynesian cross

At point A, a Keynesian equilibrium is established.

Actual investment includes both planned and unplanned investments.

Planned expenditure is the amount that households, firms, government, and the rest of the world **plan to spend** on goods and services.

Unplanned expenditure represents unplanned changes in investment in inventories.



The planned expenditure function $E = C + I + G + Xn$.

The autonomous expenditure $A = (a + I + G + g)$ consist the net export function: $Xn = g - m'Y$

The marginal propensity to import is the share of the increase in expenditure on imported goods in any change in income: $m' = \Delta M / \Delta Y$.

Commodities market

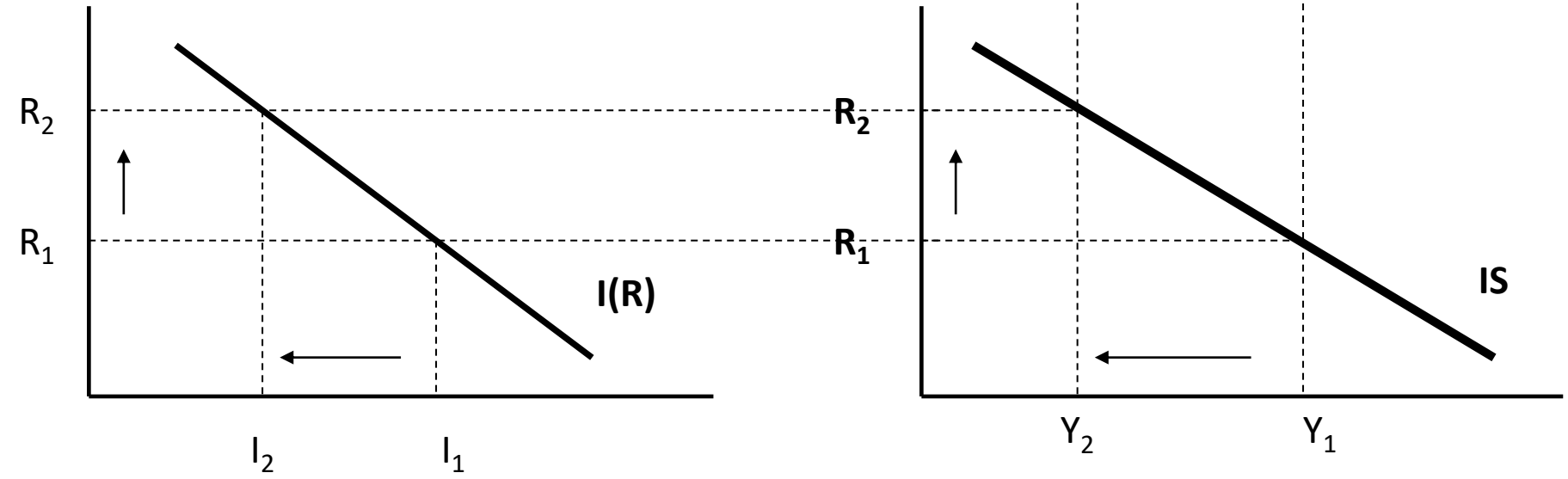
Keynesian cross model is the basis for deriving the IS curve.

R↑ → I↓ → I↓ → E↓ → Y↓

The **IS curve is an equilibrium curve** in the commodity market.

It shows the inverse relationship between aggregate income Y and the actual interest rate R.

IS curve derivation diagram

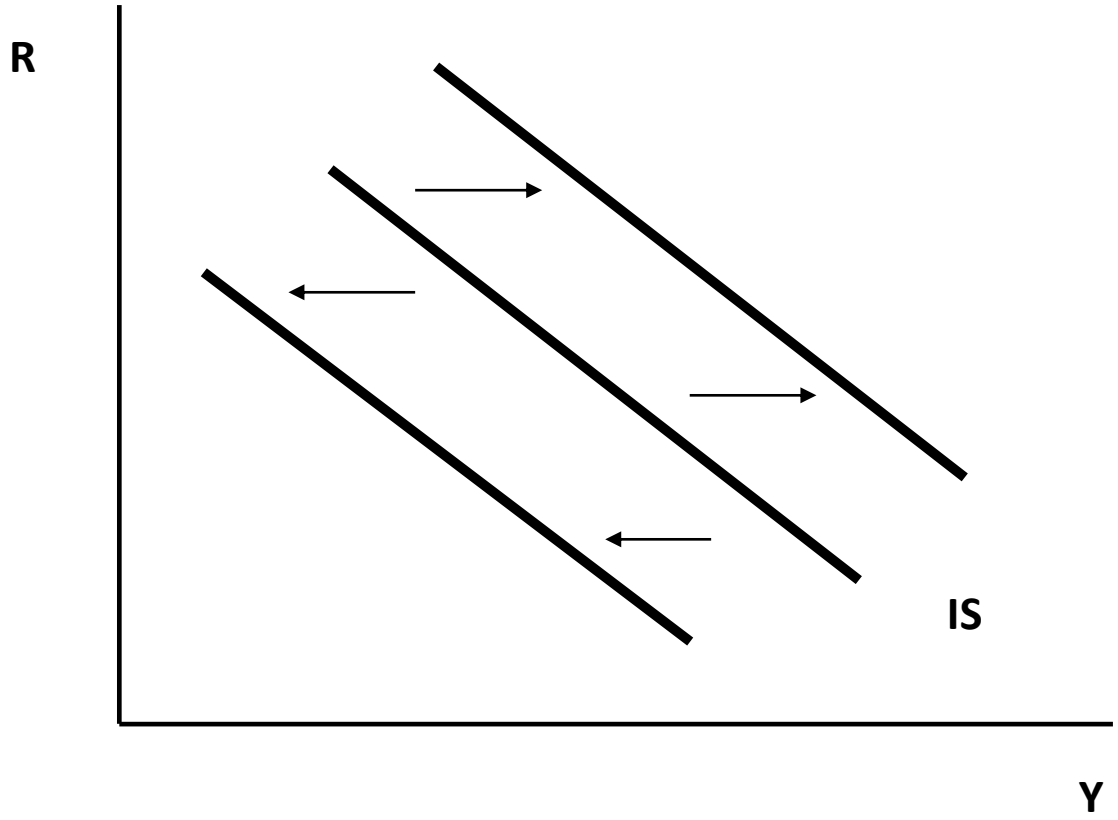


Fiscal policy in the commodity market

Under the **influence of fiscal policy**, the IS curve shifts to the left or right:

Expansionary fiscal policy:
G↑,T↓ → IS curve shifts to the right

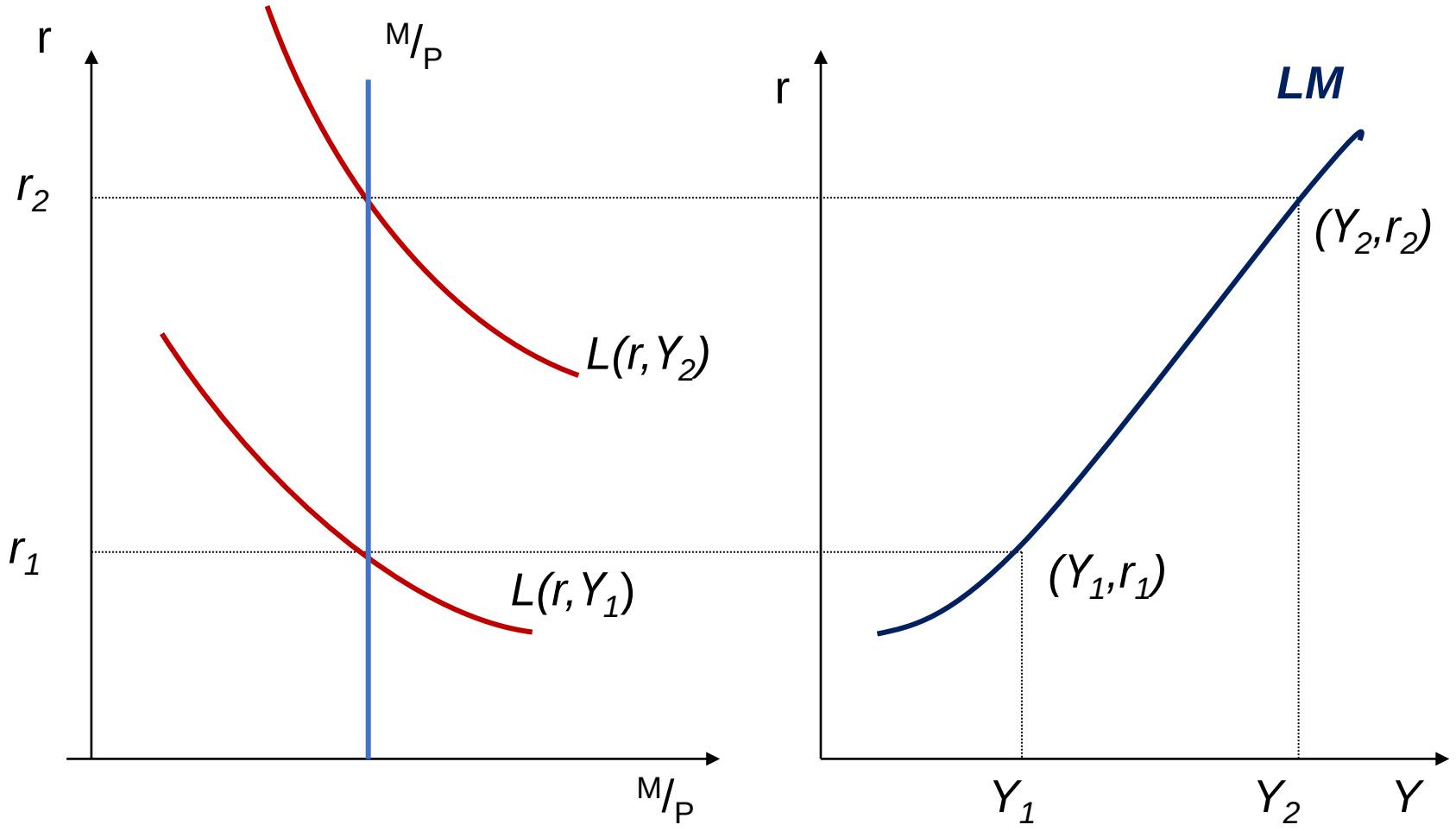
Restrictive fiscal policy:
G↓,T↑ → IS curve shifts to the left



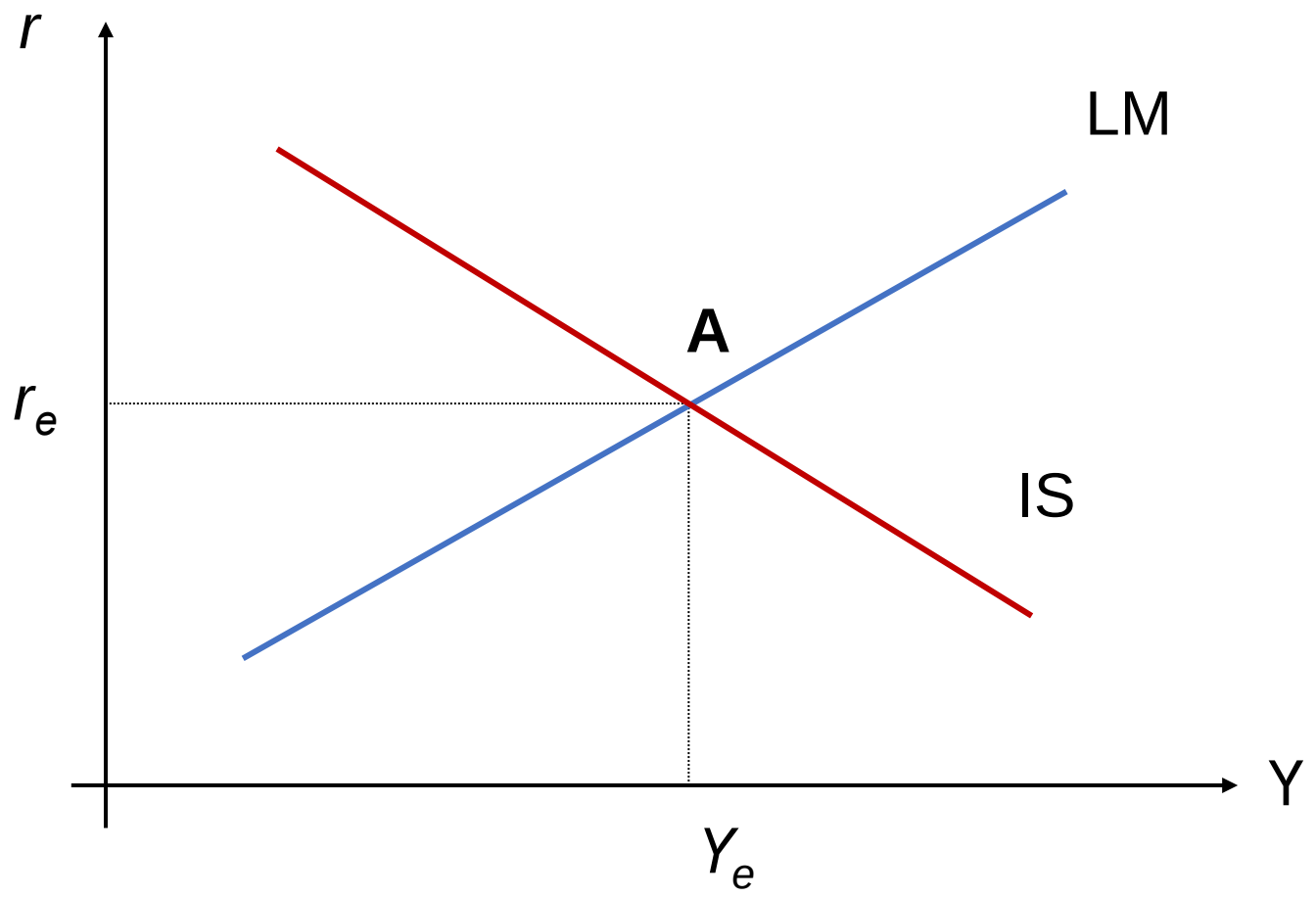
The effect of fiscal policy on the IS curve is expressed as a multiplier effect on the economy.

There are the multipliers of fiscal policy and government spending.

Derivation of the LM curve on the money market



Equilibrium in the commodity and money markets

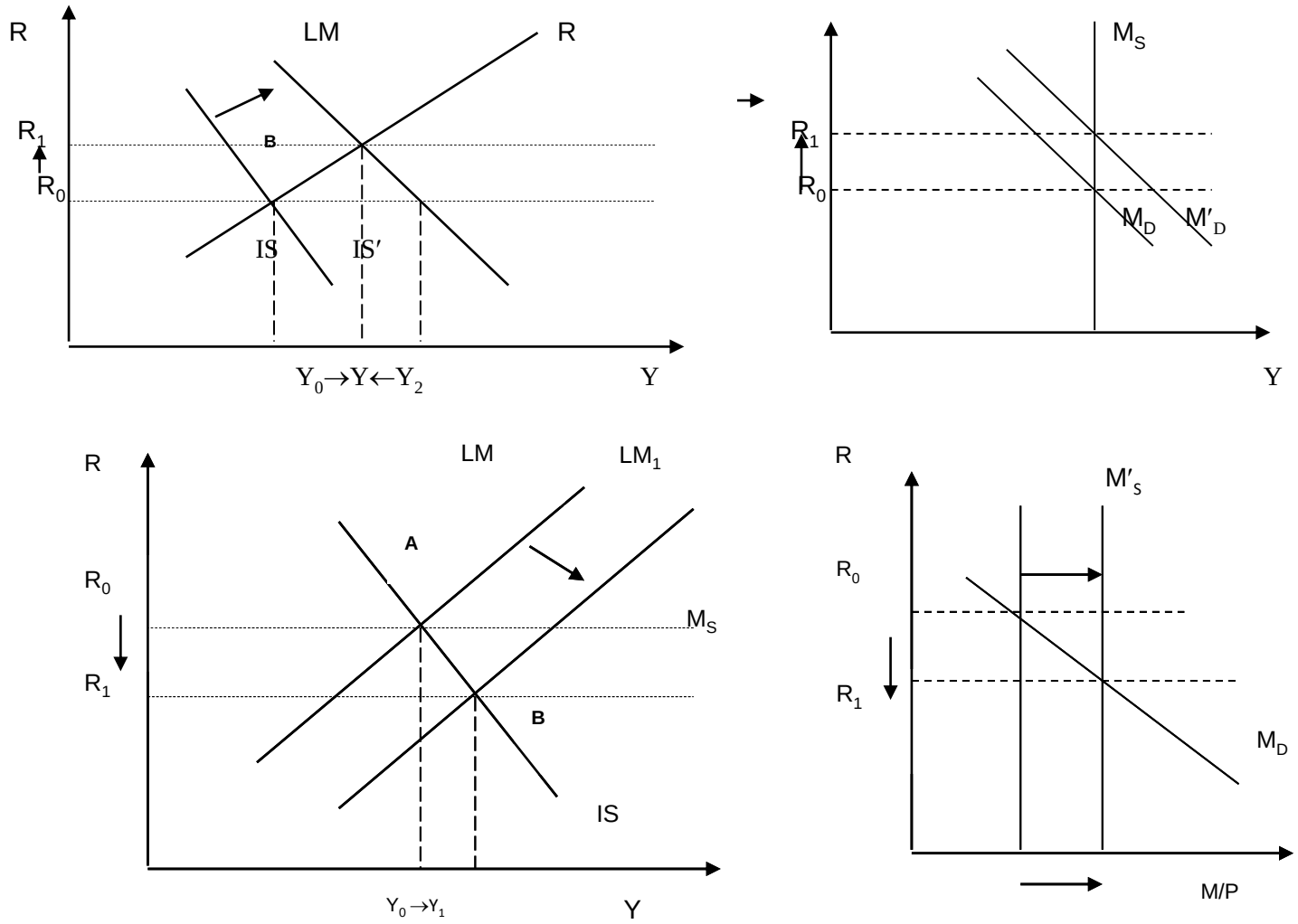


The **IS-LM model** is a model of **commodity-monetary equilibrium** that defines the aggregate demand function in Keynesian theory.

