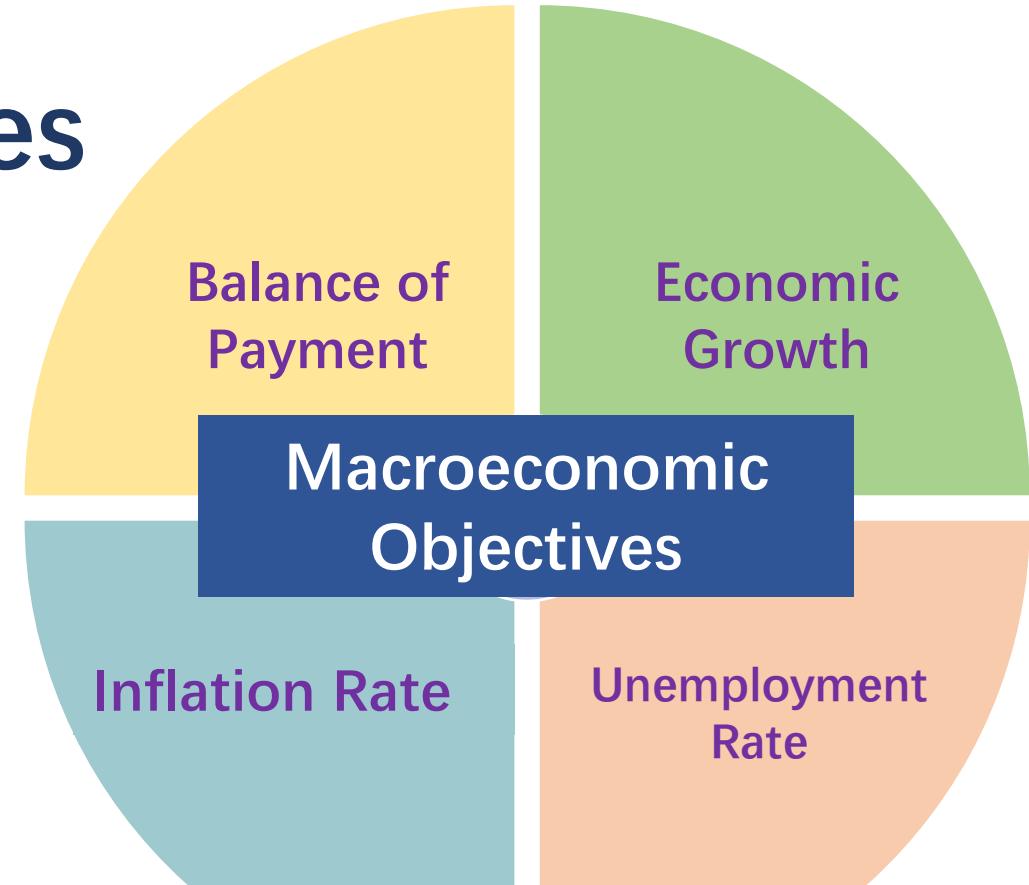




Macroeconomic objectives

- 1. A steady rate of increase in national income, that is, **economic growth**
- 2. A low and sustainable **rate of unemployment** in the economy
- 3. Low and stable **rate of inflation**, that is, price stability
- 4. **balance of payment**



→ Governments set a target inflation rate as a key macroeconomic objective as inflation reduces the purchasing power of money and a country's international competitiveness.

- But what is considered to be a “low and Stable” rate of inflation?
- Is 0% inflation rate desirable?
- Is negative inflation rate desirable?

We will distinguish between different degrees of inflation to know what is a desirable inflation rate.

Deflation is defined as a **sustained decrease** in the general price level.



Inflation is defined as a **sustained increase** in the general price level.

- ‘General price level’ refer to an average of prices of goods and services in the entire economy.
- ‘sustained’ means that the general price level must increase to a new level and not fall back again to its previous lower level.
- Not the price of all goods and services are increasing. Price of some goods and services may be constant or even falling.
- Inflation is more common than deflation

Changes in price level

V.S Changes in the rate of inflation

Distinguish between:

- **Changes in price level:** price level change.
 - price level increase indicates **inflation**
 - Price level decrease indicates **deflation**
- **Changes in the rate of inflation:** how fast the price level is rising.
 - E.g. 1st year 5% increase in price level, 2nd year 7% increase in price level → increase in the rate of inflation
 - E.g. 1st year 10% increase in price level, 2nd year 7% increase in price level → decrease in the rate of inflation (**disinflation – the price level is increasing at a lower rate**)

How to measure the price level change?



The **consumer price index (CPI)** is a measure of the **cost of living**, or the cost of goods and services purchased by the **typical household** in an economy. The index attempts to quantify the aggregate price level in an economy and thus measure the purchasing power of a country's unit of currency.

- It is a weighted index of average consumer prices of goods and services over time.
- **Weighted price index** is a price index that “weights” the various goods and services according to their relative importance in consumer spending.

Measurement of the price level change

-The consumer price index



- It is constructed by a statistical service in each country, which creates a **hypothetical 'basket'** containing thousands of goods and services that are consumed by the typical household in a year.
 - The value of this basket is calculated for a particular year (**base year**) and then subsequent years by multiplying price times quantity for each goods and service in the basket, and adding up to obtain the **total value of the basket**.
- Series of numbers that show the value of the same basket of goods and services for different years. **CPI shows the value of the basket changes from year to year by comparing its value with the base year.**

How to construct the CPI for an economy

In practice, price changes in the CPI are measured on a **monthly basis** but reported for a **twelve-months period**.

Steps:

1. **Collection of the price data** – a sample of prices are collected from a range of retail locations (such as supermarkets and the internet) for a selection of goods/services that are representative of the average household's expenditure. – monthly basis
2. **Assigning statistical weights** – each item of expenditure in the representative list of goods/services is assigned a different statistical weight to represent different patterns of spending over time. it used to reflect the relative importance of household spending on these items.

Two ways:

- a. Volume of quantities purchased
- b. Value of quantities purchased

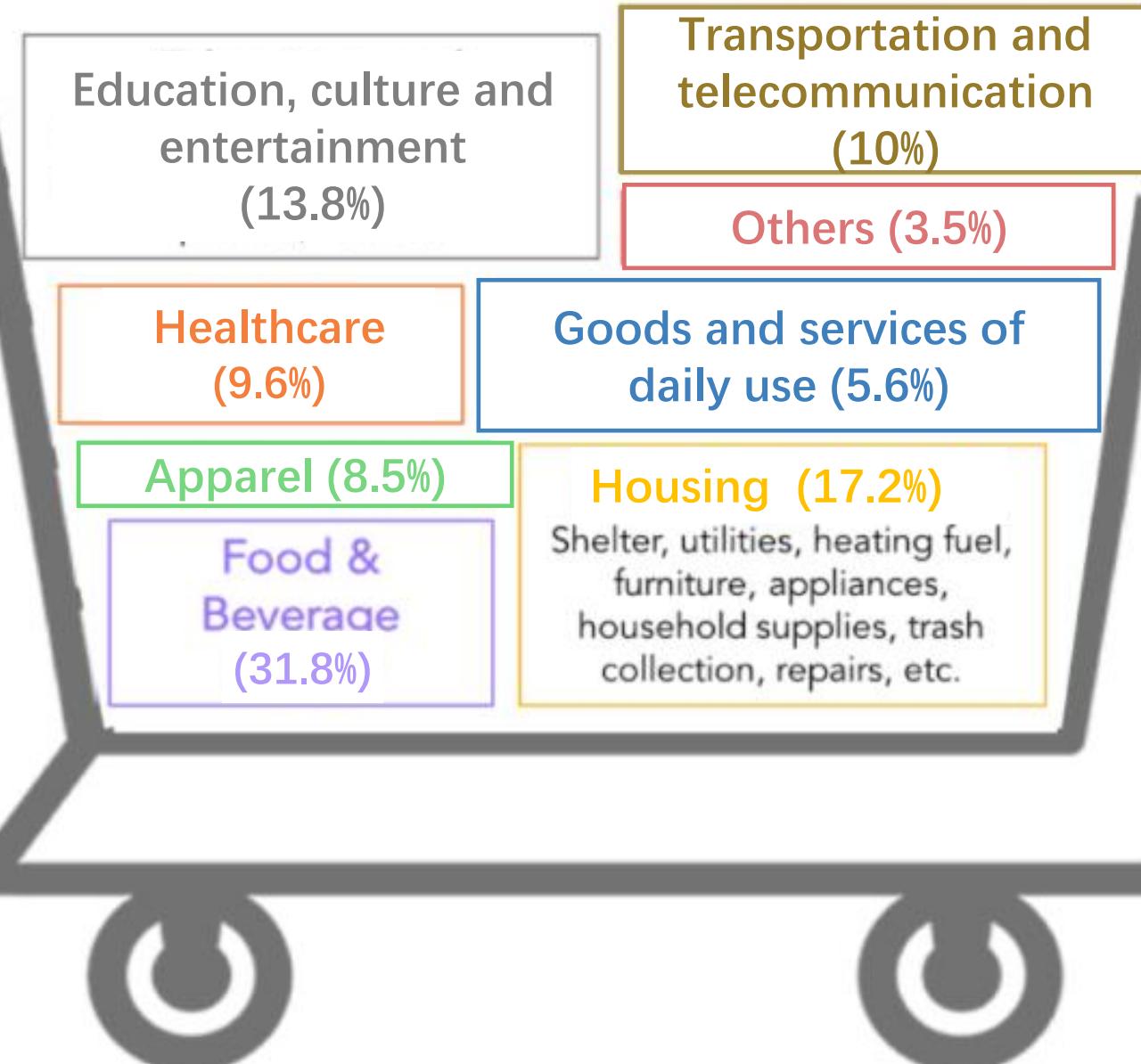
The statistical weights in the CPI are revised periodically in order to reflect changes and trends in the consumption expenditure of a typical household in the economy.

What are covered in the CPI?

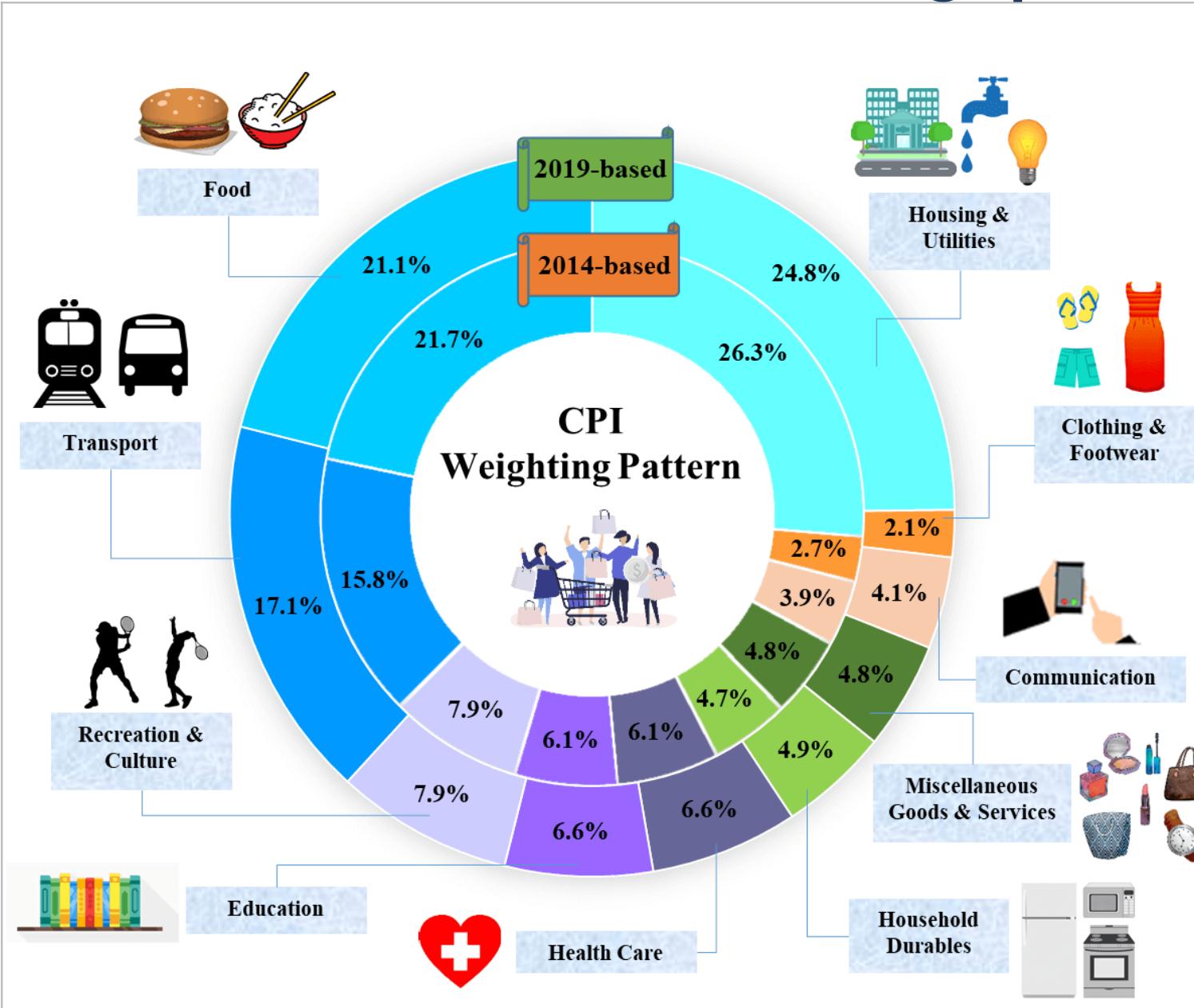
- The CPI represents the **cost of a basket of goods and services** across the country on a **monthly basis**. Those goods and services are broken down into several major groups, different country may have different categories.



