

Inflation and Unemployment

Topic 6

Learning Objectives

- Revisit the concept of the GDP deflator.
- Revisit the concept of the consumer price index.
- Learn how to derive the rate of inflation from both the GDP deflator and the consumer price index.
- Define the concept of unemployment and calculate the unemployment rate.
- Identify the causes of unemployment.
- Discuss potential remedies for unemployment.

Revision

- **Gross Domestic Product**
 - The total value of all goods and services produced domestically within a certain time period.

- **Nominal vs. Real GDP**
 - Nominal GDP uses current prices.
 - Real GDP uses the prices of a base year and therefore controls for inflation.

- **Price Level**

Revision: Change in Price Level

- Calculating the price level using the formula of the GDP Deflator means to hold the prices of the base year fixed.
- *GDP Deflator* =

$$\frac{(Q_{A_t} \times P_{A_t}) + (Q_{B_t} \times P_{B_t}) + \dots + (Q_{n_t} \times P_{n_t})}{(Q_{A_t} \times P_{A_b}) + (Q_{B_t} \times P_{B_b}) + \dots + (Q_{n_t} \times P_{n_b})} \times 100$$

Then:

- *GDP Deflator* = $\frac{NGDP}{RGDP} \times 100$

Revision: Change in Price Level

- Calculating the price level using the formula of the CPI means to hold the quantities of the base year fixed.

$$\text{CPI} = \frac{(Q_{A_b} \times P_{A_t}) + (Q_{B_b} \times P_{B_t}) + \dots + (Q_{n_b} \times P_{n_t})}{(Q_{A_b} \times P_{A_b}) + (Q_{B_b} \times P_{B_b}) + \dots + (Q_{n_b} \times P_{n_b})} \times 100$$

Then:

$$\text{CPI} = \frac{\text{Cost of Basket}_t}{\text{Cost of Basket}_b} \times 100$$

Producer Price Index

- Defined as an average of the prices received by producers of goods and services at all stages of the production process.
- The PPI tracks the prices of a market basket of goods.
- Calculating the price level using the formula of the PPI means to hold the quantities of the base year fixed.

$$\text{PPI} = \frac{(Q_{A_b} \times P_{A_t}) + (Q_{B_b} \times P_{B_t}) + \dots + (Q_{n_b} \times P_{n_t})}{(Q_{A_b} \times P_{A_b}) + (Q_{B_b} \times P_{B_b}) + \dots + (Q_{n_b} \times P_{n_b})} \times 100$$

Then:

$$\text{PPI} = \frac{\text{Cost of Basket}_t}{\text{Cost of Basket}_b} \times 100$$

Short-Run Diagnostics of an Economy

- Inflation Rate

- The percentage increase in the overall level of prices.

- $\text{Inflation Rate} = \frac{\text{GDP Deflator}_t - \text{GDP Deflator}_{t-1}}{\text{GDP Deflator}_{t-1}} \times 100$

GDP Deflator and Inflation Rate – Ctd.

- Compute GDP Deflator from nominal and real GDP.

$$\text{— } \text{GDP Deflator} = \frac{\text{NGDP}}{\text{RGDP}} \times 100$$

- Use the GDP deflator to compute the inflation rate from 2020 to 2021 and from 2021 to 2022.

$$\text{— } \text{Inflation Rate} = \frac{\text{GDP Deflator}_t - \text{GDP Deflator}_{t-1}}{\text{GDP Deflator}_{t-1}} \times 100$$

t	NGDP	RGDP	GDP Deflator	Inflation Rate
2020	46,200	46,200		
2021	51,400	50,000		
2022	58,300	52,000		

CPI and Inflation Rate

- CPI

- measure of the price level

- $$CPI = \frac{\text{Cost of Basket}_t}{\text{Cost of Basket}_b} \times 100$$

- Compute the cost of the basket:

- 20 pizzas

- 10 coca colas

t	P _{Pizza}	P _{Coca Cola}	Cost of Basket _t
2019	\$10	\$15	
2020	\$11	\$15	
2021	\$12	\$16	
2022	\$13	\$15	

CPI and Inflation Rate – Ctd.