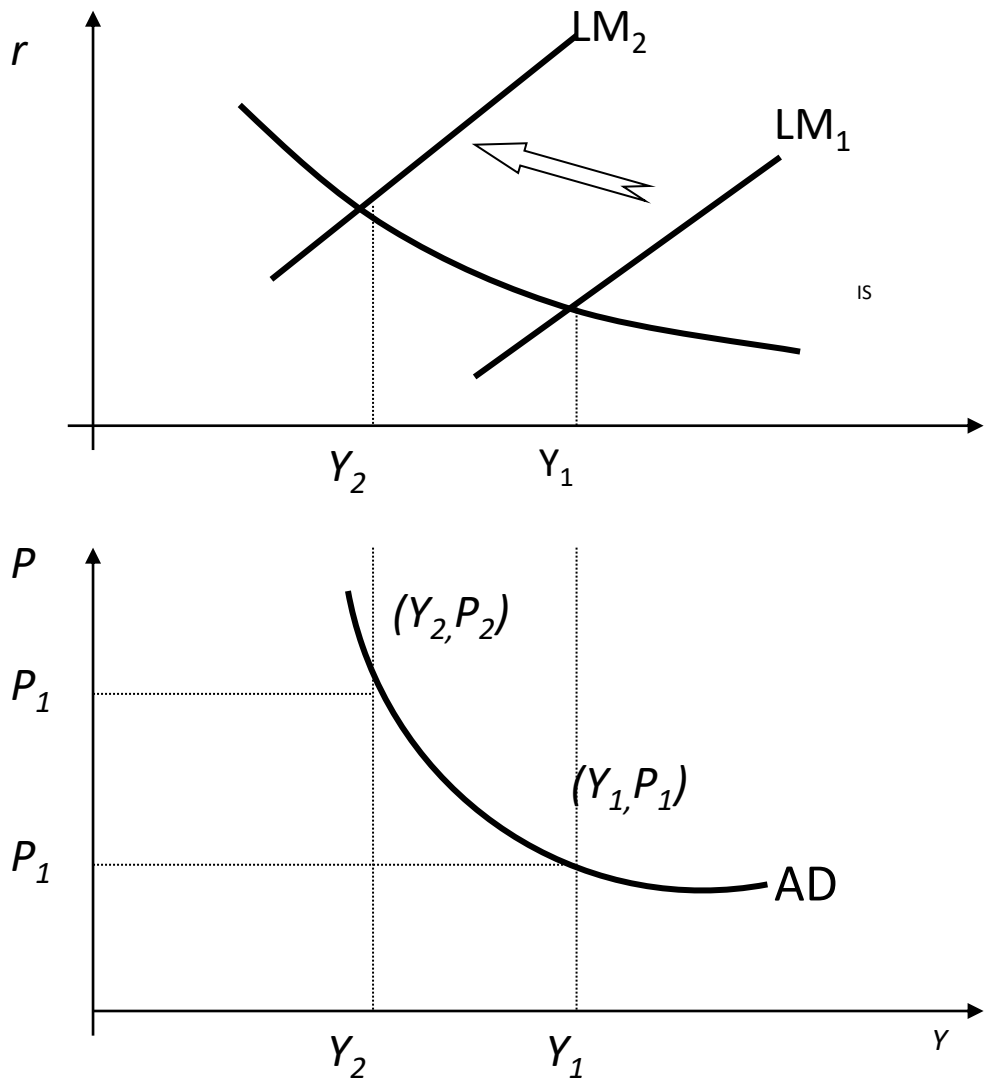
IS defines equilibrium in the goods market.

LM defines equilibrium in the money market.

Analyzing changes in the IS-LM model



Deriving the aggregate demand curve from the IS-LM model

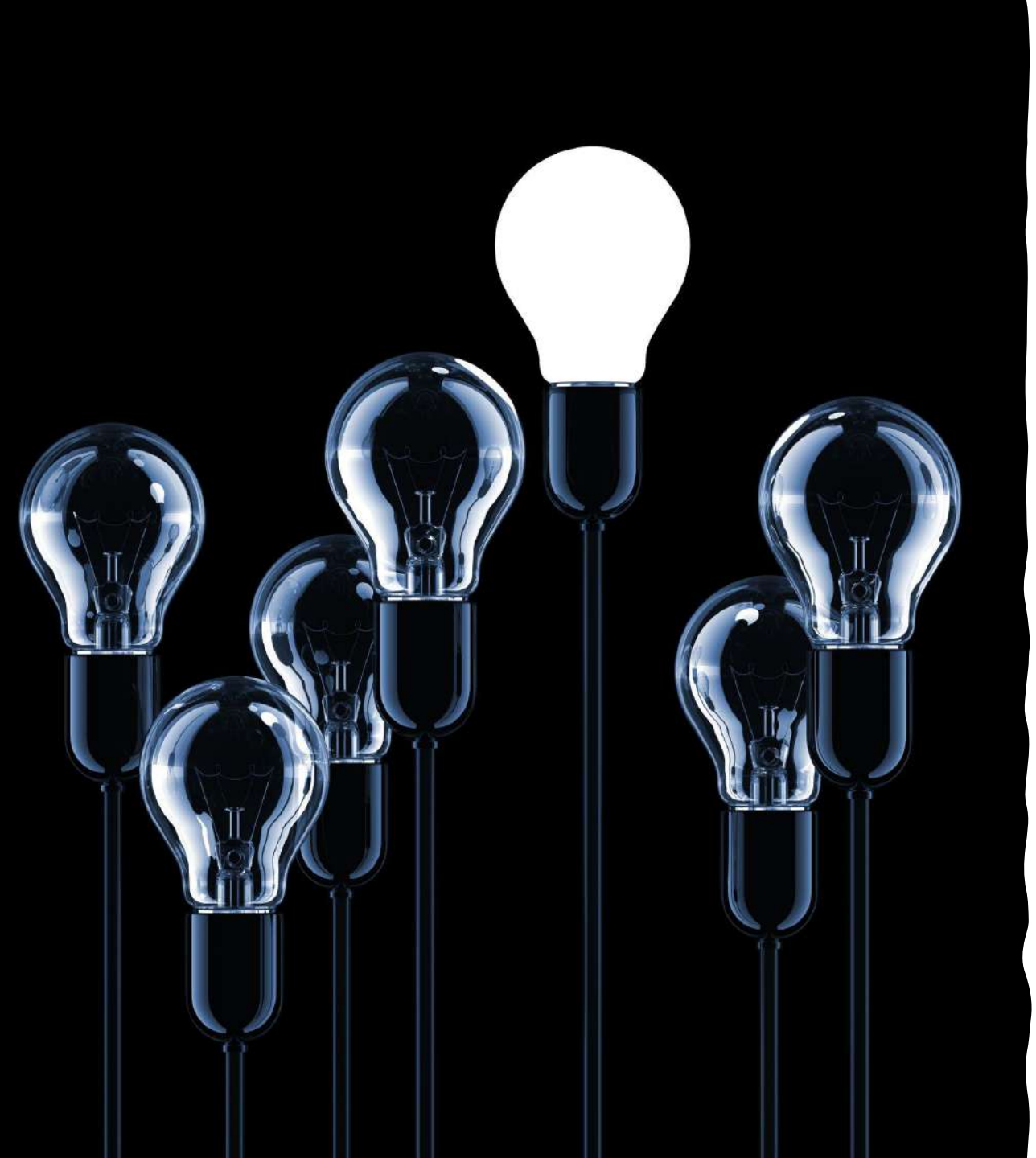


P↑ → (M/P)↓ →

R↑ → I↓ → Y↓

Classwork

1. Essay “Analyzing the effectiveness of interaction of fiscal and monetary policies in the country.”.
2. At least 200 words.



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 4.
Model of sustainable economics

Topic 13. Balance of payments model and trend analysis of FDI and ESG for the home country

Lecture Plan

1. Balance of payments.
2. Exchange rate and Mandell-Fleming model.
3. Trend analysis of FDI and ESG

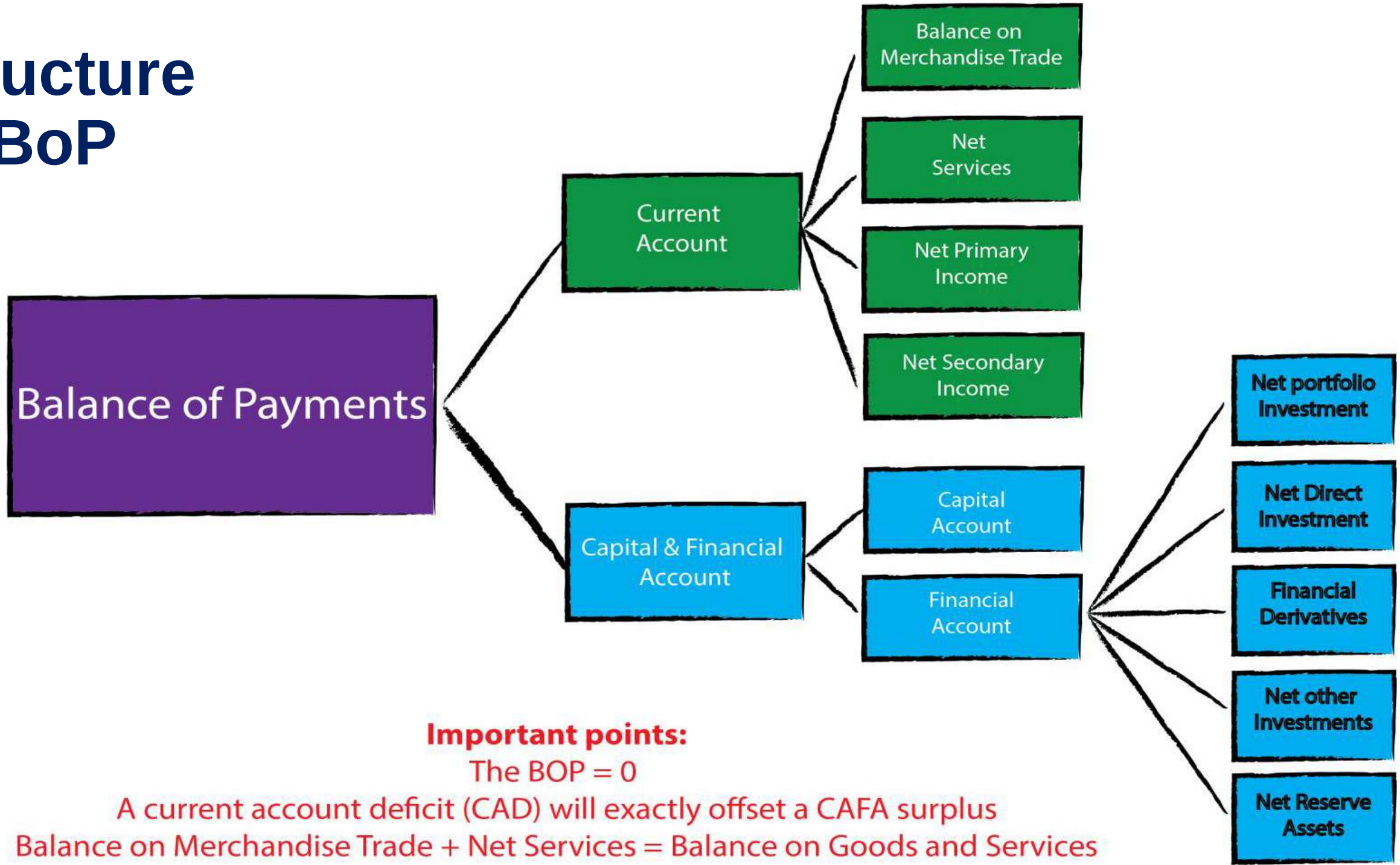
The **balance of payments (BoP) records all international trade and financial transactions** a country's residents make.

The BoP has three components:

- The **current account** measures international trade, net income on investments, and direct payments.
- The **financial account** describes the change in international ownership of assets.
- The **capital account** includes other financial transactions that don't affect the nation's economic output.

Note. The last two accounts usually are combined into one.

Structure of BoP



Important points:

The BOP = 0

A current account deficit (CAD) will exactly offset a CAFA surplus

Balance on Merchandise Trade + Net Services = Balance on Goods and Services

A country's balance of payments tells you whether it saves enough to pay for its imports.

It also reveals whether the country produces enough economic output to pay for its growth.

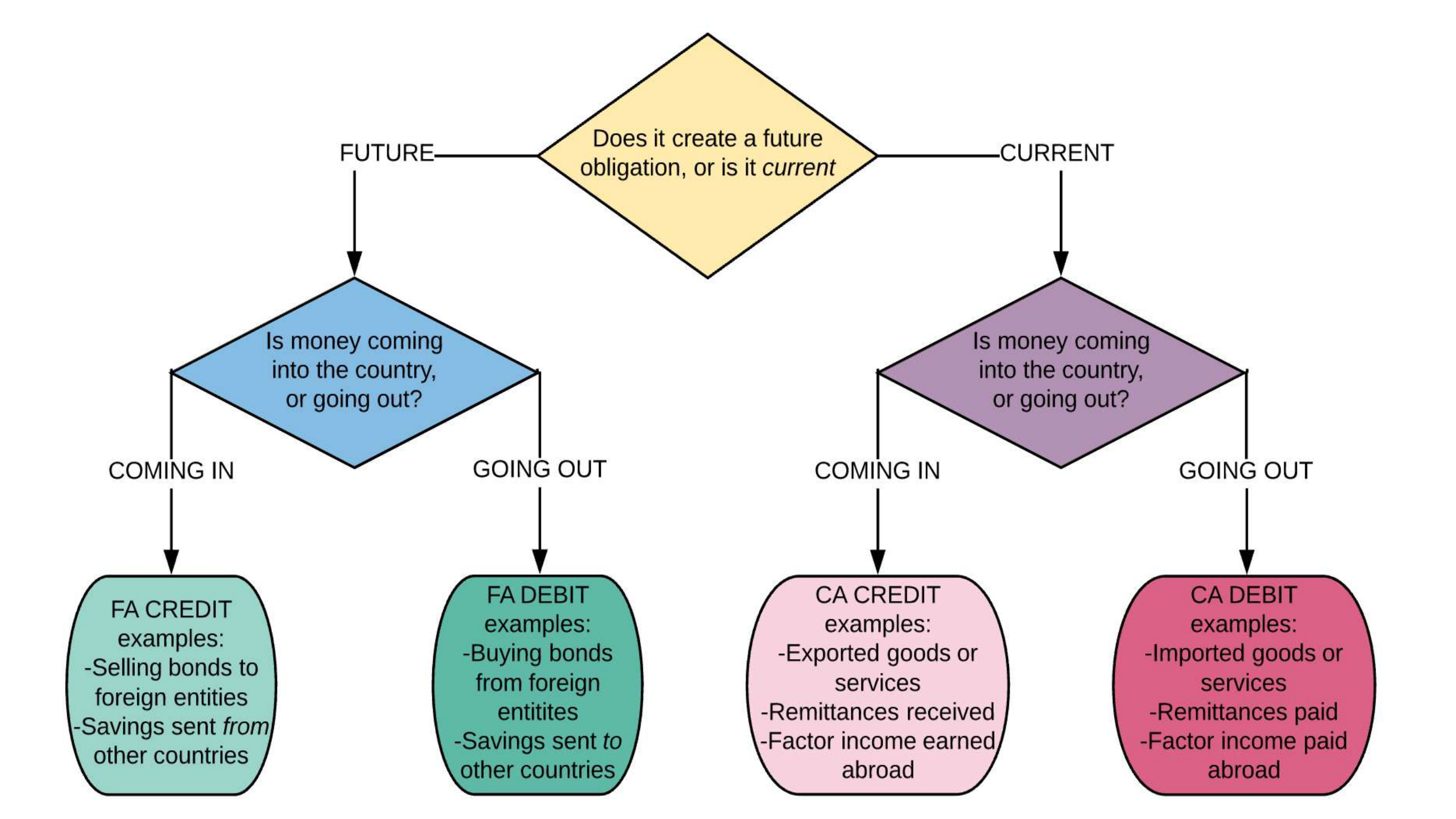
Note

A balance of payments **deficit** means the *country imports more goods, services, and capital than it exports*.