CPI categories and weighting of China in 2024



The weighting pattern change from 2014 to 2019 in Singapore



The inflation rate of China in past 6 months



The inflation rate of China in past 10 years



- In the real world, calculations of price indices are complicated as they involve collecting price data on thousands of goods and services and carrying out all necessary computation.
- It is done by specialized statistical services in every country.

Calculation of the CPI

Price index for a specific year =

$$\frac{\text{Value of basket in a specific year}}{\text{Value of same basket in base year}} * 100$$

* *The price level does not matter, but the rate of change of price does.*



Simple example: how to Constructing a consumer price index

Step 1: Choose the base year → 2017

Step 2+3: Calculate the total value of basket goods and services in base year.

Step 4: Calculate the 2018 and 2019 value of the basket.

Good and services	Quantity (no. of units) in basket (weights)	Price of basket goods and services in base year (2017)	Value of basket goods and services in base year (2017)	Price of basket goods and services in 2018	Value of basket goods and services in 2018	Prices of basket goods and services in 2019	Value of basket goods and services in 2019
Burgers	37	\$3	\$111	\$4	\$148	\$5	\$185
Movie tickets	25	\$15	\$375	\$14	\$350	\$16	\$400
Haircuts	15	\$18	\$270	\$20	\$300	\$21	\$315
Total value of basket			\$756		\$798		\$900

Simple example: how to Constructing a consumer price index

Step 5: calculate the price index for each year.

Good and services	Quantity (no. of units) in basket (weights)	Price of basket goods and services in base year (2017)	Value of basket goods and services in base year (2017)	Price of basket goods and services in 2018	Value of basket goods and services in 2018	Prices of basket goods and services in 2019	Value of basket goods and services in 2019
Burgers	37	\$3	\$111	\$4	\$148	\$5	\$185
Movie tickets	25	\$15	\$375	\$14	\$350	\$16	\$400
Haircuts	15	\$18	\$270	\$20	\$300	\$21	\$315
Total value of basket			\$756		\$798		\$900

Price index for 2017 = $756/756 \times 100 = 100$ (base year always equals to 100)

Price index for 2018 = $798/756 \times 100 = 105.50$

Price index for 2019 = $900/756 \times 100 = 119$

Using the CPI to calculate the rate of inflation

Year	2017	2018	2019
Consumer price index	100.0	105.5	119.0
Value of basket	\$756	\$798	\$900

The rate of inflation = the % change in the price index
= the % change in the value of the basket

$$\rightarrow \text{The rate of inflation}(2017 \text{ to } 2018) = (105.5 - 100) / 100 * 100\% = 5.50\% \text{ OR } 105.50 - 100.00 = 5.50\%$$

$$\rightarrow \text{The rate of inflation}(2017 \text{ to } 2019) = (119 - 100) / 100 * 100\% = 19\%$$

$$\rightarrow \text{The rate of inflation (2018 to 2019)} = (119 - 105.5) / 105.5 * 100\% = 12.80\%$$

OR

$$\rightarrow \text{The rate of inflation}(2017 \text{ to } 2018) = (798 - 756) / 756 * 100\% = 5.50\%$$

$$\rightarrow \text{The rate of inflation}(2018 \text{ to } 2019) = (900 - 756) / 756 * 100\% = 19\%$$

$$\rightarrow \text{The rate of inflation (2018 to 2019)} = (900 - 798) / 798 * 100\% = 12.80\%$$

When the price level is presented as a price index, the rate of inflation is equal to the index number of any year minus the index number of the base year (always 100).

Exercise

- Using the following data, to construct a consumer price index
- Calculate the price index for 2019 and 2020
- Calculate the inflation rate from 2019 to 2020.

Item	Price per unit in 2019	Price per unit in 2020	Quantity in basket
Pizza	\$8	\$10	6
Cinema ticket	\$9	\$10	3
Public transport	\$4	\$5	15

Exercise answer

- Using the following data, construct a consumer price index

Item	Price per unit in 2019	Price per unit in 2020	Quantity in basket	Value of basket in 2019	Value of basket in 2020
Pizza	\$8	\$10	6	\$48	\$60
Cinema ticket	\$9	\$10	3	\$27	\$30
Public transport	\$4	\$5	15	\$60	\$75
Total basket price				\$135	\$165

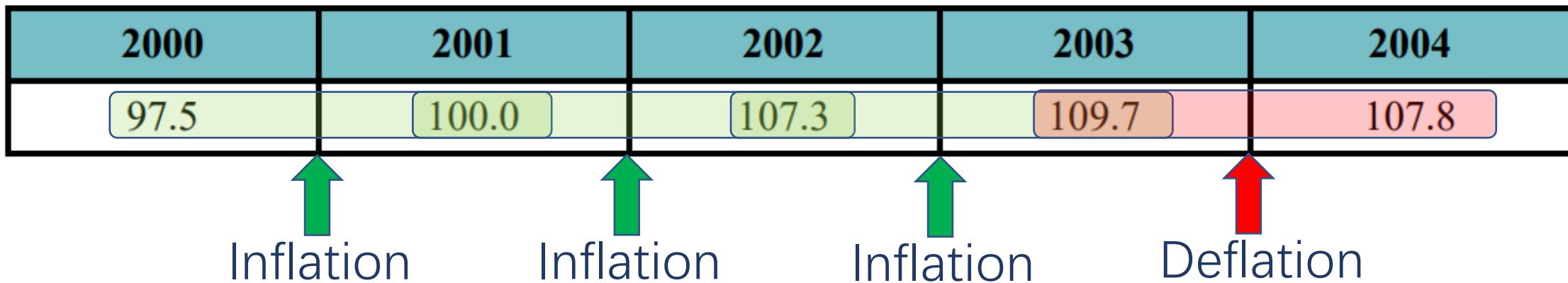
Price index for 2019 = $135/135 \times 100 = 100$

Price index for 2020 = $165/135 \times 100 = 122.22$

Inflation rate = $(165-135)/135 \times 100 = 22.22\%$

Distinguish inflation and deflation

- Base year: 2001



Caution during comparison



1. Make sure it uses the **same basket of goods and services**.
2. Make sure it uses the **same base year**

Problems with the consumer price index (CPI)

1. Different rates of inflation for different income earners.

- The CPI only considers the expenditure of the ‘average’ household, whatever this might actually mean in multicultural and diverse societies in the real world.
- Different income earners may have **different consumption patterns** depending on their income levels.

2. Different rates of inflation depending on regional or cultural factors.

- Variations in taste and product purchased due to cultural and regional factors.
- Prices tend to rise faster in central business districts than in rural areas of the country.

Problems with the consumer price index (CPI)

3. Changes in consumption patterns due to consumer substitutions when relative prices change.

- When the price of good/services become cheaper or more expensive over time, consumers make substitutions, buying more units of the cheaper goods and less units of the more expensive one. → **changing weights**
- The changes in consumption patterns cannot be accounted for in CPI.
- The CPI gives a misleading impression of the degree of inflation, usually overstating it.

Problems with the consumer price index (CPI)

4. Changes in consumption patterns due to increasing use of discount stores and sales.

- When consumers buy goods/services at discount stores and sales, with lower price than those used in CPI calculations → the CPI tends to overstate inflation.

5. Changes in consumption patterns due to introduction of new products.

- A fixed baskets of goods/services cannot account for new products introduced into the market, as well as older products that become less popular or are withdrawn.

Problems with the consumer price index (CPI)

6. Changes in product quality.

- The CPI cannot account for quality changes over time.
- E.g. televisions, computers, cars and smartphones.

7. International comparison.

- Different countries have different goods/service type and weighting included in the basket. It limits the comparability of CPIs and inflation rates from countries to countries.
- E.g. housing costs are extremely high in H.K. PRC and Singapore, but far more affordable in Hungary or Scotland.

8. Comparability over time.

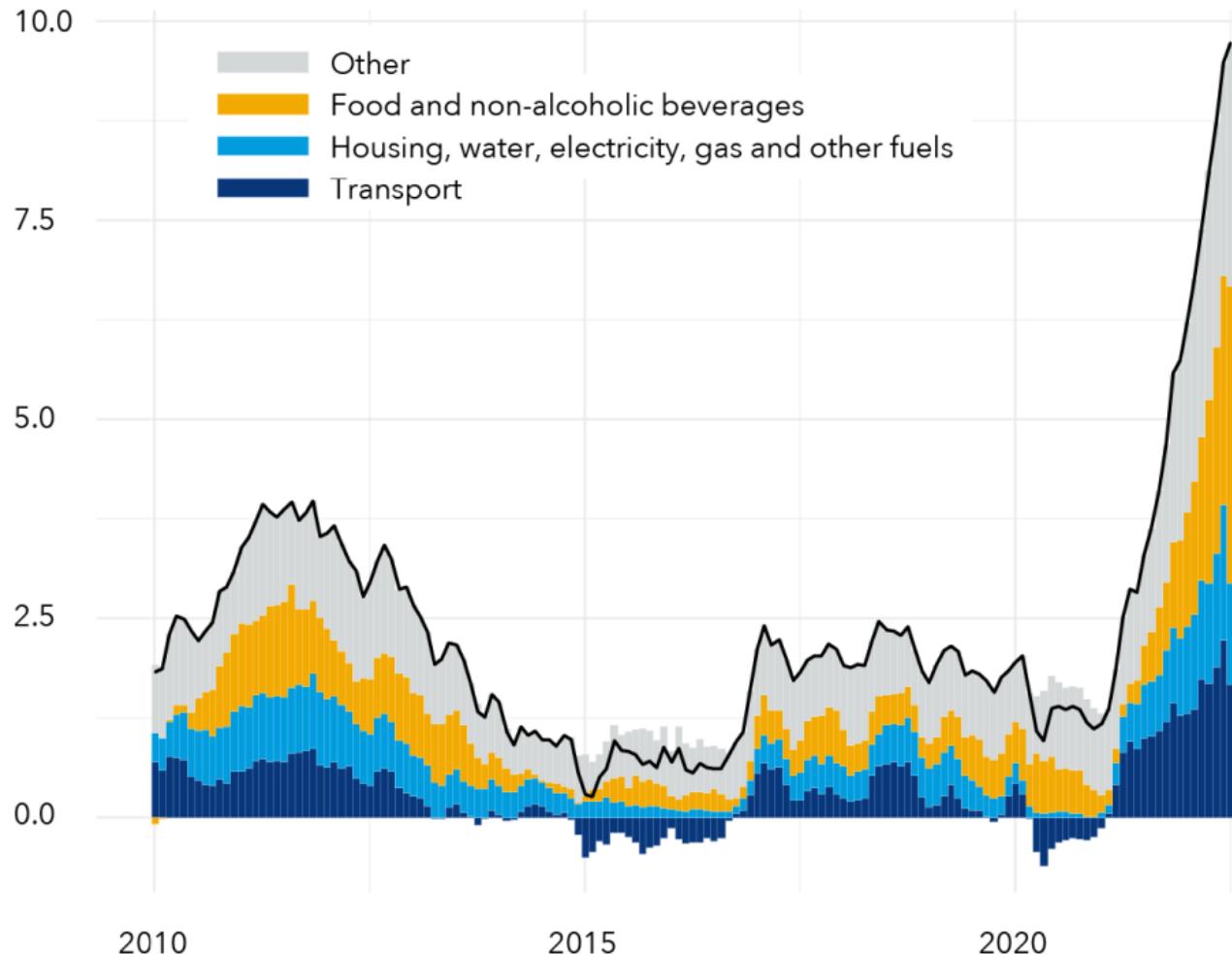
- All countries periodically revise their CPI baskets and change the base year to try to deal with many of the problems mentioned above.
- CPI can only be comparable over short periods of time because of cumulative changes in the basket of goods and services.

The core rate of inflation

- There are certain goods that have highly volatile prices. When these kind of goods are included in CPI, they may give rise to misleading impressions regarding the rate of inflation.
- A CPI that does not include food and energy products with highly volatile prices.

Inflation drivers

Food and energy prices continue to drive the global inflation surge.
(percent, median inflation rate)



Source: IMF CPI database and IMF staff calculations.