- Compute the CPI.

$$- \text{CPI} = \frac{\text{Cost of Basket}_t}{\text{Cost of Basket}_b} \times 100$$

- Use the CPI to compute the inflation rate from 2017 to 2018 and from 2018 to 2019.

$$- \text{Inflation Rate} = \frac{\text{CPI}_t - \text{CPI}_{t-1}}{\text{CPI}_{t-1}} \times 100$$

t	Cost of Basket _t	CPI	Inflation Rate
2019	\$350		
2020	\$370		
2021	\$400		
2022	\$410		

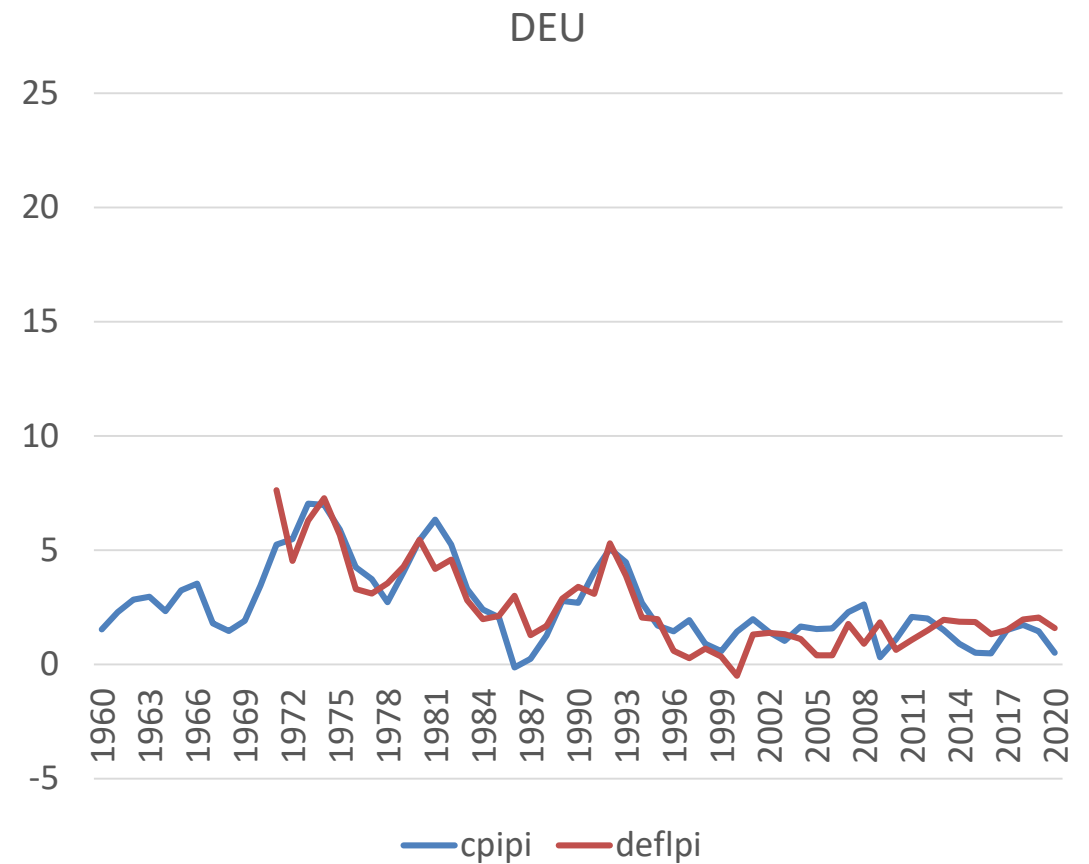
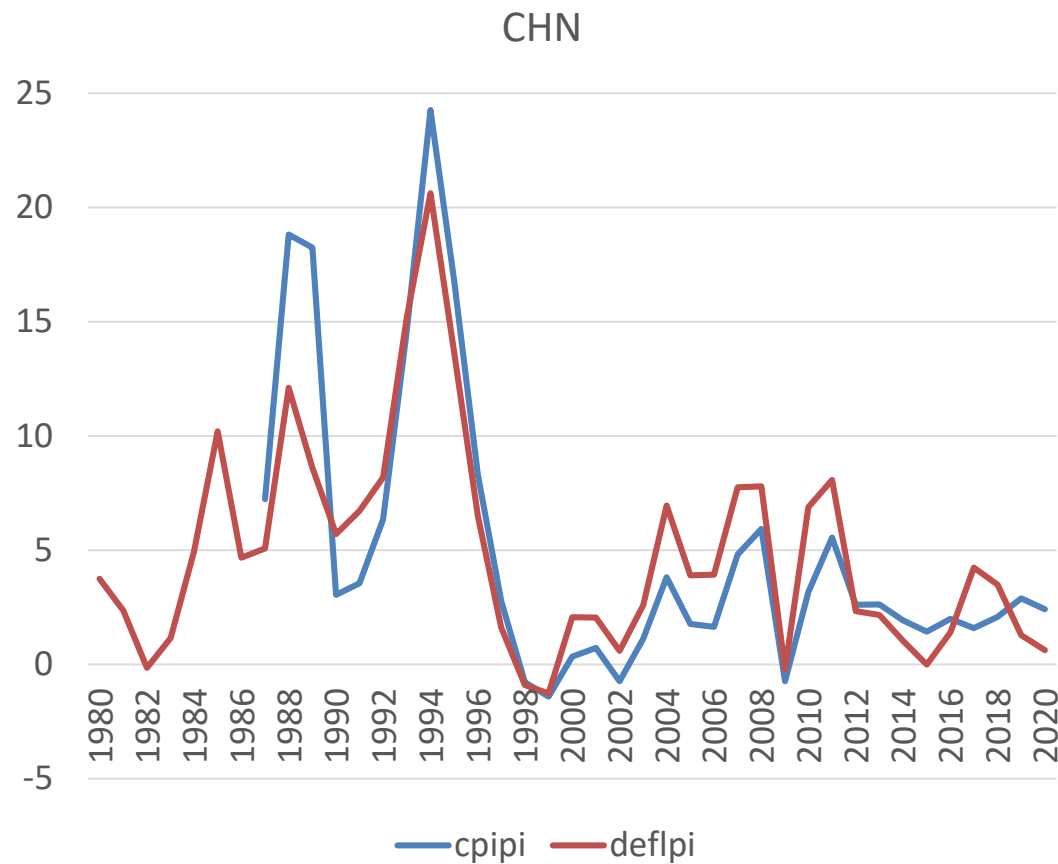
Why the CPI may Overstate Inflation