It must borrow from other countries to pay for its imports.

- All trades conducted by both the **private and public sectors** are accounted for in the BoP to determine *how much money is going in and out of a country*.
- If a country has received money, this is known as a **credit**, and if a country has paid or given money, the transaction is counted as a **debit**.

Theoretically, credit shall be equal to a debit.

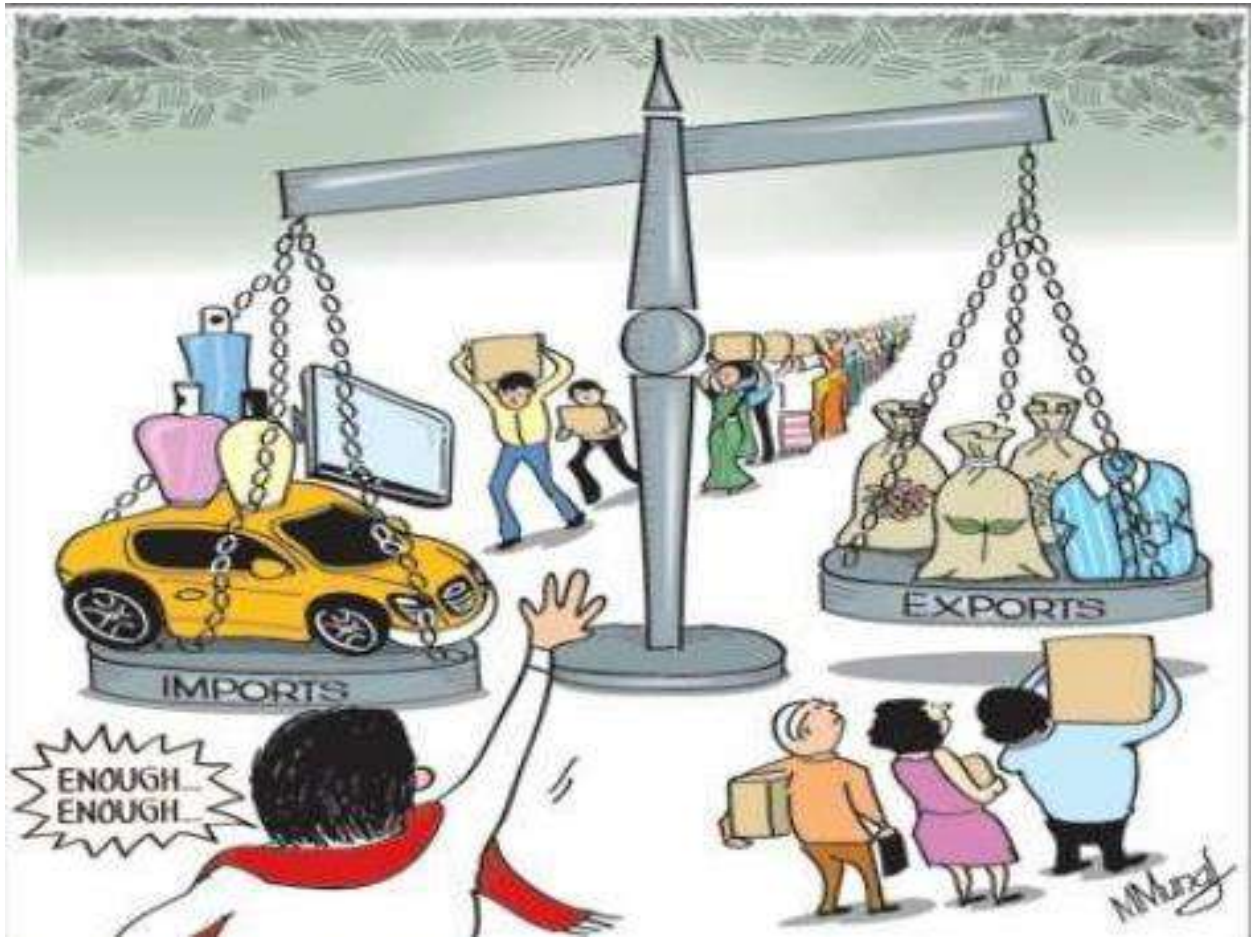

Does it create a future obligation, or is it *current*
FUTURE
CURRENT
Is money coming into the country, or going out?
Is money coming into the country, or going out?
COMING IN
GOING OUT
COMING IN
GOING OUT
FA CREDIT examples:
-Selling bonds to foreign entities
-Savings sent *from* other countries
FA DEBIT examples:
-Buying bonds from foreign entitites
-Savings sent *to* other countries
CA CREDIT examples:
-Exported goods or services
-Remittances received
-Factor income earned abroad
CA DEBIT examples:
-Imported goods or services
-Remittances paid
-Factor income paid abroad

Rules for reflecting international economic operations in the balance of payments of credit and debit

Operation	credit (+)	debit (-)
Goods and services	Export of goods and services	Import of goods and services
Income from investments and pay for work	Revenues from non-residents	Payments to non-residents
Transfers	Receiving funds	Transfer of funds
Transactions in financial assets	Getting long-term and short-term loans	Providing long-term and short-term loans

Theoretically, the BoP should be **zero**, meaning that **assets** (credits) and **liabilities** (debits) should **balance**, but this is rarely the practice case.

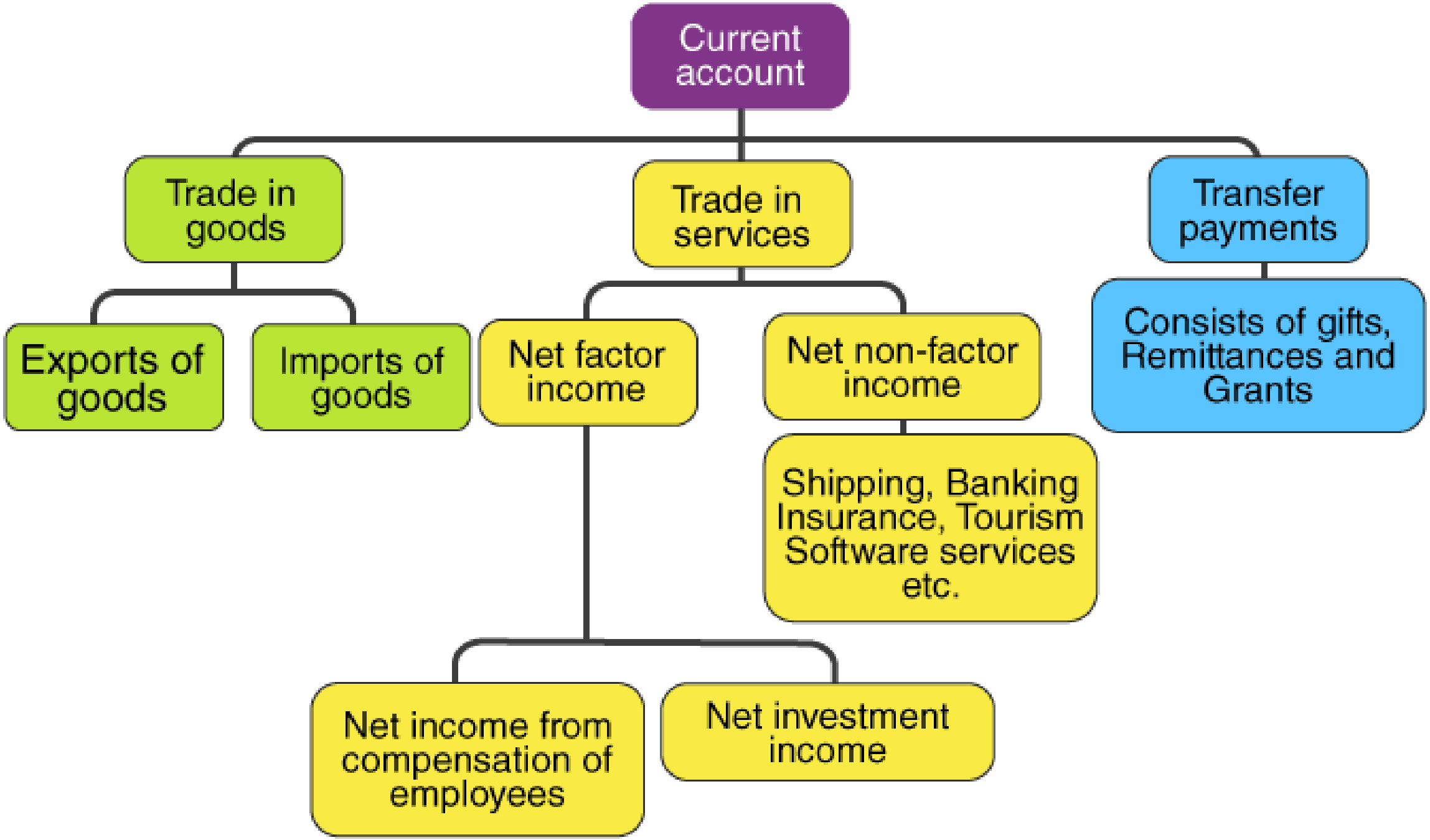
Thus, the BoP can tell the observer if a country has a deficit or a surplus and from which part of the economy the discrepancies are stemming.



Generalized balance of payments structure

I. Current account	
1. Export of goods	2. Import of goods
Foreign trade balance (trade balance)	
3. Export of services (income from foreign tourism, etc., excluding credit services)	4. Import of services (payments for tourism abroad, etc., excluding credit services)
5. Net factor income from abroad	
6. Net current transfers	
Current account balance	
II. Capital and financial transactions account Change in official reserves	
7. Capital inflow	8. Capital outflow
Balance of capital flows and financial transactions	
Balance of the current, capital and financial transactions	

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Current Account	2 628,6	4 527,2	-2 852,7	-9 979,5	-6 964,6	-3 426,7	-1 765,7	-7 027,7	-10 960,4	-2 671,8	7 078,7
Trade balance	40 218,6	38 533,3	27 652,6	7 715,9	10 470,4	18 468,3	24 038,4	18 420,8	6 009,0	24 228,1	34 983,8
Exports	86 876,3	87 699,2	70 106,3	41 647,4	37 021,6	49 469,5	59 025,3	59 541,4	44 065,1	65 790,6	85 613,1
Imports	46 657,7	49 165,9	42 453,8	33 931,5	26 551,1	31 001,2	34 986,9	41 120,7	38 056,1	41 562,5	50 629,3
Services	-8 913,6	-8 112,9	-6 843,5	-4 777,0	-3 812,6	-3 653,2	-4 761,7	-3 786,7	-3 237,4	-2 099,5	-1 550,1
Exports	5 430,9	5 970,6	7 002,5	6 177,4	6 084,5	6 504,9	7 319,9	7 754,3	5 208,3	5 935,0	7 967,9
Imports	14 344,5	14 083,5	13 845,9	10 954,4	9 897,1	10 158,1	12 081,6	11 541,0	8 445,7	8 034,6	9 518,1
Primary income	-28 117,1	-25 147,7	-22 701,2	-11 617,9	-13 449,7	-18 138,5	-21 960,6	-22 724,5	-15 077,7	-24 165,8	-25 515,2
Secondary income	-559,3	-745,4	-960,6	-1 300,5	-172,7	-103,4	918,2	1 062,8	1 345,7	-634,6	-839,8
Capital account balance	15,4	-6,4	29,3	131,7	269,5	346,8	251,0	231,1	239,2	233,1	246,0
Financial account (excluding reserve assets)	5 487,2	272,8	-6 704,8	-9 655,7	-7 897,1	-5 523,2	2 690,3	1 298,4	-12 542,5	-2 464,3	5 917,1
Direct investment	-11 855,9	-8 034,4	-4 674,6	-3 261,4	-13 749,2	-3 800,9	-4 992,6	-5 904,4	-5 875,4	-1 901,5	-8 024,0
Portfolio investment	17 387,9	6 033,6	1 038,8	-5 887,9	745,4	-5 400,2	2 899,6	5 118,2	-7 743,9	-3 578,1	13 227,0
Other investment	-153,7	2 169,9	-3 032,0	-491,8	5 131,6	3 562,4	4 673,9	2 165,6	1 005,6	2 909,4	454,3
Overall balance	4 306,5	2 379,7	-4 254,9	767,7	71,7	1 365,5	1 526,2	6 599,7	3 192,6	4 798,2	2 180,0
Financing	-4 306,5	-2 379,7	4 254,9	-767,7	-71,7	-1 365,5	-1 526,2	-6 599,7	-3 192,6	-4 798,2	-2 180,0
Reserve assets NBK	-4 306,5	-2 379,7	4 254,9	-767,7	-71,7	-1 365,5	-1 526,2	-6 599,7	-3 192,6	-4 798,2	-2 180,0
IMF credits	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0
Exceptional financing	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0


Current account
Trade in goods
Trade in services
Transfer payments
Exports of goods
Imports of goods
Net factor income
Net non-factor income
Consists of gifts, Remittances and Grants
Shipping, Banking Insurance, Tourism Software services etc.
Net income from compensation of employees
Net investment income

The difference between goods exports and imports is the Net export (Xn) or trade balance.

Net transfers abroad are equal to transfers from firms, households, and the government of a given country to foreigners minus transfers to residents of a given country from foreigners.

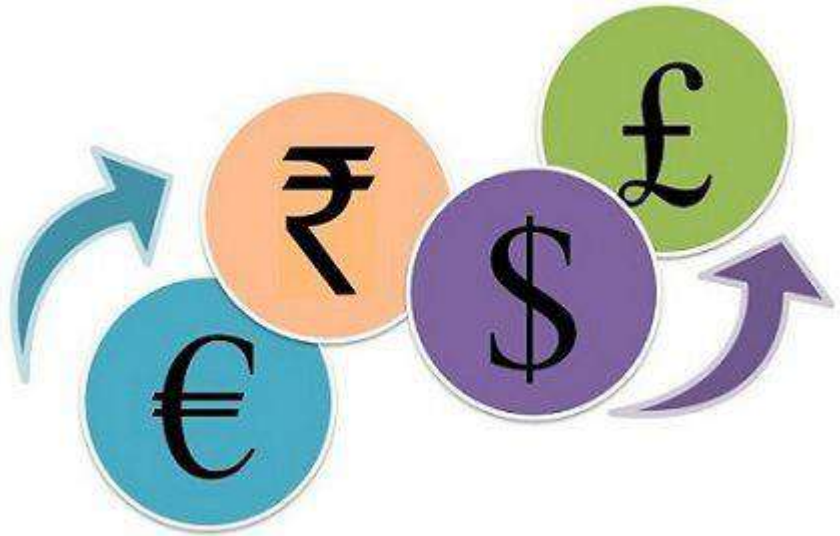
Net factor income from abroad is the net remuneration of temporary workers.

Accounts of BP

1. Current account reflects the value of real property, which the country gave or received from foreign countries in addition to its GDP.

The current account balance is the country's net export: **Nx = Y - (C + I + G).**

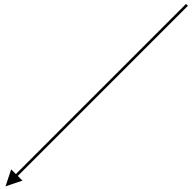
A positive balance means that the difference is exported, a negative balance means that the difference is imported.



Accounts of BoP

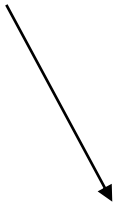
The capital account is equal to the proceeds from the sold assets minus the cost of buying assets abroad and is equal to the net export of capital (XnK).