Note: Chart shows median total inflation and in select categories across 88 countries, including 28 advanced economies and 60 emerging and developing economies.

Two main causes of inflation

Demand pull

Cost push

**When there
is excess
demand**

**When costs
rise**

Demand-pull inflation



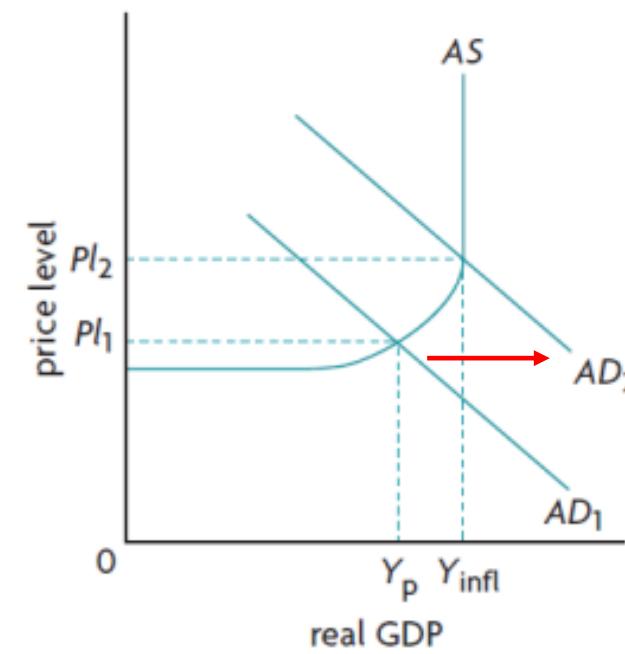
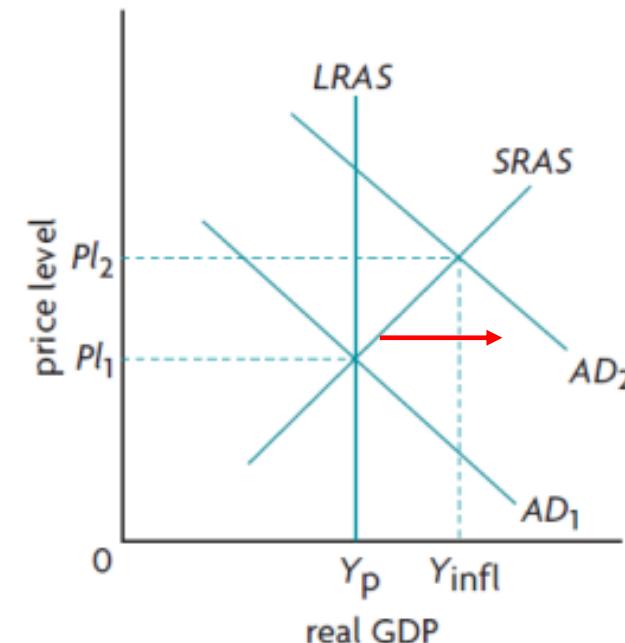
Too much of money chasing too few goods



- **Demand-pull inflation** is caused by increases in aggregate demand, in turn brought about by changes in any of the determinants of aggregate demand.
- Originates from “**buyers' side of the market**”
- An **increase in any component of aggregate demand** (consumption, investment, government spending and net exports) will cause demand-pull inflation.

Demand-pull inflation

- The economy is initially at full employment equilibrium producing potential GDP Y_p .
 - An increase in aggregate demand (e.g., income tax cut), AD curve shift from AD_1 to AD_2 .
 - The price level increased from PL_1 to PL_2 , real GDP increased from Y_p to Y_{infl} .
- **Inflationary gap**: real GDP>potential GDP, unemployment rate < natural rate of unemployment.



Cost-push inflation

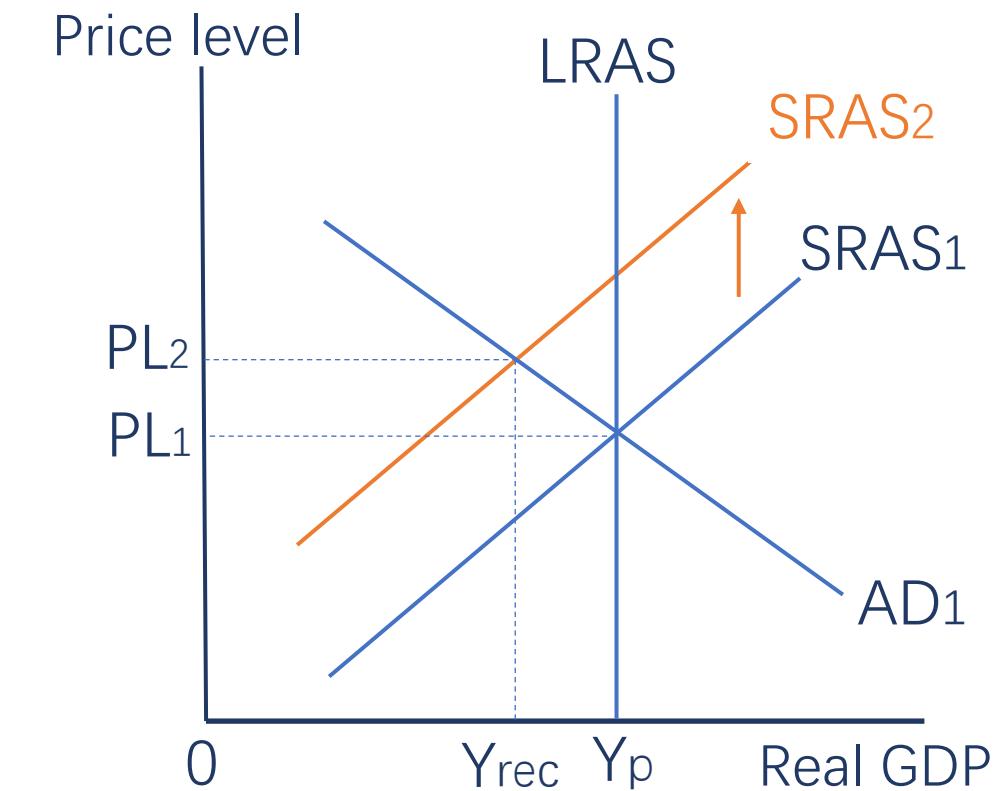
Definition: A type of inflation caused by a **fall in aggregate supply**, usually resulting from **increases in cost of production or supply-side shocks**, shown in the AD-AS model as a leftward shift of the SRAS curve.

- Cost-push inflation is analyzed only by means of the monetarist/new classical AD-AS model. The Keynesian model is not equipped to deal with short-term fluctuations of aggregate supply.
- **Causes of cost-push inflation** include:
 - increase in wages (wage push inflation)
 - increase in cost of raw materials
 - increased cost of imported components



Illustration of cost-push inflation

- Economy is initially at the full employment level of output, Y_p .
- Suppose there is an **increase in cost of production** (such as higher raw material prices or soaring rents), it forces firms to raise their prices in order to maintain their profit margins. Diagrammatically, **SRAS₁ shift to SRAS₂**, leading to an increase in the price level **PL₁ to PL₂**.
→ A fall in equilibrium level of real GDP from **Y_p to Y_{rec}** .



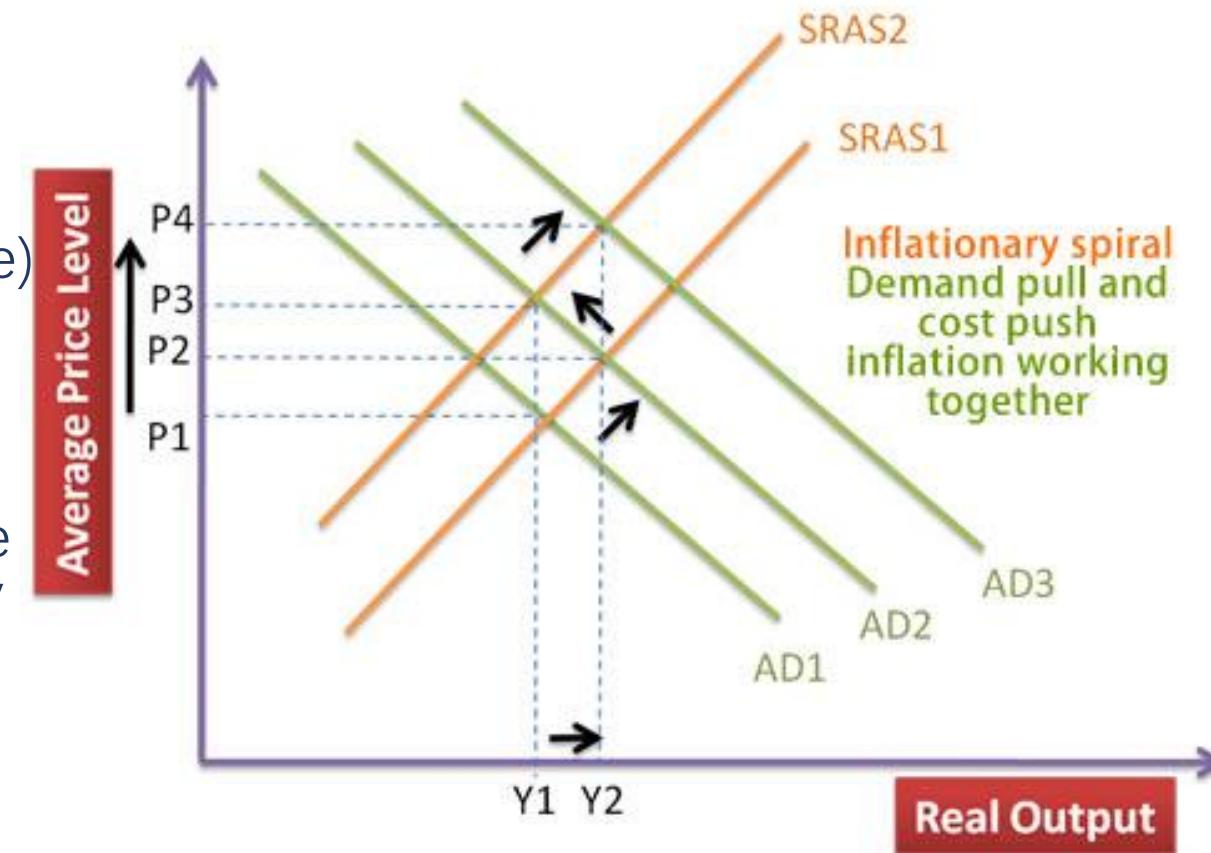
Inflationary Spiral (price-wage spiral)

- a continuous rise in prices that is sustained by the tendency of wage increases and cost increases to react on each other. It is self-sustaining upward trend in general price levels due to interaction of demand pull and cost push inflation.
- Demand pull inflation occur results in higher price level ($AD_1 \rightarrow AD_2$, $PL_1 \rightarrow PL_2$)

→ There will be demands for higher wages (e.g. trade unions negotiate higher wages for their members, government set higher minimum wage)

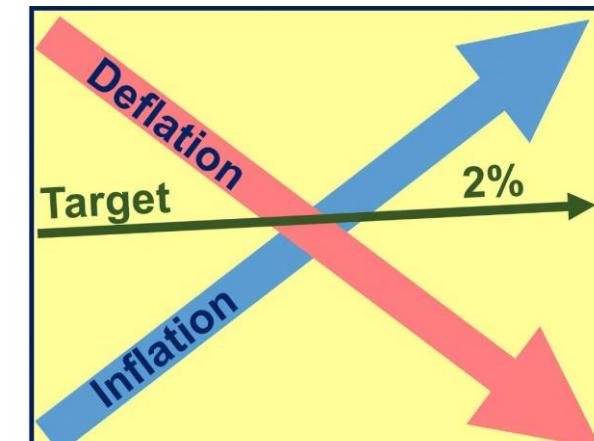
→ Cost of production up forcing firms to increase prices, **SRAS₁ shift to SRAS₂**.

→ Consumers increase their spending to benefit from the current price before they increase in the future or government increase the money supply to stimulate the economy, Price level increase which in turn trigger calls for fresh wage increases ... and so on. (**AD shift to the right, SRAS to the left**)



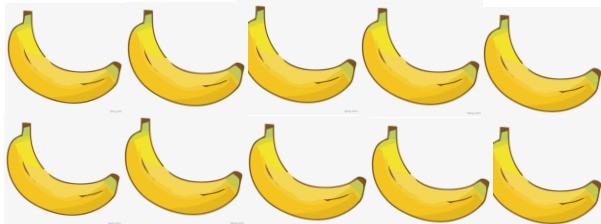
Appropriate rate of inflation?

- Most governments prefer a low and stable rate of inflation, not a zero rate of inflation.
 - A zero rate of inflation is not preferred because it comes dangerously close to deflation.
- There is no one particular rate of inflation that is ideal, but many governments would like to see this in the range of about 2-3% per year.
- Less than 2%: coming close to deflation
 - More than 4%: too high



Nominal income & Real income

- **Purchasing power** refers to the quantity of goods and services that can be bought with money.