- **Substitution Bias:**
 - Thus, it cannot reflect consumers' substituting towards those goods whose relative prices have fallen.
- **New Product Bias:**
 - Thus, it cannot reflect the increase in the real value of the currency due to the introduction of new goods (which makes consumers better off).

Why the CPI may Overstate Inflation

- Increase in Quality Bias:
 - Quality improvements increase the value of the currency but are not reflected in the CPI.
- Outlet bias:
 - National Statistics Offices continuously collect price statistics from full-price retail stores, disregarding discount outlets and online stores.

Why the CPI may Overstate Inflation

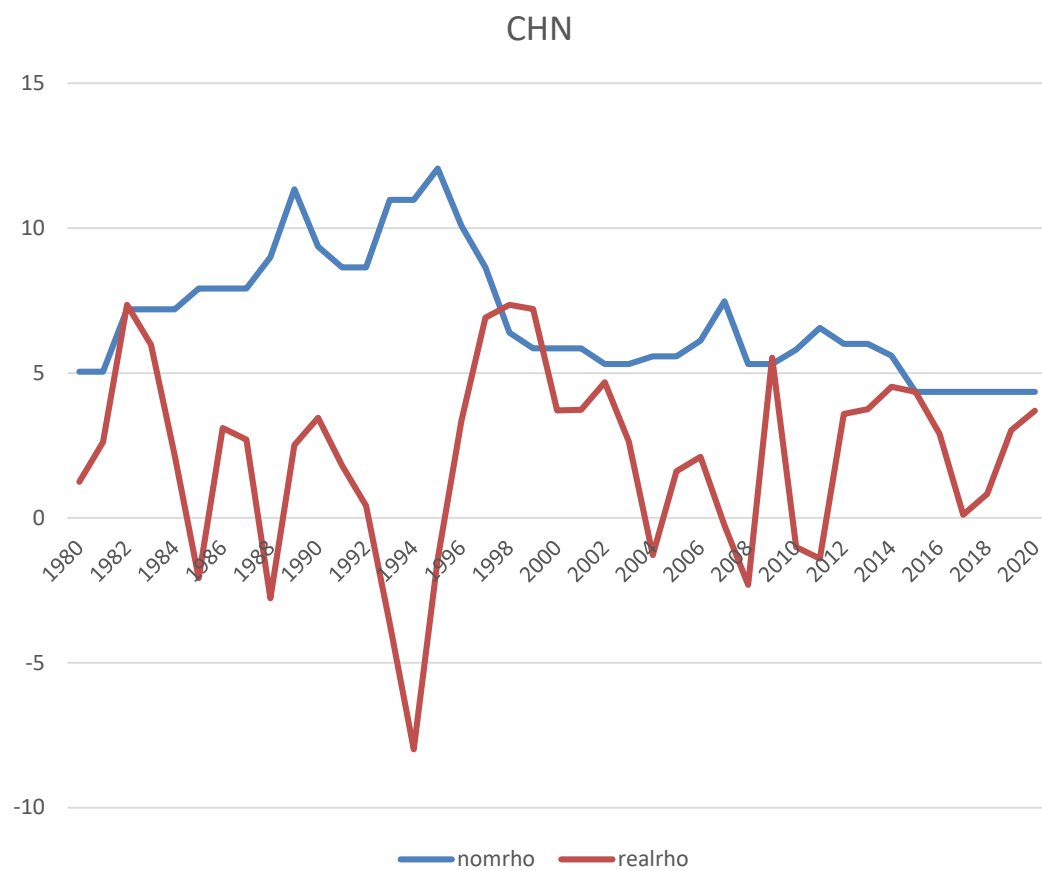
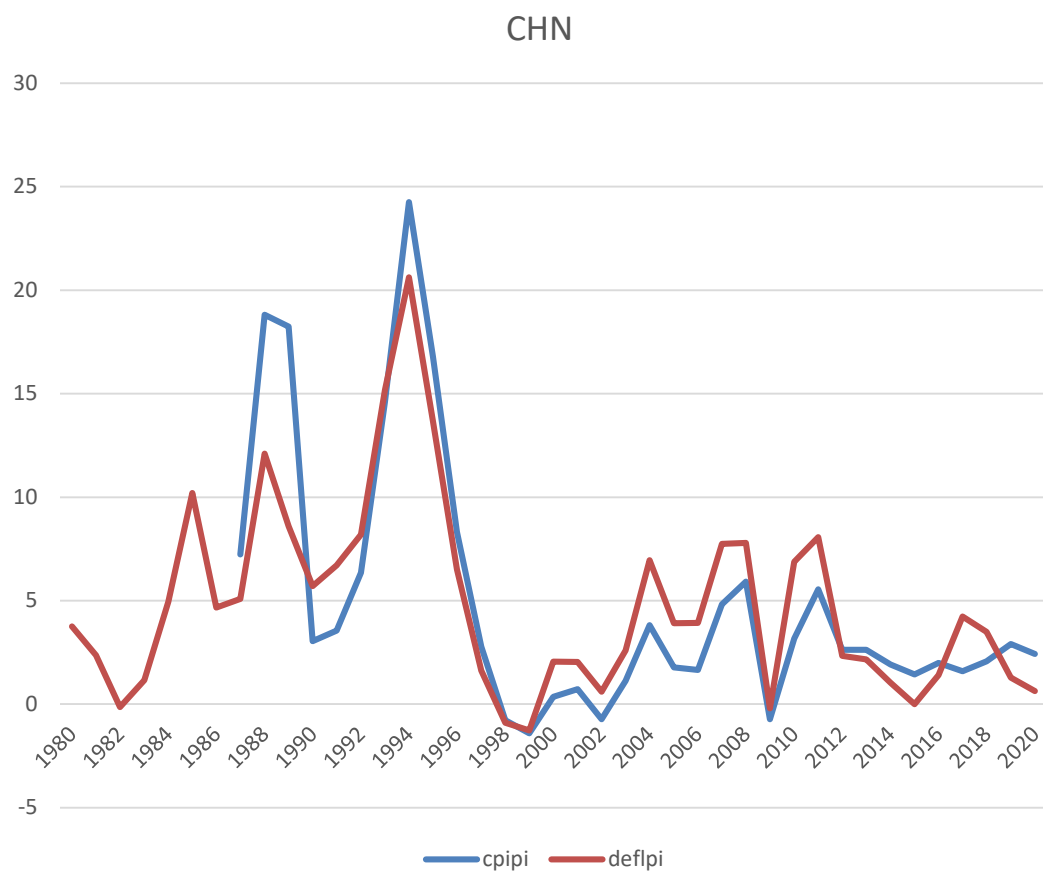


Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

Nominal vs. Real Interest Rates

- The difference between nominal and real values is important when money is being borrowed and lent.
- Interest Rate:
 - Cost of borrowing funds, expressed as a percentage of the amount borrowed.
- Nominal Interest Rate:
 - The stated interest rate on a loan.
- Real Interest Rate:
 - Corrects the nominal interest rate for the effect of inflation on purchasing power.
 - *Real Interest Rate = Nominal Interest Rate – Inflation Rate*

Nominal vs. Real Interest Rates



Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

The Cost of Inflation

- The Distribution of Income
 - Some people will find their income rising faster than the rate of inflation: their purchasing power rises
 - other people find their income rising slower than the rate of inflation: their purchasing power decreases
- Anticipated Inflation
 - Distribution of income
 - Decreasing value of cash
 - Menu costs
 - Taxes paid on nominal payments, not real payments
- Unanticipated Inflation
 - To make long-term commitments, e.g. wage contracts, mortgage loans, the rate of inflation must be forecasted

Unemployment

In government statistics we find different categories of the population:

- **Employed**
 - Someone who currently has a job or who is temporarily away from his or her job
- **Unemployed**
 - Someone who is not currently at work but who is available for work and who actively looked for work during the previous month
- **Labor Force**
 - The sum of employed and unemployed workers in the economy
- **Not in the Labor Force**
 - Someone who is not currently at work and who has no job.