XnK > 0



net capital inflow

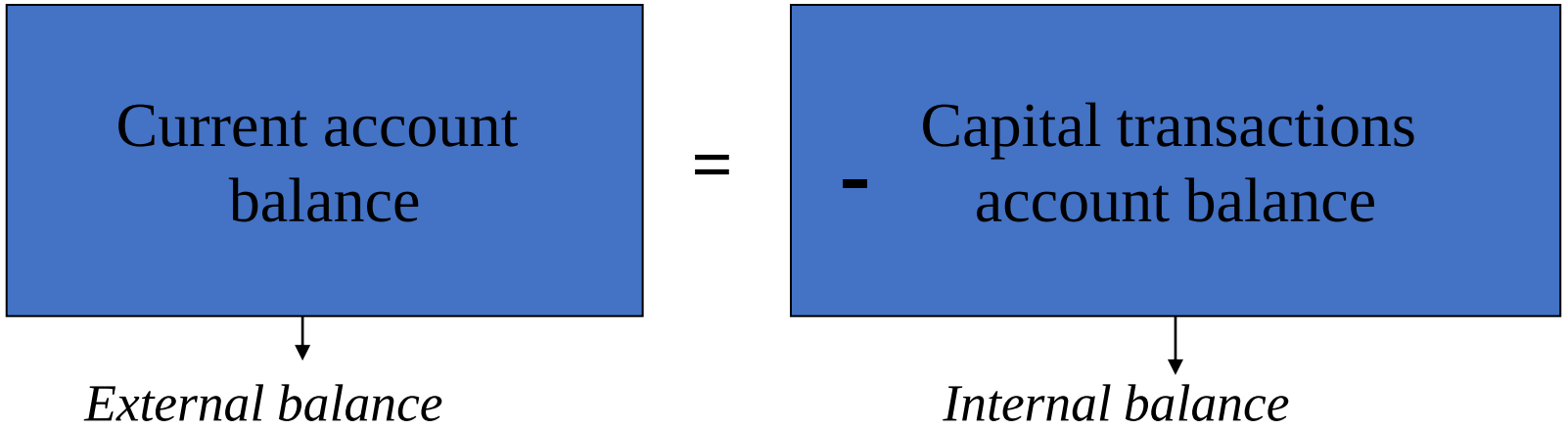
XnK < 0



net capital outflow

Balance of payments and government

In the absence of government intervention in the form of currency intervention, this equality holds:



Balance of payments and basic macroeconomic identity

$$y = C + I + G + X_n$$

$$y - C - G = I + X_n$$

National savings (S)

$$(I - S) + X_n = 0 = BP$$

(Balance of payments)

Capital flows account

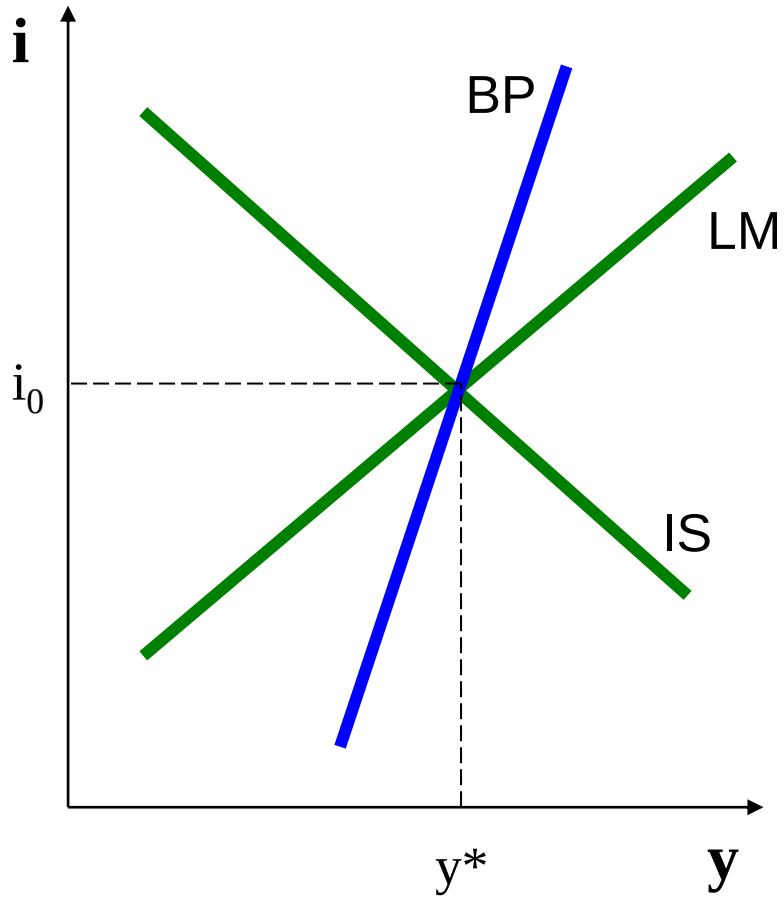
Current account

Official foreign exchange reserves of the Central Bank

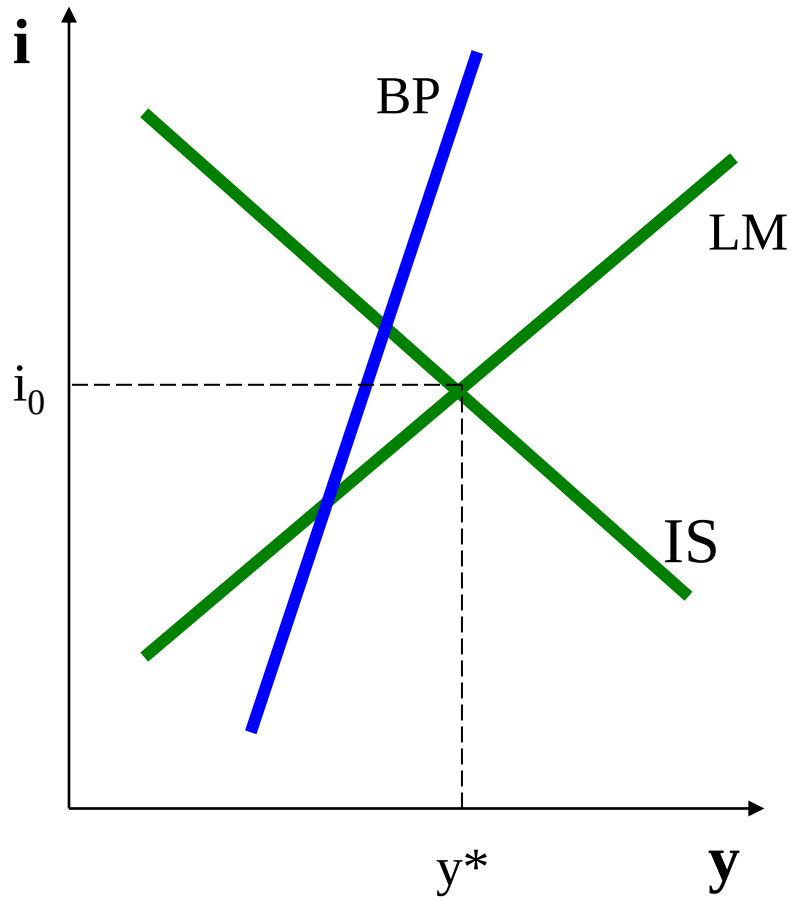
Balance of payments deficit can be financed by reducing the official reserves of the Central Bank, while the surplus of the balance of payments increases the official foreign exchange reserves of the Central Bank (ΔR).

***Balance* of *BoP*: $(I-S) + Nx + \Delta R = 0$**

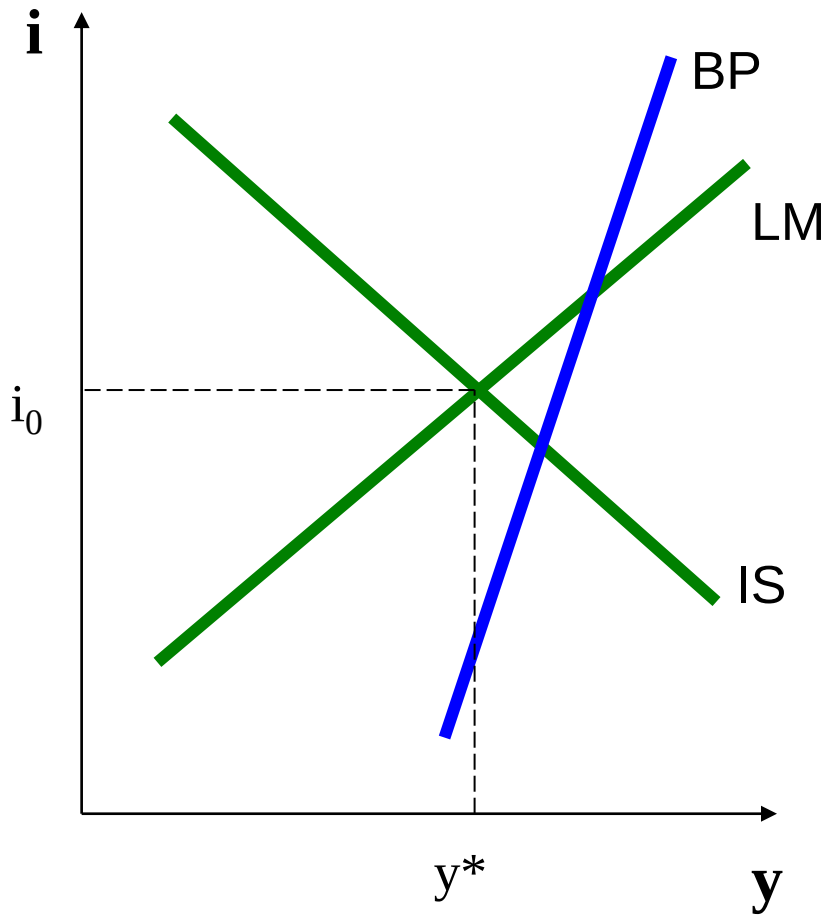
Joint equilibrium IS-LM and the line BP zero balance



IS-LM model with a balance of payments deficit



IS-LM model with a balance of payments surplus



Exchange rate: basic definitions

In the **foreign exchange** market, currency exchange is carried out in specific proportions.

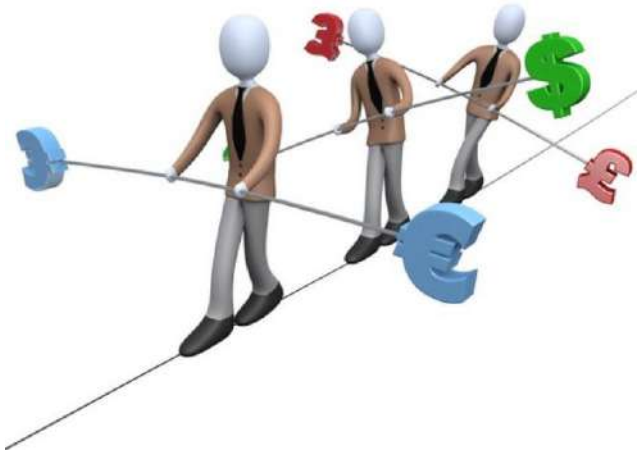
The **exchange rate of two countries** is the price at which national currencies are exchanged.
For example, the price of the U.S. dollar, expressed in units of Kazakh tenge, or the price of Kazakh tenge, expressed in units of the U.S. dollar.

Types of exchange rate

The **nominal exchange rate (e)** is the relative price of two countries' currencies, i.e., the price of one currency in units of another. The **real exchange rate (ε)** is the relative price of goods produced in two countries.

The ratio of nominal and real exchange rates

$$\varepsilon = e \cdot \frac{P_d}{P_f}$$



$$e = \varepsilon \cdot \frac{P_f}{P_d}$$

ε - real exchange rate

e - nominal exchange rate

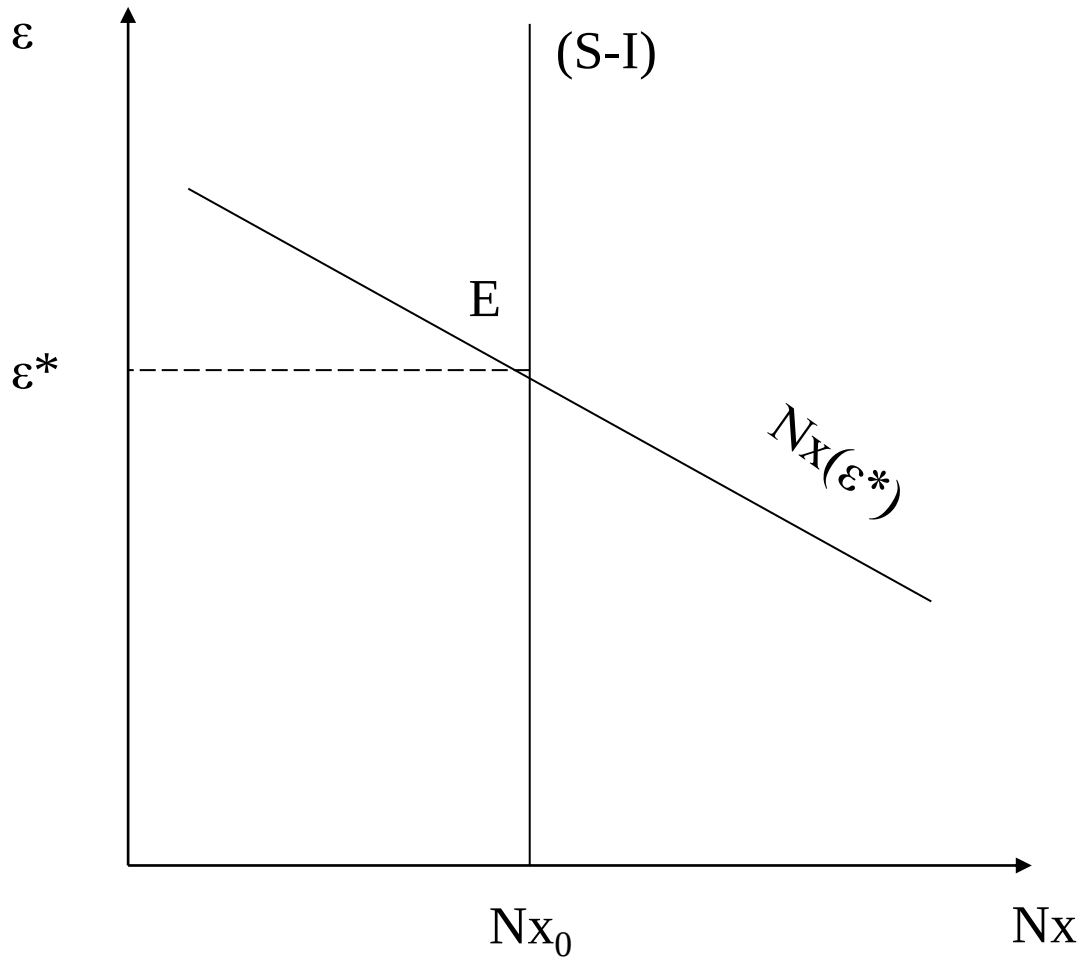
Pd - general price level in a given country (in domestic currency)

Pf – general price level abroad (in foreign currency)

Factors determining the exchange rates

- The money supply.
- GNP/GDP.
- The cyclic fluctuations.
- Differences in interest rates and capital flows.
- Expectations regarding the future dynamics of the exchange rate.

The equilibrium real exchange rate



At point E, the number of currency units resulting from transactions with the capital account equals the number of currency units required to cover the current account balance, and vice versa.

Conclusion

The balance of payments determines the amount of money circulating within a country and, therefore, the overall economic situation.

In addition to the level of economic activity within a country, the balance of payments is influenced by the current exchange rate of the national monetary unit in the foreign exchange market, the difference between the price level at home and abroad, the difference between interest rates and the ratio of inflation rates at home and abroad.

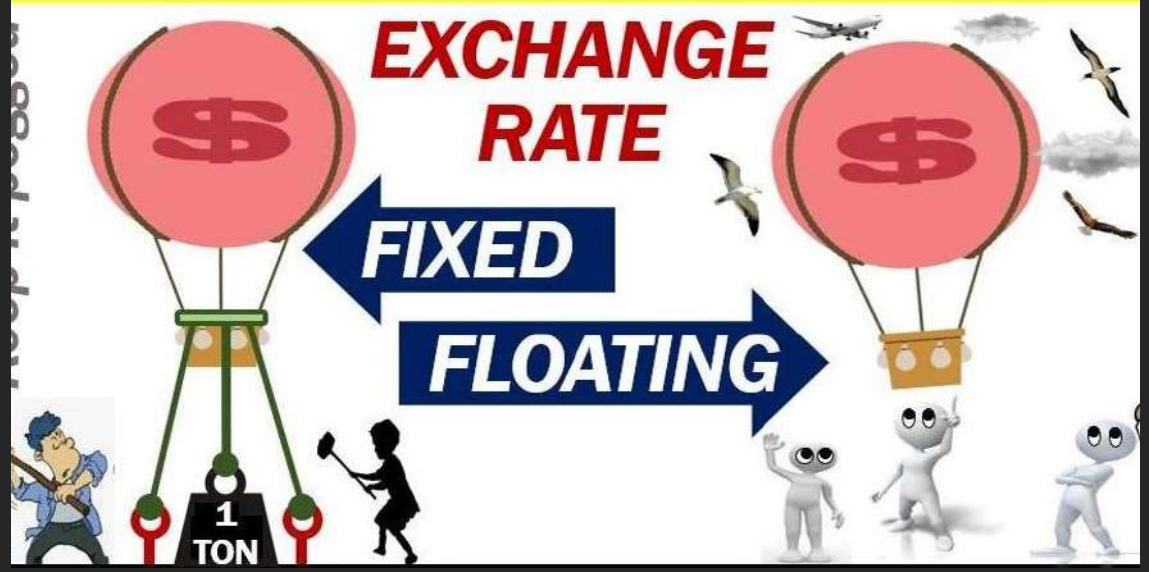
Systems of exchange rates

Floating Exchange Rate

A system in which the interplay of the market forces of demand and supply determine a currency's value.