Price = ¥2/banana



¥20

- Nominal income = ¥20
- **Real income = purchasing power**
- If the rate of inflation is 100%, the average price of all goods and services in the economy has risen by 100%, Your purchasing power (the amount you can buy) has been reduced dramatically.
- As the price of the banana increase, minion's **real income** decrease.



Price = ¥4/banana



¥20



Nominal income vs. real income

- The CPI could be used to calculate the real income.

$$\text{Real Income} = \frac{\text{Nominal Income}}{\text{CPI}} * 100$$

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP deflator}} * 100$$

Inflation and purchasing power

- Changes in real income, money income and the general price level are related to each other in the following way:

$$\text{% change in real income} \quad (\text{purchasing power}) = \text{% change in nominal income} - \text{% change in the price level (rate of inflation)}$$

- Real income is the amount of money you have and the purchasing power of that money, based on the rate of inflation.
- If there is 5% increase of your nominal income and the annual inflation rate is 3%, then your real income has increased by $5\% - 3\% = 2\%$.

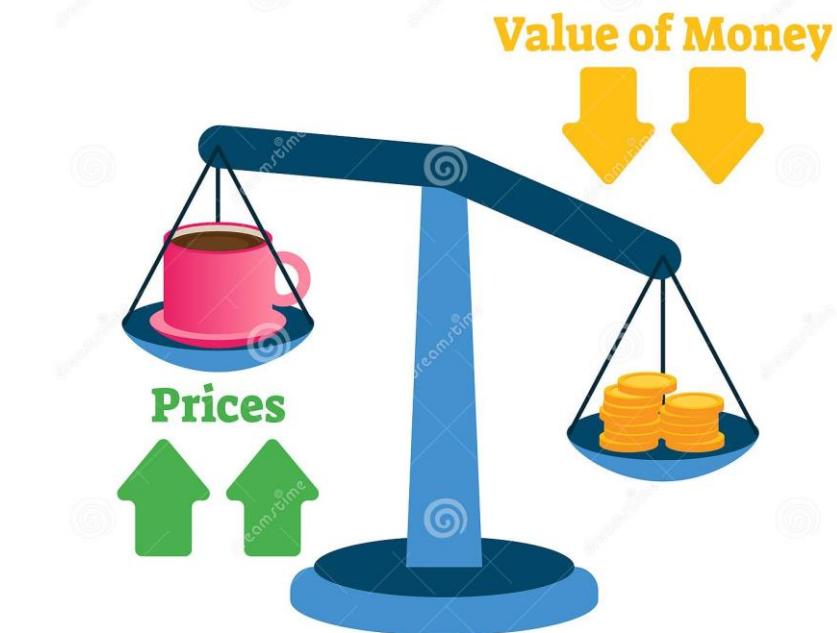
→ The price level does not matter, but the rate of change of price does.



Costs of inflation (AO3)

Inflation diminishes the ability of money to function as a medium of exchange. This means the real purchasing power of households, firms and governments declines when there is inflation. This is because there is a **fall in real national income** as money is worth less than before.

1. Redistribution effects
2. Uncertainty
3. Effects on saving
4. International (export) competitiveness
5. Effects on economic growth
6. Effects on resource allocation
7. Social and personal costs that are unequally distributed.



Costs of inflation

1. Redistribution effects

- Inflation redistributes income away from certain groups in the economy and towards other groups.

Better off



Worse off

Redistribution of wealth
Salary:
 $\text{¥}100 + \text{¥}5 = \text{¥}105$



Employee
receive fixed
income

Costs of inflation

1. Redistribution effects

Better off

Worse off

- Payers of fixed incomes or wages
 - People who receive fixed incomes or wages
 - Workers have wage contracts fixing their wages over a period of time
 - Pensioners receive fixed pensions
 - Landlords receive fixed rental income
 - Individuals receive fixed welfare payments.
 - People who receive incomes or wages that increase less rapidly than the rate of inflation.
 - Holders of cash
- Payers of incomes or wages that increase less rapidly than the rate of inflation.

Costs of inflation

1. Redistribution effects



=



In 2022



Lender



In 2023



Lender



¥100



¥105 (100+interest)



1.



Borrower



Borrower

5% interest
rate

5% interest
rate

5% inflation
rate



Costs of inflation

1. Redistribution effects

Better off

➤ Borrowers (debtors)

- Borrowing at a lower interest rate than the rate of inflation makes the borrower better off at the end of the load period. The money they need to repay is worth less than when they initially borrowed it.



Worse off

➤ Lenders (creditors)

- People (or financial institutions) who lend money may be worse off due to inflation. The real value of the money returned to lenders in the future is lower.

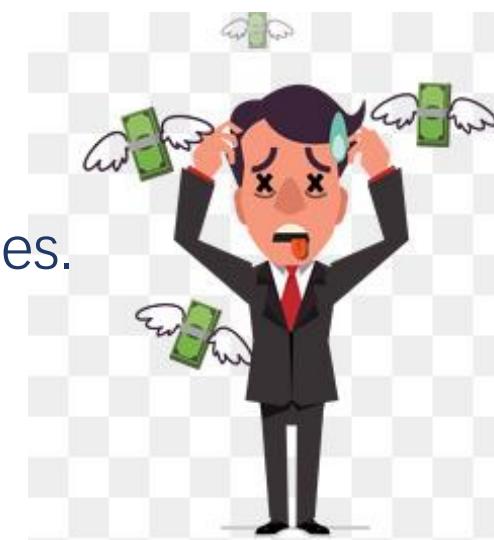
➤ Savers: people who save money.

- In order to maintain the real value of their savings, savers must receive a rate of interest that is at least equal to the rate of inflation.
- Interest rate = inflation rate → no loss
- Interest rate < inflation rate → loss

Costs of inflation

2. Uncertainty

- Inflation reduces the real value of money, so **lower the purchasing power** of households and firms in the economy.
- This creates uncertainty, especially when the inflation rate is very high, thereby **reducing business confidence levels**.
- **Inability to accurately predict** what inflation will be in the future means that people cannot predict future changes in purchasing power (of income, wealth, loans and anything else that is measured in terms of money)
 - Uncertainty among economic decision-makers, firm particularly.
 - Firms become more cautious about making future plans, because they cannot make accurate forecasts of costs and revenues.
 - Fewer investments
 - lower economic growth



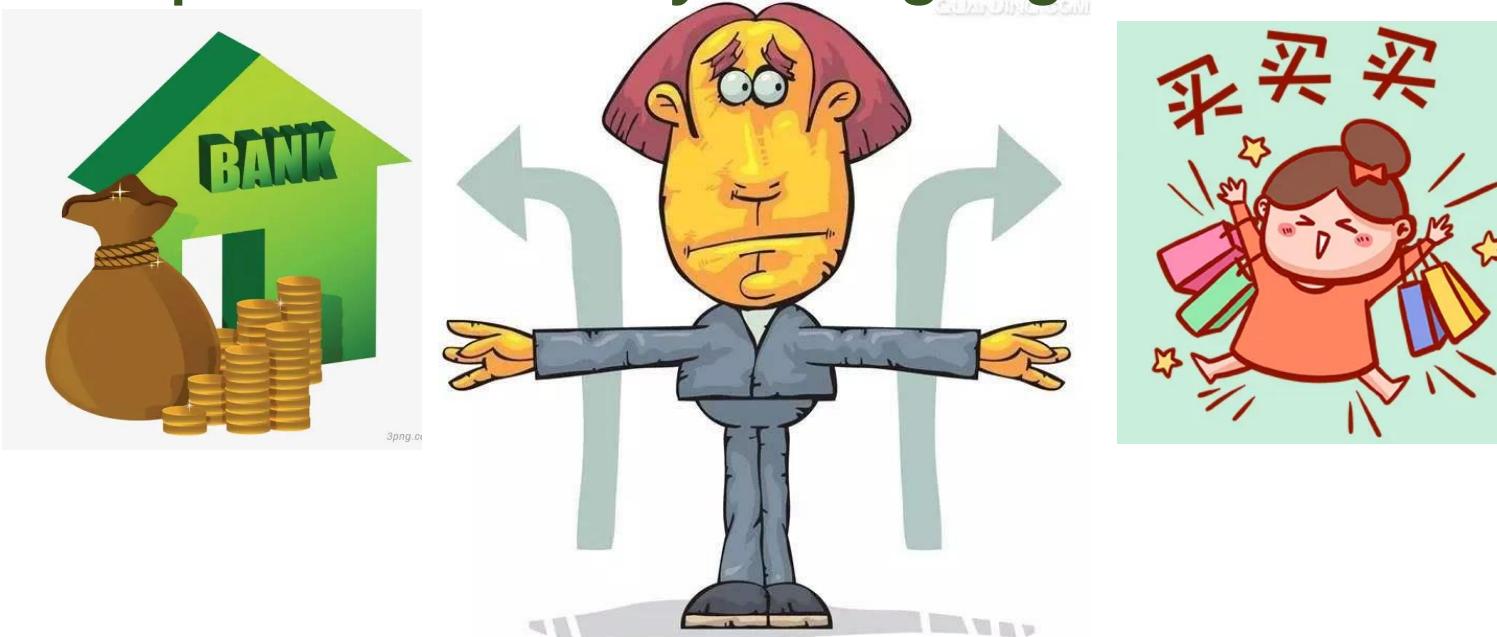
Costs of inflation

3. Effects on saving

- When there is inflation, **savers lose** if they receive no interest or interest rate lower than inflation rate on their savings.
- Inflation reduces the real rate of return for savers, thus it **lowers the incentive to save** as money becomes less effective as a store of value.
- This is particularly harmful to the elderly, who often have to rely on the interest on their savings as a source of income.
- **Expectation of future:** if the rate of inflation is high, people may spend more now in order to avoid high prices in the future, leading to lower future saving.
- Lower saving means **less available fund for bank** to lend out as investment.



Whether we should save the money or spend the money during high inflation?



- Inflation discourages people to save, People may decide to consume before the price rise even higher, also they may buy assets such as houses or artworks.
- As saving is the source of bank to lend to others, less saving means less funds for investment → negative impact on growth

Costs of inflation

4. International(export) competitiveness



If a country has persistently higher inflation rates than its trading partners:

Export

- Exports become more expensive for foreign consumers
→ lower international competitiveness of domestic firms. → lower sales and profitability
 - slower economic growth with higher unemployment. → exporters worse off
- High inflation will damage a country's **export competitiveness**
- **Balance of payment deficit (import>export)** → lower economic activity and higher unemployment.

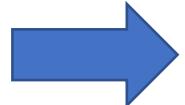
Import

- Imports become relatively cheaper for domestic consumers & firms
→ they choose to substitute domestic products for imported ones.
 - * Problems for countries that are heavily reliant on essential imports (petroleum, steel, etc.) – inelastic of demand → lower purchasing power means higher cost of production. → higher product prices

Costs of inflation

5. effects on economic growth

- **High inflation rate → uncertainty among firms → investment decrease**
 - The combination of uncertainty and the lower expected real rates of return on capital investment (due to higher cost of production) tends to lower the amount of planned investment in the economy.
 - In the long run, a lack of investment expenditure due to lower business confidence levels might damage the country's productive potential and productivity.
- **High inflation rate → lower saving → investment decrease**
 - Lower saving means less funds for banks to lend out for investment.
- **Higher inflation rate → higher wage → profit margin decline**
 - Workers are more likely to demand a pay rise during times of inflation in order to maintain their level of real income and spending power. As a result, labour cost rise and profit margins decline.
 - Consumption is also likely to fall due to higher price level, employers tend to lose out from inflation.
- **High inflation rate → lower exports and higher imports → fall in net export**



A fall in aggregate demand, lower real GDP

Costs of inflation

6. Effects on resource allocation

- High inflation can cause inefficiencies in the economy as higher prices can distort resource allocation.
 - If prices are rising rapidly, the signaling and incentive functions do not work effectively.
 - The price do not increase in the same proportion for all products, they rise more for some products than for others, meaning that the signals and incentives they provide for consumers and producers become distorted and therefore inaccurate.
- Allocative inefficiency.

Costs of inflation

7. social and personal costs that are unequally distributed

- People on **fixed incomes** suffer losses as their income loses its purchasing power.
- **People on low incomes** are more seriously affected by high rates of inflation than people with **higher incomes**.
 - Low income people don't put their savings in assets(real estate, stocks in the stock market, gold, jewelry) that do not lose its value with inflation.
 - Rising prices of necessities such as food and energy needed for heating can cut deeply into the incomes of lower income people.



Hyperinflation

- Hyperinflation occurs when the price level increases by more than 50% per month, though it can reach thousands or even millions of percentage points per year.
- Hyperinflation results from very significant increases in the supply of money, which impact directly on the price level.
- Hyperinflation occur when governments resort to printing money.



What Causes Hyperinflation?