Unemployment

- Labor Force
 - Employed + unemployed
- Labor Force Participation Rate
 - The fraction of the adult population that participates in the labor force
 - $LFPR = \frac{\text{Labor Force}}{\text{Population}} \times 100$
- Unemployment Rate
 - Percentage of the labor force that is unemployed
 - $UER = \frac{\text{Unemployment}}{\text{Labor Force}} \times 100$
- Employment-population Ratio
 - The fraction of the adult population that is employed

Computing Labor Statistics

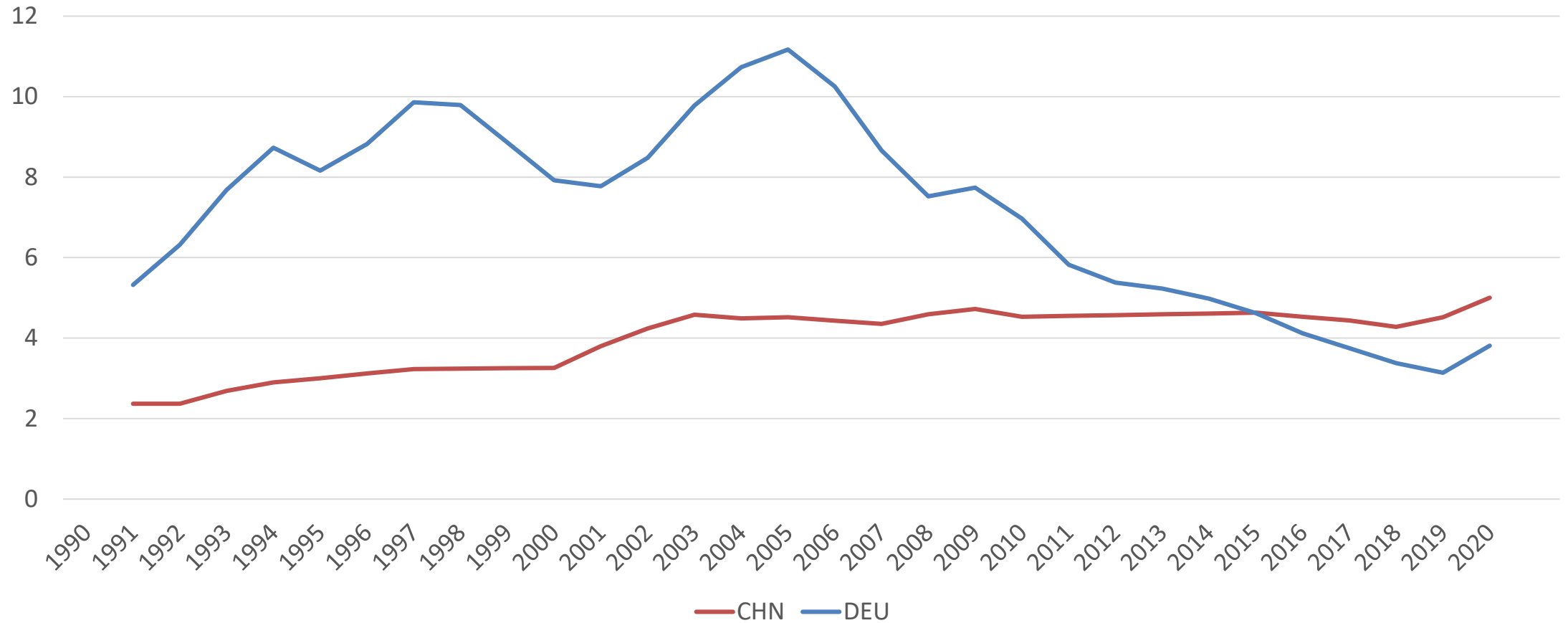
Chinese Population Data

- Number employed
 - 745 million
- Number unemployed
 - 40 million
- Adult Population
 - 1100 million

Calculate:

- The labor force
- The unemployment rate
- The labor force participation rate

The Unemployment Rate



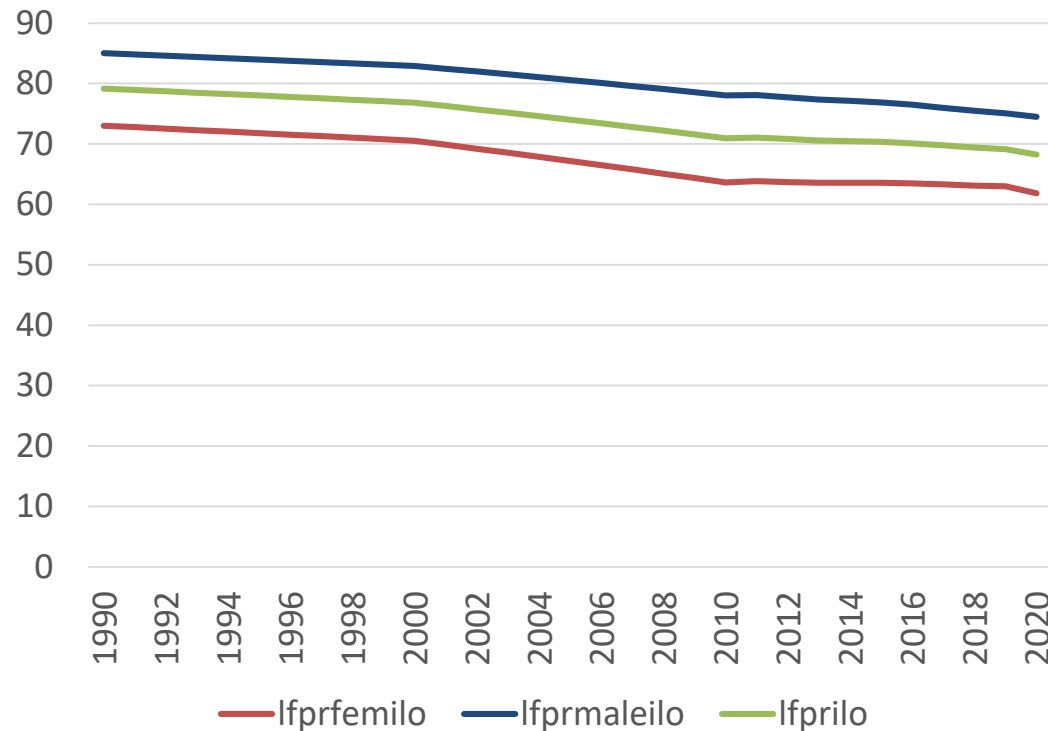
Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

Problems with Measuring Unemployment

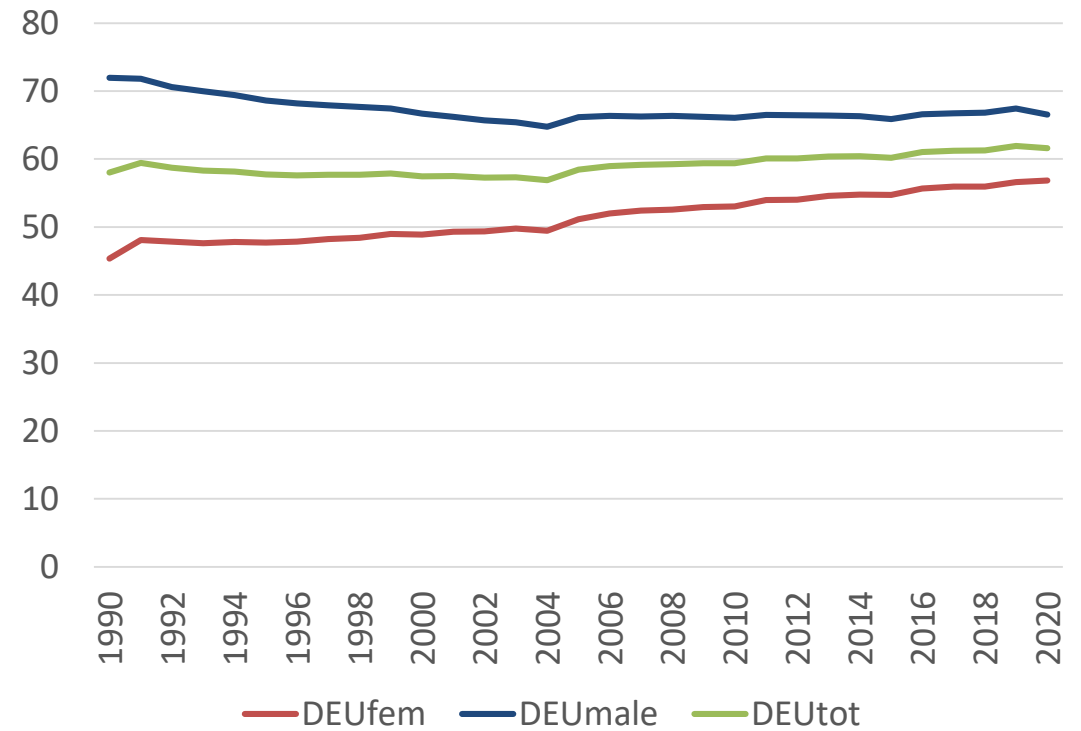
- Understating the degree of joblessness in an economy
 - Unemployed vs. not in the labor force
 - Part-time jobs as employment
- Overstating the degree of joblessness in an economy
 - Survey responses are not verified
 - Concealing legitimate jobs to avoid paying taxes
 - Involvement in illegal activity