Fixed Exchange Rate

A system in which the government tries to peg the value of its currency to another currency.



P. Mandell: Nobel Prize in Economics 1999

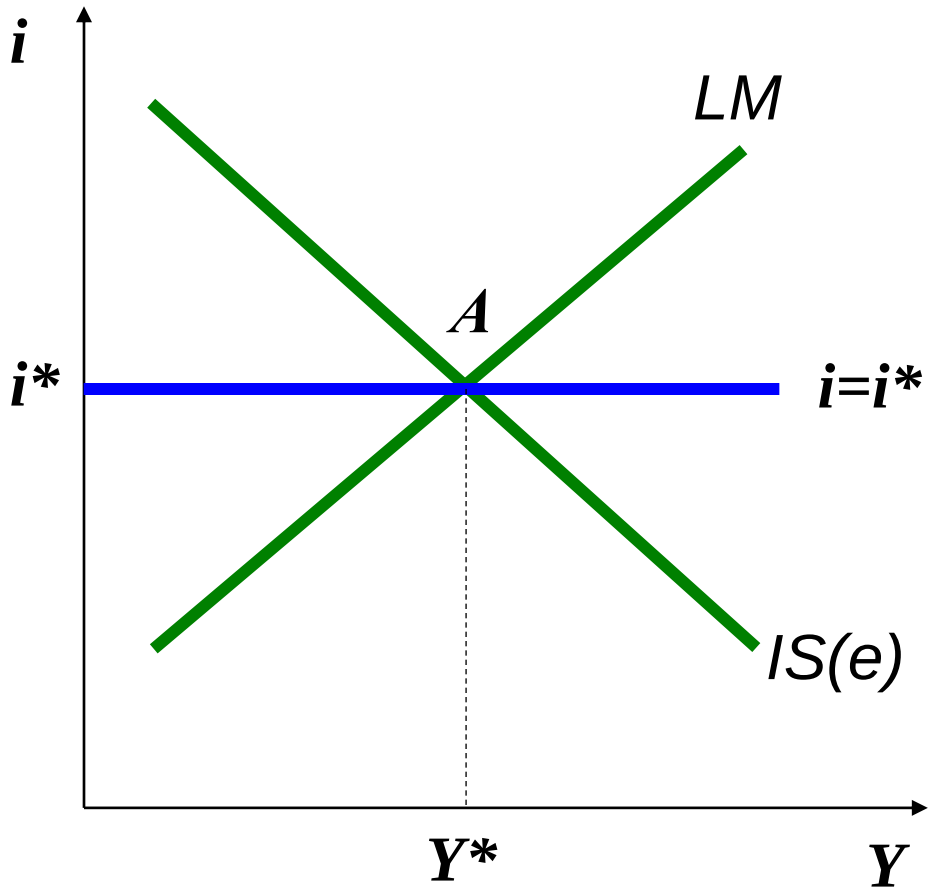
"...for analyzing monetary and fiscal policy under different exchange rate regimes and for analyzing optimal currency areas."

From the decision of the Nobel Committee

Основные предпосылки модели

- The **Mandell-Fleming model** is a **modification of the IS-LM model for a small open economy**.
- Research assumptions (additional to the IS-LM model):
  - the economy is small.
  - the economy is open (international flows of goods and capital are perfectly mobile).
  - the economy is considered in one short-term period modifies.

Mandell-Fleming model for a small open economy



- $i = i^*$
- $C = a + b(Y - T)$
- $Y=F(K, L)$
- $I = I(i^*)$
- $M/P = L(Y, i^*)$
- $X_n = X_n(e)$
- $Y = C + I + G + X_n$

Income and the real exchange rate are endogenous variables under a floating exchange rate, while income and money supply are endogenous variables under a fixed exchange rate.

Basic equations of the model

- Equilibrium condition of the goods market:

$$Y = C(Y - T) + I(i^*) + G + NX(e)$$

- Equilibrium condition of the money market:

$$M/P = LM(i^*, Y)$$

- Equilibrium condition of the external sector:

$$i = i^*$$

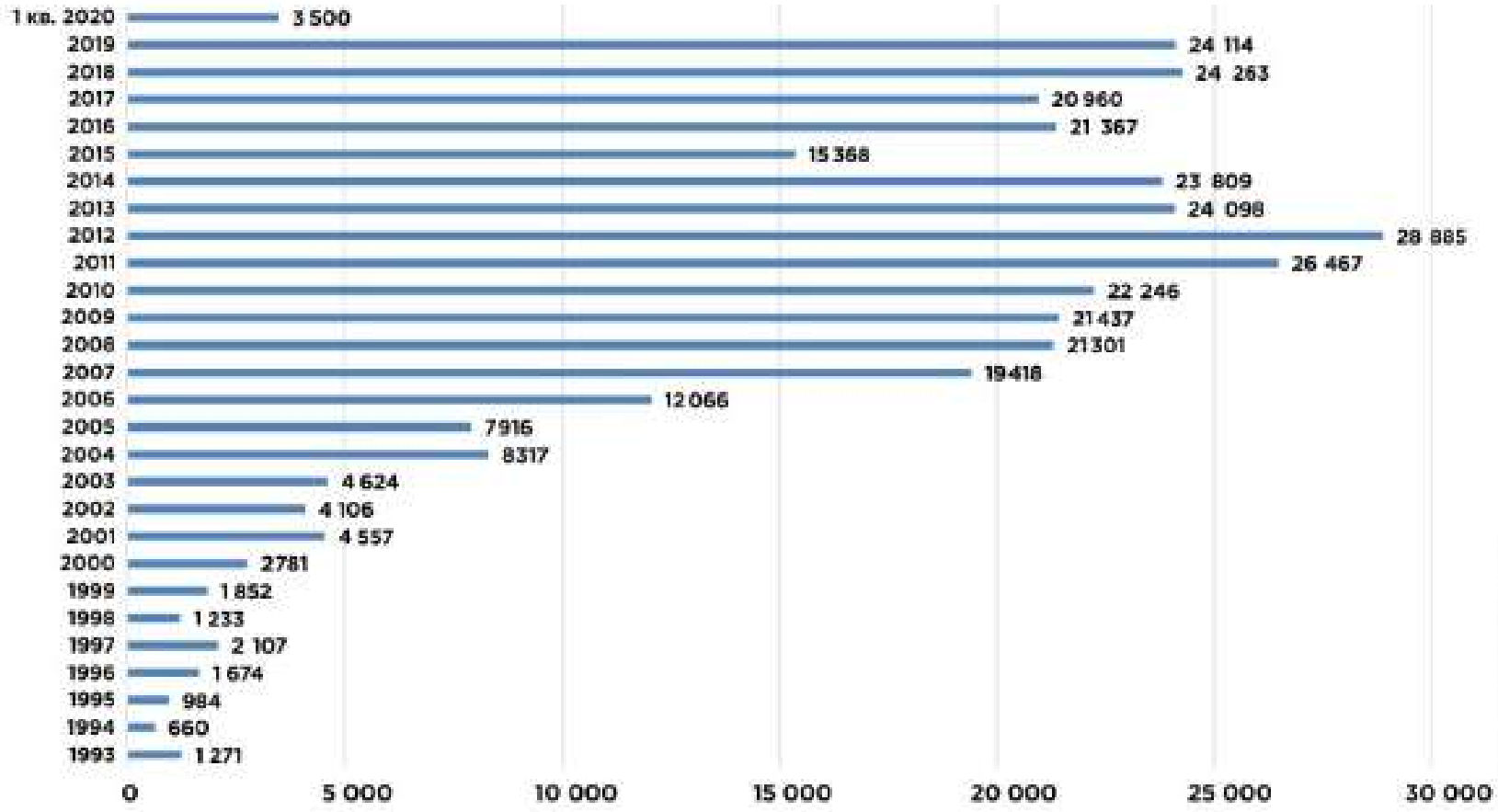
At the ***A*** point, of the intersection of the three straight lines, the solution $(Y^A; r^A; e^A)$ determines the equilibrium values of income, interest rate, and exchange rate

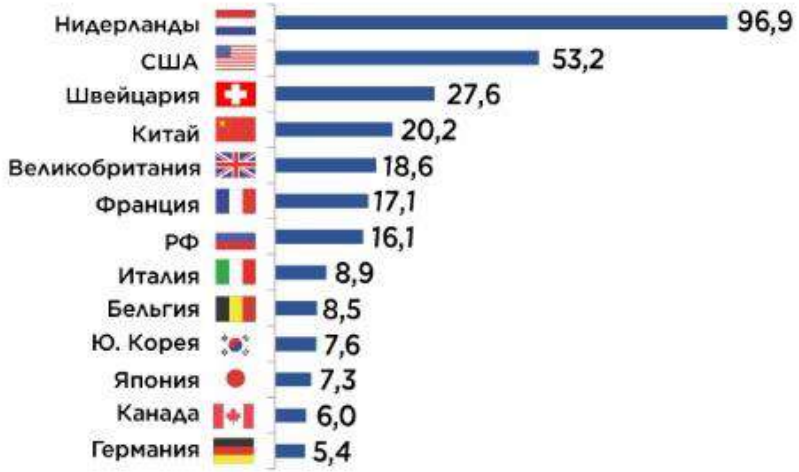
Macroeconomic equilibrium in an open economy involves simultaneous internal and external equilibrium.

Macroeconomic policy results

Policy	Exchange rate system	Floating exchange rate			Fixed exchange rate		
	variable	*Y*	*e*	*NX*	*Y*	*e*	*NX*
Fiscal policy		0	+	-	+	0	0
Monetary policy		+	-	+	0	0	0
Foreign trade policy		0	+	-	+	0	+

Trend analysis of FDI (1993-2020 1q.)





Trend analysis of ESG

- The first ESG index appeared in 2006. Over time, it has gained popularity around the world. Former UN Secretary-General Kofi Annan first formulated the ESG principles as we know them today. And in 2015, a conference on ESG was held for the first time.

- The UN encouraged the world's largest companies to incorporate these principles into their strategies. Since then, Kazakhstan has started to look at them as well.

- What is ESG?

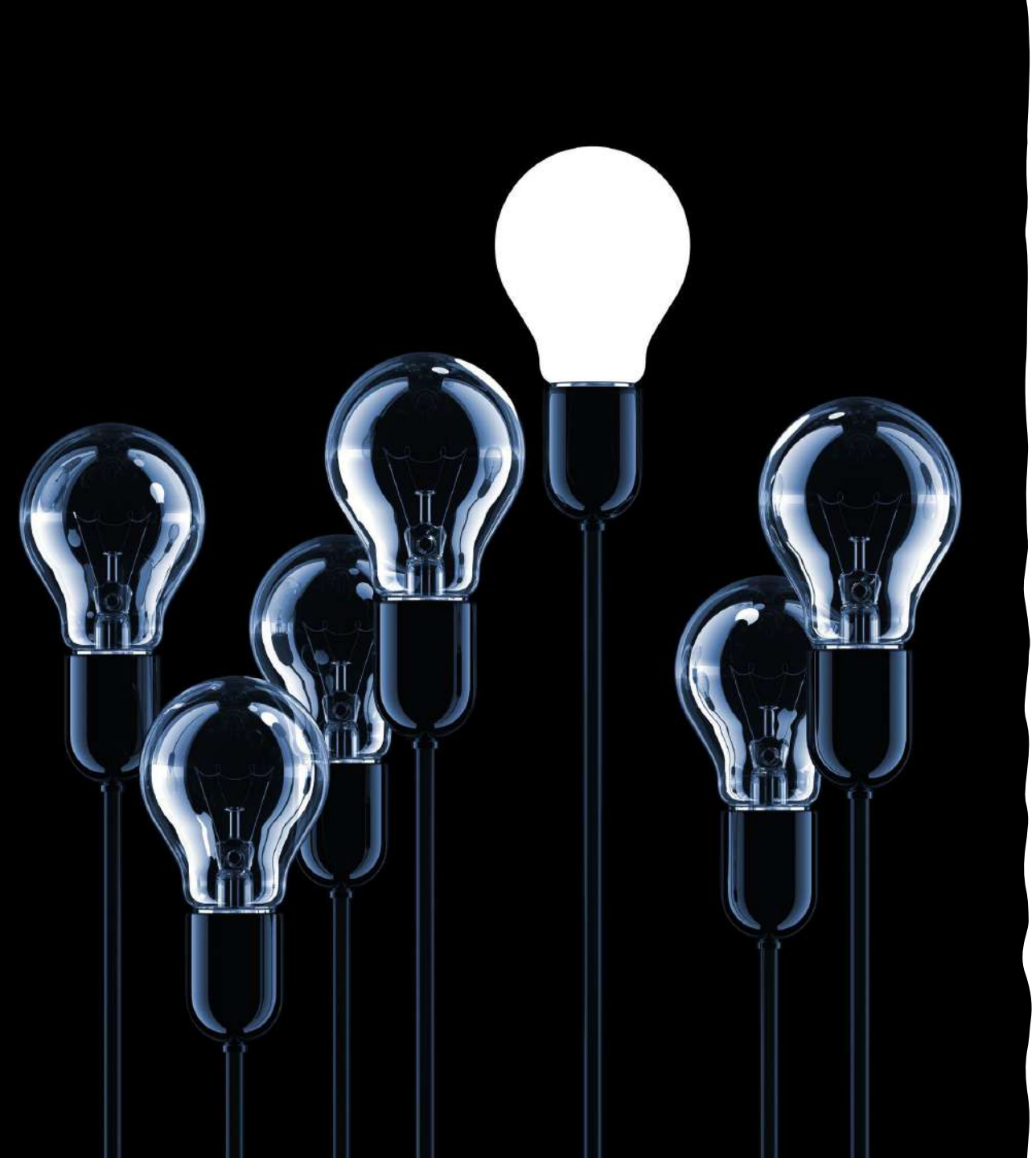
The abbreviation ESG is "ecology, social policy, and corporate governance." In essence, it is a sustainable development of commercial activity built on such principles as care for the environment (E - environment); social responsibility (S - social), and high quality of corporate governance (G - governance).

Trend analysis of ESG

- To get a good ESG score, a company must meet development standards in three categories:
  - social, i.e., labor conditions, gender equality, and investment in social projects.
  - managerial, i.e., the quality of the company's management: transparency of reporting, management salaries, office environment, relations with shareholders, and anti-corruption measures.
  - environmental, i.e., the company's careful attitude to the environment.

For sustainable development, a company must find a balance between all criteria.

- ESG ratings are formed by independent research agencies, which evaluate the development of companies according to these three criteria.
- Kazakhstan has pursued ESG and sustainability policies since the early 2010s and has one of the most developed ESG legislation in the CIS. The Carbon Exchange (ETS-KZ) has been in place since 2013, and Kazakhstan also has an Environmental Code.



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 4.
Model of sustainable economics

Topic 14. Sustainable development goals: concepts, problems, results.

Sustainable development goals


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

No Poverty

Poverty has many dimensions, but its causes include unemployment, social exclusion, and the high vulnerability of certain populations to disasters, diseases, and other phenomena that prevent them from being productive.

- Governments can help create an enabling environment to generate productive employment and job opportunities for the poor and the marginalized.
- The private sector has a major role in determining whether the growth it creates is inclusive and contributes to poverty reduction. It can promote economic opportunities for the poor.
- The contribution of science to end poverty has been significant. For example, it has enabled access to safe drinking water, reduced deaths caused by water-borne diseases, and improved hygiene to reduce health risks related to unsafe drinking water and lack of sanitation.

SUSTAINABLE DEVELOPMENT GOALS | 1 NO POVERTY

DONATE WHAT YOU DON'T USE.

More than 700 million people still live in extreme poverty.

1 ЛИКВИДАЦИЯ НИЩЕТЫ

1 FIN DE LA POBREZA

القضاء على الفقر 1

1 PAS DE PAUVRETÉ

1 无贫穷

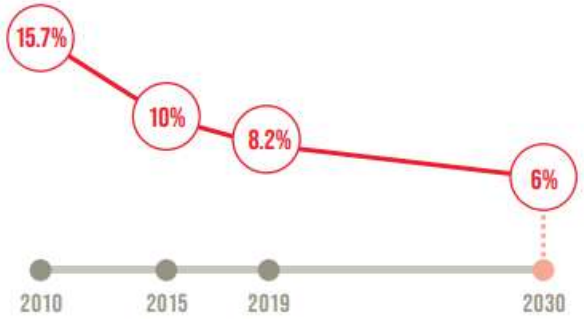
1 NO POVERTY

Let's end poverty everywhere, for everyone.