It starts when a country's government begins printing money to pay for its spending

Instead of tightening the money supply to stop inflation...



...the government keeps printing more

Hyperinflation is when the prices of goods and services rise more than 50% in a month



As the government increases the money supply, prices rise as in regular inflation



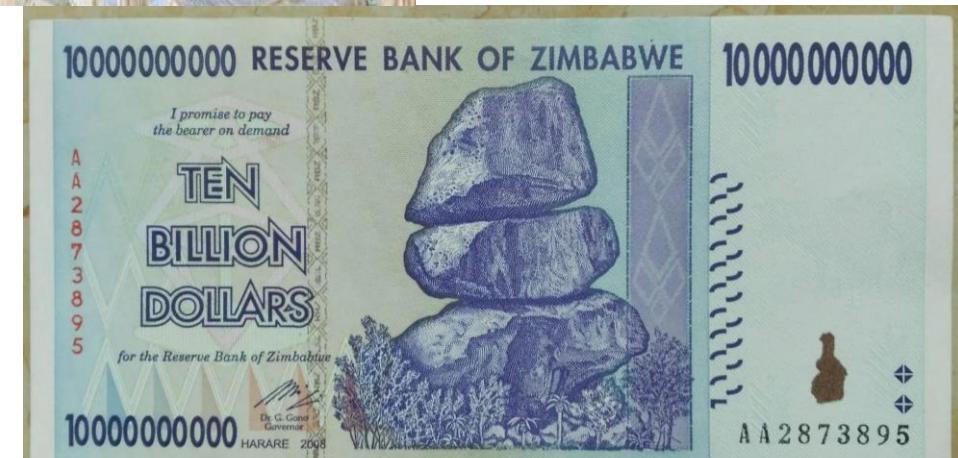
With too much currency sloshing around, prices skyrocket



2008, Zimbabwe, inflation rate: 79600000000%

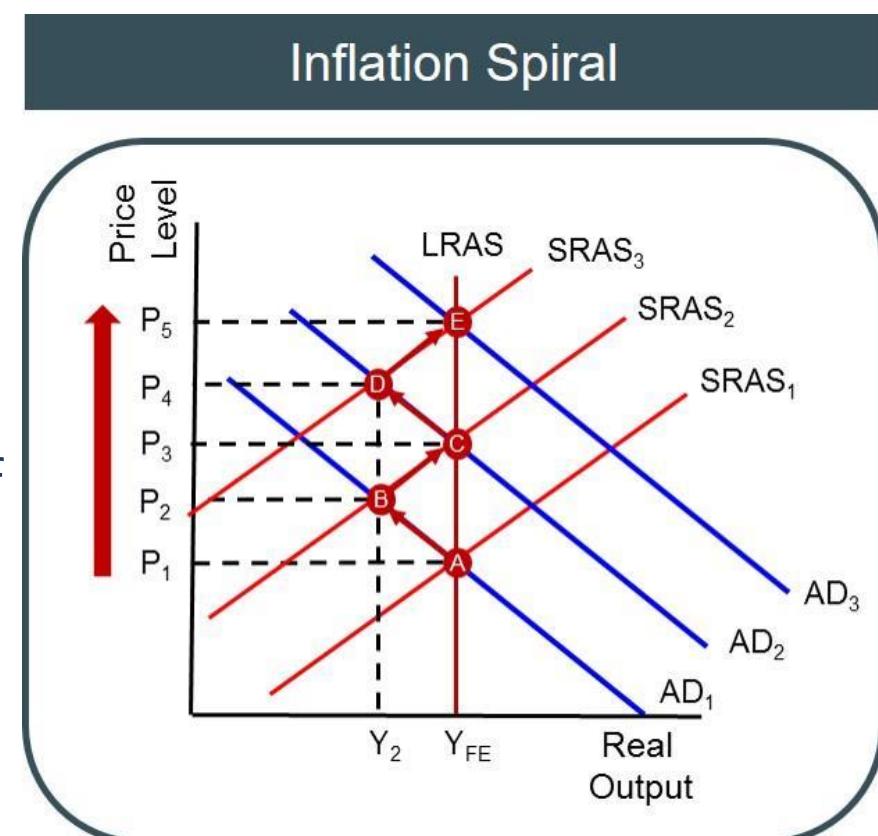


10 billion
note



Consequences of hyperinflation

- Consumers increase their spending to benefit from the current price before they increase in the future → **demand-pull inflation**.
 - Workers demand higher nominal wages to maintain the real value of their current and future incomes, thereby feeding → **cost-pull inflation**.
- **Inflationary spiral** is created which is a process where inflation sets in motion a series of events that worsen the inflation.



Consequences of hyperinflation

- **Businesses** stop investing in productive activities and invest instead in assets that are believed to maintain their value as price rise (gold, real estate, jewels, etc.)
- **Businesses** withhold goods from sale in the market so that they can sell them later at higher prices.
- **Lenders** suffer massive losses as the real value of debts falls dramatically.
- Political and social unrest.



People stop using their currency



Prices shoot up on a daily basis



People start hoarding basic products

Why deflation occurs rarely in the real world?

- It is common that the price of a particular good or service may fall over time, but it is rare to see the general price level of an economy falling.
 - A one month dip in prices does not count as deflation.
 - Sustained decreases in the prices of a few goods do not count as deflation.
- **The reasons are:**
 - Wages of workers do not ordinarily fall.
 - Sticky wage → difficult to lower the cost of production → sticky product price
 - Large oligopolistic firms may fear price wars
 - If one firm lower the price, others may lower theirs more aggressively to capture market share, then all the firms will be worse off.

Causes of deflation

1. Decreases in aggregate demand

- An decrease in aggregate demand due to loss of consumer confidence from **AD₁ to AD₂**. (relative long period of persisting low AD)

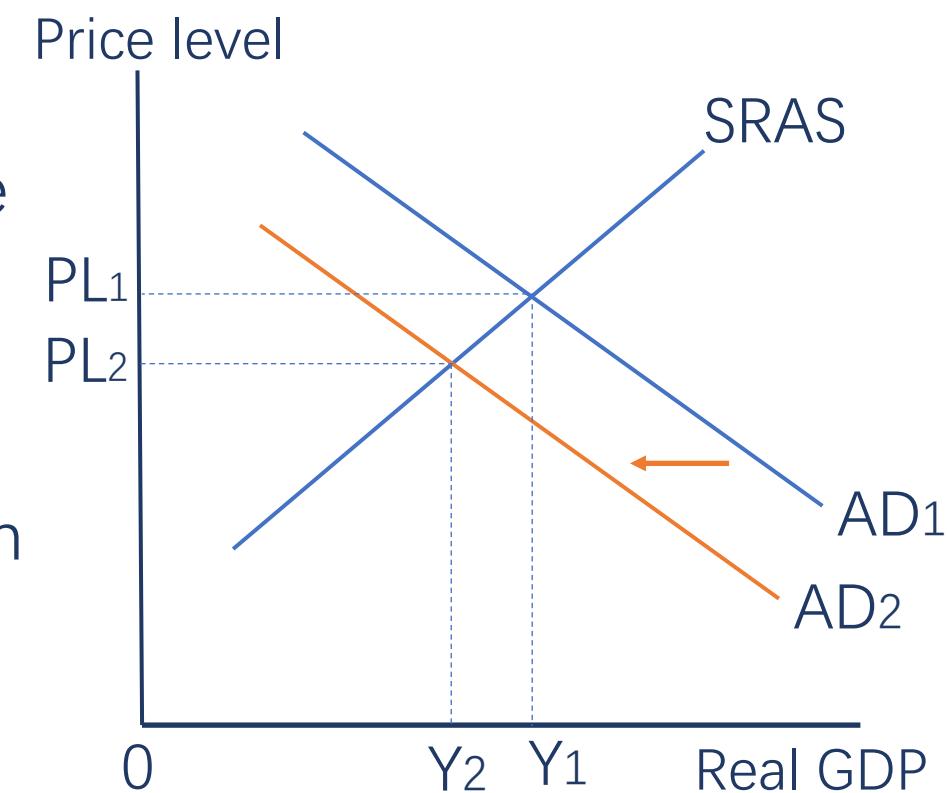
→ The price level falls from **PL₁ to PL₂**.

→ Real GDP falls from **Y₁ to Y₂**.

→ It often associated with recession, falling income and output, cyclical unemployment.

→ “**Bad deflation**”

Examples: 1930's great depression. The deflation in Japan since 2000.

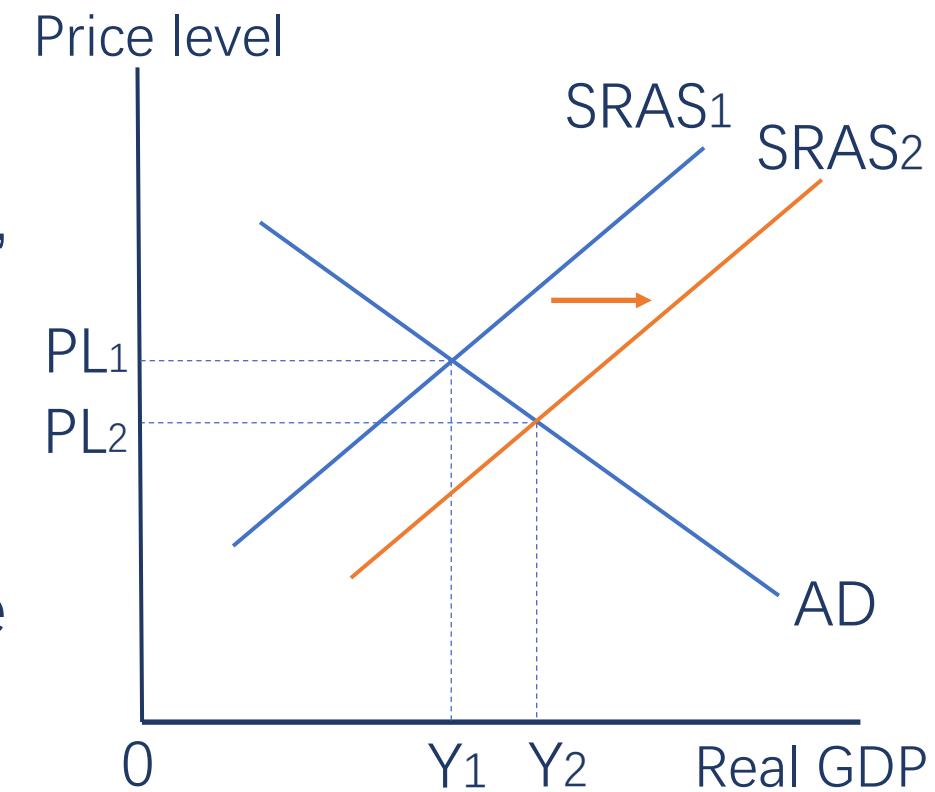


Causes of deflation

2. Increases in aggregate supply

- An **increase in aggregate supply** due to decreasing resource price, from $SRAS_1$ to $SRAS_2$.
 - The price level falls from PL_1 to PL_2 .
 - Real GDP increase from Y_1 to Y_2 .
- It often associated with economic expansion, rising income and output, increasing employment.
- “**Good deflation**”

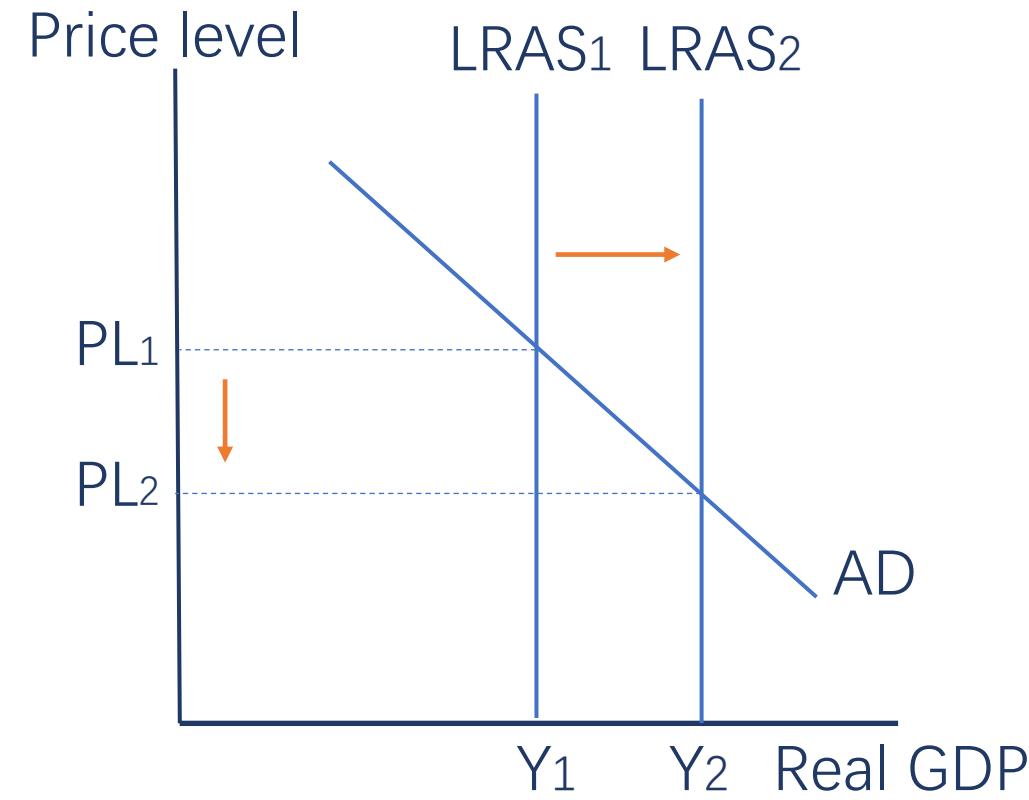
Examples: the deflation of Britain and US in the late 19th century.