The Labor Force Participation Rate

Trends in China

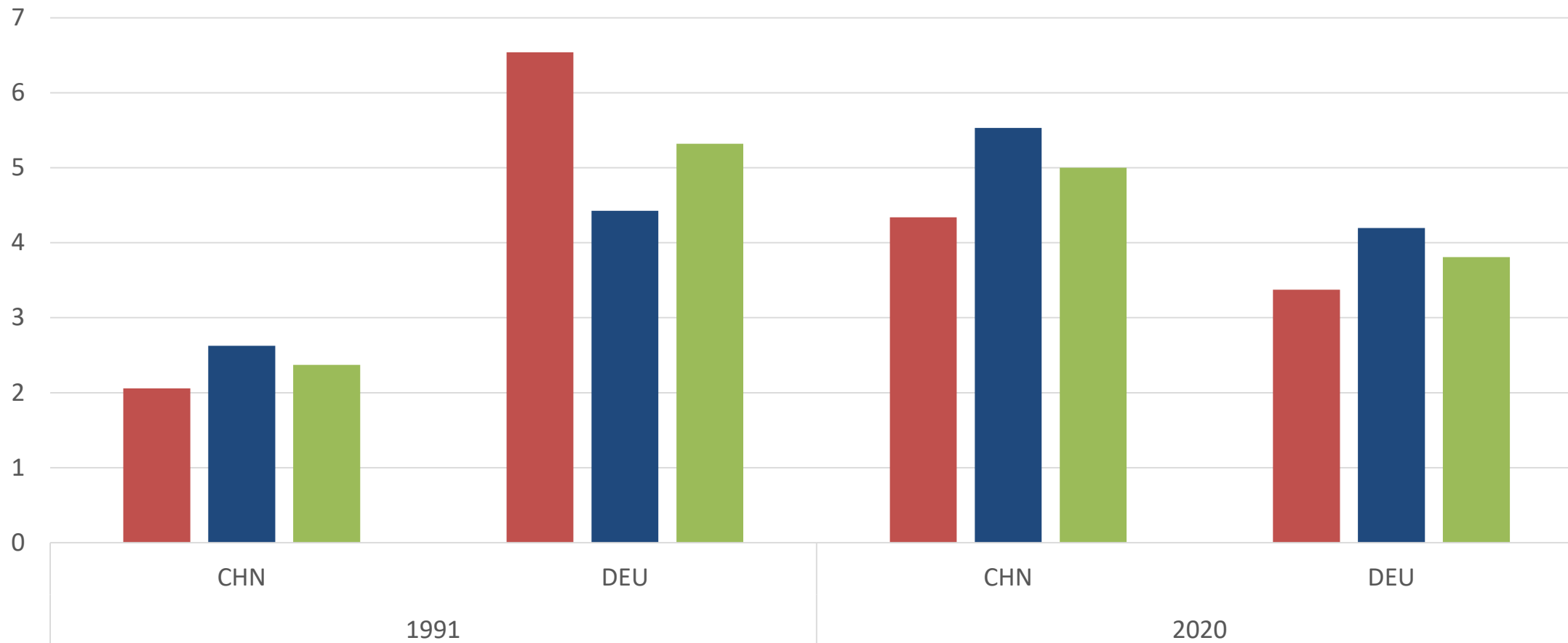


Trends in Germany



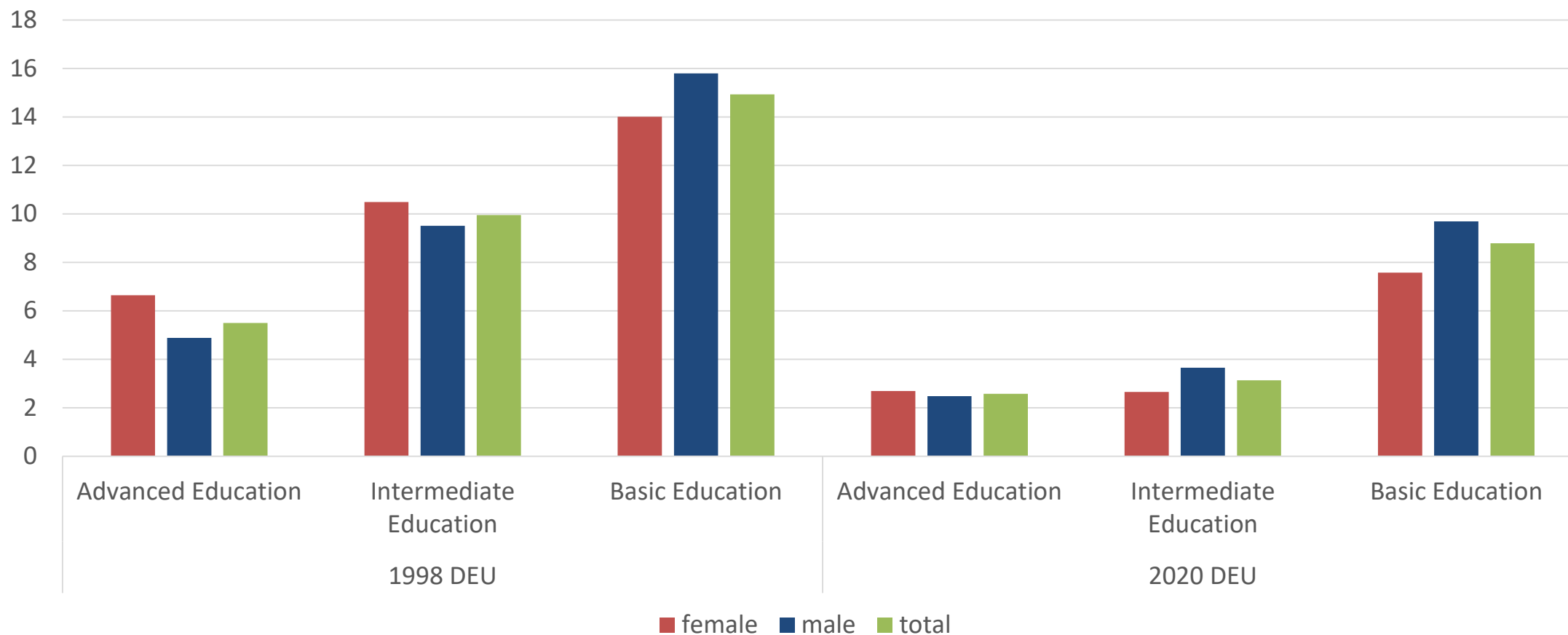
Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

Unemployment in different Groups



Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

Unemployment in different Groups



Source: The World Bank, World Development Indicator Database (WDI). 2022. <https://databank.worldbank.org/source/world-development-indicators>

Surveys to Determine Unemployment

- The Household Survey
 - USA: The Current Population Survey
 - CHN: Monthly Survey of Urban Residents
 - DEU: Haushaltsbefragung
- The Establishment Survey
 - a survey of a sample of establishments or enterprise that seeks to measure the behavior, structure, or output of organizations
 - provide information on variables such as employment or wages by occupation, labor cost, productivity, or employee benefits

Job Creation and Destruction

- In a vibrant market system Firms are constantly being
 - Started
 - Expanded
 - Contracted
 - Closed
- Reasons:
 - Consumer tastes
 - Technological progress
 - Success and failure of entrepreneurs

Causes of Unemployment

- **Frictional Unemployment**
 - Caused by the time it takes to search for a job.
- **Structural Unemployment**
 - Caused by structural factors like inflation, deflation, high wages, taxes, and regulations
- **Cyclical Unemployment**
 - Caused by seasonal factors and general business cycles

The Natural Rate of Unemployment

- The average rate of unemployment around which the economy fluctuates.
- In a recession, the actual unemployment rate rises above the natural rate.