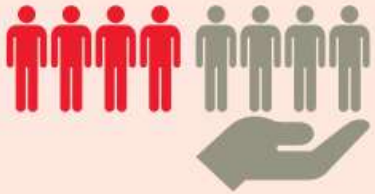
SUSTAINABLE DEVELOPMENT GOALS #GlobalGoals

BEFORE COVID-19

THE WORLD WAS OFF TRACK TO END POVERTY BY 2030



YOUNG WORKERS ARE TWICE AS LIKELY TO BE LIVING IN EXTREME POVERTY AS ADULT WORKERS (2019)



4 BILLION PEOPLE DID NOT BENEFIT FROM ANY FORM OF SOCIAL PROTECTION IN 2016

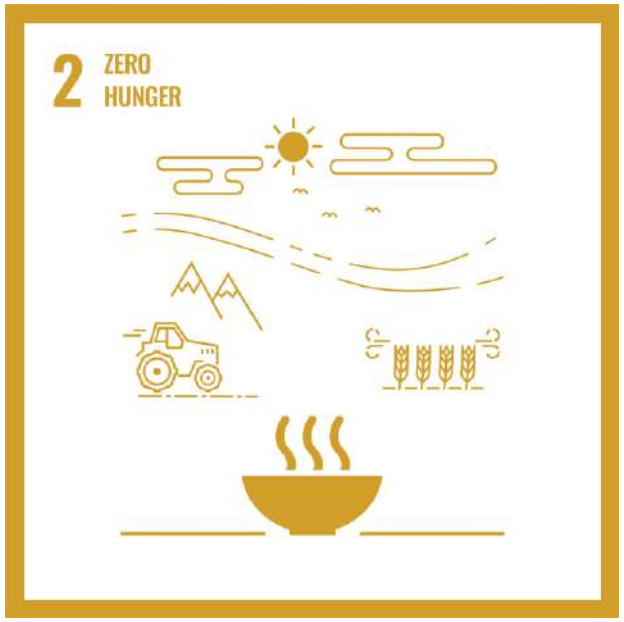
COVID-19 IMPLICATIONS

COVID-19 CAUSES THE FIRST INCREASE IN GLOBAL POVERTY IN DECADES

+71 MILLION PEOPLE ARE PUSHED INTO EXTREME POVERTY IN 2020

NATURAL DISASTERS EXACERBATE POVERTY

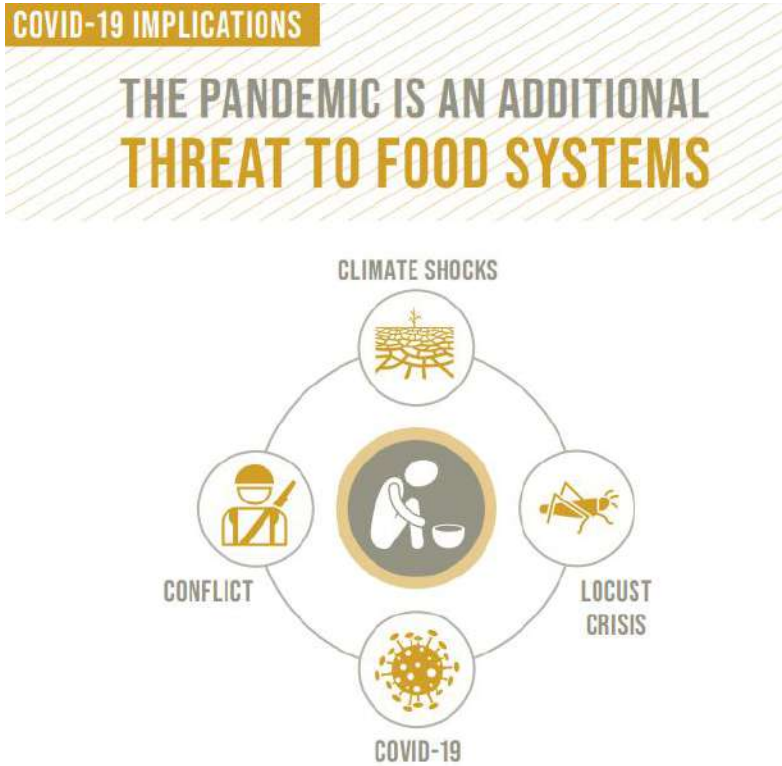
$23.6 BILLION DIRECT ECONOMIC LOSSES (FROM 63 COUNTRIES IN 2018)

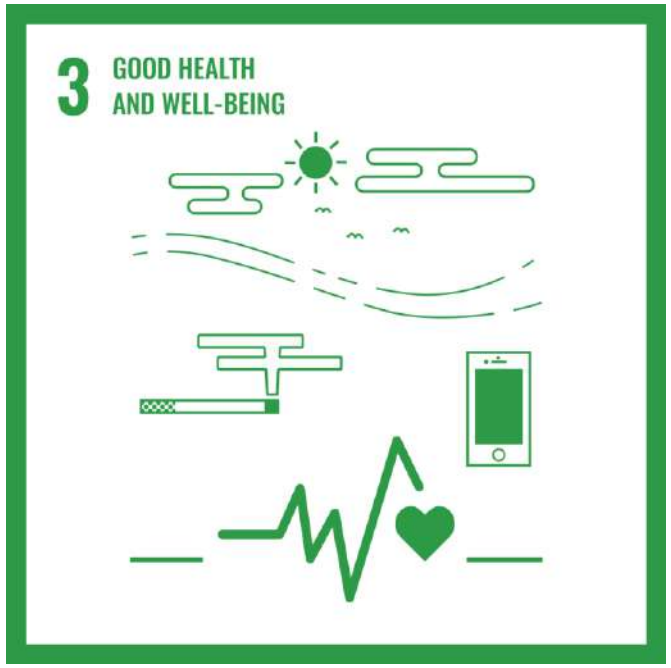


Zero Hunger

Hunger and malnutrition mean less productive individuals, who are more prone to disease and thus often unable to earn more and improve their livelihoods. 2 billion people in the world do not have regular access to safe, nutritious, and sufficient food. In 2019, 144 million children under the age of 5 were stunted, and 47 million were affected by wasting.

- You can make changes in your own life—at home, at work, and in the community — by supporting local farmers or markets, making sustainable food choices, supporting good nutrition, and fighting food waste.
- You can also use your power as a consumer and voter, demanding businesses and governments make the choices and changes that will make Zero Hunger a reality.

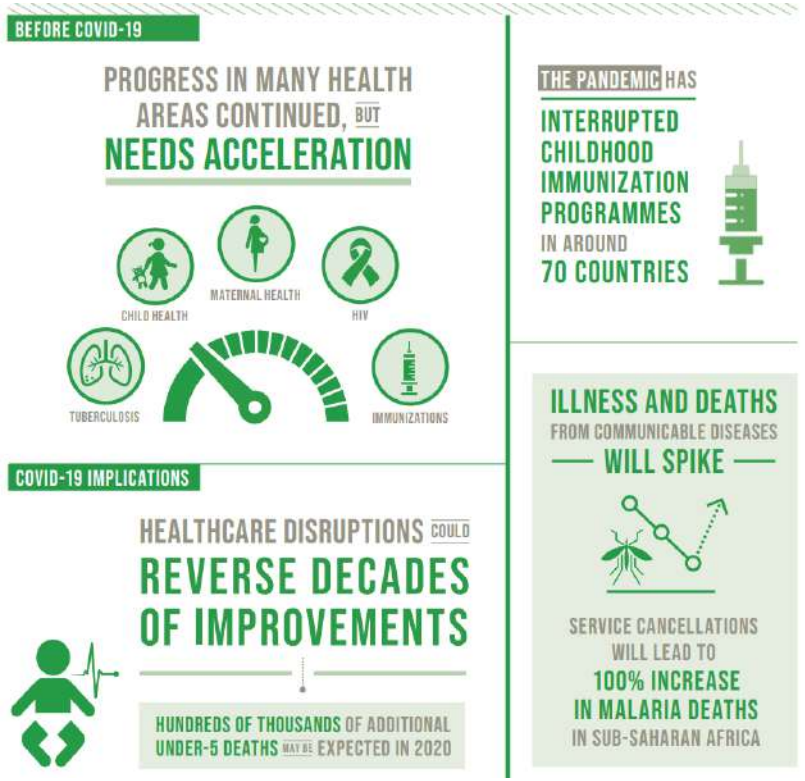


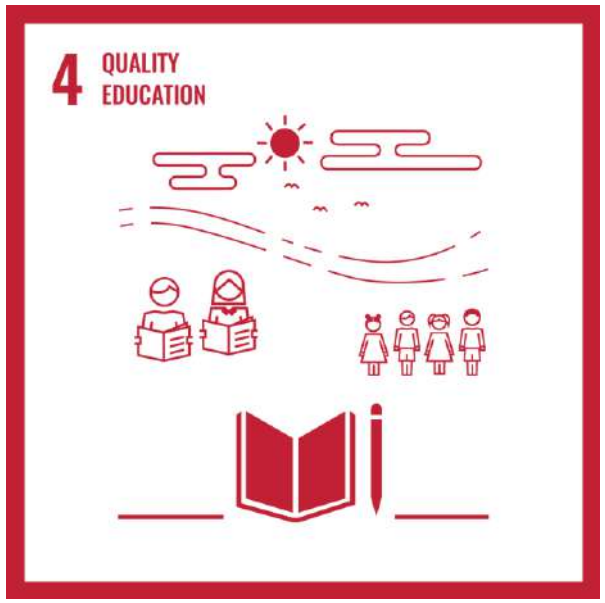


Good Health and Well-Being

In 2017, only one-third to half of the global population was covered by essential health services. If current trends continue, only 39 to 63 % of the global population will be covered by essential health services by 2030. The COVID-19 crisis has disrupted essential health services around the world. If universal health coverage is to become a reality by 2030, growth in the provision and use of essential health services must greatly accelerate.

- ❑ We all want our families to have enough food to eat that is safe and nutritious.
- ❑ A world with zero hunger can positively impact our economies, health, education, equality, and social development. It's a key piece of building a better future for everyone.
- ❑ With hunger limiting human development, we cannot achieve other sustainable development goals such as education, health, and gender equality.

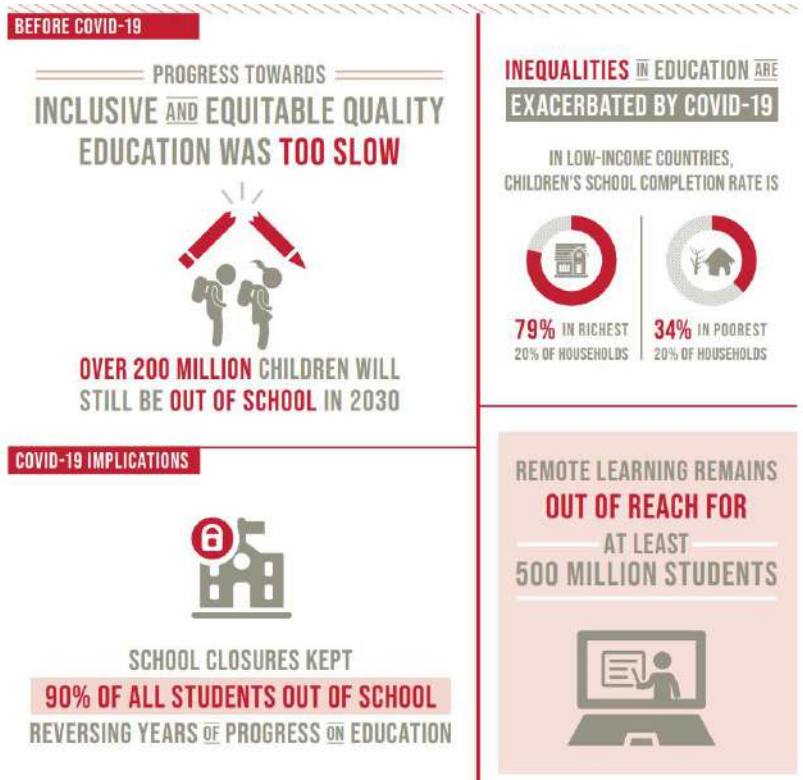




Quality Education

Education enables upward socioeconomic mobility and is a key to escaping poverty. Education helps reduce inequalities, reach gender equality, and fosters tolerance and more peaceful societies. The primary school completion rate reached 84% in 2018, up from 70% in 2000 and, under current trends, is expected to reach 89% globally by 2030.

Ask our governments to make education a priority in both policy and practice.
Lobby our governments to make firm commitments to provide free primary school education to all, including vulnerable or marginalized groups.

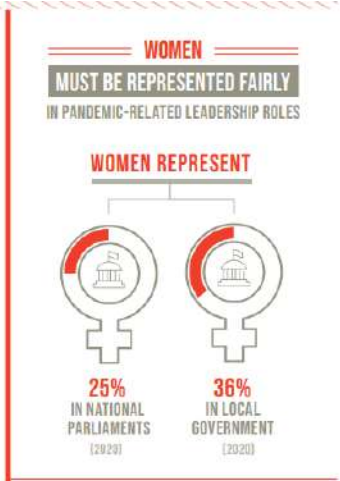


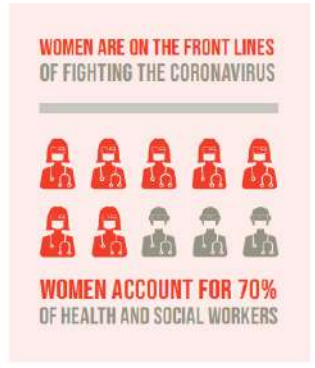
Gender Equality

Women and girls represent half of the world's population and, therefore, also half of its potential. But today, gender inequality persists everywhere and stagnates social progress. Women continue to be underrepresented at all levels of political leadership.

Across the globe, women and girls perform a disproportionate share of unpaid domestic work. Inequalities faced by girls can begin right at birth and follow them all their lives. In some countries, girls are deprived of access to health care or proper nutrition, leading to a higher mortality rate.

Disadvantages in education translate into a lack of access to skills and limited opportunities in the labor market. Women's and girls' empowerment is essential to expand economic growth and promote social development. The full participation of women in labor forces would add percentage points to most national growth rates— double digits in many cases.

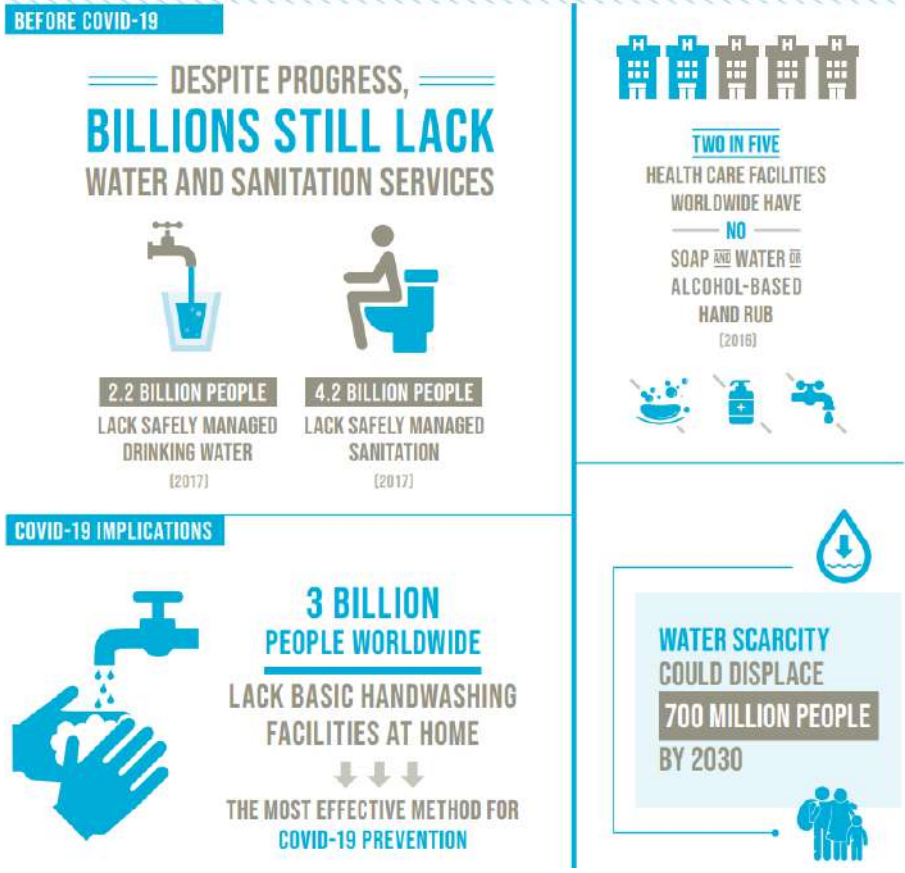




Clean Water and Sanitation

Access to water, sanitation, and hygiene is a human right. Water is essential to health, poverty reduction, food security, peace and human rights, ecosystems, and education. Nevertheless, countries face growing challenges linked to water scarcity, water pollution, degraded water-related ecosystems, and cooperation over transboundary water basins.