Causes of deflation

3. outwards shift of the economy's LRAS

- Deflation can come about by an **outward shift of the economy's LRAS**.
 - E.g. policies to increase the quantity and quality of factor resources, such as investments in human resource and 5G telecommunications technologies, can boost the economy's production capacity in the long-term, thereby increasing the country's national output without prices having to increase.
 - LRAS curve shift rightwards from **LRAS₁** to **LRAS₂**, this increases real GDP from Y_1 to Y_2 and the price level decrease from PL_1 to PL_2 .
- “good deflation”



Costs of deflation - Deflation is considered by economists to be a greater threat than inflation.

1. Redistribution effects - Opposite of those of inflation.

- Deflation causes a **fall in the value of assets and household wealth**. Owning to declining profitability, share prices fall during times of deflation. Dividends and the capital returns on holding shares and other fixed assets also fall.
- Deflation also leads to a redistribution of income and wealth from **borrowers to lenders**, since the real value of debts will increase (also higher real interest rate). Owing to the uncertainties and instability caused by deflation, many debtors may default on their loans (fail to repay their escalating debts)

Better off

- Individuals on fixed incomes
- Savers and lenders
- Holders of cash

Worse off

- Payers of individuals on fixed income
- Borrowers

Costs of deflation

2. Increase in the real value of debt

- Higher real value of the debt. E.g. When you own \$1000, when the price level falls, the real value of your debt (in terms of its purchasing power) increases.
- Higher real interest rate

3. Uncertainty

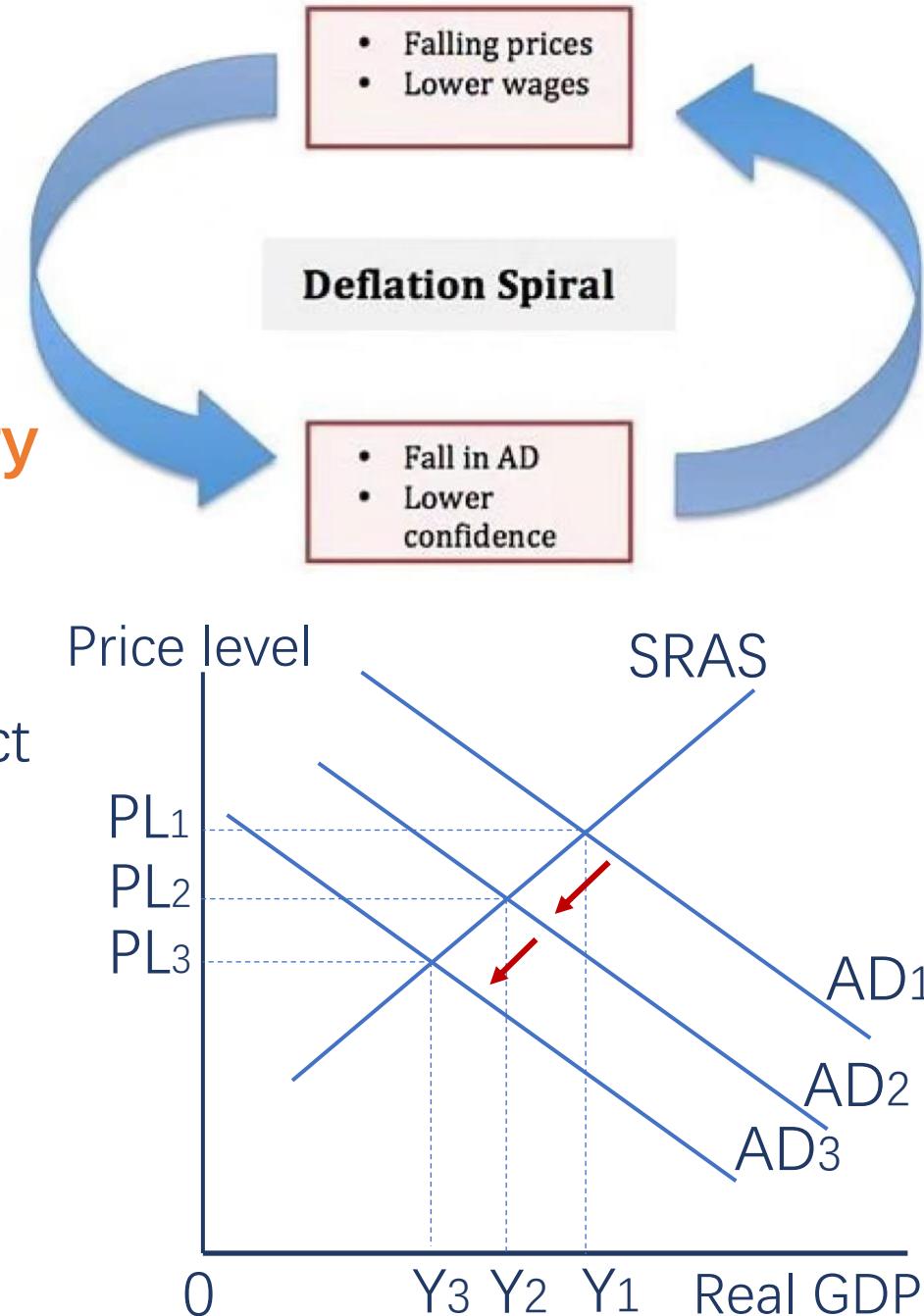
- Firms are **unable to forecast their costs and revenues** due to declining price level.
- With deflation, there is a subsequent increase in the real value of debts, so this reduces both consumer and business confidence levels.
 - Consumer: limit their consumption expenditure
 - Firms: less incentive to invest. Because during periods of deflation they **receive lower prices and hence, lower profitability.**

→ Negative impact on unemployment and economic growth

Costs of deflation

4. Deferred consumption, high and increasing cyclical unemployment: risk of a deflationary spiral

- Deferred consumption means that **consumers postpone spending**. Consumer postpone making purchases when they see falling prices as they expect that prices will continue to fall.
 - Deflation discourages spending.
 - Deflation discourages borrowing. – the real value of debt increases as the price level falls.
 - Aggregate demand falls
 - lower real GDP and cyclical unemployment
 - Price level fall further



Costs of deflation

5. Risk of bankruptcies and a financial crisis

- Deflation result in increasing real value of debt.
- If the economy is in recession, Since the incomes are falling and the real value of debt is increasing, firms and consumers who are unable to pay back their debts night go bankrupt.
- Widespread bankruptcies will affect banks and financial institutions
→ risk of financial crisis arises.

Costs of deflation

6. Inefficient resource allocation

- The signaling and incentive function of price are unable to work effectively → inefficient resource allocation (resource misallocation)

7. Policy ineffectiveness

- When People's expectations of a falling price level become well established, they used to spending less, it might be difficult to change their mindset.
- Expansionary monetary policy of reducing interest rate to encourage more spending and borrowing may become ineffective. As once the interest rate approaches zero, they cannot continue to fall.

Positive effect of deflation

- Deflation increase international competitiveness.
 - Lower price → increasing exports because foreign consumers now prefer buying from the country with lower price.
 - Lower price → decreasing imports because domestic consumers prefer the lower-price domestically produced goods.
- Net export ($X-M$) increase
- AD increase → Real GDP increase

Inflation and Unemployment

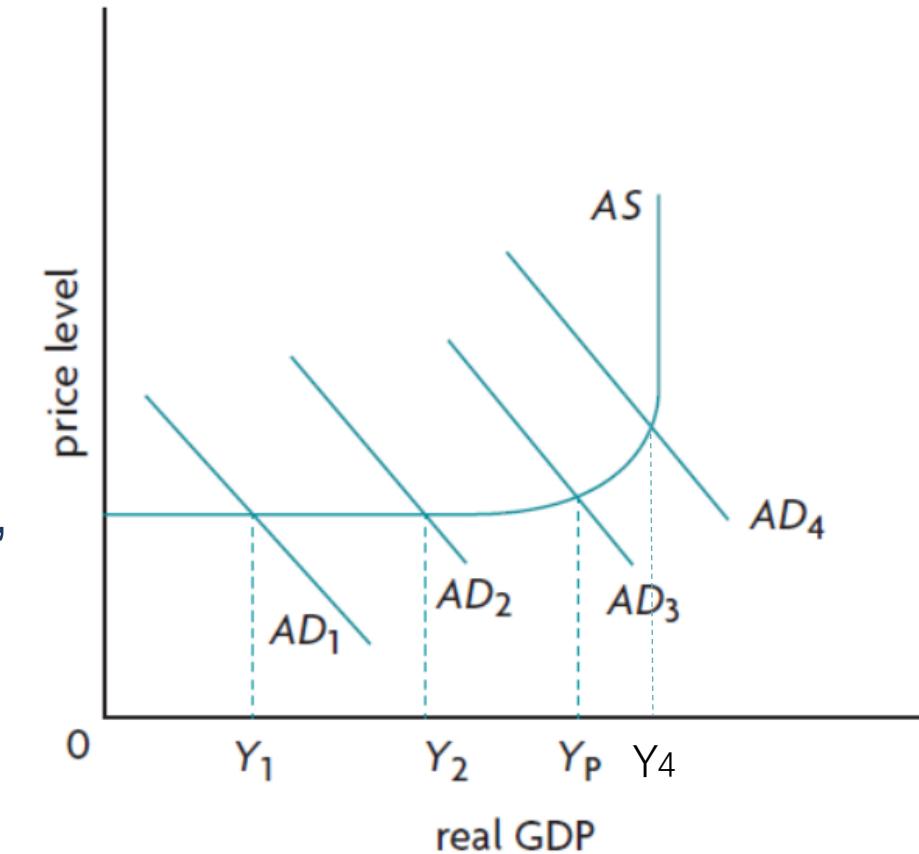


The relationship between unemployment and inflation

- Both unemployment and inflation increases unhappiness.
 - And unemployment has a stronger negative impact.
-
- There are conflicts between Macroeconomics objectives of low unemployment and low inflation in the short run.

Illustration by Keynesian model

- At output level Y_1 or Y_2 , there is recessionary gap.
→ Low real GDP with high cyclical unemployment, price level is constant, i.e., low rate of inflation.
- As aggregate demand increases, the price level begin to rise while cyclical unemployment falls.
- At output level Y_4 , there is inflationary gap.
- As aggregate demand increases, resources are used more fully, the wage and other resource prices starts to rise, which results in higher product prices. Unemployment rate < natural rate, the rate of inflation is very high.
→ It may be difficult to achieve both a low rate of inflation and a low unemployment rate at the same time.



The Phillips Curve

- The Phillips Curve shows the long-term negative relationship between the **unemployment rate** and the **rate of inflation**.

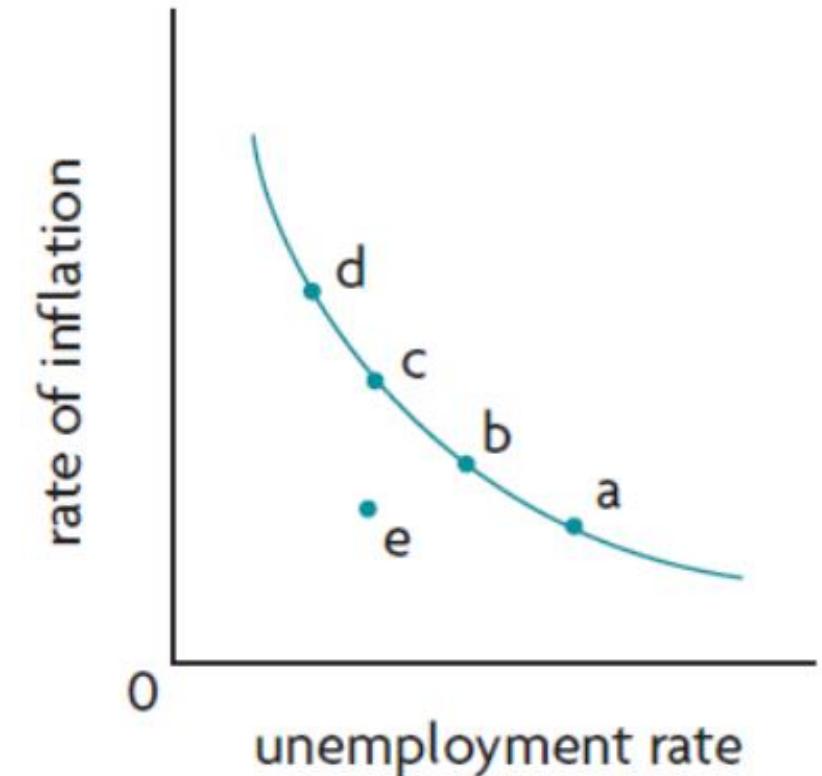
- Vertical axis: rate of inflation

- Horizontal axis: unemployment rate

→ The lower the rate of inflation, the higher the unemployment rate.