- In a boom, the actual unemployment rate falls below the natural rate.

Remedies for Unemployment?

- Unemployment Insurance and Other Payments
 - Helps the unemployed maintain their income and spending, which lessens the personal hardship of being unemployed and also helps reduce the severity of recessions
 - Provides an incentive to remain unemployed longer
- Minimum Wage Laws
 - If set above the market wage determined by the market equilibrium, the quantity supplied of labor will exceed the quantity demanded for labor, resulting in workers becoming unemployed

Remedies for Unemployment?

- Labor Unions

- Wages negotiated above the market equilibrium wage causes the quantity demanded for labor to fall below quantity supplied, resulting in workers becoming unemployed

- Efficiency Wages

- Defined as an above-market wage that a firm pays to increase worker's productivity

- Because being above the equilibrium wage, it will result in quantity supplied of labor being greater than quantity demanded, and workers being laid off

Summary

- Inflation and unemployment are important macroeconomic concepts that macroeconomic policy tries to target.
- Inflation is defined as an overall increase in the level of prices.
- The inflation rate measures the annual percentage increase in the general price level of goods and services.
- There are different ways to describe the price level and calculate the inflation rate
 - GDP Deflator
 - CPI
 - PPI
- The unemployment rate is defined as the percentage of the labor force that is unemployed, and it is important to understand their underlying concepts