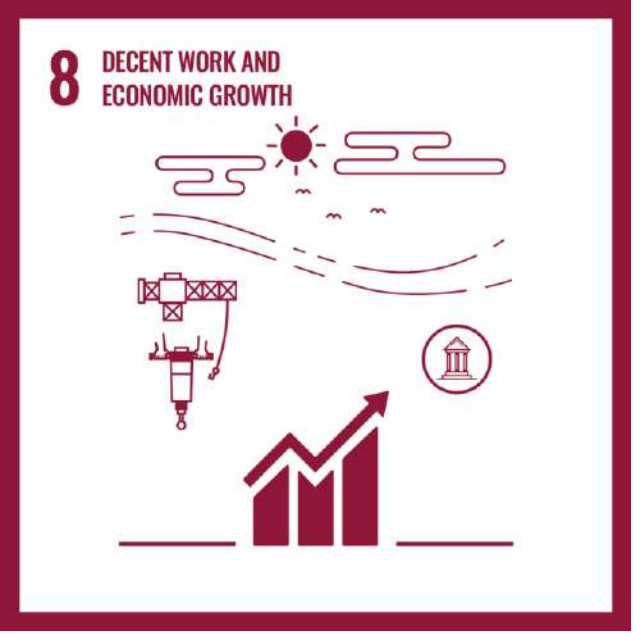
- ❑ Civil society organizations should work to keep governments accountable, invest in water research and development, and promote the inclusion of women, youth, and indigenous communities in water resources governance.
- ❑ Generating awareness of these roles and turning them into action will lead to win-win results and increased sustainability and integrity for both human and ecological systems.



Affordable and Clean Energy

A well-established energy system supports all sectors, from businesses, medicine, and education to agriculture, infrastructure, communications, and high technology. Access to electricity in poorer countries has begun to accelerate, energy efficiency continues to improve, and renewable energy is making impressive gains. Nevertheless, more focused attention is needed to improve access to clean and safe cooking fuels and technologies for 2.8 billion people.

- ❑ Countries can accelerate the transition to an affordable, reliable, and sustainable energy system by investing in renewable energy resources, prioritizing energy-efficient practices, and adopting clean energy technologies and infrastructure. Businesses can maintain and protect ecosystems and commit to sourcing 100% of operational electricity needs from renewable sources.
- ❑ Employers can reduce the internal demand for transport by prioritizing telecommunications and incentivizing less energy-intensive modes such as train travel over auto and air travel.
- ❑ Investors can invest more in sustainable energy services, quickly bringing new technologies from a diverse supplier base to the market.
- ❑ You can save electricity by plugging appliances into a power strip and turning them off completely when not in use, including your computer. You can also bike, walk, or take public transport to reduce carbon emissions.



Decent Work and Economic Growth

Sustained and inclusive economic growth can drive progress, create decent jobs, and improve living standards. Even before the outbreak of COVID-19, one in five countries – home to billions of people living in poverty – were likely to see per capita incomes decline in 2020. The economic and financial shocks associated with the pandemic—such as disruptions to industrial production, financial market volatility, and rising insecurity—derailed the already tepid economic growth and compounded heightened risks from other factors.

Providing youth the best opportunity to transition to a decent job calls for investing in education and training of the highest possible quality, providing youth with skills that match labor market demands, giving them access to social protection and basic services regardless of their contract type, as well as that all aspiring youth can attain productive employment regardless of their gender, income level or socio-economic background.

Governments can work to build dynamic, sustainable, innovative, and people-centered economies, promoting youth employment, women's economic empowerment, and decent work for all.

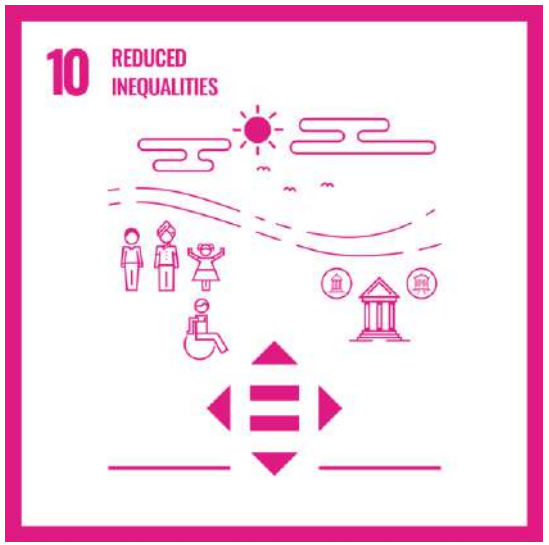
Implementing adequate health and safety measures and promoting supportive working environments is fundamental to protecting the safety of workers, especially relevant for health workers and those providing essential services.

Industry, Innovation, and Infrastructure

Economic growth, social development, and climate action heavily depend on investments in infrastructure, sustainable industrial development, and technological progress. In the face of a rapidly changing global economic landscape and increasing inequalities, sustained growth must include industrialization that, makes opportunities accessible to all people, and second is supported by innovation and resilient infrastructure.

Inclusive and sustainable industrialization, innovation and infrastructure, can unleash dynamic and competitive economic forces that generate employment and income. They play a key role in introducing and promoting new technologies, facilitating international trade, and enabling the efficient use of resources. The growth of new industries means improving the standard of living for many of us. If industries pursue sustainability, this approach positively affects the environment.

- ❑ Establish standards and promote regulations that ensure company projects and initiatives are sustainably managed.
- ❑ Collaborate with NGOs and the public sector to help promote sustainable growth within developing countries.
- ❑ Think about how the industry impacts your life and well-being and use social media to push for policymakers to prioritize the SDGs



Reduced Inequalities

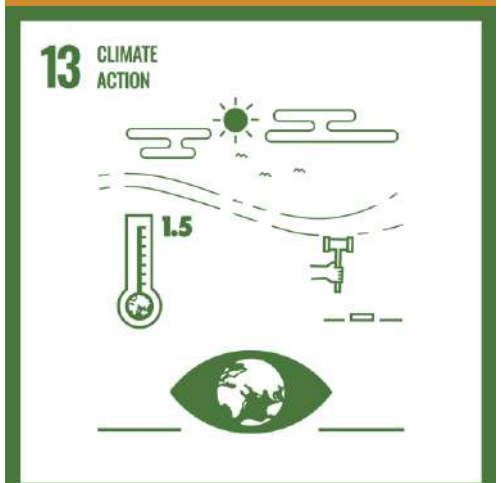
Inequalities based on income, sex, age, disability, sexual orientation, race, class, ethnicity, religion, and opportunity continue to persist across the world. Inequality threatens long-term social and economic development, harms poverty reduction, and destroys people's fulfillment and self-worth. This, in turn, can breed crime, disease, and environmental degradation.

Reducing inequality requires transformative change. Greater efforts are needed to eradicate extreme poverty and hunger and invest more in health, education, social protection, and decent jobs, especially for young people, migrants and refugees, and other vulnerable communities.

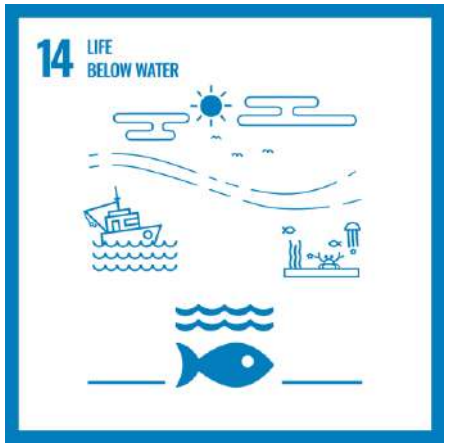
- ❑ Within countries, it is important to empower and promote inclusive social and economic growth. We can ensure equal opportunity and reduce income inequalities if we eliminate discriminatory laws, policies, and practices.
- ❑ Among countries, we need to ensure that developing countries are better represented in decision-making on global issues so that solutions can be more effective, credible, and accountable.
- ❑ Governments and other stakeholders can also promote safe, regular, and responsible migration, including through planned and well-managed policies, for the millions of people who have left their homes seeking better lives due to war, discrimination, poverty, lack of opportunity, and other drivers of migration.

All these issues will eventually affect every citizen. Inequality can lead to unrest and insecurity, pollution deteriorates everyone's health and affects workers' productivity and, therefore the economy, and natural disasters have the potential to disrupt everyone's lifestyles.

Economic and social progress over the last century has been accompanied by environmental degradation that is endangering the very systems on which our future development and survival depend. COVID-19 offers an opportunity to develop recovery plans to reverse current trends and shift our consumption and production patterns to a more sustainable course. A successful transition will mean improving resource efficiency, considering the entire life cycle of economic activities, and active engagement in multilateral environmental agreements.



The climate crisis continues unabated as the global community shies away from the total commitment required for its reversal. 2010-2019 was the warmest decade ever recorded, bringing with it massive wildfires, hurricanes, droughts, floods, and other climate disasters across continents

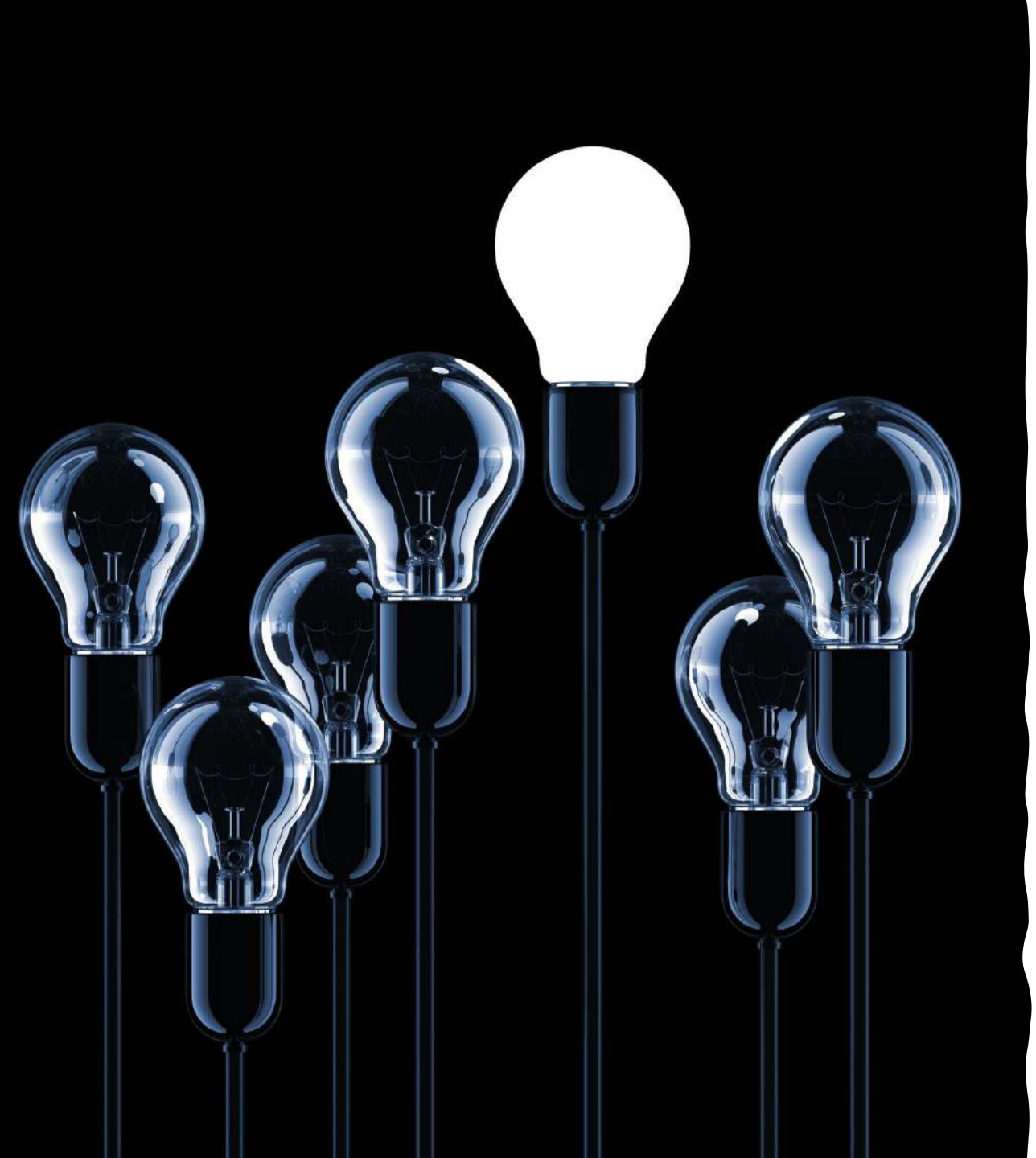


Oceans are our planet’s life support and regulate the global climate system. They are the world’s largest ecosystem, home to nearly a million known species and containing vast untapped potential for scientific discovery. Oceans and fisheries continue to support the global population’s economic, social and environmental needs.

Forests cover nearly 31 per cent of our planet’s land area. From the air we breathe, to the water we drink, to the food we eat–forests sustain us. Forests are home to more than 80 per cent of all terrestrial species of animals, plants and insects. However, biodiversity is declining faster than at any other time in human history.

People everywhere need to be free of fear from all forms of violence and feel safe as they go about their lives, whatever their ethnicity, faith, or sexual orientation. Conflict, insecurity, weak institutions, and limited access to justice threaten sustainable development.

In light of the consequences of the global COVID-19 pandemic, we have seen that strengthening multilateralism and global partnerships are more important than ever if we are to solve the world’s problems. The Sustainable Developmet Goals remain the framework for building back better. We need everyone to come together—governments, civil society, scientists, academia and the private sector



Thanks for your attention!

AL-FARABI KAZAKH NATIONAL UNIVERSITY
HIGHER SCHOOL OF ECONOMICS AND BUSINESS

COURSE
“Macroeconomic Modeling"

EP “7M04102 - Economics"

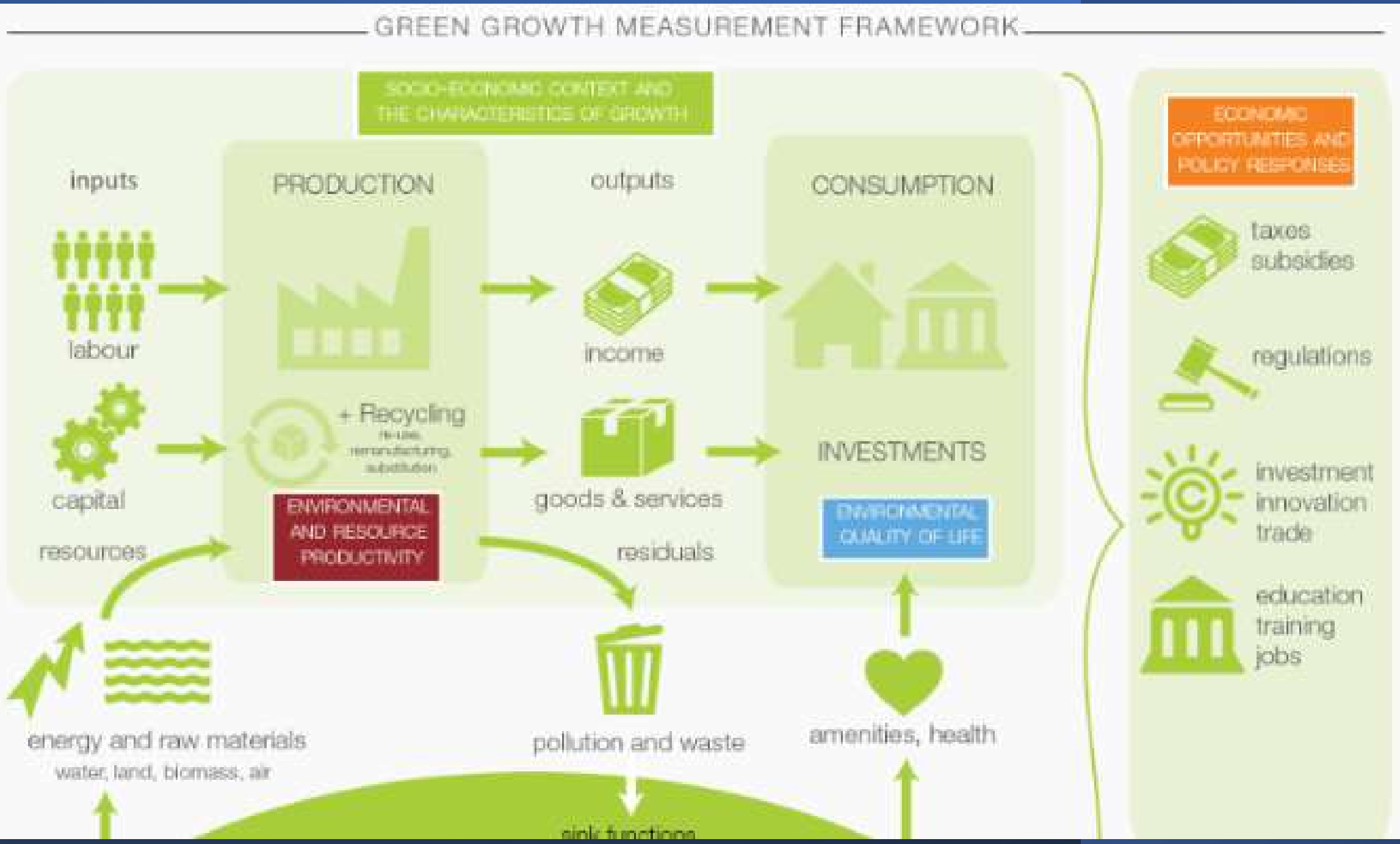
Mrs. Dinara Rakhmatullayeva
Ph.D., Senior Lecturer
Economics Department

Almaty, 2023

MODULE 4.
Model of sustainable economics

Topic 15. Models of green development and digital transformation in the country.