→ The higher the rate of inflation, the lower the unemployment rate.

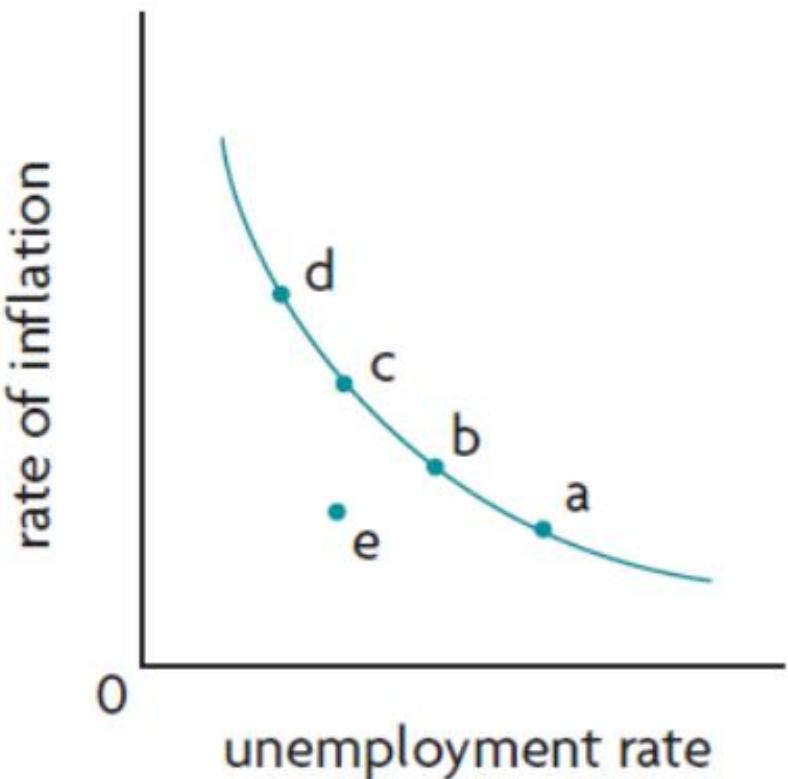
a The shape of the Phillips curve



The Phillips Curve

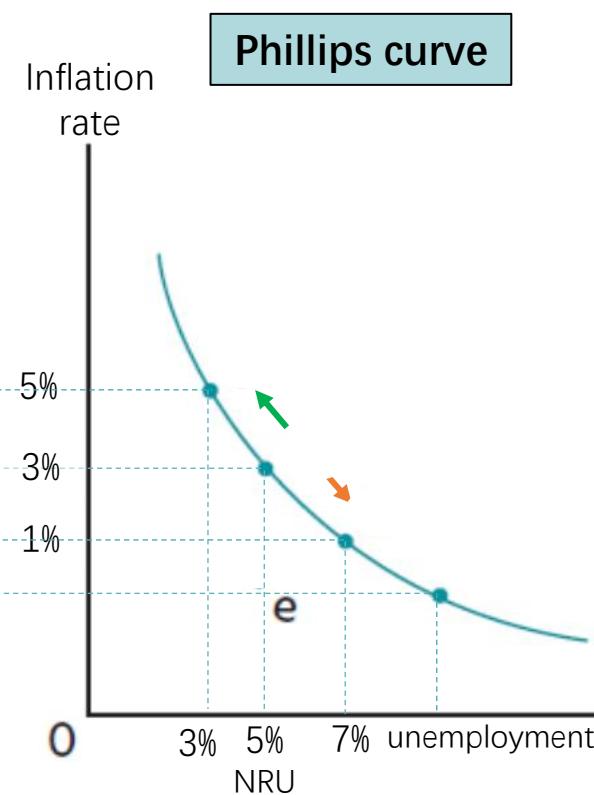
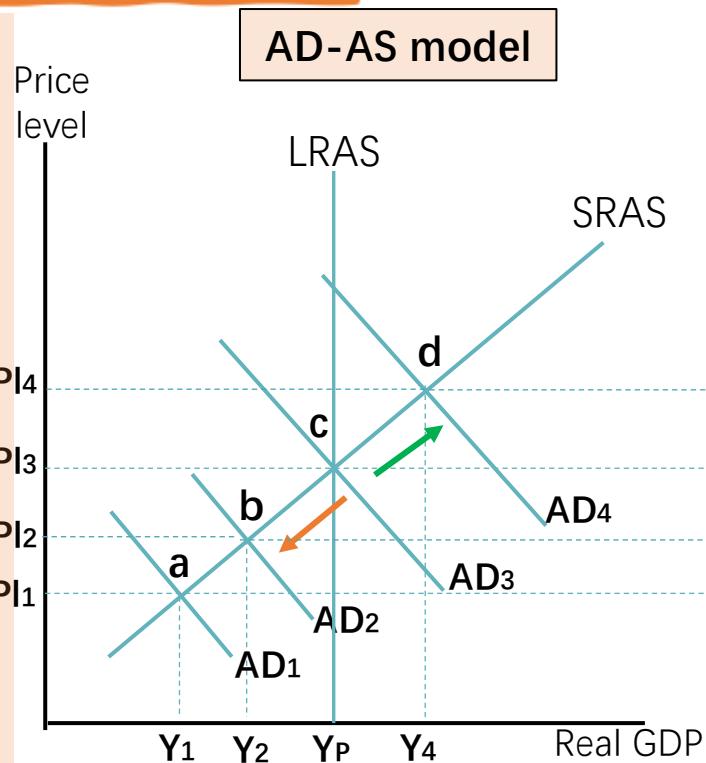
- Every economy faces a trade-off between inflation and unemployment.
- It can choose points on the Phillips curve, such as point **a** with lower inflation rate and high unemployment rate, or point **d** with high inflation rate and low unemployment rate.
- Point **e** with both low inflation rate and low unemployment rate is preferable but not possible.

a The shape of the Phillips curve



AD-AS Model & Phillips Curve

1. In AD-AS model, the original long run equilibrium at point **c** with PL3 and Y_p .
2. On the upward sloping SRAS, as the aggregate demand increase, shifting from AD_3 to AD_4 , (**c**→**d**) the price level rise from PL_3 to PL_4 , real GDP rise from Y_p to Y_4 (the level of unemployment correspondingly falls).
3. When aggregate demand fall, shifting from AD_3 to AD_2 , (**c**→**b**) the price level drop from PL_3 to PL_2 , real GDP fall from Y_p to Y_2 (the level of unemployment correspondingly rises).



- **Shifting of AD curve** will lead to a **movement along** the short run Phillips curve.
- The ‘choice’ of where to be on the Phillips curve thus corresponds to a ‘choice’ of AD in AD-AS model.

1. On the **Phillips curve**, point **c** corresponding to inflation rate of 5% and natural unemployment rate of 3%.
2. On the Phillips curve, it moves along the curve from point **c** to **d**, with higher inflation rate 5% and lower unemployment rate 3%.
3. On the Phillips curve, it moves along the curve from point **c** to **b**, with lower inflation rate 1% and higher unemployment rate 7%.

The breakdown in the relationship

- Stagflation

- At 1960s, most economists were very strongly influenced by Keynesian thinking, believing that demand-side policies were very important in influencing the level of economic activity and real GDP.
- With relatively stable aggregate supply, the Phillips curve appeared to offer governments the possibility of using demand-side policies to choose between various alternatives.
- But... here comes the **stagflation**...

Stagflation

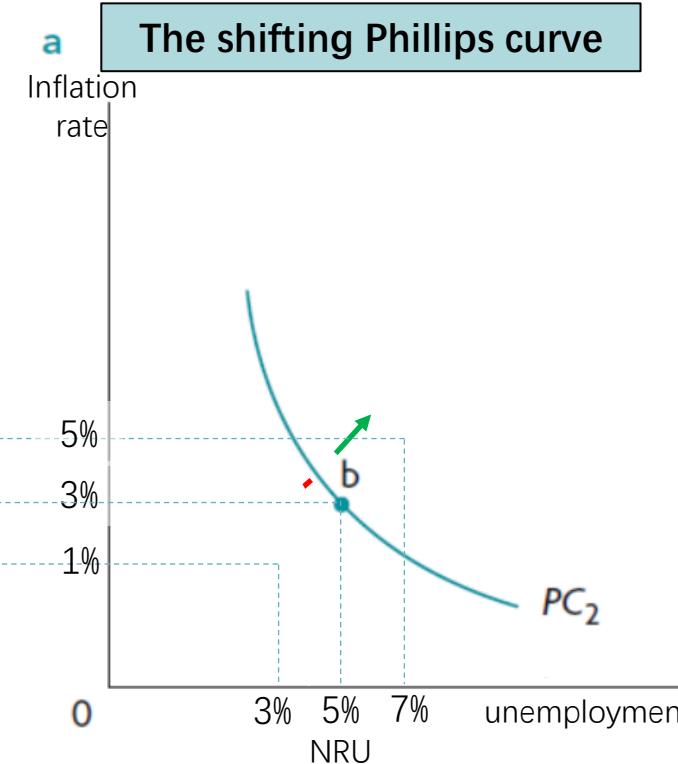
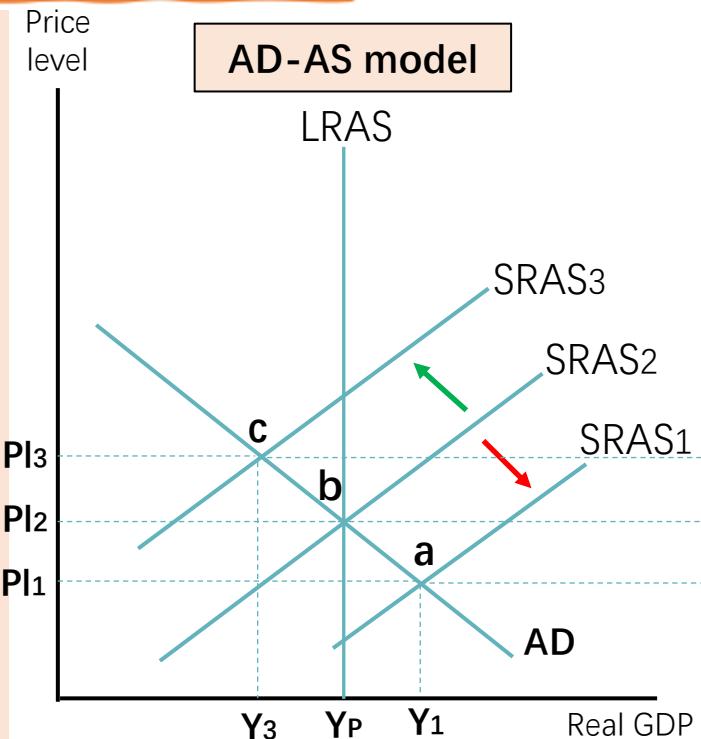
- In 1970s, a number of aggregate supply shocks led to a period of stagflation, with high unemployment and high inflation rate simultaneously.
 - Oil price increase (action by OPEC)
 - Food price increase



The reasoning behind SRAS shifts in terms of the AD-AS model

In AD-AS model:

1. In AD-AS model, the original long run equilibrium at point **b** with PL2 and Yp.
2. The supply shock cause the SRAS curve shift leftward from **SRAS2** to **SRAS3**, it results in higher price level from **PL2** to **PL3** and lower level of GDP from **Yp** to **Y3**, signifying **increases in unemployment**. → stagflation
3. Increase in SRAS (with AD constant) from SRAS2 to SRAS1, result in lower price levels PL1 and higher real GDP, Y1.

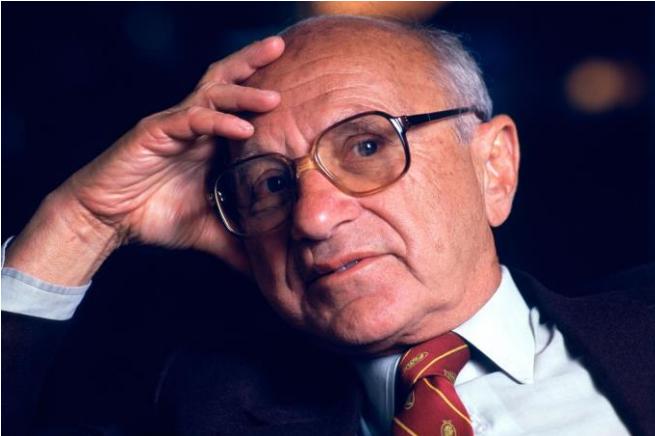


In Phillips model:

1. On the **Phillips curve**, point **b** corresponding to inflation rate of 3% and natural unemployment rate of 5%.
2. An outward shifts in the Phillips curve from PC2 to PC3. → higher rates of inflation are associated with higher rates of unemployment.
3. An inward shift in the Phillips curve from PC2 to PC1 → lower inflation rate and lower unemployment rate.

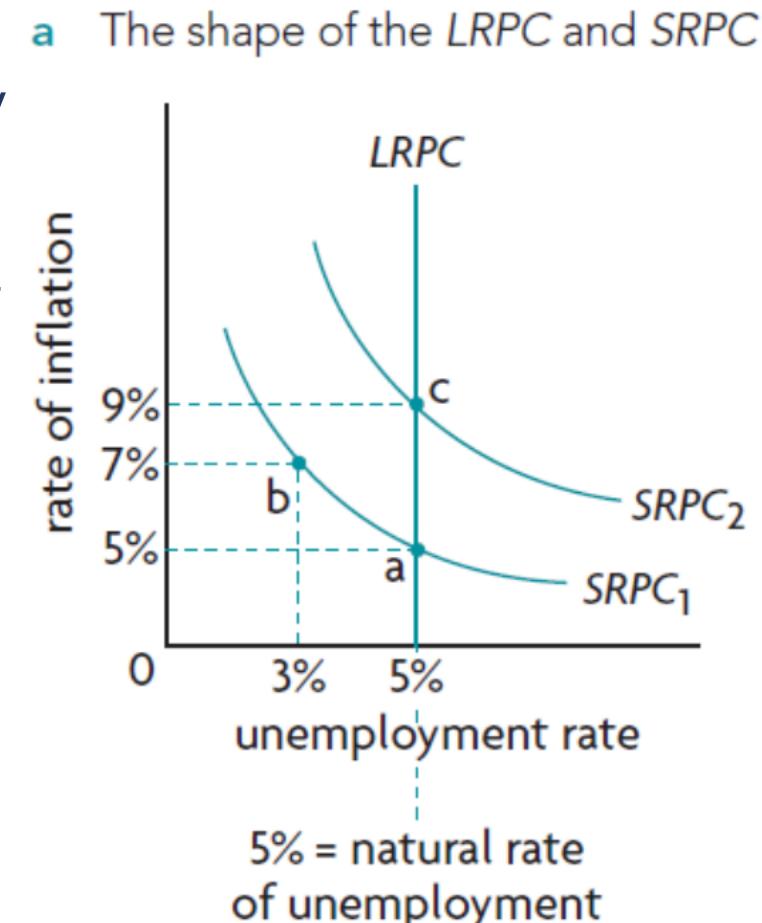
- **Shifting of SRAS curve** will lead to a rightward or leftward shift of the short run Phillips curve.

The long-run Phillips Curve and the natural rate of unemployment



Milton Friedman: There is a stable negative relationship between inflation and unemployment, and there is only a temporary trade-off between inflation and unemployment, not a permanent one.

- The **long-run Phillips curve** is vertical at the level of 'full employment' (natural rate of unemployment – a concept introduced by Milton Friedman)



In AD-AS model:

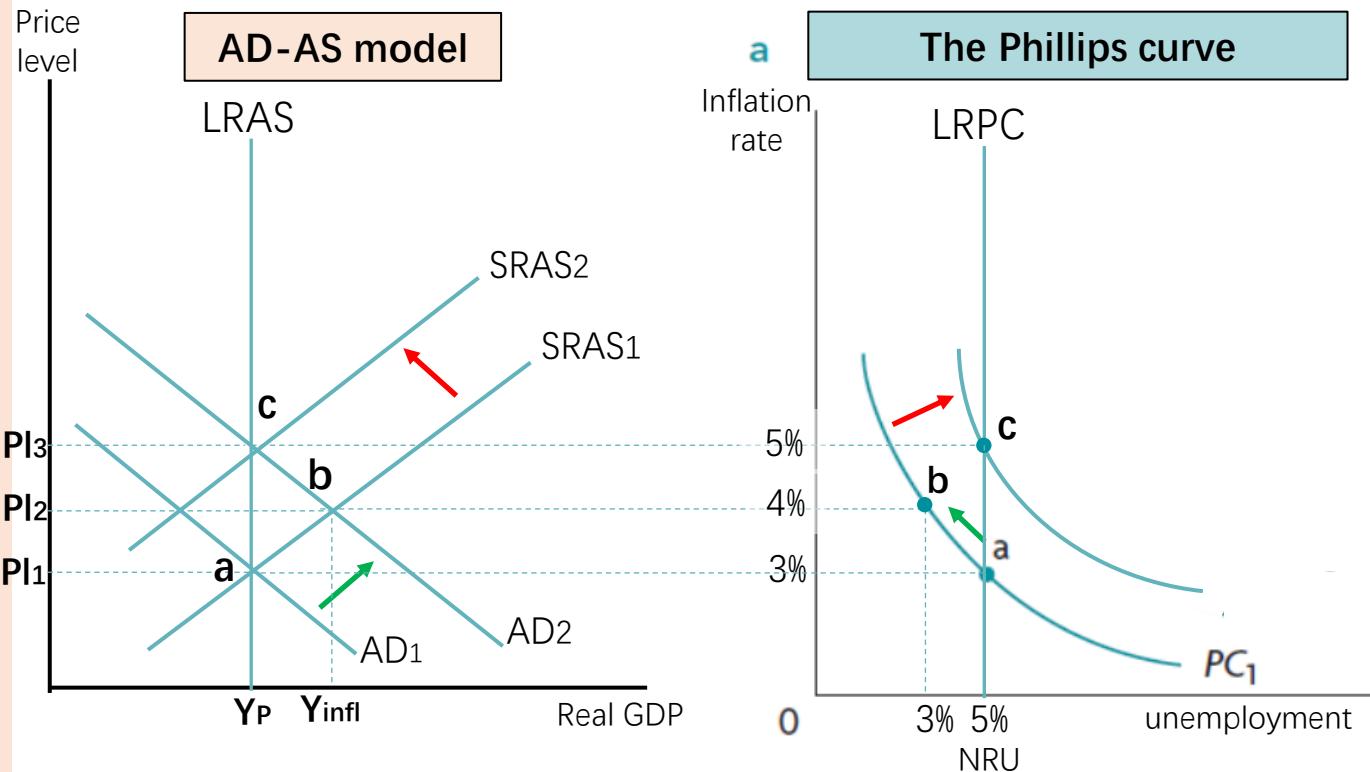
1. The economy is initially at point **a** of long-run equilibrium on AD1, SRAS1 and LRAS. Real GDP = Y_p , unemployment rate = natural rate.

2. Aggregate demand increase from **AD1** to **AD2**, in the short run, the economy moves to point **b** on the SRAS1 with higher price level **PL2** and higher output **Y_1** . → inflationary gap arise, demand-pull inflation.

3. In long run, with higher price level, Workers will demand for a higher wage, thus the increase in cost of production will shift **SRAS1** to **SRAS2**. point **c** with price level **PL3** and real output **Y_p**

4. The economy will self-adjusted back to the potential output Y_p .

The long-run Phillips Curve



- In AD-AS model, in the long-term, the output will self-adjusted and always return to the full employment level.
- In Phillips curve, the unemployment rate will always return to the natural rate (equilibrium unemployment), with the inflation rate vary.

In Phillips model:

1. the economy is on a short-run Philips curve, point **a**, SRPC1, with inflation rate of 5% and NRU of 5%.

2. On the Phillips curve, it moves along the PC1 from point **a** to **b**, with higher inflation rate 4% and lower unemployment rate $3\% < \text{natural rate}$.

3. As SRAS curve shifts to the left, the Phillips curve shift rightwards from PC1 to PC2. **b**→**c**. the inflation rate rise to 5% while the unemployment rate return to the natural rate.

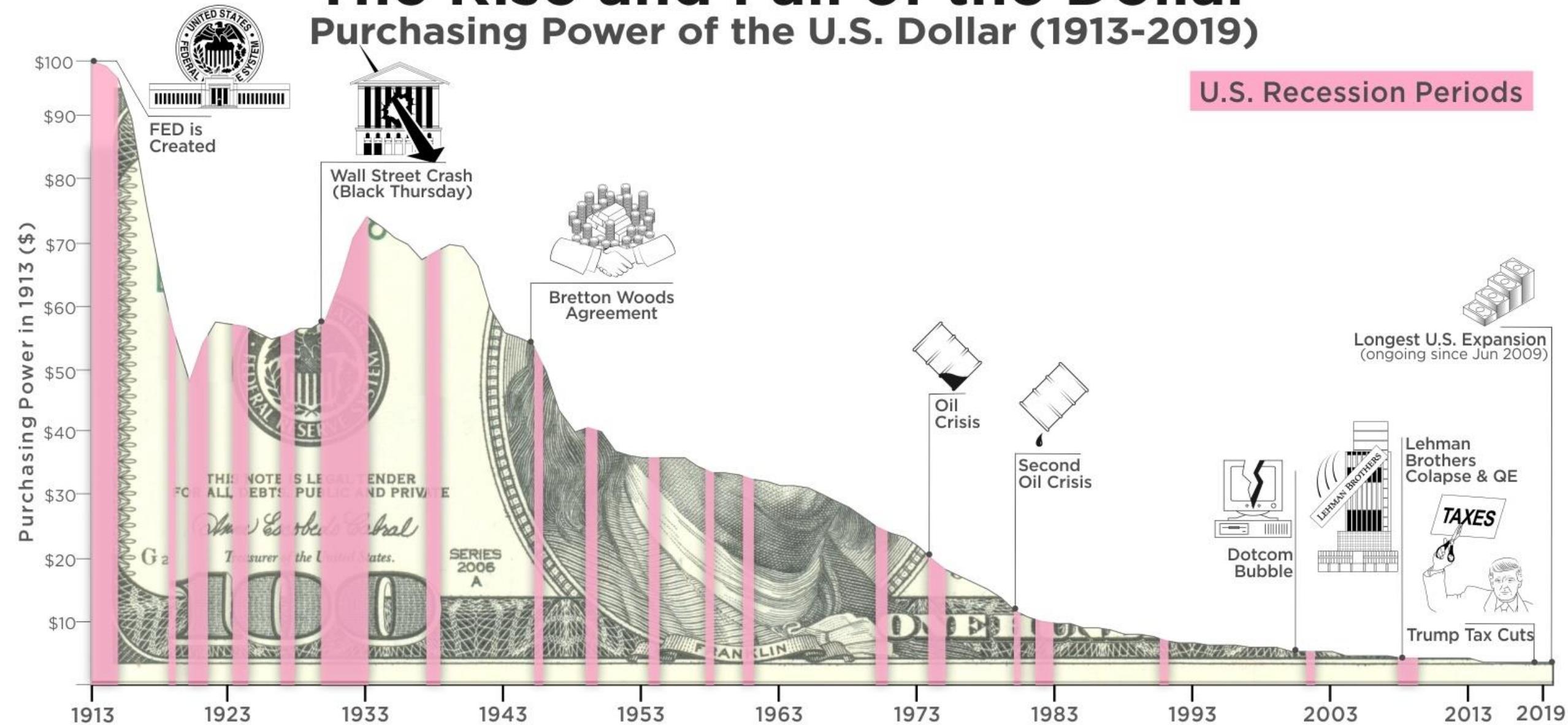
4. If we connect point **a** and **c** together, we will have a vertical Long run Phillips curve **LRPC**.

Short-run vs. long-run Phillips curve

- The **short-run Phillips curve** is a tool preferred by **Keynesian economists**, who see in this the possibility of using policies that focus on **influencing aggregate demand** to make choices about the rate of inflation and the rate of unemployment.
- The **long-run Phillips curve** is an analytical tool preferred by **monetarist/new classical economists**, who use it to show that expansionary demand-side policies are more likely to result in inflation than to influence unemployment and real GDP.
- So new classical/monetarist argued that the Increase in aggregate demand is not a way to increase real output or decrease unemployment in the long term, what we really need is **supply-side policies**. As the only way to increase real output, reduce the natural rate of unemployment and achieve lower inflation rate is by **shifting LRAS to the right or shifting LRPC to the left**.

The Rise and Fall of the Dollar

Purchasing Power of the U.S. Dollar (1913-2019)



Ongoing debate about the SRPC...

- Data shows while unemployment has fallen to very low levels, inflation has not been increasing as the SRPC would predict. This could be due to:
 - ✓ Rising global competition makes it difficult for firms to raise prices.
 - ✓ Wages have not been rising in many economically more developed countries
 - ✓ Decline of labour unions
 - ✓ Technology development
 - ✓ Globalization