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS


GREEN GROWTH MEASUREMENT FRAMEWORK
SOCIO-ECONOMIC CONTEXT AND THE CHARACTERISTICS OF GROWTH
inputs
PRODUCTION
outputs
CONSUMPTION
labour
capital
resources
+ Recycling
re-use, remanufacturing, substitution
ENVIRONMENTAL AND RESOURCE PRODUCTIVITY
income
goods & services
residuals
INVESTMENTS
ENVIRONMENTAL QUALITY OF LIFE
energy and raw materials
water, land, biomass, air
pollution and waste
amenities, health
sink functions
ECONOMIC OPPORTUNITIES AND POLICY RESPONSES
taxes
subsidies
regulations
investment
innovation
trade
education
training
jobs

KAZAKHSTAN: Sustainable development goals

The nominal exports in Kazakhstan amounted to USD 63.8 bln, 47.5% more than in the first nine months of 2021 (USD 43.3 bln). However, according to ERI calculations, the real growth of RK exports (IAV) is about 2.8-3%, which means that the current increase was possible due to high prices for our main export items. For example, oil supplies in tons increased by only 1.6% and export revenues by 63.4%.

In 2020, the total number of sustainable investment funds reached 3,987, which is 30% more than in 2019. Over the past five years, the total income of sustainable investment funds has increased fourfold: from $405 billion to $1.7 trillion (Figure 1).

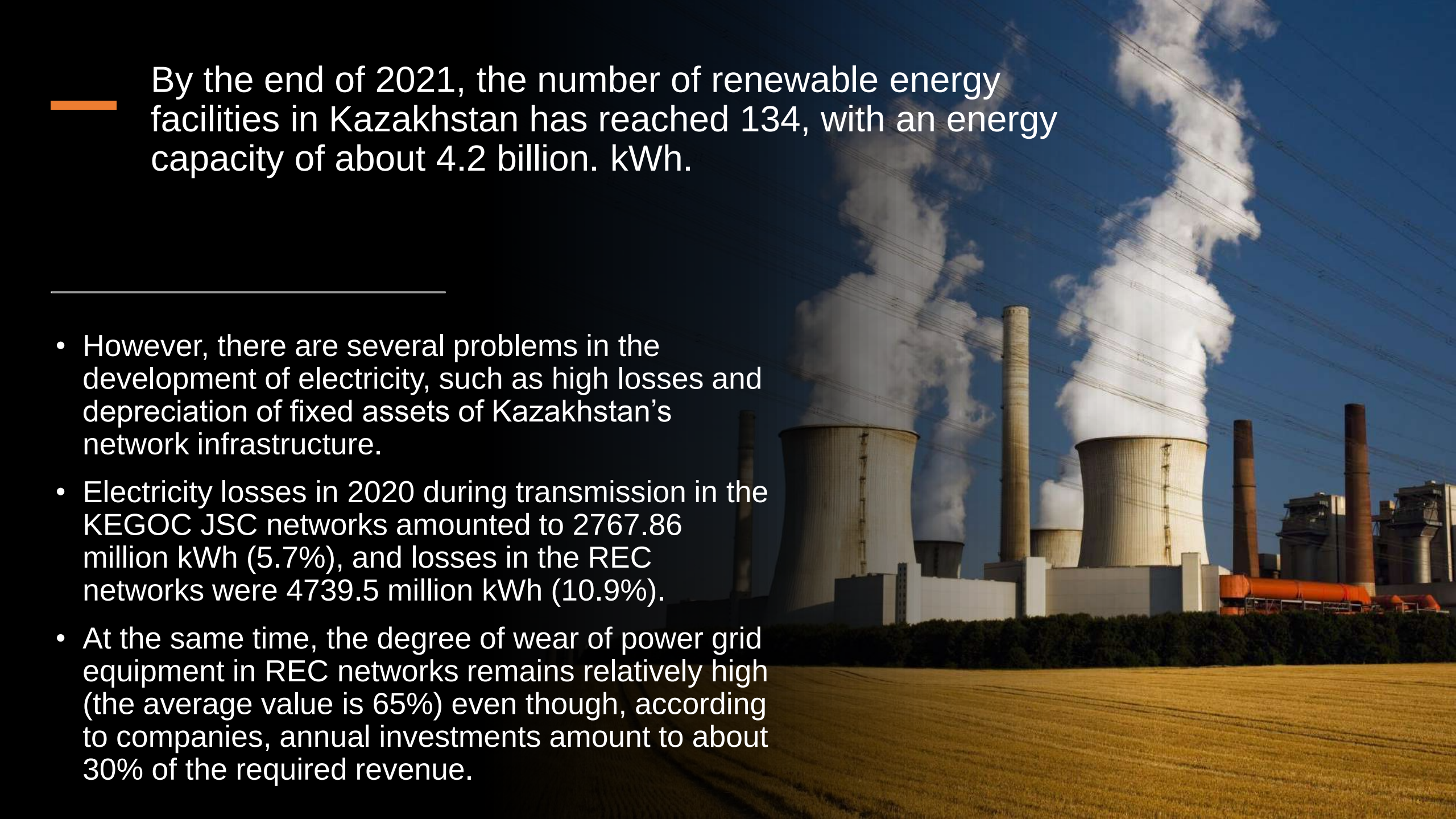
Figure 1: Assets of sustainable investment funds in 2016-2020 (USD billion)

Source: UNCTAD, based on Morningstar and TrackInsight data.

About Kazakhstan

- As part of the Concept for the transition to a "green economy,» Kazakhstan has set a goal for the share of renewable sources in electricity production of 3% by 2020, 15% by 2030, 50% by 2050, and by 2060 Kazakhstan has declared carbon neutrality. As a result of this work, 9 billion emissions of more than a ton of carbon dioxide are not allowed.
- Despite the challenges facing the country, Kazakhstani entrepreneurs are taking on the voluntary commitments noted on the Agenda and have begun to get involved in the localization of the SDGs. Some Kazakhstani entrepreneurs record their work to achieve the SDGs in special reports.
- Kazakhstan also has a high potential for developing renewable energy, about 1 trillion kWh, which exceeds the current demand for electricity by more than 9 times (108 billion kWh). Given the prospects and importance of the industry, renewable energy projects in Kazakhstan are fully supported by the Government.

By the end of 2021, the number of renewable energy facilities in Kazakhstan has reached 134, with an energy capacity of about 4.2 billion. kWh.



- However, there are several problems in the development of electricity, such as high losses and depreciation of fixed assets of Kazakhstan’s network infrastructure.
- Electricity losses in 2020 during transmission in the KEGOC JSC networks amounted to 2767.86 million kWh (5.7%), and losses in the REC networks were 4739.5 million kWh (10.9%).
- At the same time, the degree of wear of power grid equipment in REC networks remains relatively high (the average value is 65%) even though, according to companies, annual investments amount to about 30% of the required revenue.

What should Kazakhstan do to attract more investments in sustainable projects?

1. Provide financial and non-financial support to domestic entrepreneurs for the implementation of projects in the field of sustainable development.

2. Introduce a mandatory requirement for non-financial reporting disclosure among subsoil users. Many resource-producing countries have introduced mandatory reporting of subsoil users on disclosure of non-financial information within the framework of the ESG.

3. In Kazakhstan, renewable energy technology costs are high, so the country’s “green” energy is three times higher than world prices. As a solution, it is possible to offer investors state guarantees of the repayment of funds and the provision of land plots for renewable energy sources.

Our achievements

Kazakhstan ranks 20th in the speed of digitalization and is among the most promising countries for the development of digital wealth.

In 2022, the level of digitalization in Kazakhstan increased by 12%, and our digital products are becoming increasingly competitive in international markets.

In 2022, exports of IT products and services increased 5 times (333 million dollars). The goal is to increase this indicator to 500 million dollars by 2025.

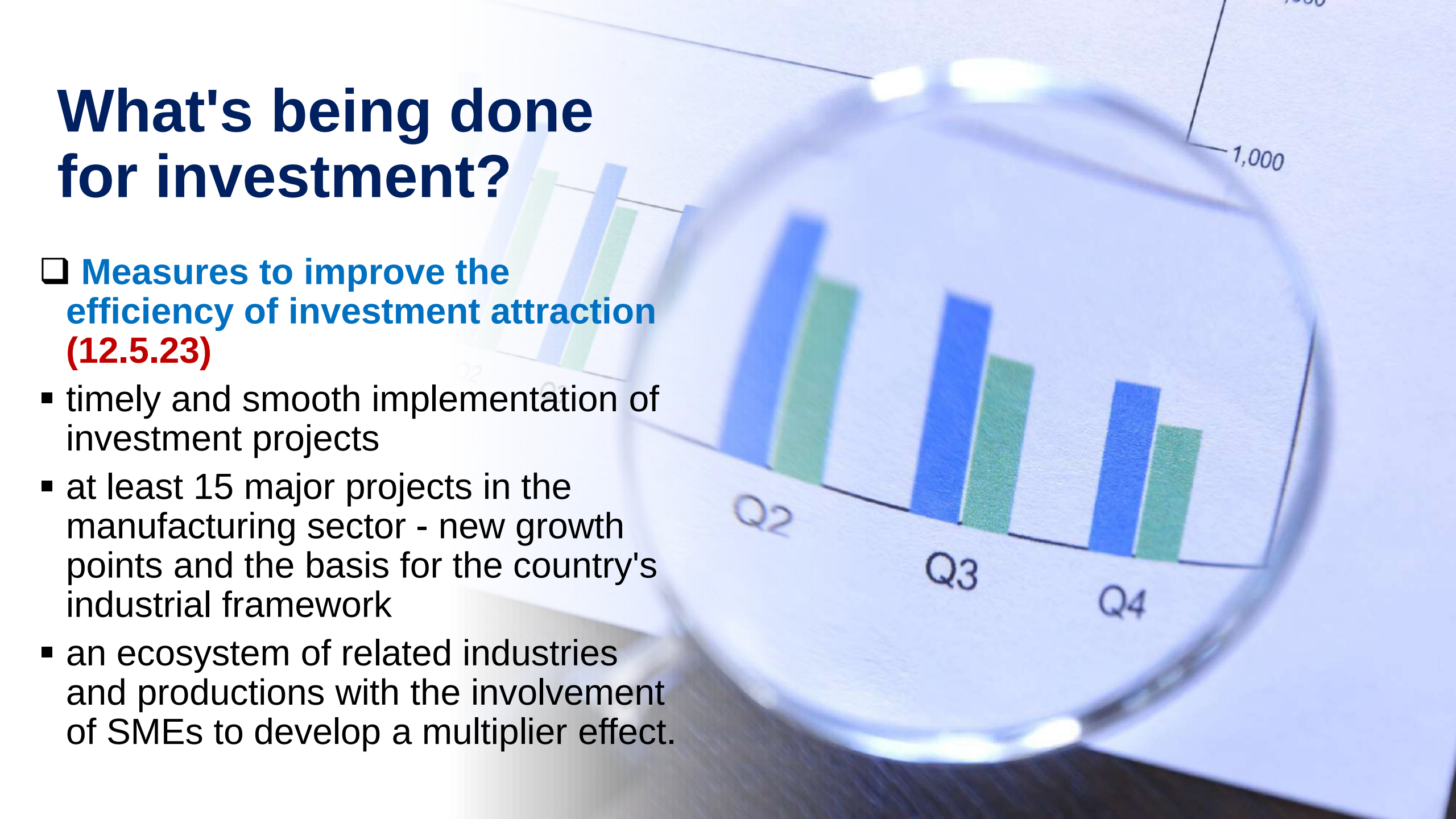
The share of SMEs has exceeded 36% of GDP.

The number of people working in SMEs has reached 4.3 million, representing 45% of the country's employable citizens.

What is important for business development and investment?

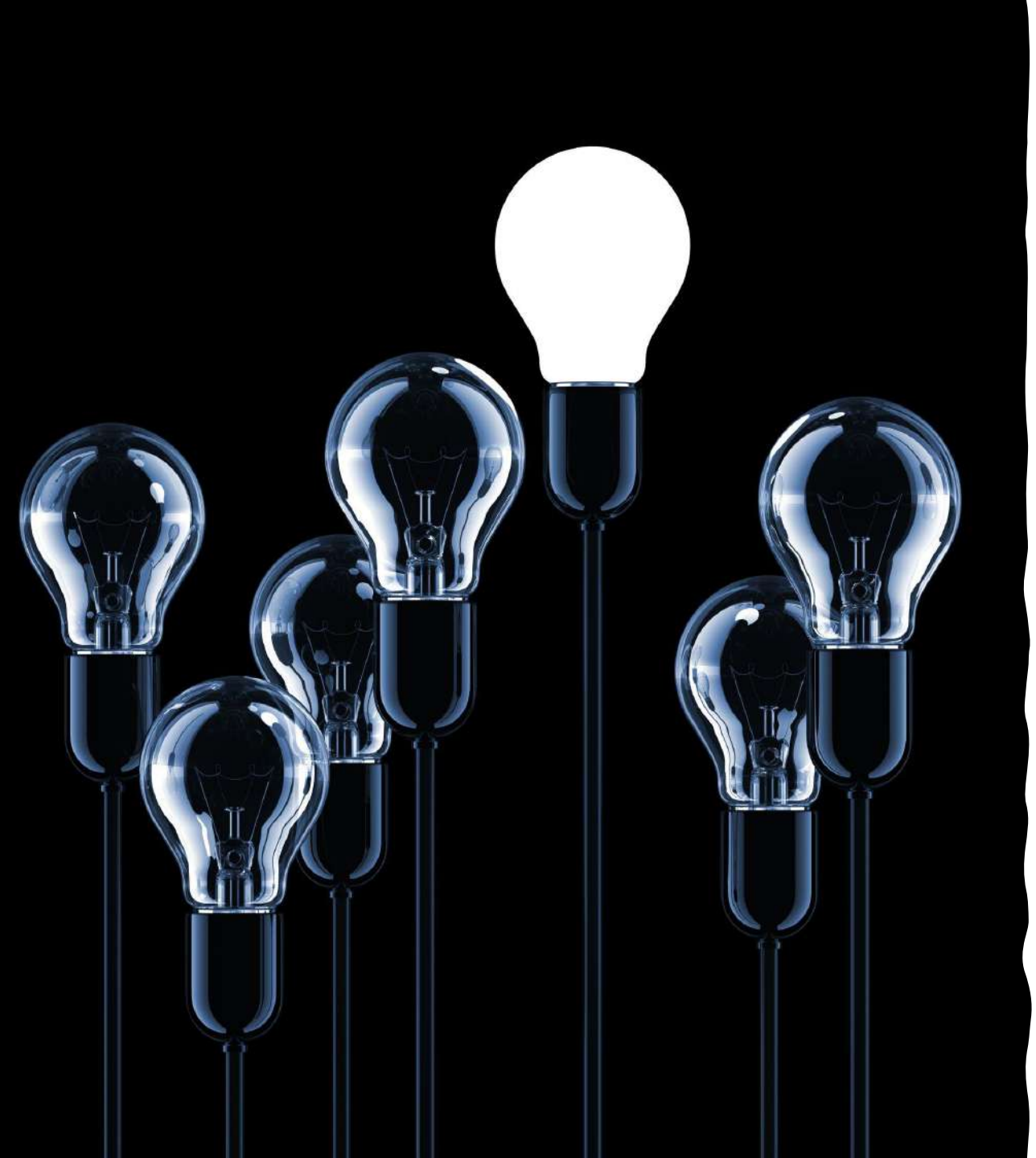
- Developing economic policy and stimulating business development.
- Legislation, law enforcement and respect for human rights.
- Issues of labor rights and working conditions.
- Compliance with law and order.
- Attracting investment and business development in the country.
- Protection and promotion of human rights.
- Sustainable development, including social responsibility of business.
- Environment and environmental considerations in business practices.

What's being done for investment?



❑ **Measures to improve the efficiency of investment attraction (12.5.23)**

- timely and smooth implementation of investment projects
- at least 15 major projects in the manufacturing sector - new growth points and the basis for the country's industrial framework
- an ecosystem of related industries and productions with the involvement of SMEs to develop a multiplier effect.



Thanks for your attention!